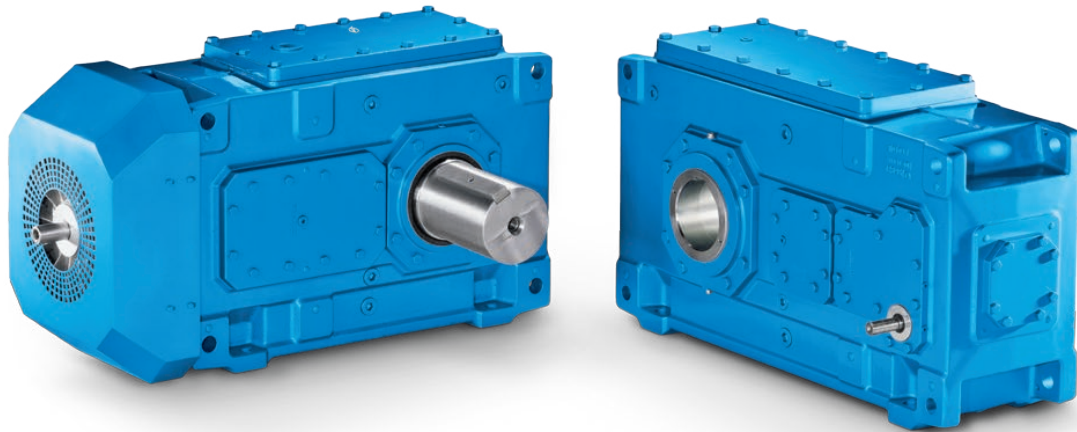


FLENDER GEAR UNITS  
CATALOG **MD 20.1**  
EDITION 2018 EN



# HELICAL AND BEVEL HELICAL GEAR UNITS

Innovative technology, tried and tested modular system.  
The original from Flender.

FLENDER

# RELATED CATALOGS

## FLENDER couplings

Standard Couplings  
MD 10.1  
E86060-K5710-A111-A5-7600



## Bucket Elevator Drives

MD 20.2  
E86060-K5720-A121-A4-6300



## ARPEX

High Performance Couplings  
MD 10.2  
E86060-K5710-A121-A1-7600



## PLANUREX 2

Planetary Gear Units  
MD 20.3  
E86060-K5720-A131-A2-6300



## SIPEX and BIPEX-S

Backlash-free Couplings  
MD 10.3  
E86060-K5710-A131-A1-7600



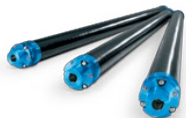
## Paper Machine Drives

MD 20.5  
E86060-K5720-A151-A2-6300



## ARPEX

Composite Couplings  
MD 10.5  
E86060-K5710-A151-A2-7400



## Conveyor Belt Drives

MD 20.6  
E86060-K5720-A161-A2-6300



## ARPEX

Torque Limiters  
MD 10.11  
E86060-K5710-A221-A2-7400



## Marine Reduction Gearboxes

MD 20.7  
E86060-K5720-A171-A1-7400



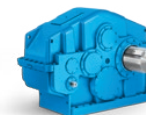
## FLENDER SIP

Standard Industrial Planetary Gear Units  
MD 31.1  
E86060-K5731-A111-A5-7600



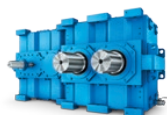
## DUORED 2

Helical Gear Units, Load-sharing  
MD 20.8  
E86060-K5720-A181-A1-6300



## FLENDER CHG

Helical Gear Units  
MD 20.10  
E86060-K5720-A231-A1-7400



## Pinion Drive for Tube Mills

MD 20.9  
E86060-K5720-A191-A1-7400



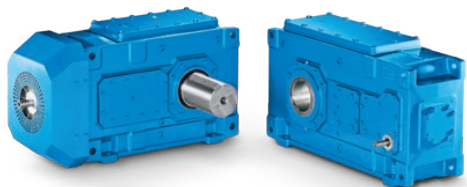
## Gear Units

Fast Track  
MD 20.12  
E86060-K5720-A221-A1-6300



FLENDER GEAR UNITS

# HELICAL AND BEVEL HELICAL GEAR UNITS



Catalog MD 20.1 · 2018

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The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with EN ISO 9001 (Certified Registration No. 01 100 000708). The certificate is recognized by all IQNet countries.



# COMPANY HISTORY

**1899** Founding of A. Friedr. Flender & Co. by Alfred Friedrich Flender for the manufacture and sale of wooden belt pulleys in Düsseldorf-Reisholz (Germany).

**1945** Resumption of small scale production after the production plants were largely destroyed during World War II.

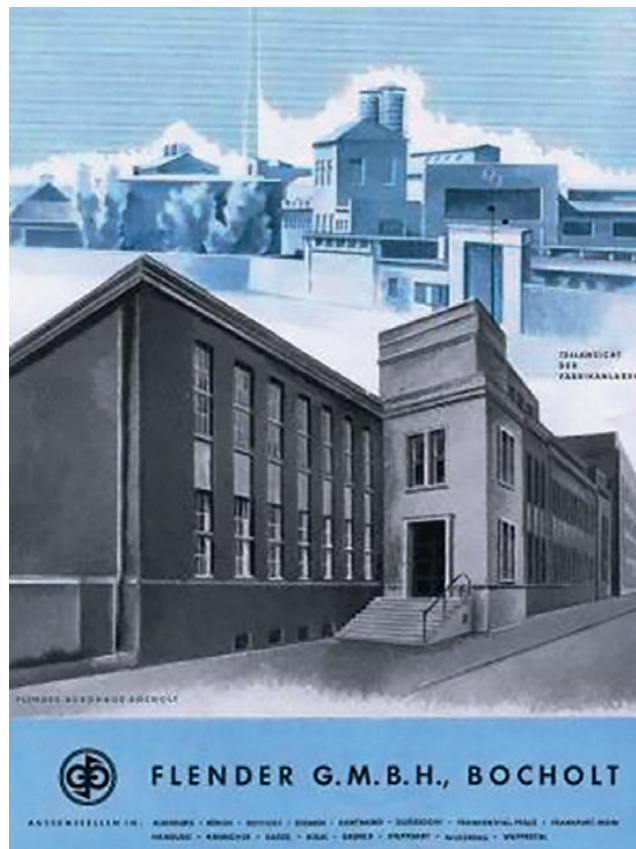
**1982** Takeover of the Himmelwerke in Tübingen from the Bauknecht bankruptcy estate.

**1986** Conversion of A. Friedr. Flender AG & Co. KG into a stock corporation.

**1989** Transition of 95 percent of A. Friedr. Flender AG to the ownership of the Deutsche Babcock AG.



Company founder, Dr. A. Friedrich Flender (1876–1939)



1927 – Gear unit production gets underway in Bocholt

**1990** Take-over of the Penig Getriebewerk in Saxony (the first acquisition of an East German company by a West German company).

**2000** Divestiture of all shares of FLENDER AG by Babcock Borsig AG to the holding company Citicorp Venture Capital, London.

**2001** Founding of Winergy AG as a separate legal entity.

**2005** Take-over of Flender GmbH by Siemens AG into the A&D Division.

**2010** Conclusion of the Flender integration as Business Unit Mechanical Drives (MD).

**2013** Sale of Siemens Gusstechnik GmbH, Wittgendorf, to Franken Guss GmbH & Co. KG (as part of a higher-level streamlining program).


**2015** Company-internal transfer of the geared motors and rail gear units business to the Business Unit PD LD. Start of the MD 2020 program.

**2017** Conversion of MD into an independent company under the aegis of Siemens: Founding of Flender GmbH.




*Company headquarters Bocholt today*

Competence  Benefit from good advice through interdisciplinary know-how

Availability  We are there whenever and wherever you need us


Maximum performance  The largest applications in the world are driven by us


Quality  We see your most stringent demands as our duty


Responsibility  You can expect commitment and trustworthiness from us


Experience  Rely on modern thinking based on decades of experience

Innovation  We are always thinking ahead. The goal: Your perfect solution.

Digitalization  The path to the right solution leads through information

Reliability  You can rely on our products, as well as on us

Flexibility  We are flexible in all of our processes

Reliable partner  You can trust our products, our company, and us

# FLENDER BY YOUR SIDE.

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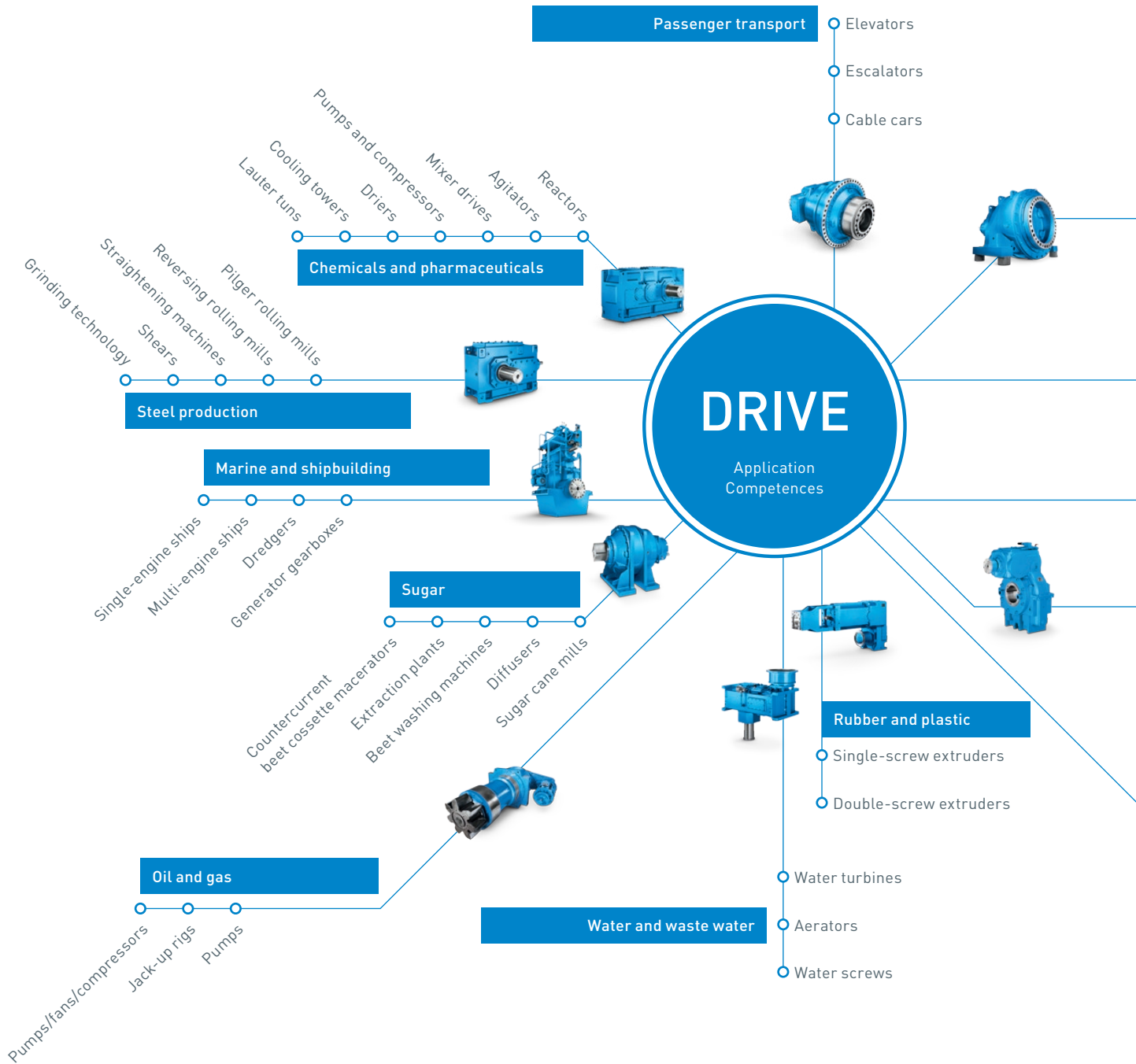
Flender stands for comprehensive knowledge of all aspects of mechanical drive technology and for maximum quality of products and services. For us, highly qualified and engaged employees have always been the key to innovative energy and performance capability. But they are also the basis for our special competence in consulting, which is supported by an almost unlimited range of products. Thanks to our comprehensive application know-how and decades of experience in many industries and in the acquisition of raw materials, we are able to competently advise our customers with an eye on their individual requirements.

As a full subsidiary of Siemens, we combine the stability and process reliability of a world-renowned company with the customer proximity and pragmatism of a medium-sized company, thus combining the best of both worlds.

Our customers regard Flender as a reliable, investment-safe partner. All of our business relationships are based on trust, responsibility and traditional business ethics. In this spirit, together with our customers, we look forward to writing a new chapter in the history of Flender.



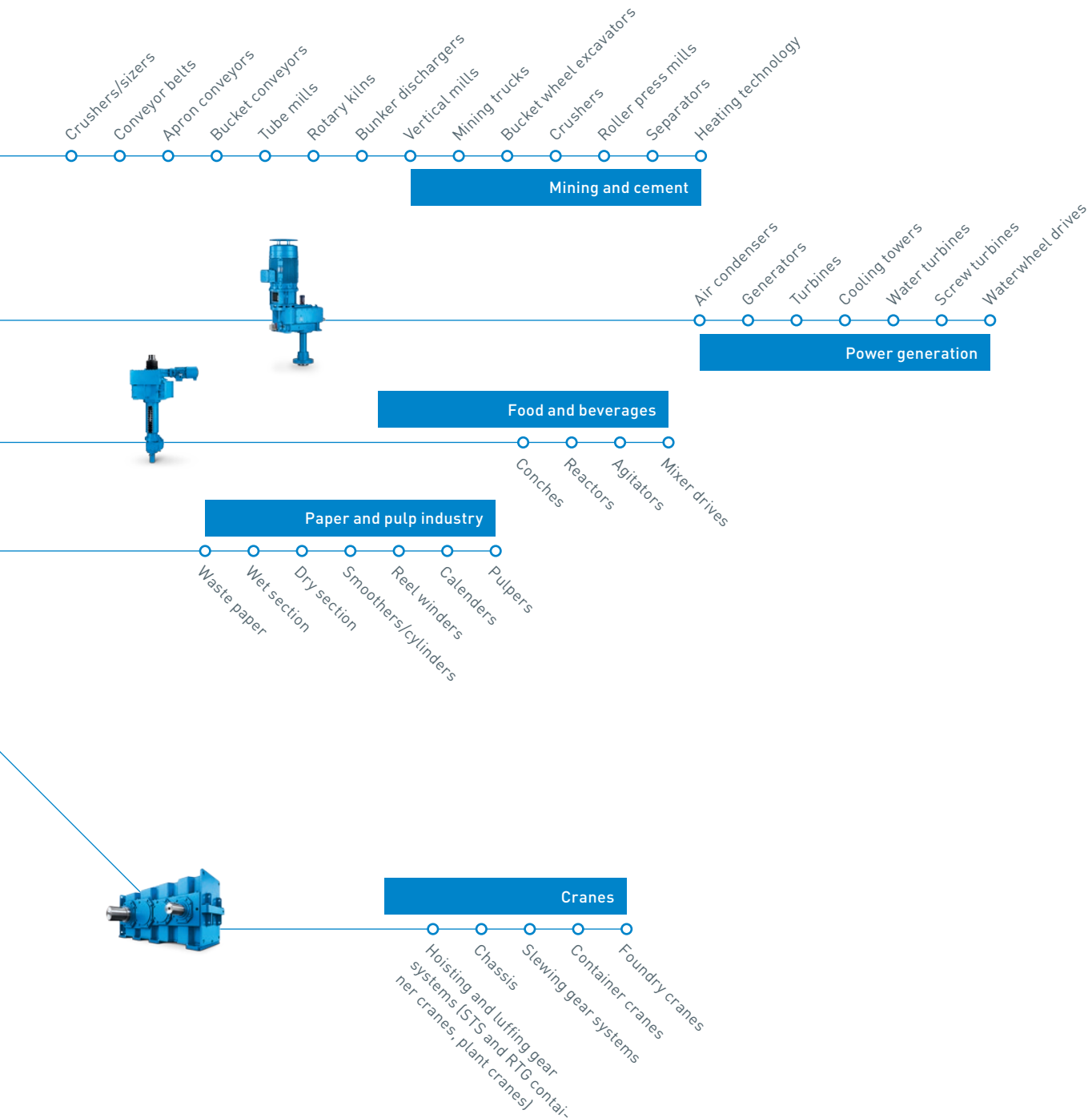
# MILLIONS OF APPLICATIONS, ONE CONCLUSION: ABSOLUTE RELIABILITY





The drive technology of Flender is simply reliable. This is verified by reference projects from all industries around the entire world in which our gear units have often been running reliably for many decades. In many applications, our components and systems ensure unflinching continuous operation.

Flender stands for reliable drives and efficient production, for available systems and stable processes, for dependable partnership and competent consulting, for responsible acting and sustainable thinking. This is our aspiration.



Flender's system competence turns first-class components into systems with tangible added value. Drive systems from Flender ensure maximum productivity, energy efficiency and reliability in any automation environment.

### Consultation

Our customers use our interdisciplinary know-how, our application competence, our innovation strength and, last but not least, our experience to find the right drive system for their individual requirements.

Reduced engineering time, lower costs



### Integrated drive portfolio

We provide more than just gear units and couplings. Thanks to the collaboration with Siemens, we also have the competence for electrical drive technology, which allows us to offer the entire drive train, including frequency converters, motors and controllers from a single source – perfectly integrated and optimally interacting with one another, as a standard or individual solution.

Fewer interface risks, more efficiency

# INDIVIDUAL SOLUTIONS.

## Flender service

From diagnostics and support, replacement part and repair services, all the way to maintenance and retrofit services – the Flender service portfolio creates individual solutions, fully and completely tailored to the needs of our customers. In this way, a gear unit remains an original Flender gear unit.

Increased system availability, reduced lifecycle costs

We have the right solution for you, even if your requirements are special. We no longer have to newly develop every special solution. Many solutions are already available.

At [flender.com](https://www.flender.com), we provide application-specific solutions for your special requirements.

Use our online configurator, which allows you to create tailored product combinations.

## DIAGNOSTEX

Ensuring the process stability requires status-oriented maintenance of the drive train. With DIAGNOSTEX®, sensors measure deviations of our gear units from the target status. These can be analyzed and evaluated in terms of maximized system availability.

Industrie 4.0, reduced costs

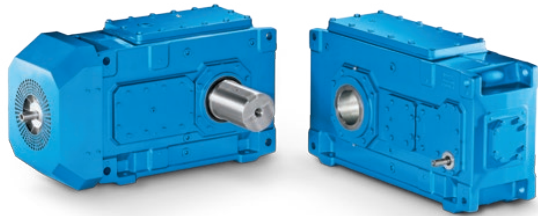




## THE RIGHT GEAR UNIT SOLUTION FOR ANY REQUIREMENT

We provide helical and planetary gear units made up of standard modules or as a complete application solution.

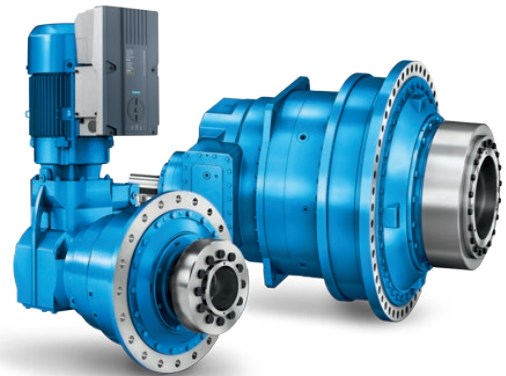
Helical and planetary gear units from Flender are modern drive solutions that satisfy the most varying and extreme demands, day after day and year after year. For decades, plant operators have been achieving high system reliability and low lifecycle costs in every conceivable industry with our helical gear units.



### Helical and bevel helical gear units

Flender helical and bevel helical gear units are by far the most comprehensive range of industrial gear units in the world. It ranges from a multi-faceted universal gear unit portfolio and application-specific gear units to customer-specific solutions.

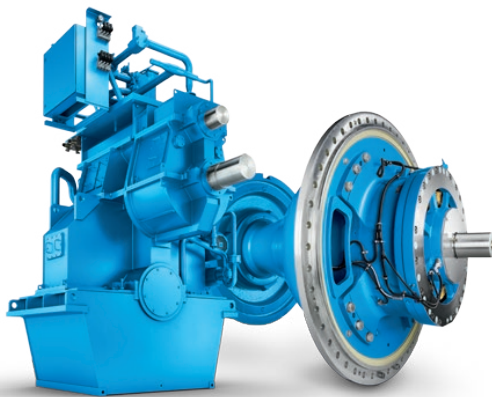
**Nominal output torque: 3,300 Nm ... 1,400,000 Nm**



### Planetary gear units

With Flender planetary gear units, we provide a range of durable, reliable and finely graduated gear unit solutions. The series wins customers over due to its highly integrated planetary geared motor and maximum conformity with all international motor standards. It also brings quality and performance in a good ratio of lifecycle costs to price.

**Nominal output torque: 10,000 Nm ... 5,450,000 Nm**



### Application-specific gear units

With application-specific gear units, Flender provides by far the most application solutions and thus covers nearly every drive-related need from hundreds of applications in industry and the acquisition of raw materials.

**Nominal output torque: Up to 10,000,000 Nm**



### Customer-specific designs

Our experts are available at any time for special requirements during the development of new products. From designing and simulating complex drive solutions to implementing them, we work together with you to resolve multi-layered tasks.

# GREAT EXPERTISE IN YOUR INDUSTRY TOO.

Each industry has its own conditions. Every application has its own specific requirements. We are looking forward to meeting your challenges.

We probably already have the right solution at hand. Here are a few examples:



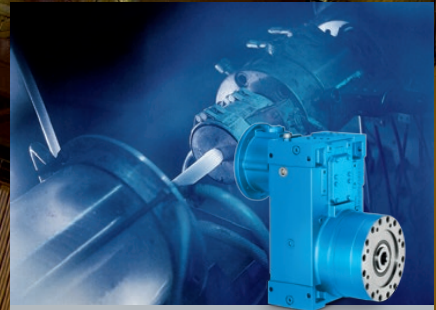
## Minerals and Mining

**Requirement:**  
Perfectly coordinated drive system



## Cement

**Requirement:**  
Low maintenance effort and cost,  
sealing due to dirt in surroundings



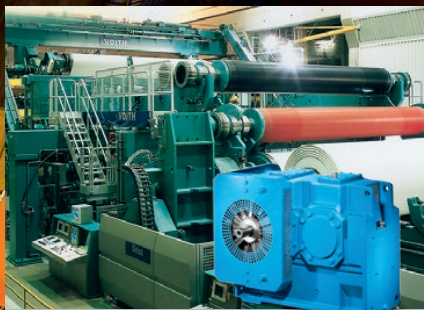
## Plastics and Rubber

**Requirement:**  
Absorption of high axial forces,  
suitability for explosion protection



## Environmental & Recycling

**Requirement:**  
Highest possible reliability, rugged  
design



## Pulp and Paper

**Requirement:**  
Suitability for centrally located  
lubrication



## Industrial Cranes

**Requirement:**  
Quick availability, version with  
double drive shaft



### Chemicals

**Requirement:**  
Absorption of forces from the manufacturing process



### Power Generation

**Requirement:**  
Effective cooling, speed adjustment for motor to fan



### Metals

**Requirement:**  
Harsh working conditions, high peak loads



### Harbour Cranes

**Requirement:**  
Specific axle clearance, frequent start-up



### Oil and Gas

**Requirement:**  
Flexible adaptation to speed requirements



### Water and Waste water

**Requirement:**  
Absorption of external forces, oil-retaining pipe required

# UNIVERSAL GEAR UNITS

The huge modular system with its finely spaced series of helical and bevel-helical gear units probably already includes the right solution close to your desired torque.

Nominal torque range

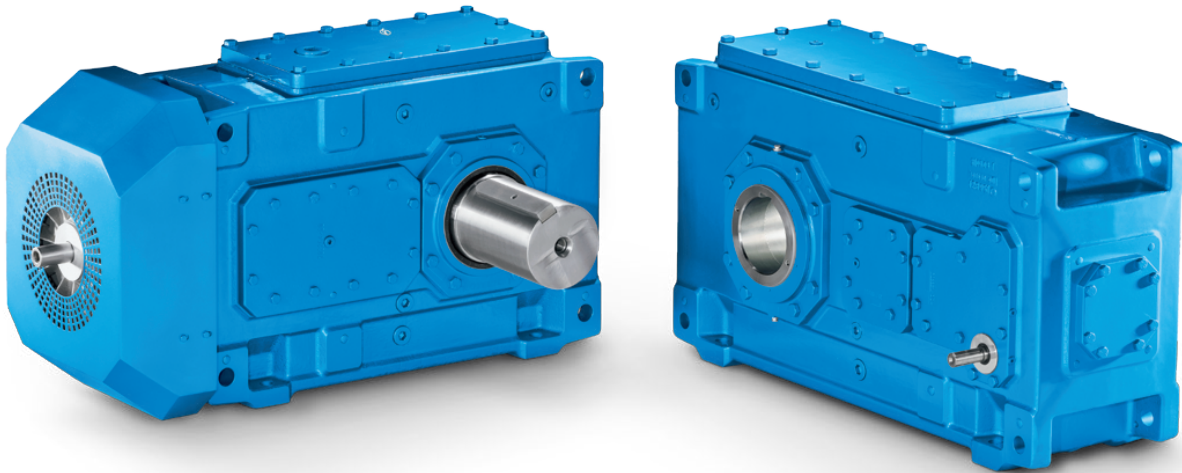
Monoblock design

Divided housing design

## DESIGNS AND SIZES

TYPE	SIZE	03	04	05	06	07	08	09	10	11	12	13	14
Helical gear unit H1	Nominal torque class T2N	3,300 Nm	-	9,600 Nm	-	17,800 Nm	-	28,700 Nm	-	50,600 Nm	-	75,700 Nm	-
	Type__Size	H1__03	-	H1__05	-	H1__07	-	H1__09	-	H1__11	-	H1__13	-
	Ratio range (i)	1:1.25...5.6	-	1:1.25...5.6	-	1:1.25...5.6	-	1:1.25...5.6	-	1:1.6...5.6	-	1:1.6...5.6	-
Helical gear unit H2	Nominal torque class T2N	3,500 Nm	6,700 Nm	11,200 Nm	14,400 Nm	20,300 Nm	25,600 Nm	33,700 Nm	42,200 Nm	59,300 Nm	73,800 Nm	86,000 Nm	107,000 Nm
	Type__Size	H2__03	H2__04	H2__05	H2__06	H2__07	H2__08	H2__09	H2__10	H2__11	H2__12	H2__13	H2__14
	Ratio range (i)	1:6.3...22.4	1:6.3...22.4	1:6.3...22.4	1:8...28	1:6.3...22.4	1:8...28	1:6.3...22.4	1:8...28	1:6.3...22.4	1:8...28	1:6.3...20	1:8...25
Helical gear unit H3	Nominal torque class T2N	-	-	11,600 Nm	15,500 Nm	21,700 Nm	27,200 Nm	35,700 Nm	43,800 Nm	63,500 Nm	77,200 Nm	88,000 Nm	109,000 Nm
	Type__Size	-	-	H3__05	H3__06	H3__07	H3__08	H3__09	H3__10	H3__11	H3__12	H3__13	H3__14
	Ratio range (i)	-	-	1:25...90	1:31.5...112	1:25...90	1:31.5...112	1:25...90	1:31.5...112	1:25...90	1:31.5...112	1:22.4...90	1:28...112
Helical gear unit H4	Nominal torque class T2N	-	-	-	-	21,700 Nm	27,200 Nm	35,700 Nm	44,200 Nm	61,600 Nm	78,000 Nm	90,700 Nm	113,000 Nm
	Type__Size	-	-	-	-	H4__07	H4__08	H4__09	H4__10	H4__11	H4__12	H4__13	H4__14
	Ratio range (i)	-	-	-	-	1:100...355	1:125...450	1:100...355	1:125...450	1:100...355	1:125...450	1:100...355	1:125...450
Bevel-helical gear unit B2	Nominal torque class T2N	-	6,200 Nm	9,400 Nm	12,000 Nm	19,000 Nm	23,800 Nm	29,900 Nm	38,000 Nm	54,000 Nm	66,300 Nm	81,100 Nm	101,000 Nm
	Type__Size	-	B2__04	B2__05	B2__06	B2__07	B2__08	B2__09	B2__10	B2__11	B2__12	B2__13	B2__14
	Ratio range (i)	-	1:5...18	1:5...18	1:6.3...22.4	1:5...18	1:6.3...22.4	1:5...18	1:6.3...22.4	1:5...18	1:6.3...22.4	1:5...18	1:6.3...22.4
Bevel-helical gear unit B3	Nominal torque class T2N	3,600 Nm	6,700 Nm	11,600 Nm	15,500 Nm	21,700 Nm	27,200 Nm	35,700 Nm	43,800 Nm	63,500 Nm	77,200 Nm	90,700 Nm	113,000 Nm
	Type__Size	B3__03	B3__04	B3__05	B3__06	B3__07	B3__08	B3__09	B3__10	B3__11	B3__12	B3__13	B3__14
	Ratio range (i)	1:20...71	1:12.5...71	1:12.5...71	1:16...90	1:12.5...71	1:16...90	1:12.5...71	1:16...90	1:12.5...71	1:16...90	1:12.5...71	1:16...90
Bevel-helical gear unit B4	Nominal torque class T2N	-	-	11,600 Nm	15,500 Nm	21,700 Nm	27,200 Nm	35,700 Nm	44,200 Nm	61,600 Nm	78,000 Nm	90,700 Nm	113,000 Nm
	Type__Size	-	-	B4__05	B4__06	B4__07	B4__08	B4__09	B4__10	B4__11	B4__12	B4__13	B4__14
	Ratio range (i)	-	-	1:80...315	1:100...400	1:80...315	1:100...400	1:80...315	1:100...400	1:80...315	1:100...400	1:80...315	1:100...400





15	16	17	18	19	20	21	22	23	24	25	26	27	28
130,000 Nm	-	173,000 Nm	-	245,000 Nm	-	-	-	-	-	-	-	-	-
H1__15 1:2...5.6	-	H1__17 1:2.8...5.6	-	H1__19 1:4...5.6	-	-	-	-	-	-	-	-	-
143,000 Nm	160,000 Nm	195,000 Nm	230,000 Nm	292,000 Nm	335,000 Nm	410,000 Nm	458,000 Nm	640,000 Nm	725,000 Nm	860,000 Nm	1,030,000 Nm	1,230,000 Nm	1,400,000 Nm
H2__15 1:6.3...20	H2__16 1:7.1...22.4	H2__17 1:6.3...20	H2__18 1:7.1...22.4	H2__19 1:6.3...20	H2__20 1:7.1...22.8	H2__21 1:7.1...20	H2__22 1:8...22.4	H2__23 1:6.3...20	H2__24 1:7.1...22.4	H2__25 1:6.3...20	H2__26 1:7.1...22.4	H2__27 1:8...20	H2__28 1:9...22.4
153,000 Nm	173,000 Nm	200,000 Nm	240,000 Nm	300,000 Nm	345,000 Nm	420,000 Nm	470,000 Nm	640,000 Nm	725,000 Nm	860,000 Nm	1,030,000 Nm	1,230,000 Nm	1,400,000 Nm
H3__15 1:22.4...90	H3__16 1:25...100	H3__17 1:22.4...90	H3__18 1:25...100	H3__19 1:22.4...90	H3__20 1:25...100	H3__21 1:22.4...90	H3__22 1:25...100	H3__23 1:22.4...90	H3__24 1:25...100	H3__25 1:22.4...90	H3__26 1:25...100	H3__27 1:22.4...90	H3__28 1:25...100
153,000 Nm	173,000 Nm	200,000 Nm	240,000 Nm	300,000 Nm	345,000 Nm	420,000 Nm	470,000 Nm	640,000 Nm	725,000 Nm	860,000 Nm	1,030,000 Nm	1,230,000 Nm	1,400,000 Nm
H4__15 1:100...355	H4__16 1:112...400	H4__17 1:100...355	H4__18 1:112...400	H4__19 1:100...355	H4__20 1:112...400	H4__21 1:100...355	H4__22 1:112...400	H4__23 1:100...355	H4__24 1:112...400	H4__25 1:100...355	H4__26 1:112...400	H4__27 1:100...355	H4__28 1:112...400
132,000 Nm	148,000 Nm	195,000 Nm	230,000 Nm	-	-	-	-	-	-	-	-	-	-
B2__15 1:5...18	B2__16 1:5.6...20	B2__17 1:5.6...18	B2__18 1:7.1...20	-	-	-	-	-	-	-	-	-	-
153,000 Nm	173,000 Nm	200,000 Nm	240,000 Nm	300,000 Nm	345,000 Nm	420,000 Nm	470,000 Nm	640,000 Nm	725,000 Nm	860,000 Nm	1,030,000 Nm	1,230,000 Nm	1,400,000 Nm
B3__15 1:12.5...71	B3__16 1:14...80	B3__17 1:12.5...71	B3__18 1:14...80	B3__19 1:12.5...71	B3__20 1:14...80	B3__21 1:12.5...71	B3__22 1:14...80	B3__23 1:20...71	B3__24 1:22.4...80	B3__25 1:20...71	B3__26 1:22.4...80	B3__27 1:20...71	B3__28 1:22.4...80
153,000 Nm	173,000 Nm	200,000 Nm	240,000 Nm	300,000 Nm	345,000 Nm	420,000 Nm	470,000 Nm	640,000 Nm	725,000 Nm	860,000 Nm	1,030,000 Nm	1,230,000 Nm	1,400,000 Nm
B4__15 1:80...315	B4__16 1:90...355	B4__17 1:80...315	B4__18 1:90...355	B4__19 1:80...315	B4__20 1:90...355	B4__21 1:80...315	B4__22 1:90...355	B4__23 1:80...315	B4__24 1:90...355	B4__25 1:80...315	B4__26 1:90...355	B4__27 1:80...315	B4__28 1:90...355



## THE PERFECT COUPLING FOR THE PERFECT GEAR UNIT

We provide elastic, highly elastic, rigid and hydrodynamic solutions.

Regardless of which demands are made on the coupling: Low or high performance, demanding operating conditions or high ambient temperatures, dusty or hazardous environments – we have the right portfolio. Our comprehensive range of couplings offers a large number of sizes and designs with a torque range from 0.5 to 10,000,000 Nm.

In over 90 years of development, conception and production, our product portfolio has grown to its current level of diversity. Nearly every matured coupling solution is available as a standard item in our modular system. This saves our customers time and money.

We are a powerful and flexible player in every market in the world – just like our customers. The production of our coupling components aims for maximum quality. As a trio, the setup, material and design result in optimal coupling solutions – rugged, dependable, largely low-maintenance and, above all, available at any time, anywhere. We provide high quality, first class delivery performance, and comprehensive service.



### Flexible couplings

Our elastic couplings are pluggable and easy to install. The elastomer element equalizes the shaft offset and absorbs impacts from the motor or driven machine.

**Nominal output torque: 12 Nm ... 1,300,000 Nm**



### Torsionally rigid couplings

Our compact steel couplings provide extremely precise transmission of high torques, especially in harsh operating conditions and extreme temperatures.

**Nominal output torque: 5 Nm ... 10,000,000 Nm**



### Hydrodynamic couplings

Soft start, overload protection, torsional vibration damping – FLUDEX® fluid couplings allow the torque-limited approach and have very little slippage at rated load.

**Nominal output torque: 1.2 kW ... 2,500 kW**



### Highly-flexible couplings

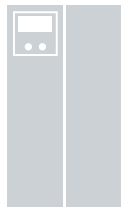
Highly flexible couplings are well-suited for connecting machines that operate asymmetrically. They are preferred for use in systems that are periodically operated.

**Nominal output torque: 24 Nm ... 90,000 Nm**

Converters/control systems

Motor

Couplings



# THE COUPLING IN THE DRIVE TRAIN

FLUDEX

## Hydrodynamic couplings

Soft start, overload protection, torsional vibration damping  
– FLUDEX fluid couplings allow the torque-limited approach and have very little slippage at rated load.

ZAPEX couplings and ARPEX all-steel couplings

## Torsionally rigid couplings

Our compact steel couplings provide extremely precise transmission of high torques, especially in harsh operating conditions and extreme temperatures.



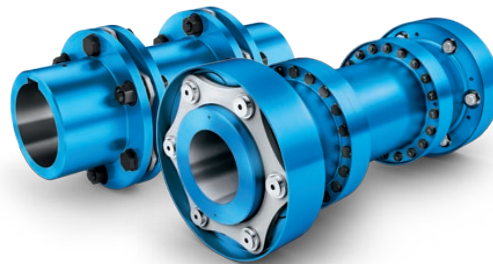
FLUDEX  
fluid couplings

Power:  
1.2 kW ... 2,500 kW



ZAPEX  
couplings

Nominal output torque:  
1,020 Nm ... 7,200,000 Nm



N-ARPEX and ARPEX  
all-steel couplings

Nominal output torque:  
5 Nm ... 10,000,000 Nm

Gear units

Couplings



N-EUPEX, RUPEX and N-BIPEX

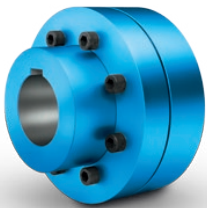
**Flexible couplings**

Flexible Flender couplings are pluggable and easy to install. The elastomer element equalizes the shaft offset and absorbs impacts from the motor or driven machine.

ELPEX, ELPEX-B and ELPEX-S

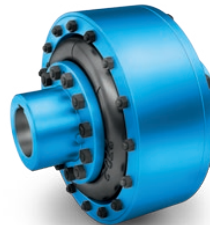
**Highly-flexible couplings**

Highly-flexible Flender couplings are well-suited for connecting machines that operate asymmetrically. They are preferred for use in systems that are periodically operated.



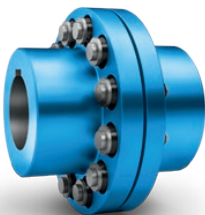
N-EUPEX  
cam couplings

Nominal output torque:  
19 Nm ... 62,000 Nm



ELPEX  
elastic ring couplings

Nominal output torque:  
1,600 Nm ... 90,000 Nm



RUPEX  
pin-and-bush couplings

Nominal output torque:  
200 Nm ... 1,300,000 Nm



ELPEX-B  
elastic tire couplings

Nominal output torque:  
24 Nm ... 14,500 Nm



N-BIPEX  
cam couplings

Nominal output torque:  
12 Nm ... 4,650 Nm



ELPEX-S  
rubber disk couplings

Nominal output torque:  
330 Nm ... 63,000 Nm



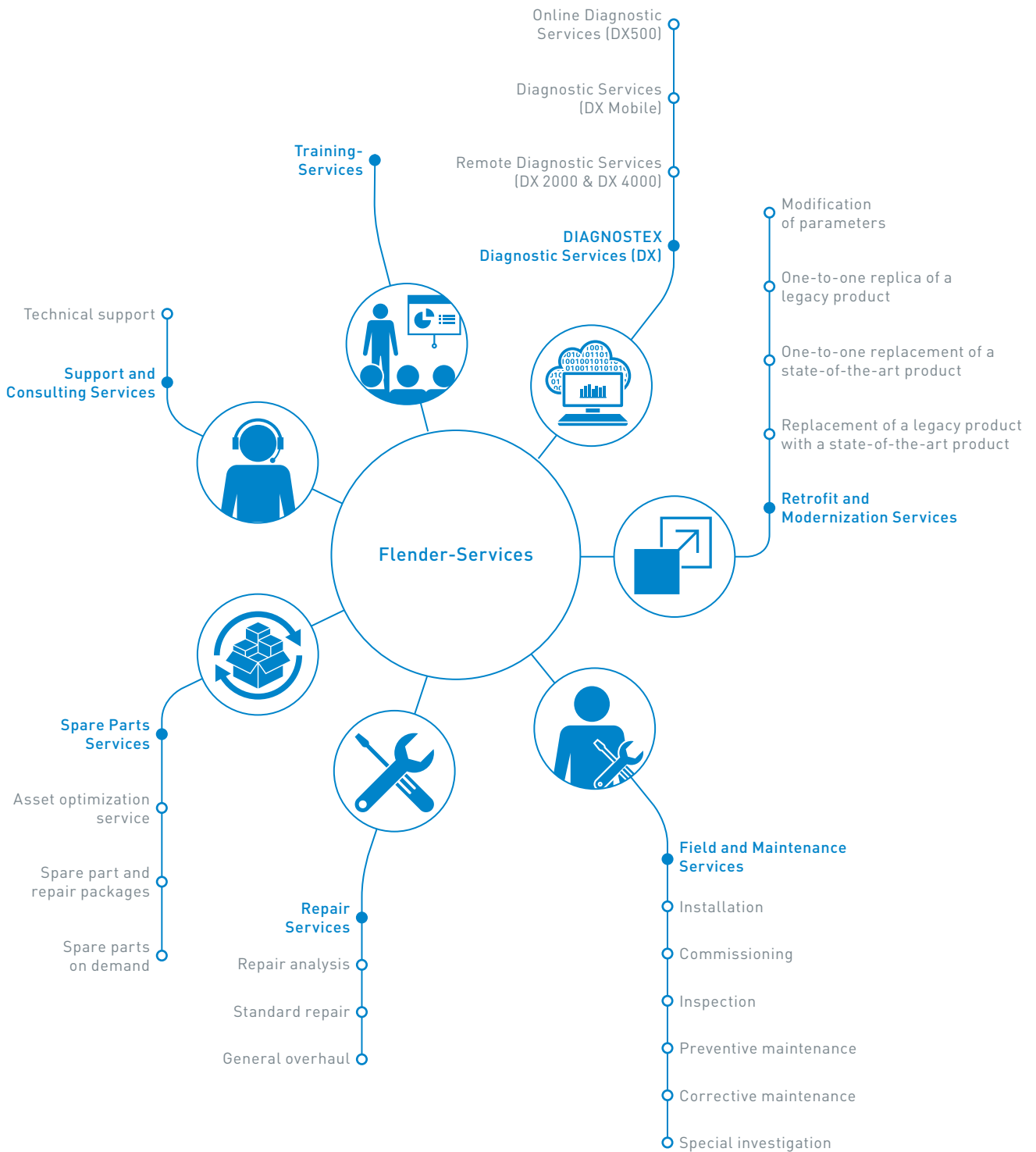
## SERVICES

Ever increasing requirements make it more and more important for industrial plants to work with maximum productivity and efficiency. Flender Services give companies a decisive advantage over the competition in industry, the acquisition of raw materials and energy production. In view of the high cost pressure, increasing energy prices and stricter and stricter environmental stipulations, our services are becoming a decisive factor to success over the competition.

Enjoy the support of our service experts, from planning, development and operation to the modernization of your plant and benefit from our experience and in-depth know-how of your application – in more than 100 countries, seven days a week, 24 hours a day.

Reduce standstills, minimize downtimes due to failure, and increase the productivity, flexibility and cost efficiency of your plant.

# OUR OFFER FOR GEAR UNITS AND COUPLINGS AT A GLANCE.

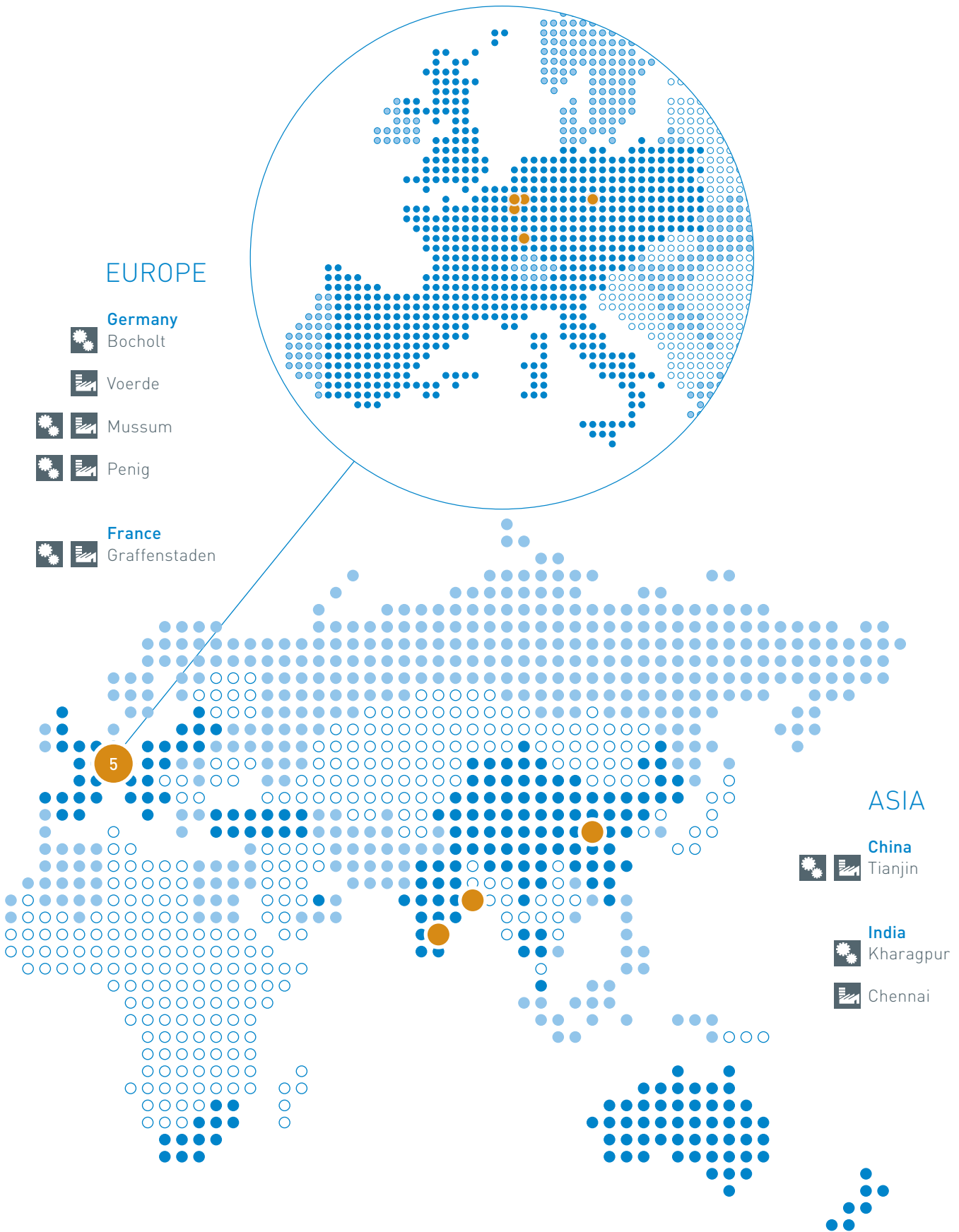


# BY YOUR SIDE.

Competency, flexibility and top performance on-site: With our setup, we can offer customer proximity worldwide. In addition to seven plants, we are broadly represented on five continents by sales and service locations. Thanks to our global setup, we have achieved a very high level of efficiency in production, installation, sales and service.







● Flender subsidiary

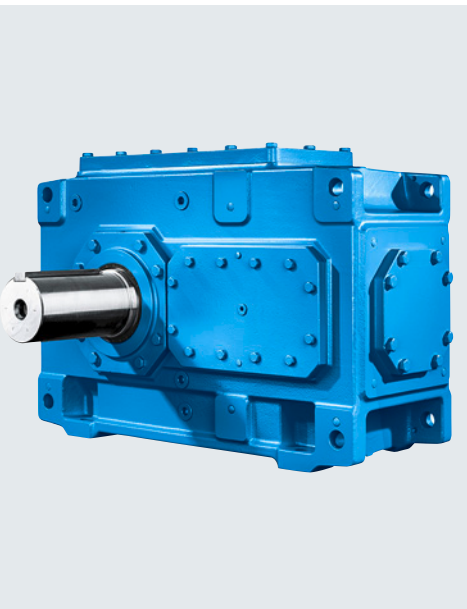
● Sales and/or service partners

⚙️ Manu-  
facturing

🏭 Assembly



## General



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### General

Certificates and approvals

**General**  
Certificates and approvals

**Overview**

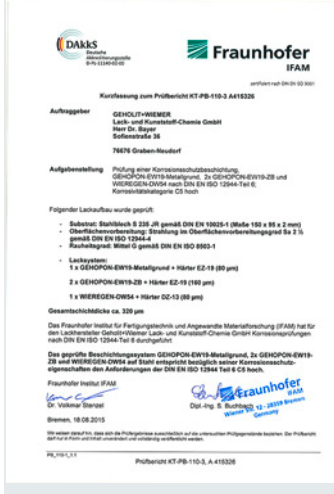
ISO 9001	ISO 14001	BS OHSAS 18001
<p><b>Zertifikat</b>                      Prüfungsraum: <b>ISO 9001:2008</b>                      Zertifikat-Registrier-Nr.: 01 100 880718                      Unternehmen: <b>Flender GmbH</b>                      Alfred Flender-Str. 77                      40285 Bochum                      Deutschland                      mit den Standorten gemäß Anlage                      Geltungsbereich: Entwicklung, Konstruktion, Herstellung, Prüfung, Vertrieb und Service von Komponenten und Bauelementen der Antriebstechnik sowie von Geräten und Apparaten der Überwachung, Steuerung und Regelung solcher Produkte.                      Durch ein Audit wurde der Nachweis erbracht, dass die Forderungen der ISO 9001:2008 erfüllt sind.                      Gültigkeit: Dieses Zertifikat ist gültig vom 01.09.2015 bis 31.08.2018. Erstzertifizierung 2001                      26.01.2018                      TÜVRheinland®                      Genau. Richtig.</p>	<p><b>Zertifikat</b>                      Prüfungsraum: <b>ISO 14001:2004</b>                      Zertifikat-Registrier-Nr.: 01 104 090951                      Unternehmen: <b>Flender GmbH</b>                      Alfred Flender-Str. 77                      40285 Bochum                      Deutschland                      mit den Standorten gemäß Anlage                      Geltungsbereich: Entwicklung, Konstruktion, Herstellung, Prüfung, Vertrieb und Service von Komponenten und Bauelementen der Antriebstechnik sowie von Geräten und Apparaten der Überwachung, Steuerung und Regelung solcher Produkte.                      Durch ein Audit wurde der Nachweis erbracht, dass die Forderungen der ISO 14001:2004 erfüllt sind.                      Gültigkeit: Dieses Zertifikat ist gültig vom 23.09.2015 bis 14.09.2018. Erstzertifizierung 2009                      26.01.2018                      TÜVRheinland®                      Genau. Richtig.</p>	<p><b>Zertifikat</b>                      Prüfungsraum: <b>BS OHSAS 18001:2007</b>                      Zertifikat-Registrier-Nr.: 01 213 110807                      Unternehmen: <b>Flender GmbH</b>                      Alfred Flender-Str. 77                      40285 Bochum                      Deutschland                      mit den Standorten gemäß Anlage                      Geltungsbereich: Entwicklung, Konstruktion, Herstellung, Prüfung, Vertrieb und Service von Komponenten und Bauelementen der Antriebstechnik sowie von Geräten und Apparaten der Überwachung, Steuerung und Regelung solcher Produkte.                      Durch ein Audit wurde der Nachweis erbracht, dass die Forderungen der BS OHSAS 18001:2007 erfüllt sind.                      Gültigkeit: Dieses Zertifikat ist gültig vom 16.10.2017 bis 18.10.2020. Erstzertifizierung 2011                      26.01.2018                      TÜVRheinland®                      Genau. Richtig.</p>
<p><b>Zertifikat</b>                      Prüfungsraum: <b>ISO 50001:2011</b>                      Zertifikat-Registrier-Nr.: 01 407 100640                      Unternehmen: <b>Siemens Industriegetriebe GmbH</b>                      Thiersbacher Str. 24                      D-10522 Pasing                      Geltungsbereich: Entwicklung, Herstellung, Prüfung, Vertrieb und Service von Getrieben, Kupplungen, Getriebemotoren, Elektromotoren und antriebsmechanischen Systemlösungen.                      Durch ein Audit wurde der Nachweis erbracht, dass die Forderungen der ISO 50001:2011 erfüllt sind.                      Gültigkeit: Dieses Zertifikat ist gültig vom 28.09.2015 bis zum 27.09.2018.                      28.09.2015                      TÜVRheinland®                      Genau. Richtig.</p>	<p><b>EXAM</b>                      BSG Prüf- und Zertifikat GmbH                      - Richtlinie 94/9/EG -                      Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen  <b>Bestätigung</b>                      1. Nachweis des                      BVS 01 ATEX II/B 048                      entsprechend Artikel 8 (2) (b) i)                      über den Erhalt der Übereinstimmung gemäß VIII Nummer 3                      Hersteller: A. Fricke, Flender AG                      Anschrift: Alfred Flender-Str. 77                      40285 Bochum                      Die Zertifizierungsstelle der EXAM BSG Prüf- und Zertifikat GmbH, bezogen auf die 94/9/EG gemäß Artikel 8 des Beschlusses 94/11/EG des Europäischen Parlaments und des Rates der Europäischen Gemeinschaften vom 23. März 1994, bestätigt, die im Folgenden aufgeführte Dokumentation am 06.07.2004 erhalten zu haben.                      Unterlagen vom Flender Zahnradtrieb                      angegr. BA 3036 DE, BA 3031 DE                      Die Unterlagen werden weiter auf Verfügbarkeit nach zu Rechtigen gestellt. Sie werden von uns 10 Jahre lang verwahrt. Falls der Hersteller eine länger Andauernde Gültigkeit wünscht, ist dies entsprechend schriftlich mitzuteilen.                      EXAM BSG Prüf- und Zertifikat GmbH                      Bochum, Am 12.07.2004                      J. Fricke                      N. Dornhölzl                      Prüfingenieur</p>	

Overview (continued)

Flender is represented in the FVA



Test certificate for corrosion protection coating



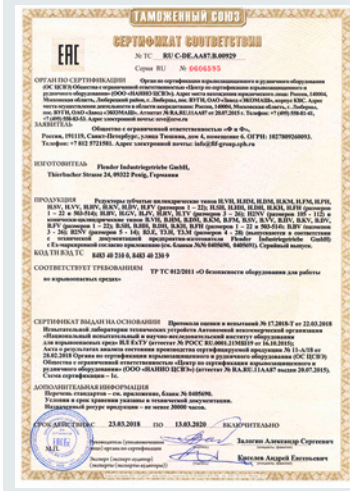
Flender has been a member of the AGMA (American Gear Manufacturer Association) since 1988



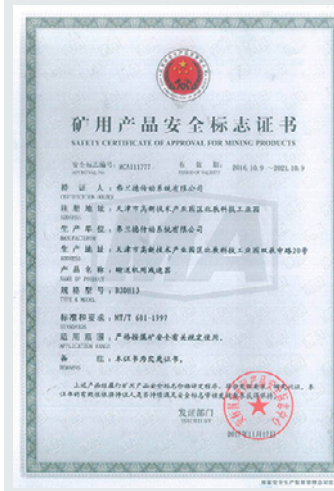
Flender is a member of the Cooling Technology Institute (relevant for cooling tower applications)



EAC certificate



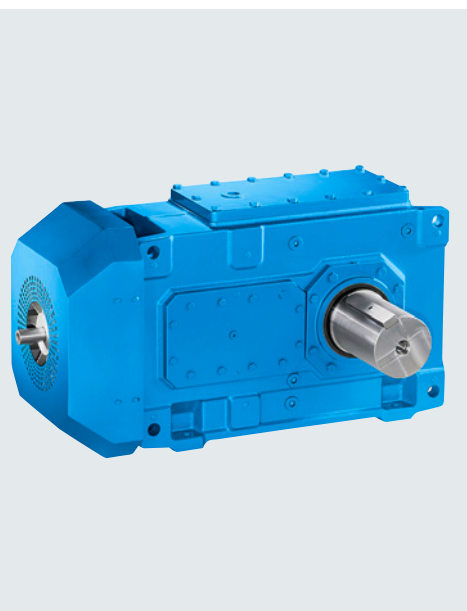
MA certificate



## General

### Notes

## Introduction



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### Notes

Overview of types/  
Gear unit designation

Orientation in space

Information about basics

Data regarding rating plate

Notes on selection and operation

## Introduction

### Notes

## Overview of types/Gear unit designation

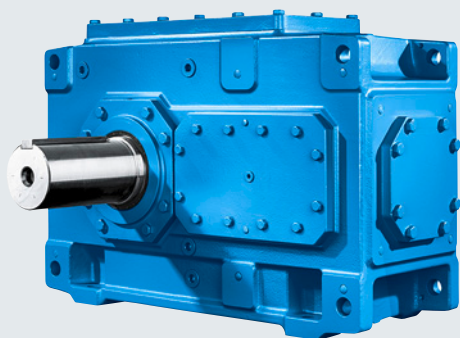
### Overview

#### Types

##### Helical gear units

Types H1..., H2..., H3..., H4...

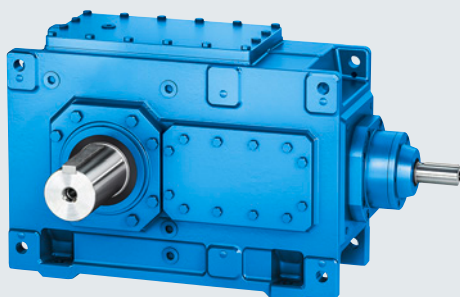
1- ... 4-stage,  $i_N = 1.25 \dots 450$



##### Bevel helical gear units

Types B2..., B3..., B4...

2- ... 4-stage,  $i_N = 5.6 \dots 400$



#### Structure of gear unit designation

Type	B	3	S	H	1	1
Type	Helical gear units	H				
	Bevel helical gear units	B				
No. of stages	1		1			
	2		2			
	3		3			
	4		4			
Design of the low speed shaft	Solid shaft with parallel key acc. to DIN 6885/1		S			
	Solid shaft with parallel key acc. to DIN 6885/1 with reinforced spigot		V			
	Solid shaft without parallel key		C			
	Hollow shaft with keyway acc. to DIN 6885/1		H			
	Hollow shaft with shrink disk		D			
	Hollow shaft with spline acc. to DIN 5480		K			
	Flanged shaft		F			
Mounting position	Horizontal			H		
	Vertical			V		
	Upright, low speed shaft (LSS) bottom <sup>*)</sup>			H		
	Upright, low speed shaft (LSS) top <sup>*)</sup>			H		
Gear unit size	3				0	3
	4				0	4
	5				0	5
	...					
	...					
	...					
	27				2	7
	28				2	8

#### Further details required in orders

- Ratio  $i$
- Design of the shafts A, B, C, D, etc.

#### Example B3SH11A16

- 3-stage bevel helical gear unit
- Output in solid shaft design
- Horizontal mounting position
- Size 11
- Version A
- Ratio  $i = 16$

<sup>\*)</sup> Describe in the free text with "high speed shaft over low speed shaft" or "low speed shaft over high speed shaft" (observe oil supply and heat generation)



**Overview**

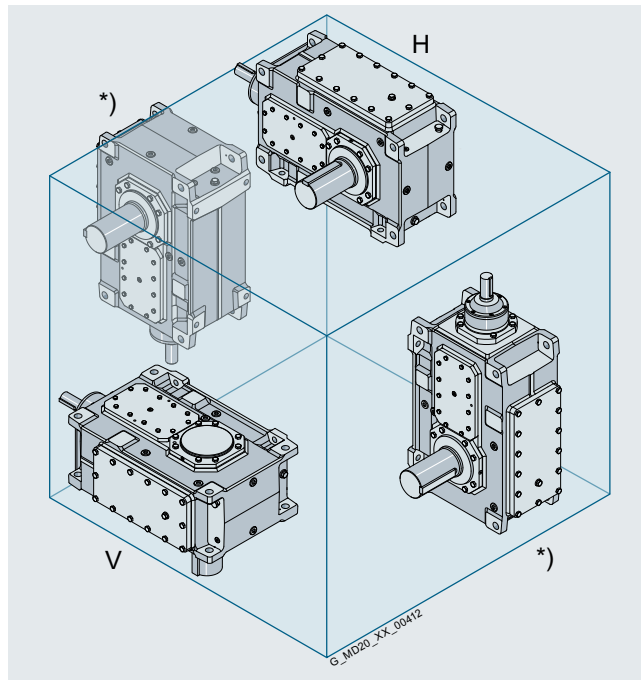
**Mounting positions**

Flender gear units are available for horizontal (H) and vertical (V) mounting position.

The upright mounting positions with low speed shaft at the bottom, low speed shaft at the top, and inclined or swiveling mounting positions are also possible following consultation:

\* Order in the horizontal mounting position (H) and describe in the free text with "high speed shaft (HSS) over low speed shaft (LSS)" or "low speed shaft over high speed shaft" (observe oil supply and heat generation).

The basic gear unit can be optimally adapted to customer requirements by fitting different add-on parts such as base rail feet, housing flanges, motor lanterns, gear unit swing bases or backstops.

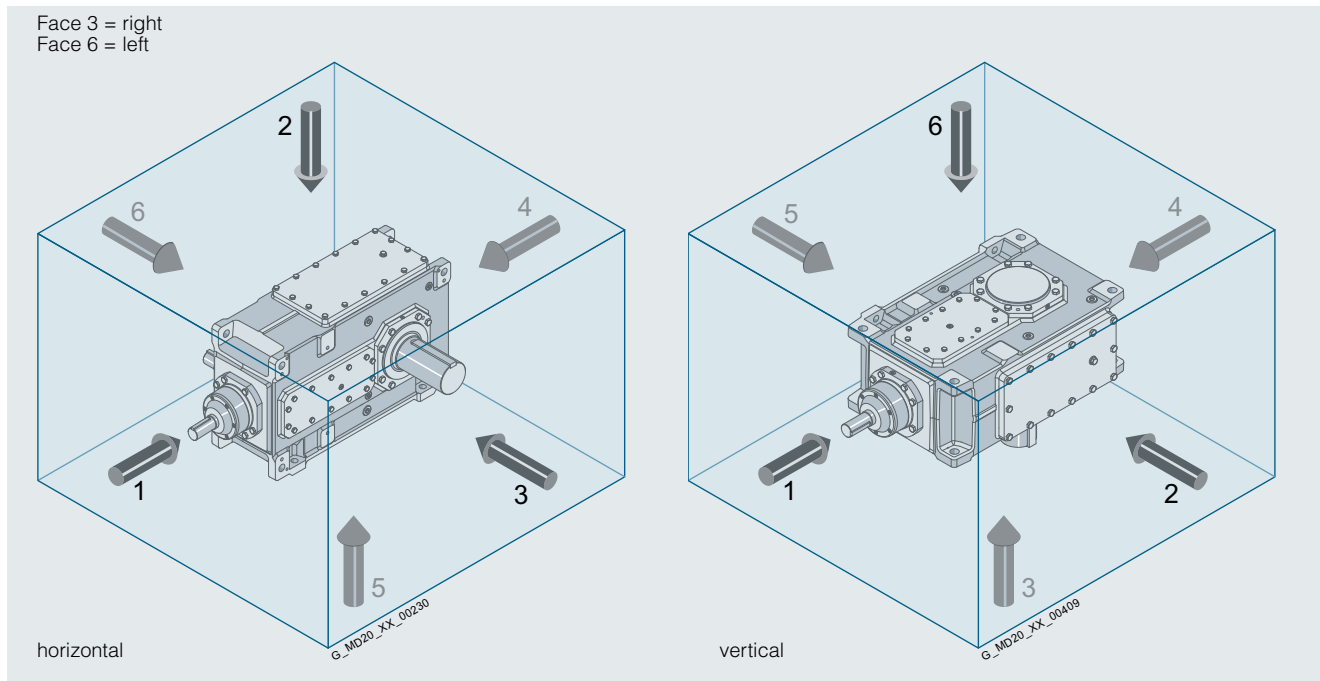


**Designation of gear unit faces**

Irrespective of the mounting position of the gear unit, the face designations "right" and "left" always refer to the horizontal mounting position with the view directed at the front of the housing for

the high speed shaft (face 1). Face 2 describes the side of the housing with the mounting or inspection hole cover.

Mounting cover top (2), with the view directed at the front of the housing of the high speed shaft (1):



Face 3 = right  
Face 6 = left

Standard mounting surfaces	
Mounting position	Surface
Mounting position H	Gear unit face 5
Mounting position V	Gear unit face 3

Alternative mounting surfaces to those specified above (depending on the mounting position) are available on request.

## Introduction

### Notes

#### Information about basics

#### Overview

##### **Technical design**

Flender gear units are the most successful and widespread standard gear units in the world.

Advantages are:

- Very solid and harmonious torque grading
- Extremely high degree of flexibility thanks to ability to be set up and used in nearly all mounting positions
- Reliable system availability due to the high quality of roller bearings used
- Wide range of variants from 7 types with different solid shaft or hollow shaft output versions
- Reliable gear unit seal thanks to protection of the radial shaft seal lip due to optionally selectable dust-proof Taconite seal
- Internal cooling or standardized fan mounting, as required
- Fast availability worldwide
- Attractive price/performance ratio.

The gearing is designed according to DIN 3990/3991. It is possible to calculate according to ISO 6336, ISO 10.300, AGMA 2003: AGMA 2001-B88; AGMA 2101-C95/D04; AGMA 6110-F97.

The shafts are calculated in accordance with DIN 743.

Roller bearings are designed in accordance with ISO 281.

Only roller bearings from certified suppliers which can meet the high quality demands over a long period of time are used.

The housings of the multi-stage gear units up to the torque  $\leq 78000$  Nm are laid out undivided in the monoblock design. The housings of the single stage gear units in horizontal mounting position are generally divided. All housings are extremely rugged and can be flexibly used.

The standard material for housings is lamellar graphite cast iron, which, at a minimum, satisfies the properties of EN-GJL-200. Upon request, housings made of spheroidal graphite EN-GJS-400 or welded versions can also be made available.

##### **Application-specific drive solutions**

A variety of special solutions can be serviced on the basis of Flender gear units.

A defined assortment of gear units can be built within 2 weeks using the "Fast Track" designator.

In addition, application-specific affiliate programs are available for nearly every use case, such as:

- Water screw gear units (pump application)
- Conveyor belt gear units
- Apron conveyor drives
- Scraper conveyor/scraper drives
- Bevel helical gear units for bucket elevator applications
- Gear units for crane applications/hoisting gear
- Traversing gear units
- Gear units for preparation engineering (crusher, shredder, etc.)
- Gear units for stirring and mixing processes for liquid media
- Single-screw extruder gear units

- Gear units for applications in paper production
- Sifter gear units
- Gear units for generating energy from hydro power (both water wheel drives and water turbine gear units)
- Auxiliary drives for rotary furnaces
- Gear units for cable railways
- Gear units for various pumps (both for centrifugal pumps and for oscillating pumps)

Many years of experience in the applications ensure maximum availability and efficient operation when Flender gear units are used.

##### **Noise behavior**

The noise levels of Flender gear units are well below the legal requirements.

This can be guaranteed throughout the series by the following solutions:

- Grinding the bevel gears
- Optimized gearing set
- Compact monoblock housings up to 78000 Nm for multi-stage gear units
- High contact ratios of the gearing.

##### **Thermal behavior**

Flender gear units have a favorable thermal behavior when the degree of efficiency is high.

The degree of efficiency of the gear units is directly proportional to the utilization of the gear units. Over-dimensioning leads to an increase in the amount of heat that needs to be dissipated.

Large fans with an air deflection hood that encompasses the entire housing already provide optimal heat dissipation in the basic design (costly solutions with 2 fans are not required).

The maximum oil temperature that is the basis for the gear unit selection lies within permitted ranges.

Due to the large number of factors that influence the determination of thermal capacities, a re-calculation of the exact drive application is recommended. The catalog data can only give a very limited depiction of the wide range of possibilities in regard to heat generation and dissipation. We recommend, especially for applications with low ratios or applications in which the gear unit is completely filled with oil, that the limits of the thermal capacities should not be fully utilized.

By that, the operational reliability will be increased and the maintenance overhead reduced due to longer oil change intervals.

The gear units up to and including size 22 are intended for use in an ambient temperature range of  $-25$  °C to  $40$  °C. In addition, and for applications in hazardous environments (ATEX),  $-20$  °C is defined as the lower limit value. Contact Flender regarding deviating temperatures.

##### **Stock**

Flender gear units have a modular design. Through this, the variety of components could be reduced. The components are mainly on stock, enabling manufacturing plants worldwide to be delivered at short term.

**Overview** (continued)**Corrosion protection version**

The Flender standard color RAL5015 and an assortment of preferred colors are primarily "silk-matt" and are applied using a solvent-free coating system.

The default coloring is comparable to corrosion protection category C3 "medium" according to EN ISO 12994-5.

Deviating coating systems possible on request.

The versions regarding corrosion protection according to the corrosivity categories according to EN ISO 12994-5 refer to the gear unit itself in the standard program. Add-on parts such as air guides/covers/protective covers made of a sheet steel are coated with "signal yellow" powder RAL 1003. Flender confirms the suitability of powder-coated built-on components for all corrosion protection classes. An assignment of the corrosivity categories is omitted.

This powder-coating is applied independently of the color scheme ordered for the gear unit or the required layer thickness.

In the combination of electrostatic attraction between the coating powder and the part to be coated and the melting of this powder by applying heat (between 140 – 200 °C), a closed film, the Duroplast color layer, is formed.

Powder coating has the following advantages over liquid painting:

- Better corrosion protection
- Better chemical resistance
- Better surface quality, considerably more resistant to impacts, scratches and abrasions
- Can be immediately used after the surface has cooled down
- Solvent- and emission-free, therefore very environmentally friendly
- Considerably lower risk of damage to the color system during assembly processes.

This generally concerns components that must be dismantled when mounting the drive or for some other purpose. For multi-layer color structures, the risk of damage due to slings or tools is considerably higher than for the design with plastic powder.

The gears are delivered preserved.

**Standard packaging**

The packaging on wooden frames is included in the standard delivery kit (as far as possible). Upon request, the packaging can also be shrink-wrapped.

Optionally, deliveries can also be delivered in containers or in stackable wooden crates for container transport. Please contact Flender to find out about the additional efforts.

## Introduction

### Notes

#### Information about basics

#### Overview (continued)

##### Interior preservation of gear units

Without additional measures, the corrosion protection for standard packaged gear units will last up to 6 months when transported and stored in a dry, draft-free and closed room without major temperature fluctuations.

The service life differs depending on the type of packaging.

Overview of the basic service life (in months) of the gear unit's interior preservation for hermetically sealed gear units:

Packaging/storage environment of the unit	Transport/storage/non-operational setup under the following conditions (in months):	
	• Air with little or no salt content and low or average humidity and • low or average air pollution acc. to EN ISO 9223 (Annex C) Corrosion category C1 or C2	• Medium or high salinity air and/or • high humidity and/or heavy air pollution acc. to EN ISO 9223 (Annex C) Corrosion category C3 or higher
No packaging or basic packaging outdoors	5	3
No packaging or basic packaging outdoors; seals taped with water-proof adhesive tape; gear units equipped with wet air filters	13	9
No packaging or basic packaging in closed, dry room	20	14
Seaworthy packaging	24	24

When labyrinth seals with a V-ring are used, the service life is halved (upper limit value 12 months).

The internal preservation of Flender gear units is dependent on the oil used and the shaft seals provided.

If the storage periods mentioned are exceeded, the anti corrosive agent in the gear unit must be renewed.

If gear units are stored outdoors, the maximum permissible storage time might be as little as 12 months depending on the packaging used.

Observe operating instructions!

##### Lubrication of Flender gear units

###### Dip lubrication

There are 2 types of dip lubrication.

1. Rotating components (toothed gears, roller bearings) are immersed in oil to the extent prescribed. Due to rotation at a high circumferential speed, all of the points of these components are immersed in oil during each rotation. The teeth generate a splashing effect. Some of the oil is also spattered onto the interior wall of the housing. An oil mist forms, which aids in the cooling, lubrication and heat dissipation during operation.

This type of lubrication is typically found in gear units that are in a horizontal mounting position.

If the temperatures are below the values as listed in the table on page 2/7, heating is required.

In case of dip lubrication, the oil temperature must not drop below the pour point of the selected oil.

2. In case of dip lubrication, all parts to be lubricated are submersed in oil.

The gear units are often inserted vertically and designed with an "oil expansion tank", to provide the space required by the change in volume of the oil due to the usual warming. This also applies to the "high speed shaft over low speed shaft" mounting position.

If the temperatures are below the values as listed in the table on page 2/7, heating is required.

In case of dip lubrication, the oil temperature must not drop below the pour point of the selected oil.

###### Forced lubrication/oil circulation lubrication

In an oil circulation lubrication system, all of the bearing points and meshing that are not located in oil are supplied with oil via a pump (motor pump, cooling/lubricating system pump or an attached flange-mounted pump).

For selection criteria, see Chapter 6.

When an oil circulation lubrication system is used, the operating viscosity must not exceed 1800 cSt.

At temperature limits below those listed in the table on page 2/7, dip lubrication or a gear unit heating system must be provided.

###### Combination of lubrication types

In practice, dip and forced lubrication are often provided together.

**Overview** (continued)**Selection of oil**

The Flender gear units can be filled with oil from approved oil suppliers. The oil producer or supplier is responsible for the quality of the product. For the selection of oil grade and viscosity, the limits of application given in the table are to be taken into consideration.

A minimum operating viscosity of 25 cSt must be ensured.

Viscosity ISO-VG at 40 °C in mm <sup>2</sup> /s (cSt)	Temperature limits for oil in °C			
	Mineral oil		PAO oil	
	Minimum	Maximum	Minimum	Maximum
Dip lubrication				
VG 220	-10	90 (briefly 100)	-30	100 (briefly 110)
VG 320	-10		-30	
VG 460	-6		-25	
Oil circulation lubrication				
VG 220	10	90 (briefly 100)	0	100 (briefly 110)
VG 320	15		10	

Depending on the environmental and operating conditions, the use of different viscosities may be possible. Please contact Flender in this regard.

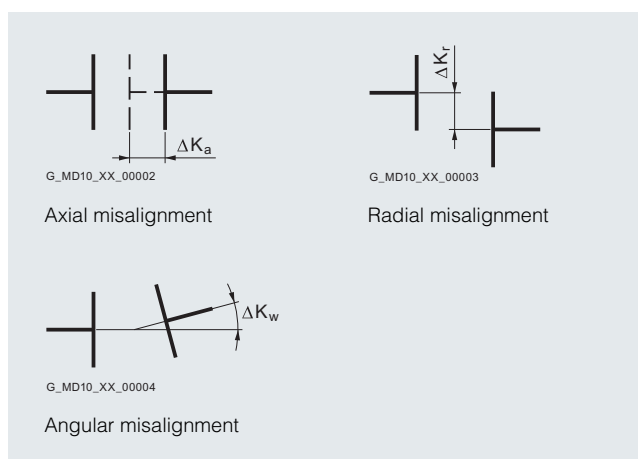
Data for other types of oils (e.g. oil suitable for foodstuffs) upon request.

**Shaft misalignment**

Shaft misalignment is the result of displacement during assembly and operation and, where machines constructed with two radial bearings each are rigidly coupled, will cause high loads being placed on the bearings. Elastic deformation of base frame, foundation and machine housing will lead to shaft misalignment, which cannot be prevented even by precise alignment. Furthermore, because individual components of the drive train heat up differently during operation, heat expansion of the machine housings causes shaft misalignment.

Poorly aligned drives are often the cause of seal or roller bearing failure. Alignment should be carried out by specialist personnel in accordance with the Flender operating instructions.

Depending on the direction of the effective shaft misalignment, a distinction is made between:



The shaft misalignment expected must be taken into account when the connection between the components and the low-speed or high-speed shaft is selected. Guidelines and limits for compensation of shaft misalignment can be obtained from the respective manufacturer.

## Introduction

### Notes

## Information about basics



### Overview (continued)

#### Maintenance

Compliance with the conditions for operation and installation is essential. To prevent damage to the gear unit or failure of the drive, regular inspection and maintenance must be performed as specified in the operating instructions.

#### Rating plate

The rating plate of the gear unit contains the most important technical specifications of the gear unit:

<b>FLENDER</b>		1)	
No. NFJ / 461XXXX - 110 - 1 / 2018		2)	
 1455 kg		3) 4)	
B3SH 11	5)	P2 120 kW	6)
$n_1$ 1475 /min	7)	$n_2$ 95,03 /min	8)
Oil: CLP PAO VG 320 95l		9)	
 BA 5010, BA7300		10)	
Projekt-Nummer / Tagging xxx		11)	
FLENDER Industriegeräte GmbH, Penig		12)	
Made in Germany		13)	

- ① Company logo
- ② Production no.: Production site code/  
Order no. position serial no./year of manufacture
- ③ Total weight in kg
- ④ Special information 1 (for special information)
- ⑤ Type, size
- ⑥ Driven machine output power rating P2 in kW or torque T2 in Nm
- ⑦ High speed  $n_1$
- ⑧ Slow speed  $n_2$
- ⑨ Oil data: oil grade, oil viscosity, amount of oil
- ⑩ Numbers of the operating instructions
- ⑪ Special information 2  
(entry of ATEX details; for special information)
- ⑫ Manufacturer and production site
- ⑬ Country of origin

This data and the agreements agreed contractually between Flender and the ordering party for the gear unit specify the limits for its proper use.

This label is designed as "printed" plastic label.

**Overview****Overview**















- Illustrations are examples only and are not strictly binding
- Dimensions are subject to change
- The weights are mean values and not strictly binding
- To prevent accidents, all rotating parts should be guarded
- Local and national safety regulations of the respective country must be observed
- Prior to commissioning, the operating instructions must be observed
- The gear units are delivered ready for operation but without oil filling
- Oil quantities given are recommended values only. The exact quantity of oil depends on the marks on the oil dipstick
- The oil viscosity has to correspond to the data given on the rating plate
- Approved lubricants only may be used. You will find current operating instructions and lubricant tables on the Internet at: <http://support.automation.siemens.com/WW/view/en/44231658>
- The gear units are supplied with radial shaft seals. For other sealing variants see [Chapter 10](#)
- The data regarding the direction of rotation refers to the low-speed shaft (output shaft  $d_2$ )
- The gear units are laid out by default for operating with 4-pole motors at 50 or 60 Hz
- The gear units are suitable for transmission in both low speed and high speed
- In case of outdoor installation, insulation is to be avoided. The customer has to provide adequate protection
  - Foundation bolts of minimum strength class 8.8
  - Tolerance of the fixing holes in the housing acc. to EN 20273 – "coarse" series.

**Torque specifications in the catalog**

- The nominal output torques specified in the catalog can be permanently transferred if the load direction is constant. The data applies to the drive speeds in the tables
- Since, as a rule, the actual motor speed can deviate from those in the tables and the usage and operating conditions also may not correspond to the laboratory conditions, a recalculation using the CFG calculating program and the actual operating data is recommended. When the gear units are well utilized (as a rule, in the range between 60 and 80% of the nominal output torque), the permitted load data lies above the values specified in the tables.

**Symbols on the gear unit and in the dimensional drawing**

The following symbols, some of which are color-highlighted, are provided for the gear unit:

Earth connection point		
Air relief point		Yellow
Oil filling point		Yellow
Oil draining point		White
Oil level indicator		Red
Oil level measurement		Red
Vibration monitoring connection point		
Lubrication point		Red
Apply grease		
Lifting eye		
Eyebolt		
Do not unscrew		
Alignment surface, horizontal		
Alignment surface, vertical		

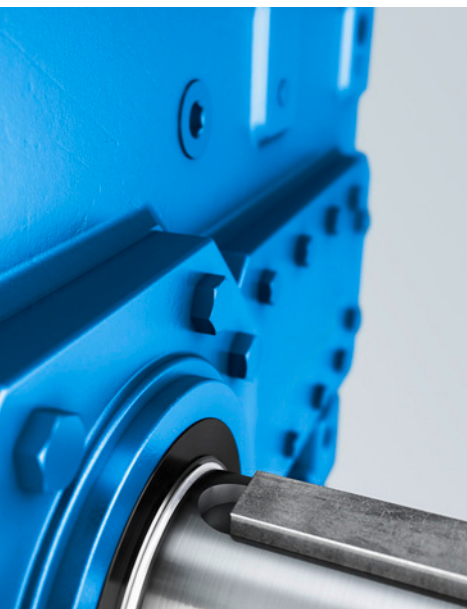
## Introduction

### Notes

2



## Design of the gear units



### 3/2 Determining the drive data – Checklist

#### Guidelines for selection

- 3/3 Constant mechanical power rating
- 3/5 Variable power rating
- 3/6 Selection aid for low speed shaft (LSS)
- 3/7 Explanation of designations
- 3/8 Calculation example
- 3/10 Service factors
- 3/13 Designs for crane applications

#### Overview tables

- 3/14 Type H1
- 3/20 Type H2
- 3/28 Type H3
- 3/36 Type H4
- 3/42 Type B2
- 3/48 Type B3
- 3/62 Type B4
- 3/68 Types H1, H2, H3, H4  
Mass moments of inertia  $J_1$
- 3/72 Types B2, B3, B4  
Mass moments of inertia  $J_1$
- 3/74 Types H1, H2, H3, H4  
Actual ratios
- 3/77 Types B2, B3, B4  
Actual ratios

# Design of the gear units

## Standardized helical and bevel helical gear units

### Determining the drive data – Checklist

3

General

#### Basic version and load data

**Gear unit type:**  Helical gear units H  Bevel helical gear units B  Right-angle gear units W  Gear units with auxiliary drive

**Quantity:** \_\_\_\_\_ Unit

**Motor power:** \_\_\_\_\_ kW

**Motor speed:** \_\_\_\_\_ rpm

**Power at low speed shaft (LSS):** \_\_\_\_\_ kW

**Speed at low speed shaft (LSS):** \_\_\_\_\_ rpm

**Service factor:** \_\_\_\_\_

**Circuits, peak loads/hour:** \_\_\_\_\_ c/h  Fluctuating direction of load

**Line frequency:**  50 Hz  60 Hz  For converter operation  Min./max. frequency \_\_\_\_\_ Hz

**Torque at low speed shaft (LSS):** \_\_\_\_\_ Nm

**Max. peak torque:** \_\_\_\_\_ Nm

**Permissible ratio:** \_\_\_\_\_ %

**Required bearing lifetime  $L_{10\text{mh}}$ :** \_\_\_\_\_ Hours

**Max. permissible oil temperature:** \_\_\_\_\_ °C

#### Ambient conditions

**Installation altitude:** \_\_\_\_\_ m  Outdoor operation

**Air humidity:** \_\_\_\_\_ %  Operation in large halls

**Temperature:** from \_\_\_\_\_ to \_\_\_\_\_ °C  Operation in small rooms

**Brief description of the system:**  
(e.g. industry, conveyor system, etc.)

Gear unit

#### Mounting and mounting position

**Mounting position:**  Horizontal H\_H  Vertical H\_V  B\_H  B\_V

High speed shaft over low speed shaft  H\_H  B\_H

Low speed shaft over high speed shaft  H\_H  B\_H

**Mounting type:**  Foot-mounted design  Shaft-mounted design  Wall mounting  On housing side \_\_\_\_\_

With motor lantern for IEC motors  With HSS coupling  With LSS coupling  Hydraulic coupling  Flexible coupling  Torsionally rigid coupling  Housing flange, short, mounting flange - short spacer  Housing flange, long, mounting flange - long spacer  With gear unit swing base  With base frame  With torque reaction arm  With trestle

**Motor type:** \_\_\_\_\_

**Shafts**

**Design of the low speed shafts:**  Solid shaft with parallel key S  Solid shaft C for flange coupling with cylindrical drilled hole and zero-backlash conical clamping connection (without keyway)  Flanged shaft F  Flange coupling with cylindrical drilled hole and zero-backlash conical clamping connection for solid shaft C  Hollow shaft with keyway H  Hollow shaft with shrink disk D  Hollow shaft with spline K

Special dimensions of high speed shaft:  $(d_1 \times l_1)$  \_\_\_\_\_ x \_\_\_\_\_ mm Tol. \_\_\_\_\_ Shaft shoulder distance:  $(G_1)$  \_\_\_\_\_ mm

Special dimensions of low speed shaft:  $(d_2 \times l_2)$  \_\_\_\_\_ x \_\_\_\_\_ mm Tol. \_\_\_\_\_ Shaft shoulder distance:  $(G_2/G_4/G_5)$  \_\_\_\_\_ mm

**Shaft arrangements:**  High speed shaft (HSS) on both sides  Low speed shaft (LSS) on both sides

**Other options:** (e.g. axial/radial forces)

General options

#### Surface treatment

**Surface protection in accordance with ISO 12944-2 (m):**  C2  C3  C4  C5  Primer coat (C1)  RAL 5015  RAL \_\_\_\_\_

**Other options**

**Auxiliary cooling:**  Fan  Cooling coil; cooling water input temperature \_\_\_\_\_ °C  Cooling unit  Oil/air  Heating, with temperature monitoring  Oil/water  U = \_\_\_\_\_ V, \_\_\_\_\_ Hz, IP \_\_\_\_\_

**Direction of rotation of low speed shaft:**  Clockwise  Counterclockwise  Backstop

**ATEX**

ATEX application?  Yes  No

If yes, please fill in ATEX checklist

### Overview

#### 1. Determination of gear unit type and size

##### 1.1 Determination of the ratio

$$i_s = \frac{n_1}{n_2}$$

##### 1.2 Determination of the nominal power rating of the gear unit

$$P_{2N} \geq P_2 \times f_1 \times f_2$$

It is not necessary to consult us, if:

$$3.33 \times P_2 \geq P_{2N}$$

##### 1.3 Check for maximum torque

e.g.: Peak operating, starting torque or torque of a brake

$$P_{2N} \geq \frac{T_A \times n_1}{9550} \times f_3$$

Gear unit sizes and number of stages are given in rating tables depending on  $i_N$  and  $P_{2N}$ .

##### 1.4 Check of whether additional forces on the low speed shaft (LSS) are permissible; it is essential to consult Flender!

##### 1.5 Check whether the actual ratio $i$ is suitable, see pages 3/74 to 3/79.

#### 2. Determination of oil supply:

##### Horizontal mounting position (H)

- Dip lubrication (all parts to be lubricated are immersed in the oil or are splash lubricated)
- Oil circulation lubrication by means of flange-mounted pump (type H1 only)

##### Vertical mounting position (V)

- Dip lubrication with oil expansion tank
- Forced lubrication on request

##### Upright mounting positions

- Dip lubrication with oil expansion tank
- Forced lubrication on request

#### 3. Thermal factor $K_{th}$

Depending on the application, it is not the gear unit nominal power rating that is used for determining the required size of the gear unit on the basis of the thermal capacity, but a lesser rated output based on the typical load curves. This is taken into account via the thermal factor  $K_{th}$ . See page 3/11.

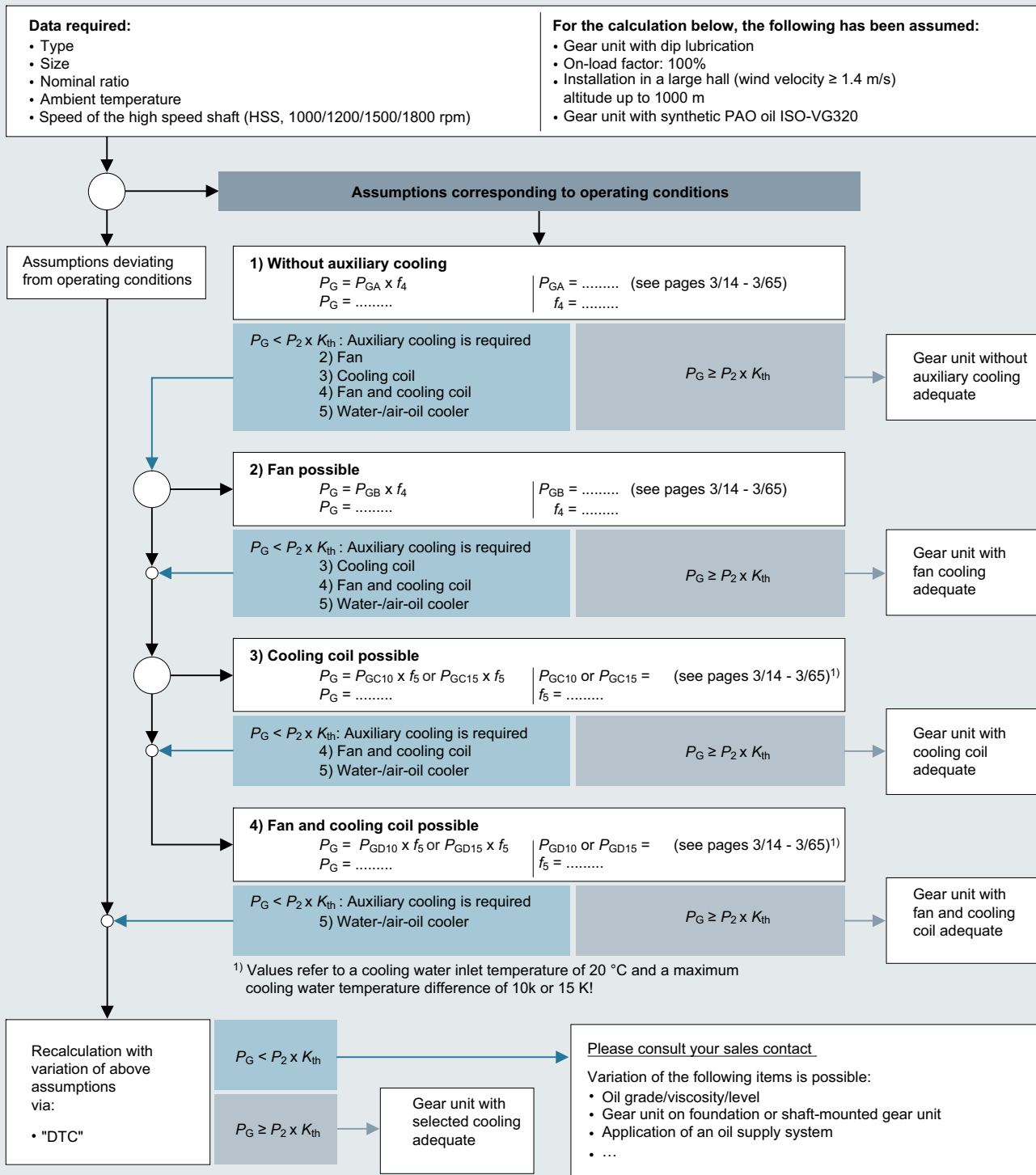
# Design of the gear units

## Guidelines for selection

### Constant mechanical power rating

#### Overview (continued)

#### 3. Determination of required thermal capacity $P_G$



G\_MD20\_EN\_00379

The type of the possibly required auxiliary cooling is dependent on the operating conditions at the customer site (dust, cooling water connection, etc.)

### Overview

For driven machines with constant speeds and variable power ratings the gear unit can be designed according to the equivalent power rating. For this, a working cycle where phases I, II...n require power  $P_I, P_{II} \dots P_n$  and the respective power ratings operate for percental time fractions  $X_I, X_{II} \dots X_n$  is taken as a basis. The equivalent power rating can be calculated from these specifications with the following formula:

$$P_{2eq} = \sqrt[6.6]{P_I^{6.6} \times \frac{X_I}{100} + P_{II}^{6.6} \times \frac{X_{II}}{100} + \dots + P_n^{6.6} \times \frac{X_n}{100}}$$

The size of the gear unit can then be determined analogously to points 1.1 ... 1.5 and 3.

The following applies:

$$P_{2N} \geq P_{2eq} \times f_1 \times f_2$$

Then, when  $P_{2N}$  has been determined, the power and time fractions must be checked by applying the following requirements.

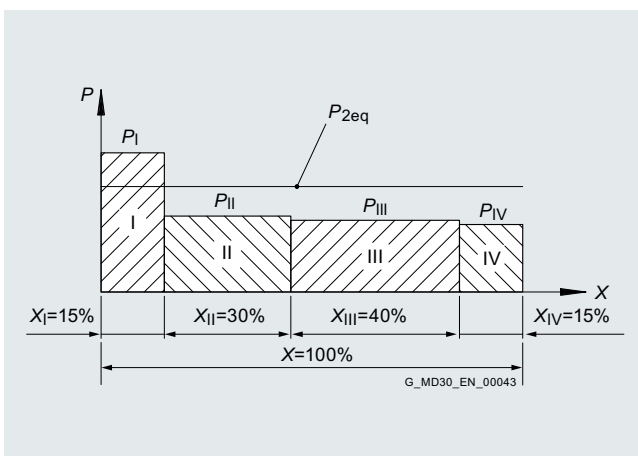
- The individual power fractions  $P_I, P_{II} \dots P_n$  must be greater than  $0.4 \times P_{2N}$ .
- The individual power fractions  $P_I, P_{II} \dots P_n$  must not exceed  $1.4 \times P_{2N}$ .
- For the power fractions  $P_I, P_{II} \dots P_n$  that are greater than  $P_{2N}$ , the total of the time fractions  $X_I, X_{II} \dots X_n$  must be a maximum of 10%.

If any one of these three requirements is not met,  $P_{2eq}$  must be recalculated.

Basically it has to be considered that a brief peak power rating not included in the calculation of  $P_{2eq}$  must not be greater than  $P_{max} = 2 \times P_{2N}$ .

In applications where the torque is variable but the speed constant, the gear unit can be designed on the basis of the so-called equivalent torque.

Example: Service classification



### Finite-life design

A gear unit design which is finite-life fatigue-resistant can be sufficient for certain applications. This includes such things as sporadic use (lock gate drives) or low speeds of the low speed shaft (LSS,  $n_2 < 4$  rpm).

In such case, consultation with Flender is required.

## Design of the gear units

### Guidelines for selection

#### Selection aid for low speed shaft (LSS)

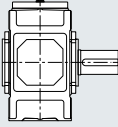
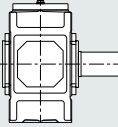
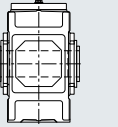
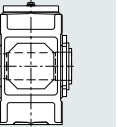
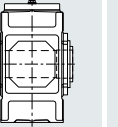
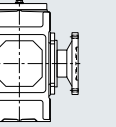
##### Overview

##### Low speed shaft (LSS)

The low speed shaft can be connected to the customer's machine in various different ways. A positively-driven or a friction-locked connection can be used. The following factors are important in selecting a suitable connection:

1. Operating mode and application
2. Ambient conditions
3. Requirements in terms of installation and detachability of the connection
4. General drive arrangement:
  - Mounted on machine shaft (shaft mounted)
  - Mounted on feet
    - Permanently
    - On foundation or
    - Metal substructure (base frame, base plate, etc.)
  - Mounting on side of gear unit housing
    - Wall mounting, permanent
    - Flange mounting, permanent

The following overview is intended as a guide to assist with the selection of a suitable LSS:

						
Type	Solid shaft with parallel key (S/V)	Solid shaft without parallel key (C)	Hollow shaft with keyway according to DIN 6885/1 (H)	Hollow shaft with spline in acc. with DIN 5480 (K)	Hollow shaft with shrink disk (D)	Flanged shaft (F)
Characteristic	<ul style="list-style-type: none"> <li>• Additional coupling element required</li> <li>• Machine shaft manufacture is moderately difficult</li> <li>• Positively-driven connection</li> </ul>	<ul style="list-style-type: none"> <li>• Additional coupling element required</li> <li>• Machine shaft manufacture is moderately difficult</li> <li>• Friction-locked connection</li> </ul>	<ul style="list-style-type: none"> <li>• No additional coupling element required</li> <li>• Machine shaft manufacture is moderately difficult</li> <li>• Positively-driven connection</li> </ul>	<ul style="list-style-type: none"> <li>• No additional coupling element required</li> <li>• Machine shaft manufacture is complex</li> <li>• Positively-driven connection</li> </ul>	<ul style="list-style-type: none"> <li>• No additional coupling element required</li> <li>• Machine shaft manufacture is simple</li> <li>• Friction-locked connection</li> </ul>	<ul style="list-style-type: none"> <li>• Additional coupling element required</li> <li>• Machine shaft manufacture is moderately difficult to complex</li> <li>• Friction-locked connection</li> </ul>
Drive mounted directly on machine shaft with torque reaction arm	-	++	+++	+++	++	++
Drive mounted on foundation	+++	+	++	++	+	+
Drive mounted on machine flange	++	-	++	+++	-	-
Short overall length	+	+	+++	+++	++	++
Small installation space	++	+++	+	+	+	+++
Highly corrosive environment (C5)	++	++	+	+	++	+++
Easy to detach	++	+	+	++	+	+
Less complex connection including connecting element and machine shaft	+++	++	+++	+	++	+++
Intermittent operation, non-periodic and periodic operation (S3-S9)	+	+++	+	++	+++	++

- Not suitable
- + possible
- ++ highly suitable
- +++ extremely suitable

### Overview

#### Explanation of designations

Designation	Explanation	Chapter/page
$E_D$	ON period per hour in % (e.g. ON period = 80% per hour)	
$f_1$	Factor for driven machine	3/10
$f_2$	Factor for prime mover	3/12
$f_3$	Peak torque factor	3/12
$f_4$	Thermal factor	3/12
$f_5$	Thermal factor	3/12
$f_6$	Altitude factor	3/12
$f_7$	Altitude factor	3/12
$i$	Actual ratio	3/74, 3/77
$i_N$	Nominal ratio	
$i_s$	Required ratio	
$K_{th}$	Thermal factor	
$n_1$	Speed of the high speed shaft (HSS, rpm)	
$n_2$	Speed of the low speed shaft (LSS, rpm)	
$P_G$	Required thermal capacity	3/4
$P_{GA}$	Thermal capacity for gear units without auxiliary cooling	
$P_{GB}$	Thermal capacity for gear units with fan cooling	
$P_{GC}$	Thermal capacity for gear units with built-in cooling coil	
$P_{GC10}$	Thermal capacity for gear units with built-in cooling coil, limitation of cooling water temperature difference to 10 K	
$P_{GC15}$	Thermal capacity for gear units with built-in cooling coil, limitation of cooling water temperature difference to 15 K	
$P_{GD}$	Thermal capacity for gear units with built-in cooling coil and fan	
$P_{GD10}$	Thermal capacity for gear units with built-in cooling coil and fan, limitation of cooling water temperature difference to 10 K	
$P_{GD15}$	Thermal capacity for gear units with built-in cooling coil and fan, limitation of cooling water temperature difference to 15 K	
$P_{2N}$	Nominal power rating of gear unit (kW), see rating tables	
$P_2$	Power of driven machine (kW)	
$t$	Ambient temperature (°C)	
$T_A$	Max. torque occurring on high speed shaft (HSS), e.g.: Peak operating, starting or braking torque (Nm)	
$T_{2N}$	Nominal output torque on the low speed shaft (LSS, kNm)	
$T_{2max}$	Max. permissible torque of low speed shaft (LSS, kNm)	
$T_M$	Nominal motor torque (Nm)	
$T_{MA}$	Motor starting torque (Nm)	
$T_{MK}$	Motor pull-out torque (Nm)	
$P_{2eq}$	Equivalent power rating (kW)	
$P_f, P_{fI}, P_n$	Fractions of power (kW) from load spectrum	
$X_f, X_{fI}, X_n$	Fractions of time (%) load spectrum	

#### Notes and legend for tables of thermal capacities

*	On request	$P_{GC10} / P_{GC15}$ (kW)	Gear unit with built-in cooling coil
$P_{GA}$ (kW)	Gear unit without auxiliary cooling	$P_{GD10} / P_{GD15}$ (kW)	Gear unit with fan and built-in cooling coil
$P_{GB}$ (kW)	Gear unit with fan cooling	The values are applicable for:	Operation cycle 100% Installation in large hall Altitude 0 m Cooling water inlet temperature of 20 °C with limiting of the cooling water temperature difference to 10 or 15 K
The values are applicable for:	Operation cycle 100% Installation in large hall Altitude 0 m		

## Design of the gear units

### Guidelines for selection

#### Calculation example

##### Overview

###### Known criteria for the calculation example

###### Prime mover

- Electric motor:  $P_1 = 75 \text{ kW}$
- Motor speed:  $n_1 = 1500 \text{ rpm}$
- Max. starting torque:  $T_A = 720 \text{ Nm}$

###### Driven machine

- Belt conveyor:  $P_2 = 71 \text{ kW}$
- Speed:  $n_2 = 26 \text{ rpm}$
- Duty: 12 h/day
- Starts per hour: 7
- ON period per hour:  $E_D = 100\%$
- Ambient temperature: 40 °C
- Installation in a large hall: Wind velocity  $\geq 1.4 \text{ m/s}$
- Altitude: Sea level

###### Gear unit design

- Bevel helical gear units
- Mounting position: horizontal
- Low speed shaft (LSS): on the right, version C, solid shaft
- Direction of rotation of low speed shaft (LSS): counter-clockwise

###### Required

- Type of gear unit
- Gear unit size

###### 1. Determination of gear unit type and gear unit size

###### 1.1 Determination of the ratio

$$i_s = \frac{n_1}{n_2} = \frac{1500}{26} = 57.7 \quad i_N = 56$$

###### 1.2 Determination of the nominal power rating of the gear unit

$$P_{2N} \geq P_2 \times f_1 \times f_2 = 71 \times 1.3 \times 1 = 92.3 \text{ kW}$$

Selected from power rating table type B3SH, gear unit size 9 with  $P_{2N} = 100 \text{ kW}$ .

$$3.33 \times P_2 \geq P_{2N} \quad 3.33 \times 71 = 236.4 \text{ kW} > P_{2N}$$

It is not necessary to consult us

###### 1.3 Check the starting torque

$$P_{2N} \geq \frac{T_A \times n_1}{9550} \times f_3 = \frac{720 \times 1500}{9550} \times 0.65 = 73.5 \text{ kW}$$

$$P_{2N} = 100 \text{ kW} > 73.5 \text{ kW}$$

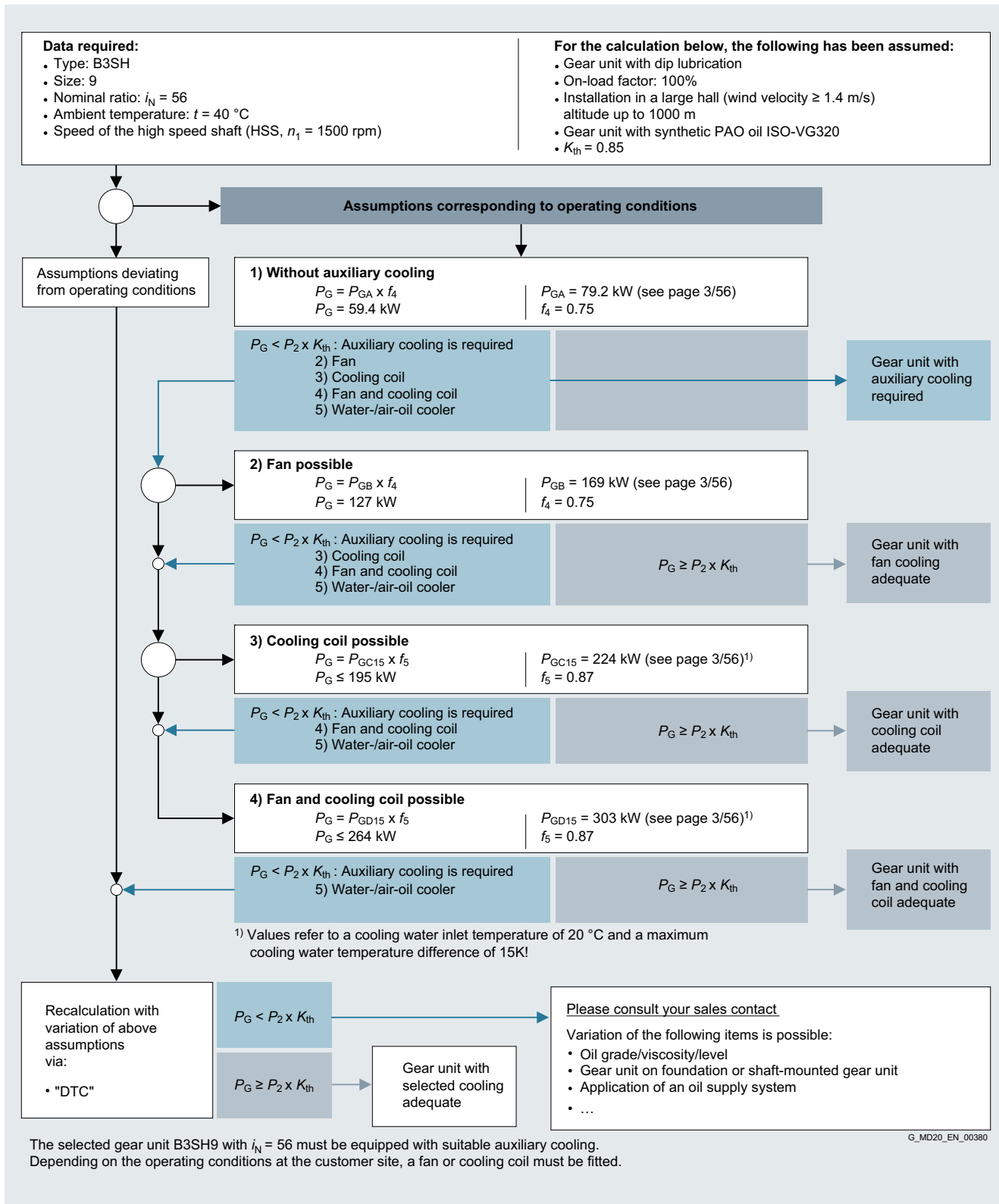
###### 2. Determination of oil supply

Gear unit with dip lubrication



**Overview** (continued)

3. Determination of required thermal capacity  $P_G$



# Design of the gear units

## Guidelines for selection

### Service factors

#### Overview

##### Driven machine factor $f_1$

Driven machines	Effective operating period under load in hours		
	≤ 0.5	> 0.5 - 10	> 10
<b>Waste water</b>			
• Thickeners (central drive)	–	–	1.2
• Filter presses	1.0	1.3	1.5
• Flocculation apparatus	0.8	1.0	1.3
• Aerators	–	1.8	2.0
• Raking equipment	1.0	1.2	1.3
• Combined longitudinal and rotary rakes	1.0	1.3	1.5
• Pre-thickeners	–	1.1	1.3
• Water screw pumps	–	1.3	1.5
• Water turbines	–	–	2.0
<u>Pumps</u>			
• Centrifugal pumps	1.0	1.2	1.3
• Displacement pumps			
- 1 piston	1.3	1.4	1.8
- > 1 piston	1.2	1.4	1.5
<b>Excavators</b>			
• Bucket conveyors	–	1.6	1.6
• Dumping devices	–	1.3	1.5
• Caterpillars	1.2	1.6	1.8
<u>Bucket wheels</u>			
- as pick-up	–	1.7	1.7
- for primitive material	–	2.2	2.2
• Cutter heads	–	2.2	2.2
• Swing gears <sup>1)</sup>	–	1.4	1.8
<b>Plate bending machines <sup>1)</sup></b>	–	1.0	1.0
<b>Chemical industry</b>			
• Extruders	–	–	1.6
• Dough mills	–	1.8	1.8
• Rubber calendars	–	1.5	1.5
• Cooling drums	–	1.3	1.4
<u>Mixers for</u>			
- uniform media	1.0	1.3	1.4
- non-uniform media	1.4	1.6	1.7
<u>Agitators for/media with</u>			
- uniform density	1.0	1.3	1.5
- non-uniform density	1.2	1.4	1.6
- non-uniform gas absorption	1.4	1.6	1.8
• Toasters	1.0	1.3	1.5
• Centrifuges	1.0	1.2	1.3
<b>Metal working mills</b>			
• Plate tilters	1.0	1.0	1.2
• Ingot pushers	1.0	1.2	1.2
• Winding machines	–	1.6	1.6
• Cooling bed transfer frames	–	1.5	1.5
• Roller straighteners	–	1.6	1.6
<u>Roller tables</u>			
- continuous	–	1.5	1.5
- intermittent	–	2.0	2.0
• Reversing tube mills	–	1.8	1.8
<u>Shears</u>			
- Continuous cut <sup>1)</sup>	–	1.5	1.5
- Crank type <sup>1)</sup>	1.0	1.0	1.0
• Continuous casting drivers <sup>1)</sup>	–	1.4	1.4

Driven machines	Effective operating period under load in hours		
	≤ 0.5	> 0.5 - 10	> 10
<b>Rolls</b>			
- Reversing blooming mills	–	2.5	2.5
- Reversing slabbing mills	–	2.5	2.5
- Reversing wire mills	–	1.8	1.8
- Reversing sheet mills	–	2.0	2.0
- Reversing plate mills	–	1.8	1.8
• Roll adjustment drives	0.9	1.0	–
<b>Conveyor systems</b>			
• Bucket conveyors	–	1.4	1.5
• Hauling winches	1.4	1.6	1.6
• Conveyor systems	–	1.5	1.8
• Belt conveyors ≤ 150 kW	1.0	1.2	1.3
• Belt conveyors ≥ 150 kW	1.1	1.3	1.4
• Goods elevators <sup>1)</sup>	–	1.2	1.5
• Passenger elevators <sup>1)</sup>	–	1.5	1.8
• Apron conveyors	–	1.2	1.5
• Escalators	1.0	1.2	1.4
• Railway vehicles	–	1.5	–
<b>Piston compressors</b>	–	1.8	1.9
<b>Crane systems <sup>2)</sup></b>			
• Slewing gears <sup>1)</sup>			See designs for crane applications, page 3/13.
• Luffing gears			
• Traveling gears			
• Hoisting gears			
• Derricking jib cranes			
<b>Cooling towers</b>			
• Cooling tower fans		On request	
• Blowers (axial and radial)	–	1.4	1.5
<b>Food industry</b>			
<u>Cane sugar production</u>			
• Cane knives <sup>1)</sup>	–	–	1.7
• Cane mill	–	–	1.7
<u>Beet sugar production</u>			
• Beet cossettes macerators	–	–	1.2
• Extraction plants, mechanical refrigerators, juice boilers	–	–	1.4
• Sugar beet washing machines, sugar beet cutters	–	–	1.5
<b>Paper machines</b>			
• all types <sup>3)</sup>	–	1.8	2.0
• Pulper drives (on request)			
<b>Centrifugal compressors</b>	–	1.4	1.5
<b>Cable railways</b>			
• Material ropeways	–	1.3	1.4
• To-and-fro system aerial ropeways	–	1.6	1.8
• T-bar lifts	–	1.3	1.4
• Continuous ropeways	–	1.4	1.6
<b>Cement industry</b>			
• Concrete mixers	–	1.5	1.5
• Breakers <sup>1)</sup>	–	1.2	1.4
• Rotary furnaces	–	–	2.0
• Tube mills	–	–	2.0
• Separators	–	1.6	1.6
• Roll crushers	–	–	2.0

**Note:** The listed load parameters are empirical values. Prerequisite for their application is that the machinery and equipment mentioned correspond to generally accepted design and load specifications. In case of deviations from standard conditions, please contact us. For driven machines which are not listed in this table, please refer to us.

Design for driven machine output  $P_2$

<sup>1)</sup> Designed power corresponding to max. torque

<sup>2)</sup> Load can be exactly classified, for instance, according to FEM 1001

<sup>3)</sup> A check for thermal capacity is absolutely essential

### Overview (continued)

#### Thermal factor $K_{th}$

Driven machines	$K_{th}$
<b>Waste water</b>	
• Thickeners (central drive)	1
• Filter presses	0.85
• Flocculation apparatus	0.85
• Aerators	1
• Raking equipment	0.85
• Combined longitudinal and rotary rakes	0.85
• Pre-thickeners	0.85
• Water screw pumps	0.85
• Water turbines	0.85
<u>Pumps</u>	
• Centrifugal pumps	1
• Displacement pumps	
- 1 piston	1
- > 1 piston	1
<b>Excavators</b>	
• Bucket conveyors	0.85
• Dumping devices	0.85
• Caterpillars	0.85
<u>Bucket wheels</u>	
- as pick-up	0.85
- for primitive material	0.85
• Cutter heads	0.85
• Swing gears <sup>1)</sup>	0.85
<b>Plate bending machines</b> <sup>1)</sup>	
<b>Chemical industry</b>	
• Extruders	0.9
• Dough mills	0.85
• Rubber calenders	0.85
• Cooling drums	0.85
<u>Mixers for</u>	
- uniform media	0.85
- non-uniform media	0.85
<u>Agitators for/media with</u>	
- uniform density	0.85
- non-uniform density	0.85
- non-uniform gas absorption	0.85
• Toasters	0.85
• Centrifuges	0.85
<b>Metal working mills</b>	
• Plate tilters	0.85
• Ingot pushers	0.85
• Winding machines	0.85
• Cooling bed transfer frames	0.85
• Roller straighteners	0.85
<u>Roller tables</u>	
- continuous	0.85
- intermittent	0.85
• Reversing tube mills	0.85
<u>Shears</u>	
- Continuous cut <sup>1)</sup>	0.85
- Crank type <sup>1)</sup>	0.85
• Continuous casting drivers <sup>1)</sup>	0.85
<u>Rolls</u>	
- Reversing blooming mills	0.85
- Reversing slabbing mills	0.85
- Reversing wire mills	0.85
- Reversing sheet mills	0.85
- Reversing plate mills	0.85
• Roll adjustment drives	0.85

Driven machines	$K_{th}$
<b>Conveyor systems</b>	
• Bucket conveyors	0.85
• Hauling winches	0.85
• Conveyor systems	0.85
• Belt conveyors ≤ 150 kW	0.9
• Belt conveyors ≥ 150 kW	0.9
• Goods elevators <sup>1)</sup>	0.85
• Passenger elevators <sup>1)</sup>	0.85
• Apron conveyors	0.85
• Escalators	0.85
• Railway vehicles	0.85
<b>Piston compressors</b>	
<b>Crane systems</b> <sup>2)</sup>	
• Slewing gears <sup>1)</sup>	0.85
• Luffing gears	0.85
• Traveling gears	0.85
• Hoisting gears	0.85
• Derricking jib cranes	0.85
<b>Cooling towers</b>	
• Cooling tower fans	1
• Blowers (axial and radial)	1
<b>Food industry</b>	
<u>Cane sugar production</u>	
• Cane knives <sup>1)</sup>	0.85
• Cane mill	0.85
<u>Beet sugar production</u>	
• Beet cassettes macerators	0.85
• Extraction plants, mechanical refrigerators, juice boilers	0.85
• Sugar beet washing machines, sugar beet cutters	0.85
<b>Paper machines</b>	
• all types <sup>3)</sup>	1
• Pulper drives (on request)	0.85
<b>Centrifugal compressors</b>	
<b>Cable railways</b>	
• Material ropeways	0.85
• To-and-fro system aerial ropeways	0.85
• T-bar lifts	0.85
• Continuous ropeways	0.85
<b>Cement industry</b>	
• Concrete mixers	0.85
• Breakers <sup>1)</sup>	0.9
• Rotary furnaces	0.85
• Tube mills	0.85
• Separators	0.85
• Roll crushers	0.85
<b>Further applications</b>	
<b>Exceptions</b>	
Hazardous environment (ATEX)	1
Installation deviating from horizontal mounting position	1
H1 and B2 gear units	1

**Note:** The listed load parameters are empirical values. Prerequisite for their application is that the machinery and equipment mentioned correspond to generally accepted design and load specifications. In case of deviations from standard conditions, please contact us. For driven machines which are not listed in this table, please refer to us.

<sup>1)</sup> To be evaluated individually, consultation required (0.85 ... 1).

Design for driven machine output  $P_2$

<sup>1)</sup> Designed power corresponding to max. torque

<sup>2)</sup> Load can be exactly classified, for instance, according to FEM 1001

<sup>3)</sup> A check for thermal capacity is absolutely essential

## Design of the gear units

### Guidelines for selection

#### Service factors

##### Overview (continued)

##### Prime mover factor $f_2$

	Prime mover factor $f_2$
Electric motors, hydraulic motors, turbines	1.0
Piston-driven machines 4 - 6 cylinders, degree of uniformity 1 : 100 to 1 : 200	1.25
Piston-driven machines 1 - 3 cylinders, degree of uniformity 1 : 100	1.5

##### Peak torque factor $f_3$

	Peak torque factor $f_3$			
	Load peaks per hour			
	1 - 5	6 - 30	31 - 100	> 100
Steady direction of load	0.5	0.65	0.7	0.85
Alternating direction of load	0.7	0.95	1.10	1.25

##### Thermal factor $f_4$

(Gear units without auxiliary cooling or with fan)

	Ambient temperature									
	10 °C	15 °C	20 °C	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C	
$f_4$ for PAO oil filling	1.11	1.06	1.00	0.94	0.88	0.82	0.75	0.69	0.63	
$f_4$ for gear units filled with mineral oil	0.78	0.74	0.70	0.66	0.62	0.57	0.53	0.48	0.44	

##### Thermal factor $f_5$

(For cooling with cooling coil, or with fan and cooling coil)

	Ambient temperature									
	10 °C	15 °C	20 °C	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C	
$f_5$ for PAO oil filling	1.05	1.03	1.00	0.97	0.93	0.90	0.87	0.84	0.81	
$f_5$ for gear units filled with mineral oil	0.81	0.79	0.77	0.75	0.72	0.69	0.67	0.65	0.62	

##### Altitude factor $f_6$

(Gear units without auxiliary cooling or with fan)

	Altitude (meters above sea level)				
	Up to 1000	Up to 2000	Up to 3000	Up to 4000	Up to 5000
Altitude factor $f_6$	1.00	0.95	0.90	0.85	0.80

##### Altitude factor $f_7$

(For cooling with cooling coil, or with fan and cooling coil)

	Altitude (meters above sea level)				
	Up to 1000	Up to 2000	Up to 3000	Up to 4000	Up to 5000
Altitude factor $f_7$	1.00	0.98	0.96	0.94	0.92

**Overview**

The Flender gear units are an economical solution for industrial and indoor cranes. The options often required for crane applications, such as high speed and/or low speed shafts on both sides, are available in the standard portfolio.

Service factors for crane systems

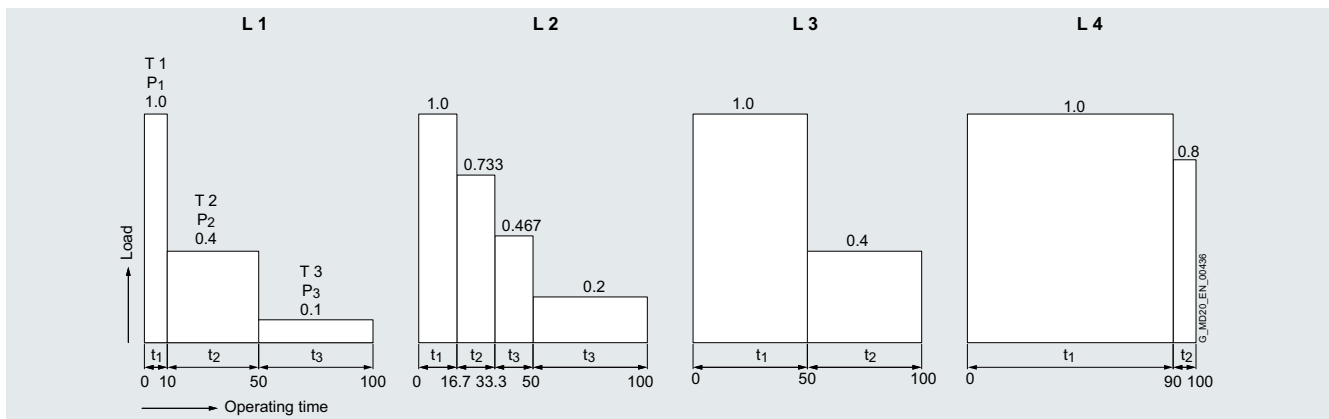
For the use of gear units with variable loads – such as those generally present in crane systems – an FEM classification is recommended. The driven machine factor  $f_1$  and the peak torque factor  $f_3$  corresponding to the mechanism group M1 to M8 – depending on the load (collective classes L1 to L4) and the duration of operation (operating classes T0 to T9) can be found in the tables below.

Regardless of the table values, a recalculation provides the basis for Flender for the right solution, because in many cases significantly smaller dimensioning is possible.

The cubic mean value K for the consideration of the load distribution for a variable load in a representative period of time "t" is calculated for:

$$K = \sqrt[3]{\left(\frac{P_1}{P}\right)^3 \cdot \frac{t_1}{t} + \left(\frac{P_n}{P}\right)^3 \cdot \frac{t_n}{t}}$$

For this,  $P_1 \dots P_n$  is the operating cycle in the time cycle  $t_1 \dots t_n$ .



Classification of the driving gears into groups		Type of driving gear
Crane type Designation		Hoisting gear      Retractable luffing gear
<b>Assembly cranes</b>		M2 ... M3      M1 ... M2
<b>Workshop cranes</b>		M6
<b>Slipway cranes, dockyard cranes, disassembly cranes</b>		M5 ... M6      M4 ... M5
<b>Harbor cranes (rotatable, on portal, etc.)</b> <b>Floating cranes and floating shearing cranes</b>		M6 ... M7      M5 ... M6

**Helical gear units Type H3 and H4 for crane applications (sizes 5 to 22)**

Collective	Cubic mean value k	Service factors	Operating service life class																				
			T0		T1		T2		T3		T4		T5		T6		T7		T8		T9		
			Total operating time in hours																				
			≤ 100	> 200 ... ≤ 400	> 400 ... ≤ 800	> 800 ... ≤ 1600	> 1600 ... ≤ 3200	> 1600 ... ≤ 6400	> 6400 ... ≤ 12500	> 12500 ... ≤ 25000	> 25000 ... ≤ 50000	> 50000											
<b>L1</b>	<b>0.42</b>	$f_1$	1.1 M1	1.1 M1	1.1 M1	1.1 M2	1.1 M3	1.1 M4	1.1 M5	1.1 M6	1.1 M7	1.1 M8	1.2 M7	1.2 M8									
		$f_{3,stat}^{1)}$	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60									
<b>L2</b>	<b>0.51</b>	$f_1$	1.1 M1	1.1 M2	1.1 M1	1.1 M3	1.1 M4	1.1 M5	1.1 M6	1.1 M7	1.2 M7	1.2 M8	1.5 M8	1.5 M8									
		$f_{3,stat}^{1)}$	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60									
<b>L3</b>	<b>0.64</b>	$f_1$	1.1 M1	1.1 M3	1.1 M2	1.1 M4	1.1 M5	1.1 M6	1.1 M7	1.3 M8	1.5 M8	1.6 M8	1.6 M8	1.6 M8									
		$f_{3,stat}^{1)}$	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60									
<b>L4</b>	<b>0.81</b>	$f_1$	1.1 M2	1.1 M4	1.1 M2	1.1 M5	1.1 M6	1.1 M7	1.3 M8	1.6 M8	1.7 M8	1.7 M8	2.0 M8	2.0 M8									
		$f_{3,stat}^{1)}$	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60									

A recalculation is absolutely required for the following gear units:  
 H3 size 6  $i = 31.5$  to 40  
 H3 size 11  $i = 25$  to 50  
 H3 size 12  $i = 31.5$  to 50  
 H3 size 19  $i = 22.4$   
 H3 size 20  $i = 25$

<sup>1)</sup> For H3 size 12, a recalculation is required.



# Design of the gear units

## Overview tables

### Type H1 – Nominal power ratings of gear unit sizes 3 to 19

#### Technical specifications

#### Nominal power ratings $P_{2N}$ (kW) type H1

$i_N$	$n_1$	$n_2$	Gear unit sizes									
			3	5	7	9	11	13	15	17	19	
1.25	1800	1440	437	1206	2291 *	3724 *	–	–	–	–	–	
	1500	1200	364	1005	1909	3103	–	–	–	–		
	1200	960	291	804	1527	2482	–	–	–	–		
	1000	800	242	670	1273	2069	–	–	–	–		
1.4	1800	1286	417	1104	2141 *	3447 *	–	–	–	–		
	1500	1071	347	919	1783	2870	–	–	–	–		
	1200	857	278	735	1426	2297	–	–	–	–		
	1000	714	231	613	1188	1913	–	–	–	–		
1.6	1800	1125	388	1013	1920 *	3192 *	*	*	–	–		
	1500	938	324	844	1600	2661	4518	*	–	–		
	1200	750	259	675	1280	2128	3612	*	–	–		
	1000	625	215	562	1066	1773	3010	4410	–	–		
1.8	1800	1000	282	921	1821 *	2931 *	4984 *	*	–	–		
	1500	833	235	767	1517	2442	4151	*	–	–		
	1200	667	188	614	1215	1955	3324	4951 *	–	–		
	1000	556	157	512	1013	1630	2771	4127	–	–		
2	1800	900	263	885	1677 *	2704 *	4627 *	*	*	–		
	1500	750	219	738	1397	2253	3856	*	*	–		
	1200	600	175	590	1118	1803	3084	4580 *	*	–		
	1000	500	146	492	931	1502	2570	3816	*	–		
2.24	1800	804	235	808	1498 *	2416 *	4259 *	*	*	–		
	1500	670	196	673	1248	2013	3549	*	*	–		
	1200	536	157	538	999	1610	2839	4220 *	*	–		
	1000	446	130	448	831	1340	2363	3511	*	–		
2.5	1800	720	218	723	1341 *	2163 *	3814 *	*	*	–		
	1500	600	182	603	1118	1803	3179	4837 *	*	–		
	1200	480	145	482	894	1442	2543	3870 *	*	–		
	1000	400	121	402	745	1202	2119	3225	4900	–		
2.8	1800	643	208	646	1151 *	1831 *	3406 *	*	*	*		
	1500	536	173	538	959	1526	2839	4321 *	*	*		
	1200	429	139	431	768	1221	2273	3458 *	*	*		
	1000	357	115	358	639	1016	1891	2878	4485	*		
3.15	1800	571	185	573	1040	1680	2875 *	4370 *	*	*		
	1500	476	154	478	867	1400	2397	3643	*	*		
	1200	381	123	382	694	1121	1918	2916	4947 *	*		
	1000	317	102	318	577	932	1596	2426	4116	*		
3.55	1800	507	169	504	944	1518	2665 *	3949 *	*	*		
	1500	423	141	420	788	1266	2223	3295	*	*		
	1200	338	113	336	629	1012	1776	2633	4459 *	*		
	1000	282	94	280	525	844	1482	2196	3720	*		
4	1800	450	150	452	838	1352	2384 *	3567 *	*	*		
	1500	375	125	376	698	1126	1986	2972	*	*		
	1200	300	100	301	559	901	1589	2378	4083 *	*		
	1000	250	83	251	465	751	1324	1981	3403	4528		
4.5	1800	400	104	322	661	1030	1926	2580 *	4565 *	*		
	1500	333	87	268	550	857	1603	2147	3800	*		
	1200	267	69	215	441	687	1286	1722	3047	4081 *		
	1000	222	58	178	367	571	1069	1431	2533	3393		
5	1800	360	90	271	520	885	1458	2197 *	3581 *	4674 *		
	1500	300	75	226	433	738	1215	1831	2984	3895 *		
	1200	240	60	180	346	590	972	1465	2387	3116 *		
	1000	200	50	150	289	492	810	1220	1989	2596		
5.6	1800	321	77	231	440	675	1226	1862 *	3038 *	3966 *		
	1500	268	64	193	367	564	1024	1554	2536	3311 *		
	1200	214	51	154	293	450	817	1241	2025	2644		
	1000	179	43	129	245	376	684	1038	1694	2211		

Forced lubrication required for horizontal gear units

\* on request

## Type H1 – Nominal output torque of low speed shaft (LSS) gear unit sizes 3 to 19

## Technical specifications (continued)

Nominal output torque of low speed shaft (LSS)  $T_{2N}$  (kNm) type H1

i <sub>N</sub>	Gear unit sizes																			Type	
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		22
1.25	2.9	–	8.0	–	15.2	–	24.7	–	–	–	–	–	–	–	–	–	–	–	–	–	H1
1.4	3.1	–	8.2	–	15.9	–	25.6	–	–	–	–	–	–	–	–	–	–	–	–	–	
1.6	3.3	–	8.6	–	16.3	–	27.1	–	46.0	–	67.4	–	–	–	–	–	–	–	–	–	
1.8	2.7	–	8.8	–	17.4	–	28.0	–	47.6	–	70.9	–	–	–	–	–	–	–	–	–	
2	2.8	–	9.4	–	17.8	–	28.7	–	49.1	–	72.9	–	129	–	–	–	–	–	–	–	
2.24	2.8	–	9.6	–	17.8	–	28.7	–	50.6	–	75.2	–	130	–	–	–	–	–	–	–	
2.5	2.9	–	9.6	–	17.8	–	28.7	–	50.6	–	77.0	–	117	–	–	–	–	–	–	–	
2.8	3.1	–	9.6	–	17.1	–	27.2	–	50.6	–	77.0	–	120	–	171	–	–	–	–	–	
3.15	3.1	–	9.6	–	17.4	–	28.1	–	48.1	–	73.1	–	124	–	173	–	–	–	–	–	
3.55	3.2	–	9.5	–	18.8	–	28.6	–	50.2	–	74.4	–	126	–	173	–	–	–	–	–	
4	3.2	–	9.6	–	17.8	–	28.7	–	50.6	–	75.7	–	130	–	173	–	245	–	–	–	
4.5	2.5	–	7.7	–	15.8	–	24.6	–	46.0	–	61.6	–	109	–	146	–	216	–	–	–	
5	2.4	–	7.2	–	13.8	–	23.5	–	38.7	–	58.3	–	95.0	–	124	–	174	–	–	–	
5.6	2.3	–	6.9	–	13.1	–	20.1	–	36.5	–	55.4	–	90.4	–	118	–	150	–	–	–	
6.3	–	6.3	10.7	–	20.3	–	33.7	–	59.3	–	86.0	–	143	–	195	–	292	–	410	–	
7.1	–	6.5	11.2	–	20.3	–	33.7	–	59.3	–	86.0	–	143	–	195	230	292	335	410	458	
8	–	6.7	11.2	13.5	20.3	25.6	33.7	42.2	59.3	73.8	86.0	107	143	160	195	230	292	335	410	458	
9	–	6.7	11.2	14.4	20.3	25.6	33.7	42.2	59.3	73.8	86.0	107	143	160	195	230	292	335	410	458	
10	–	6.3	10.5	14.4	20.3	25.6	33.7	42.2	59.3	73.8	86.0	107	143	160	195	230	292	335	410	458	
11.2	–	6.3	10.6	14.4	20.3	25.6	33.7	42.2	59.3	73.8	86.0	107	143	160	195	230	292	335	410	458	
12.5	–	6.7	11.2	13.5	20.2	25.6	33.7	42.2	59.3	73.8	86.0	107	143	160	195	230	292	335	410	458	
14	–	6.7	11.2	13.5	20.3	25.6	33.7	42.2	59.3	73.8	86.0	107	143	160	195	230	292	335	410	458	
16	–	6.7	11.2	14.4	20.3	25.6	33.7	42.2	59.3	73.8	86.0	107	143	160	195	230	292	335	410	458	
18	–	6.3	10.5	14.4	19.0	25.6	33.7	42.2	59.3	73.8	86.0	107	143	160	195	230	292	335	410	458	
20	–	6.6	11.2	14.4	19.0	25.6	33.7	42.2	59.3	73.8	86.0	107	143	160	195	230	292	335	410	458	
22.4	–	6.3	10.9	13.5	19.8	24	33.1	42.2	58.3	73.8	88.0	107	153	160	200	230	300	335	420	458	
25	–	–	11.6	14.3	21.7	24	35.7	42.2	63.5	73.8	88.0	107	153	173	200	240	300	345	420	470	
28	–	–	11.6	13.9	21.7	25	35.7	41.6	63.5	72.5	88.0	109	153	173	200	240	300	345	420	470	
31.5	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	88.0	109	153	173	200	240	300	345	420	470	
35.5	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	88.0	109	153	173	200	240	300	345	420	470	
40	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	88.0	109	153	173	200	240	300	345	420	470	
45	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	88.0	109	153	173	200	240	300	345	420	470	
50	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	88.0	109	153	173	200	240	300	345	420	470	
56	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	88.0	109	153	173	200	240	300	345	420	470	
63	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	88.0	109	153	173	200	240	300	345	420	470	
71	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	88.0	109	153	173	200	240	300	345	420	470	
80	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	88.0	109	153	173	200	240	300	345	420	470	
90	–	–	11.6	15.5	20.0	27.2	34.5	43.8	63.5	77.2	88.0	109	153	173	200	240	290	345	410	470	
100	–	–	–	14.5	21.7	27.2	35.7	43.8	61.6	77.2	90.7	109	153	173	200	226	300	335	420	465	
112	–	–	–	15.0	21.7	25.2	35.7	42.8	61.6	77.2	90.7	109	153	173	200	240	300	345	420	470	
125	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	90.7	113	153	173	200	240	300	345	420	470	
140	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	90.7	113	153	173	200	240	300	345	420	470	
160	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	90.7	113	153	173	200	240	300	345	420	470	
180	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	90.7	113	153	173	200	240	300	345	420	470	
200	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	90.7	113	153	173	200	240	300	345	420	470	
224	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	90.7	113	153	173	200	240	300	345	420	470	
250	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	90.7	113	153	173	200	240	300	345	420	470	
280	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	90.7	113	153	173	200	240	300	345	420	470	
315	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	90.7	113	153	173	200	240	300	345	420	470	
355	–	–	–	–	19.6	27.2	35.7	44.2	61.6	78.0	90.7	113	140	173	–	240	290	345	410	470	
400	–	–	–	–	–	27.2	–	44.2	–	78.0	–	113	–	158	–	223	–	335	–	465	
450	–	–	–	–	–	25.3	–	42.8	–	78.0	–	113	–	–	–	–	–	–	–	–	

Type H2, see page 3/22  
Type H3, see page 3/30  
Type H4, see page 3/38

## Design of the gear units

### Overview tables

#### Type H1 – Thermal capacities $n_1 = 1000$ rpm

#### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type H1 $n_1 = 1000$ rpm

$i_N$		Gear unit sizes								
		3	5	7	9	11	13	15	17	19
1.25	$P_{GA}$	73.2	*	*	*	–	–	–	–	–
	$P_{GB}$	222	517	698	763	–	–	–	–	–
	$P_{GC10}$	345	574	474	822	–	–	–	–	–
	$P_{GD10}$	472	963	1117	1631	–	–	–	–	–
1.4	$P_{GA}$	77.7	83.5	167	*	–	–	–	–	–
	$P_{GB}$	222	525	728	827	–	–	–	–	–
	$P_{GC10}$	335	581	514	880	–	–	–	–	–
	$P_{GD10}$	458	957	1133	1656	–	–	–	–	–
1.6	$P_{GA}$	81.7	123.9	*	*	*	*	–	–	–
	$P_{GB}$	218	550	790	883	1070	330	–	–	–
	$P_{GC10}$	316	603	582	933	674	329	–	–	–
	$P_{GD10}$	433	975	1184	1656	2047	1650	–	–	–
1.8	$P_{GA}$	93.5	138	*	*	*	*	–	–	–
	$P_{GB}$	239	516	761	908	1168	778	–	–	–
	$P_{GC10}$	337	565	572	955	820	254	–	–	–
	$P_{GD10}$	464	897	1121	1637	2081	1956	–	–	–
2.0	$P_{GA}$	92.4	145	*	*	*	*	*	*	*
	$P_{GB}$	231	502	750	919	1216	993	376	*	*
	$P_{GC10}$	319	550	575	965	919	509	376	*	*
	$P_{GD10}$	440	864	1092	1606	2079	2053	1529	*	*
2.24	$P_{GA}$	90.5	147	171	*	*	*	*	*	*
	$P_{GB}$	221	480	715	908	1237	1155	745	*	*
	$P_{GC10}$	300	528	561	957	968	710	666	*	*
	$P_{GD10}$	415	822	1025	1553	2045	2092	1772	*	*
2.5	$P_{GA}$	86.2	146	181	*	*	*	*	*	*
	$P_{GB}$	206	455	680	880	1253	1223	1068	*	*
	$P_{GC10}$	271	503	541	930	1011	858	824	*	*
	$P_{GD10}$	375	776	968	1480	2001	2081	1998	*	*
2.8	$P_{GA}$	81.8	142.7	197.3	*	*	*	*	*	*
	$P_{GB}$	192	426.3	692.8	914	1238.4	1250.3	1209.5	690.6	*
	$P_{GC10}$	247.8	473	556.4	969.3	1026.7	941.2	304.7	445.1	*
	$P_{GD10}$	345	724	982	1516	1930	2040	2050	1694	*
3.15	$P_{GA}$	85.6	165	239	286	307	*	*	*	*
	$P_{GB}$	189	429	739	931	1354	1437	1480	1197	*
	$P_{GC10}$	245	476	598	993	1157	1164	703	720	*
	$P_{GD10}$	335	711	1056	1549	2033	2177	2281	2066	*
3.55	$P_{GA}$	79.9	164	230	284	351	*	*	*	*
	$P_{GB}$	174	418	681	869	1275	1400	1494	1352	*
	$P_{GC10}$	220	466	559	933	1105	1163	824	330	*
	$P_{GD10}$	303	693	973	1440	1893	2076	2216	2124	*
4.0	$P_{GA}$	72.9	152	217	259	365	385	*	*	*
	$P_{GB}$	157	380	620	755	1189	1328	1498	1410	960
	$P_{GC10}$	194	428	514	816	1044	1128	924	587	*
	$P_{GD10}$	268	631	883	1248	1751	1940	2140	2095	*
4.5	$P_{GA}$	85.5	163	239	325	386	474	*	*	*
	$P_{GB}$	172	386	623	852	1112	1355	1704	1652	1424
	$P_{GC10}$	211	436	525	922	987	1166	1170	943	*
	$P_{GD10}$	288	634	878	1379	1637	1961	2330	2281	*
5.0	$P_{GA}$	78.0	157	235	302	404	473	519	*	*
	$P_{GB}$	155	367	602	769	1098	1301	1734	1936	1820
	$P_{GC10}$	187	416	512	837	989	1127	1245	1208	*
	$P_{GD10}$	256	604	849	1242	1612	1877	2330	2599	*
5.6	$P_{GA}$	70.5	143	214	298	391	459	536	*	*
	$P_{GB}$	139	328	538	738	1041	1185	1588	1837	2145
	$P_{GC10}$	164	375	462	812	943	1040	1168	1214	*
	$P_{GD10}$	225	540	760	1196	1529	1701	2115	2423	*

\* on request



### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type H1 $n_1 = 1200$ rpm

$i_N$		Gear unit sizes								
		3	5	7	9	11	13	15	17	19
1.25	$P_{GA}$	45.9	89.2	*	*	–	–	–	–	–
	$P_{GB}$	234	508	686	599	–	–	–	–	–
	$P_{GC10}$	368	500	306	502	–	–	–	–	–
	$P_{GD10}$	524	978	1137	1604	–	–	–	–	–
1.4	$P_{GA}$	56.2	104.8	*	*	–	–	–	–	–
	$P_{GB}$	236	530	730	729	–	–	–	–	–
	$P_{GC10}$	359	522	376	635	–	–	–	–	–
	$P_{GD10}$	510	985	1161	1661	–	–	–	–	–
1.6	$P_{GA}$	65.3	*	*	*	*	*	–	–	–
	$P_{GB}$	235	571	799	862	751	1146	–	–	–
	$P_{GC10}$	341	561	467	781	65	346	–	–	–
	$P_{GD10}$	485	1018	1217	1695	1911	826	–	–	–
1.8	$P_{GA}$	79.2	*	*	*	*	*	–	–	–
	$P_{GB}$	260	546	775	901	954	108	–	–	–
	$P_{GC10}$	364	539	474	828	320	108	–	–	–
	$P_{GD10}$	519	946	1158	1687	2009	1435	–	–	–
2.0	$P_{GA}$	80.4	92.2	128	*	*	*	*	*	*
	$P_{GB}$	252	536	780	915	1109	*	*	*	*
	$P_{GC10}$	346	531	501	853	518	487	1062	*	*
	$P_{GD10}$	494	916	1142	1657	2056	1724	539	*	*
2.24	$P_{GA}$	80.4	108	*	*	*	*	*	*	*
	$P_{GB}$	243	517	758	911	1188	767	*	*	*
	$P_{GC10}$	326	515	514	858	670	41.4	1230	*	*
	$P_{GD10}$	466	875	1087	1604	2060	1904	1081	*	*
2.5	$P_{GA}$	78.6	115	*	*	*	*	*	*	*
	$P_{GB}$	226	494	728	905	1219	975	*	*	*
	$P_{GC10}$	294	495	507	862	784	320	190	*	*
	$P_{GD10}$	422	829	1034	1546	2027	1970	1557	*	*
2.8	$P_{GA}$	75.6	117	124	168	*	*	*	*	*
	$P_{GB}$	211	465	747	954	1214	1120	751	1082	*
	$P_{GC10}$	269	469	529	916	832	528	356	1081	*
	$P_{GD10}$	389	776	1053	1595	1958	1982	1754	832	*
3.15	$P_{GA}$	82.9	153	201	*	*	*	*	*	*
	$P_{GB}$	210	476	809	996	1379	1363	1241	420	*
	$P_{GC10}$	268	484	586	969	1023	899	658	420	*
	$P_{GD10}$	380	771	1142	1647	2103	2163	2123	1545	*
3.55	$P_{GA}$	78.0	155	202	221	*	*	*	*	*
	$P_{GB}$	194	465	750	939	1327	1351	1362	898	*
	$P_{GC10}$	242	476	553	921	1019	944	329	209	*
	$P_{GD10}$	343	752	1055	1539	1986	2079	2147	1807	*
4.0	$P_{GA}$	71.7	146	197	216	222	*	*	*	*
	$P_{GB}$	175	424	685	822	1257	1330	1396	1169	997
	$P_{GC10}$	213	438	513	814	990	979	557	440	*
	$P_{GD10}$	304	686	961	1339	1855	1982	2093	1919	*
4.5	$P_{GA}$	87.7	163	231	297	315	*	*	*	*
	$P_{GB}$	194	434	698	941	1198	1396	1672	1500	831
	$P_{GC10}$	234	451	537	937	964	1075	914	458	*
	$P_{GD10}$	329	693	964	1496	1751	2037	2347	2187	*
5.0	$P_{GA}$	80.4	156	231	284	354	*	*	*	*
	$P_{GB}$	176	412	675	853	1193	1355	1769	1818	1457
	$P_{GC10}$	207	431	525	857	981	1055	1084	772	*
	$P_{GD10}$	292	660	933	1351	1734	1963	2403	2535	*
5.6	$P_{GA}$	72.9	143	213	286	350	370	*	*	*
	$P_{GB}$	158	370	604	823	1136	1252	1660	1801	1835
	$P_{GC10}$	182	391	476	836	940	997	1073	941	*
	$P_{GD10}$	257	594	837	1303	1647	1795	2219	2429	*

\* on request

## Design of the gear units

### Overview tables

#### Type H1 – Thermal capacities $n_1 = 1500$ rpm

#### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type H1 $n_1 = 1500$ rpm

$i_N$	Gear unit sizes									
		3	5	7	9	11	13	15	17	19
1.25	$P_{GA}$	*	*	*	*	–	–	–	–	–
	$P_{GB}$	238	494	562	*	–	–	–	–	–
	$P_{GC10}$	390	383	427	*	–	–	–	–	–
	$P_{GD10}$	587	996	1089	1369	–	–	–	–	–
1.4	$P_{GA}$	*	*	*	*	–	–	–	–	–
	$P_{GB}$	245	524	662	*	–	–	–	–	–
	$P_{GC10}$	383	418	*	*	–	–	–	–	–
	$P_{GD10}$	575	1009	1145	1530	–	–	–	–	–
1.6	$P_{GA}$	*	*	*	*	*	*	–	–	–
	$P_{GB}$	250	572	784	657	*	*	–	–	–
	$P_{GC10}$	368	467	220	334	318	227	–	–	–
	$P_{GD10}$	550	1048	1239	1649	1285	1609	–	–	–
1.8	$P_{GA}$	45.2	*	*	*	*	*	–	–	–
	$P_{GB}$	281	557	781	778	*	*	–	–	–
	$P_{GC10}$	393	464	281	478	339	652	–	–	–
	$P_{GD10}$	591	983	1197	1682	1586	67	–	–	–
2.0	$P_{GA}$	52.4	*	*	*	*	*	*	*	*
	$P_{GB}$	275	558	792	863	637	*	*	*	*
	$P_{GC10}$	375	473	339	587	581	869	*	*	*
	$P_{GD10}$	564	963	1185	1682	1815	*	*	*	*
2.24	$P_{GA}$	56.8	*	*	*	*	*	*	*	*
	$P_{GB}$	266	548	779	895	865	*	*	*	*
	$P_{GC10}$	355	471	391	666	675	1042	*	*	*
	$P_{GD10}$	534	929	1135	1655	1918	*	*	*	*
2.5	$P_{GA}$	60.0	*	*	*	*	*	*	*	*
	$P_{GB}$	250	530	758	897	1028	*	*	*	*
	$P_{GC10}$	321	462	407	704	217	223	653	*	*
	$P_{GD10}$	485	886	1088	1600	1956	1459	*	*	*
2.8	$P_{GA}$	60.0	*	*	*	*	*	*	*	*
	$P_{GB}$	235	504	788	953	1117	*	*	*	*
	$P_{GC10}$	295	446	443	767	398	386	885	*	*
	$P_{GD10}$	447	835	1116	1655	1939	1686	*	*	*
3.15	$P_{GA}$	74.3	121	*	*	*	*	*	*	*
	$P_{GB}$	237	532	878	1033	1369	1133	350	*	*
	$P_{GC10}$	299	480	534	871	763	271	350	298	*
	$P_{GD10}$	440	844	1229	1730	2159	2051	1501	*	*
3.55	$P_{GA}$	71.3	130	*	*	*	*	*	*	*
	$P_{GB}$	220	523	825	993	1334	1226	814	762	*
	$P_{GC10}$	269	477	518	854	809	484	813	761	*
	$P_{GD10}$	399	826	1147	1633	2049	2031	1783	*	*
4.0	$P_{GA}$	66.7	127	146	*	*	*	*	*	*
	$P_{GB}$	199	479	759	885	1274	1237	1099	282	*
	$P_{GC10}$	237	442	492	774	816	628	250	282	*
	$P_{GD10}$	354	756	1051	1437	1923	1956	1885	*	*
4.5	$P_{GA}$	88.7	154	204	222	*	*	*	*	*
	$P_{GB}$	225	496	792	1039	1257	1344	1546	1091	*
	$P_{GC10}$	266	464	538	924	866	822	353	1090	*
	$P_{GD10}$	386	770	1073	1629	1850	2036	2291	*	*
5.0	$P_{GA}$	81.9	150	210	231	*	*	*	*	*
	$P_{GB}$	204	472	768	950	1282	1325	1715	1546	*
	$P_{GC10}$	235	445	532	857	920	843	692	405	*
	$P_{GD10}$	344	734	1040	1482	1858	1981	2409	2346	*
5.6	$P_{GA}$	74.7	139	199	248	*	*	*	*	*
	$P_{GB}$	183	425	689	925	1229	1271	1632	1622	*
	$P_{GC10}$	206	405	485	847	894	857	781	277	*
	$P_{GD10}$	302	662	935	1436	1773	1852	2243	2320	*

\* on request

### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type H1 $n_1 = 1800 \text{ rpm}$

$i_N$		Gear unit sizes								
		3	5	7	9	11	13	15	17	19
1.25	$P_{GA}$	*	*	*	*	–	–	–	–	–
	$P_{GB}$	230	418	317	874	–	–	–	–	–
	$P_{GC10}$	396	192	184	352	–	–	–	–	–
	$P_{GD10}$	637	969	907	840	–	–	–	–	–
1.4	$P_{GA}$	*	*	*	*	–	–	–	–	–
	$P_{GB}$	240	483	463	962	–	–	–	–	–
	$P_{GC10}$	389	256	239	452	–	–	–	–	–
	$P_{GD10}$	624	998	1033	1117	–	–	–	–	–
1.6	$P_{GA}$	*	*	*	*	*	*	–	–	–
	$P_{GB}$	253	555	667	277	759	*	–	–	–
	$P_{GC10}$	379	347	320	276	759	–	–	–	–
	$P_{GD10}$	602	1058	1186	1428	*	*	–	–	–
1.8	$P_{GA}$	*	*	*	*	*	*	–	–	–
	$P_{GB}$	291	558	718	487	945	*	–	–	–
	$P_{GC10}$	411	380	344	486	945	–	–	–	–
	$P_{GD10}$	651	1007	1172	1557	*	*	–	–	–
2.0	$P_{GA}$	*	*	*	*	*	*	*	*	*
	$P_{GB}$	288	561	756	643	1090	*	*	*	*
	$P_{GC10}$	394	396	98	150	1089	*	*	*	*
	$P_{GD10}$	623	988	1182	1610	*	*	*	*	*
2.24	$P_{GA}$	*	*	*	*	*	*	*	*	*
	$P_{GB}$	282	552	774	752	*	*	*	*	*
	$P_{GC10}$	374	401	209	311	*	*	*	*	*
	$P_{GD10}$	591	953	1154	1620	*	*	*	*	*
2.5	$P_{GA}$	*	*	*	*	*	*	*	*	*
	$P_{GB}$	267	538	761	824	*	*	*	*	*
	$P_{GC10}$	341	403	261	428	*	*	*	*	*
	$P_{GD10}$	539	914	1114	1595	1694	*	*	*	*
2.8	$P_{GA}$	*	*	*	*	*	*	*	*	*
	$P_{GB}$	253	520	790	905	799	*	*	*	*
	$P_{GC10}$	314	400	308	542	371	761	*	*	*
	$P_{GD10}$	498	868	1143	1669	1785	*	*	*	*
3.15	$P_{GA}$	60.3	66.3	*	*	*	*	*	*	*
	$P_{GB}$	260	570	903	1040	1252	*	*	*	*
	$P_{GC10}$	323	461	444	746	298	*	*	*	*
	$P_{GD10}$	495	898	1274	1778	2110	*	*	*	*
3.55	$P_{GA}$	60.0	89.3	*	*	*	*	*	*	*
	$P_{GB}$	241	565	861	1002	1273	855	*	*	*
	$P_{GC10}$	292	463	453	743	481	369	804	*	*
	$P_{GD10}$	449	883	1201	1680	2046	1824	*	*	*
4.0	$P_{GA}$	57.7	96.2	*	*	*	*	*	*	*
	$P_{GB}$	219	521	804	901	1254	1022	*	*	*
	$P_{GC10}$	258	434	446	690	593	*	*	*	*
	$P_{GD10}$	399	811	1110	1484	1951	1834	*	*	*
4.5	$P_{GA}$	87.0	137	157	*	*	*	*	*	*
	$P_{GB}$	253	548	859	1092	1266	1252	*	*	*
	$P_{GC10}$	293	467	517	873	719	*	*	*	*
	$P_{GD10}$	439	834	1157	1715	1895	1990	2061	*	*
5.0	$P_{GA}$	81.0	135	173	*	*	*	*	*	*
	$P_{GB}$	230	523	840	1012	1304	1245	1551	*	*
	$P_{GC10}$	260	449	519	827	797	*	*	*	*
	$P_{GD10}$	391	797	1126	1573	1912	1941	2305	*	*
5.6	$P_{GA}$	74.6	129	172	183	*	*	*	*	*
	$P_{GB}$	207	472	758	996	1263	1204	1561	1219	*
	$P_{GC10}$	228	411	482	831	794	632	373	1218	*
	$P_{GD10}$	345	719	1014	1536	1837	1824	2220	*	*

\* on request

## Design of the gear units

### Overview tables

#### Type H2 – Nominal power ratings of gear unit sizes 4 to 12

##### Technical specifications (continued)

##### Nominal power ratings $P_{2N}$ (kW) type H2

$i_N$	$n_1$	$n_2$	Gear unit sizes									
			4	5	6	7	8	9	10	11	12	
<b>6.3</b>	1800	286	188	320	–	607	–	1009	–	1775	–	
	1500	238	157	266	–	505	–	839	–	1477	–	
	1200	190	125	212	–	403	–	670	–	1179	–	
	1000	159	104	178	–	337	–	561	–	987	–	
<b>7.1</b>	1800	254	172	297	–	539	–	896	–	1577	–	
	1500	211	143	247	–	448	–	744	–	1310	–	
	1200	169	115	198	–	359	–	596	–	1049	–	
	1000	141	95	165	–	299	–	497	–	875	–	
<b>8</b>	1800	225	157	263	318	478	603	793	994	1397	1738	
	1500	188	131	220	265	399	503	663	830	1167	1452	
	1200	150	105	175	212	318	402	529	662	931	1159	
	1000	125	87	146	176	265	335	441	552	776	965	
<b>9</b>	1800	200	140	234	301	425	536	705	883	1241	1545	
	1500	167	117	195	251	354	447	589	737	1036	1290	
	1200	133	93	155	200	282	356	469	587	825	1027	
	1000	111	77	130	167	235	297	391	490	689	857	
<b>10</b>	1800	180	118	197	271	382	482	635	795	1117	1390	
	1500	150	98	164	226	318	402	529	662	931	1159	
	1200	120	79	131	180	255	321	423	530	745	927	
	1000	100	65	109	150	212	268	352	441	620	772	
<b>11.2</b>	1800	161	106	178	242	342	431	568	711	999	1244	
	1500	134	88	148	202	284	359	472	592	832	1035	
	1200	107	70	118	161	227	286	377	472	664	826	
	1000	89	58	98	134	189	238	314	393	552	687	
<b>12.5</b>	1800	144	101	168	203	304	386	508	636	894	1112	
	1500	120	84	140	169	253	321	423	530	745	927	
	1200	96	67	112	135	203	257	338	424	596	741	
	1000	80	56	93	113	169	214	282	353	496	618	
<b>14</b>	1800	129	90	151	182	274	345	455	570	801	996	
	1500	107	75	125	151	227	286	377	472	664	826	
	1200	86	60	100	121	182	230	303	380	534	664	
	1000	71	49	83	100	150	190	250	313	440	548	
<b>16</b>	1800	113	79	132	170	240	301	398	499	701	873	
	1500	94	65	110	141	199	250	331	415	583	726	
	1200	75	52	87	113	159	200	264	331	465	579	
	1000	63	44	73	94	133	168	222	278	391	486	
<b>18</b>	1800	100	65	109	150	198	268	352	441	620	772	
	1500	83	54	91	125	165	222	292	366	515	641	
	1200	67	44	73	101	133	179	236	296	416	517	
	1000	56	36	61	84	111	150	197	247	347	432	
<b>20</b>	1800	90	62	105	135	179	241	317	397	558	695	
	1500	75	51	87	113	149	201	264	331	465	579	
	1200	60	41	70	90	119	160	211	265	372	463	
	1000	50	34	58	75	99	134	176	220	310	386	
<b>22.4</b>	1800	80	52	91	113	165	201	277	353	488	618	
	1500	67	44	76	94	138	168	232	296	409	517	
	1200	54	35	61	76	111	135	187	238	329	417	
	1000	45	29	51	63	93	113	155	198	274	347	
<b>25</b>	1800	72	–	–	107	–	180	–	318	–	556	
	1500	60	–	–	89	–	150	–	265	–	463	
	1200	48	–	–	71	–	120	–	212	–	370	
	1000	40	–	–	59	–	100	–	176	–	309	
<b>28</b>	1800	64	–	–	93	–	167	–	278	–	485	
	1500	54	–	–	78	–	141	–	235	–	409	
	1200	43	–	–	62	–	112	–	187	–	326	
	1000	36	–	–	52	–	94	–	156	–	273	

**Type H2 – Nominal power ratings of gear unit sizes 13 to 28**
**Technical specifications (continued)**
**Nominal power ratings  $P_{2N}$  (kW) type H2**

$i_N$	$n_1$	$n_2$	Gear unit sizes															
			13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
<b>6.3</b>	1800	286	2575	–	4282 *	–	*	–	*	–	*	–	*	–	*	–	*	–
	1500	238	2143	–	3563	–	4859	–	*	–	*	–	*	–	*	–	*	–
	1200	190	1710	–	2845	–	3879	–	*	–	*	–	*	–	*	–	*	–
	1000	159	1431	–	2380	–	3246	–	4861	–	*	–	*	–	*	–	*	–
<b>7.1</b>	1800	254	2287	–	3803 *	4255 *	*	*	*	*	*	*	*	*	*	*	*	*
	1500	211	1900	–	3159	3535	4308	*	*	*	*	*	*	*	*	*	*	*
	1200	169	1521	–	2530	2831	3450	4070	*	*	*	*	*	*	*	*	*	*
	1000	141	1269	–	2111	2362	2879	3395	4311	4946	*	*	*	*	*	*	*	*
<b>8</b>	1800	225	2026	2520	3369 *	3769 *	4594 *	*	*	*	*	*	*	*	*	*	*	*
	1500	188	1692	2106	2815	3149	3838	4527	*	*	*	*	*	*	*	*	*	*
	1200	150	1350	1680	2246	2513	3062	3612	4586 *	*	*	*	*	*	*	*	*	*
	1000	125	1125	1400	1871	2094	2552	3010	3821	4384	*	*	*	*	*	*	*	*
<b>9</b>	1800	200	1801	2240	2994 *	3350 *	4083 *	4816 *	*	*	*	*	*	*	*	*	*	*
	1500	167	1503	1871	2500	2797	3409	4021	*	*	*	*	*	*	*	*	*	*
	1200	133	1197	1490	1991	2228	2715	3203	4066 *	4665 *	*	*	*	*	*	*	*	*
	1000	111	999	1243	1662	1859	2266	2673	3393	3893	4765	*	*	*	*	*	*	*
<b>10</b>	1800	180	1620	2016	2695 *	3015 *	3675 *	4335 *	*	*	*	*	*	*	*	*	*	*
	1500	150	1350	1680	2246	2513	3062	3612	4586 *	*	*	*	*	*	*	*	*	*
	1200	120	1080	1344	1796	2010	2450	2890	3669 *	4209 *	*	*	*	*	*	*	*	*
	1000	100	900	1120	1497	1675	2041	2408	3057	3507	4293	4795	*	*	*	*	*	*
<b>11.2</b>	1800	161	1449	1803	2410 *	2697 *	3287 *	3877 *	4922 *	*	*	*	*	*	*	*	*	*
	1500	134	1206	1501	2006	2245	2736	3227	4097 *	4700 *	*	*	*	*	*	*	*	*
	1200	107	963	1198	1602	1792	2184	2576	3271 *	3753 *	4593 *	*	*	*	*	*	*	*
	1000	89	801	997	1332	1491	1817	2143	2721	3121	3820	4268	5376	*	*	*	*	*
<b>12.5</b>	1800	144	1296	1613	2156 *	2412 *	2940 *	3468 *	4402 *	*	*	*	*	*	*	*	*	*
	1500	120	1080	1344	1796	2010	2450	2890	3669	4209 *	*	*	*	*	*	*	*	*
	1200	96	864	1075	1437	1608	1960	2312	2935	3367 *	4121 *	4603 *	*	*	*	*	*	*
	1000	80	720	896	1197	1340	1633	1926	2446	2806	3434	3836	5026	5445	*	*	*	*
<b>14</b>	1800	129	1161	1445	1931 *	2161 *	2634 *	3106 *	3944 *	4525 *	*	*	*	*	*	*	*	*
	1500	107	963	1198	1602	1792	2184	2576	3271	3753	4593 *	*	*	*	*	*	*	*
	1200	86	774	963	1287	1440	1756	2071	2629	3016	3692 *	4124 *	*	*	*	*	*	*
	1000	71	639	795	1063	1189	1449	1709	2170	2490	3048	3405	4637	5049	*	*	*	*
<b>16</b>	1800	113	1017	1266	1692 *	1893 *	2307 *	2721 *	3455 *	3963 *	4851 *	*	*	*	*	*	*	*
	1500	94	846	1053	1407	1574	1919	2263	2874	3297	4035 *	4508 *	*	*	*	*	*	*
	1200	75	675	840	1123	1256	1531	1806	2293	2630	3219 *	3596 *	*	*	*	*	*	*
	1000	63	567	705	943	1055	1286	1517	1926	2209	2704	3021	4188	4548	*	*	*	*
<b>18</b>	1800	100	900	1120	1497 *	1675 *	2041 *	2408 *	3057 *	3507 *	4293 *	4795 *	*	*	*	*	*	*
	1500	83	747	929	1242	1390	1694	1998	2537	2911	3563 *	3980 *	*	*	*	*	*	*
	1200	67	603	750	1003	1122	1368	1613	2048	2350	2876 *	3213 *	*	*	*	*	*	*
	1000	56	504	627	838	938	1143	1348	1712	1964	2404	2685	3723	4218	*	*	*	*
<b>20</b>	1800	90	810	1008	1347 *	1507 *	1837 *	2167 *	2751 *	3157 *	3863 *	4316 *	*	*	*	*	*	*
	1500	75	675	840	1123	1256	1531	1806	2293	2630	3219 *	3596 *	*	*	*	*	*	*
	1200	60	540	672	898	1005	1225	1445	1834	2104	2575 *	2877 *	*	*	*	*	*	*
	1000	50	450	560	748	837	1020	1204	1528	1753	2146	2397	3063	3796	*	*	*	*
<b>22.4</b>	1800	80	–	896	–	1340 *	–	1926 *	–	2806 *	–	3836 *	–	*	–	*	–	*
	1500	67	–	750	–	1122	–	1613	–	2350	–	3213 *	–	*	–	*	–	*
	1200	54	–	605	–	904	–	1300	–	1894	–	2589 *	–	*	–	*	–	*
	1000	45	–	504	–	753	–	1083	–	1578	–	2158	–	3085	–	*	–	*
<b>25</b>	1800	72	–	806	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1500	60	–	672	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1200	48	–	537	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1000	40	–	448	–	–	–	–	–	–	–	–	–	–	–	–	–	–
<b>28</b>	1800	64	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1500	54	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1200	43	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1000	36	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Forced lubrication required for horizontal gear units

\* on request

## Design of the gear units

### Overview tables

#### Type H2 – Nominal output torque of low speed shaft (LSS) gear unit sizes 3 to 12

##### Technical specifications (continued)

##### Nominal output torque of low speed shaft (LSS) $T_{2N}$ (kNm) type H2

$i_N$	Gear unit sizes										Type
	3	4	5	6	7	8	9	10	11	12	
1.25	2.9	–	8.0	–	15.2	–	24.7	–	–	–	H1
1.4	3.1	–	8.2	–	15.9	–	25.6	–	–	–	
1.6	3.3	–	8.6	–	16.3	–	27.1	–	46.0	–	
1.8	2.7	–	8.8	–	17.4	–	28.0	–	47.6	–	
2	2.8	–	9.4	–	17.8	–	28.7	–	49.1	–	
2.24	2.8	–	9.6	–	17.8	–	28.7	–	50.6	–	
2.5	2.9	–	9.6	–	17.8	–	28.7	–	50.6	–	
2.8	3.1	–	9.6	–	17.1	–	27.2	–	50.6	–	
3.15	3.1	–	9.6	–	17.4	–	28.1	–	48.1	–	
3.55	3.2	–	9.5	–	18.8	–	28.6	–	50.2	–	
4	3.2	–	9.6	–	17.8	–	28.7	–	50.6	–	
4.5	2.5	–	7.7	–	15.8	–	24.6	–	46.0	–	
5	2.4	–	7.2	–	13.8	–	23.5	–	38.7	–	
5.6	2.3	–	6.9	–	13.1	–	20.1	–	36.5	–	
6.3	–	6.3	10.7	–	20.3	–	33.7	–	59.3	–	
7.1	–	6.5	11.2	–	20.3	–	33.7	–	59.3	–	
8	–	6.7	11.2	13.5	20.3	25.6	33.7	42.2	59.3	73.8	
9	–	6.7	11.2	14.4	20.3	25.6	33.7	42.2	59.3	73.8	
10	–	6.3	10.5	14.4	20.3	25.6	33.7	42.2	59.3	73.8	
11.2	–	6.3	10.6	14.4	20.3	25.6	33.7	42.2	59.3	73.8	
12.5	–	6.7	11.2	13.5	20.2	25.6	33.7	42.2	59.3	73.8	
14	–	6.7	11.2	13.5	20.3	25.6	33.7	42.2	59.3	73.8	
16	–	6.7	11.2	14.4	20.3	25.6	33.7	42.2	59.3	73.8	
18	–	6.3	10.5	14.4	19.0	25.6	33.7	42.2	59.3	73.8	
20	–	6.6	11.2	14.4	19.0	25.6	33.7	42.2	59.3	73.8	
22.4	–	6.3	10.9	13.5	19.8	24	33.1	42.2	58.3	73.8	
25	–	–	11.6	14.3	21.7	24	35.7	42.2	63.5	73.8	
28	–	–	11.6	13.9	21.7	25	35.7	41.6	63.5	72.5	
31.5	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
35.5	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
40	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
45	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
50	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
56	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
63	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
71	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
80	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
90	–	–	11.6	15.5	20.0	27.2	34.5	43.8	63.5	77.2	
100	–	–	–	14.5	21.7	27.2	35.7	43.8	61.6	77.2	
112	–	–	–	15.0	21.7	25.2	35.7	42.8	61.6	77.2	
125	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
140	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
160	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
180	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
200	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
224	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
250	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
280	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
315	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
355	–	–	–	–	19.6	27.2	35.7	44.2	61.6	78.0	
400	–	–	–	–	–	27.2	–	44.2	–	78.0	
450	–	–	–	–	–	25.3	–	42.8	–	78.0	

Type H1, see page 3/15  
 Type H3, see page 3/30  
 Type H4, see page 3/38

### Type H2 – Nominal output torque of low speed shaft (LSS) gear unit sizes 13 to 28

#### Technical specifications (continued)

#### Nominal output torque of low speed shaft (LSS) $T_{2N}$ (kNm) type H2

$i_N$	Gear unit sizes																Type	
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
1.25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	H1
1.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
1.6	67.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
1.8	70.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2	72.9	–	129	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2.24	75.2	–	130	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2.5	77.0	–	117	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2.8	77.0	–	120	–	171	–	–	–	–	–	–	–	–	–	–	–	–	
3.15	73.1	–	124	–	173	–	–	–	–	–	–	–	–	–	–	–	–	
3.55	74.4	–	126	–	173	–	–	–	–	–	–	–	–	–	–	–	–	
4	75.7	–	130	–	173	–	245	–	–	–	–	–	–	–	–	–	–	
4.5	61.6	–	109	–	146	–	216	–	–	–	–	–	–	–	–	–	–	
5	58.3	–	95.0	–	124	–	174	–	–	–	–	–	–	–	–	–	–	
5.6	55.4	–	90.4	–	118	–	150	–	–	–	–	–	–	–	–	–	–	
6.3	86.0	–	143	–	195	–	292	–	410	–	500	–	800	–	–	–	H2	
7.1	86.0	–	143	–	195	230	292	335	410	458	520	565	825	910	–	–		
8	86.0	107	143	160	195	230	292	335	410	458	540	585	860	940	1055	–		
9	86.0	107	143	160	195	230	292	335	410	458	555	610	860	985	1085	1205		
10	86.0	107	143	160	195	230	292	335	410	458	575	625	860	1020	1130	1240		
11.2	86.0	107	143	160	195	230	292	335	410	458	575	645	860	1030	1175	1285		
12.5	86.0	107	143	160	195	230	292	335	410	458	600	650	860	1030	1210	1340		
14	86.0	107	143	160	195	230	292	335	410	458	620	675	860	1030	1230	1375		
16	86.0	107	143	160	195	230	292	335	410	458	640	695	860	1030	1230	1400		
18	86.0	107	143	160	195	230	292	335	410	458	640	725	860	1030	1230	1400		
20	86.0	107	143	160	195	230	292	335	410	458	585	725	800	1030	1150	1400		
22.4	88.0	107	153	160	200	230	300	335	420	458	600	660	860	910	1230	1310		
25	88.0	107	153	173	200	240	300	345	420	470	620	675	860	1030	1230	1400		
28	88.0	109	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400		
31.5	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
35.5	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
40	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
45	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
50	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
56	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
63	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
71	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
80	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
90	88.0	109	153	173	200	240	290	345	410	470	585	725	800	1030	1150	1400		
100	90.7	109	153	173	200	226	300	335	420	465	640	660	860	910	1230	1310		
112	90.7	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
125	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
140	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
160	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
180	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
200	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
224	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
250	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
280	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
315	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
355	90.7	113	140	173	–	240	290	345	410	470	585	725	800	1030	1150	1400		
400	–	113	–	158	–	223	–	335	–	465	–	660	–	910	–	1310		
450	–	113	–	–	–	–	–	–	–	–	–	–	–	–	–	–	H4	

Type H1, see page 3/15  
 Type H3, see page 3/30  
 Type H4, see page 3/38

## Design of the gear units

### Overview tables

#### Type H2 – Thermal capacities $n_1 = 1000$ rpm

#### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type H2 $n_1 = 1000$ rpm

$i_N$		Gear unit sizes																		
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
6.3	$P_{GA}$	65.0	81.9	–	116	–	135	–	152	–	145	–	236	–	*	–	*	–	*	*
	$P_{GB}$	126	175	–	287	–	341	–	550	–	668	–	671	–	672	–	*	–	*	*
	$P_{GC15}$	141	234	–	364	–	584	–	701	–	739	–	637	–	329	–	*	–	*	*
	$P_{GD15}$	197	316	–	515	–	760	–	1031	–	1186	–	1219	–	1238	–	*	–	*	*
7.1	$P_{GA}$	66.7	84.2	–	114	–	138	–	167	–	183	–	*	–	*	*	*	*	*	*
	$P_{GB}$	129	177	–	273	–	329	–	541	–	679	–	713	–	819	714	*	*	*	*
	$P_{GC15}$	143	230	–	346	–	542	–	683	–	749	–	683	–	506	354	*	*	*	*
	$P_{GD15}$	199	311	–	485	–	705	–	990	–	1176	–	1233	–	1349	1269	*	*	*	*
8.0	$P_{GA}$	64.4	82.3	91.2	113	128	139	140	180	188	216	185	134	87.9	237	229	268	*	*	*
	$P_{GB}$	123	171	190	264	302	322	339	534	613	684	727	741	738	885	855	*	*	*	*
	$P_{GC15}$	134	220	241	334	372	517	576	668	753	754	785	714	699	590	530	*	*	*	*
	$P_{GD15}$	188	298	328	467	526	673	745	962	1116	1162	1252	1232	1257	1393	1379	*	*	*	*
9.0	$P_{GA}$	62.3	80.1	93.9	110	125	138	142	190	203	241	222	181	154	72.8	281	339	*	*	*
	$P_{GB}$	119	165	191	254	287	312	327	508	601	679	735	754	766	928	919	*	*	*	*
	$P_{GC15}$	128	209	237	322	353	489	546	638	735	750	794	734	731	652	612	*	*	*	*
	$P_{GD15}$	180	284	324	448	496	640	703	911	1070	1139	1242	1220	1255	1406	1420	*	*	*	*
10	$P_{GA}$	59.3	76.2	91.6	107	123	136	143	192	214	257	254	229	200	*	*	*	*	*	*
	$P_{GB}$	112	155	185	243	277	301	320	488	593	668	739	761	778	955	960	*	*	*	*
	$P_{GC15}$	119	192	227	309	340	461	521	614	719	739	798	746	749	696	673	*	*	*	*
	$P_{GD15}$	167	263	310	428	477	604	671	872	1037	1105	1226	1204	1243	1402	1432	*	*	*	*
11.2	$P_{GA}$	57.0	73.2	88.8	109	120	132	141	197	222	271	277	265	247	216	184	244	192	*	*
	$P_{GB}$	107	148	178	243	266	288	310	485	564	674	732	759	785	958	985	*	*	*	*
	$P_{GC15}$	112	181	216	305	329	430	492	612	685	748	792	748	762	728	716	*	*	*	*
	$P_{GD15}$	158	248	296	423	458	565	637	866	980	1105	1197	1177	1225	1382	1425	*	*	*	*
12.5	$P_{GA}$	56.7	74.5	84.4	109	116	134	139	206	222	278	291	292	283	301	243	344	275	358	249
	$P_{GB}$	104	146	167	237	255	281	299	480	540	640	718	762	780	999	986	*	*	*	*
	$P_{GC15}$	111	181	199	301	315	420	463	606	658	711	778	756	762	786	746	*	*	*	*
	$P_{GD15}$	155	245	273	414	437	548	603	849	937	1033	1162	1170	1197	1413	1404	*	*	*	*
14	$P_{GA}$	54.0	70.9	80.9	102	118	132	135	198	227	274	304	304	309	336	325	393	373	428	384
	$P_{GB}$	98.7	138	159	218	255	272	286	455	537	609	724	738	784	983	1025	*	*	*	*
	$P_{GC15}$	104	168	186	269	311	396	434	576	656	680	788	735	770	788	802	*	*	*	*
	$P_{GD15}$	145	227	257	371	432	518	565	804	931	982	1162	1120	1190	1374	1433	*	*	*	*
16	$P_{GA}$	49.3	66.7	82.0	96.7	118	126	137	188	236	258	309	325	320	359	359	439	419	492	453
	$P_{GB}$	89.5	129	157	203	248	256	279	426	531	560	686	731	757	952	1007	*	*	*	*
	$P_{GC15}$	92.4	154	186	246	307	363	423	535	649	630	748	733	749	777	803	*	*	*	*
	$P_{GD15}$	129	209	254	341	422	478	546	745	912	903	1085	1098	1139	1321	1392	*	*	*	*
18	$P_{GA}$	47.3	62.8	77.8	91.5	110	119	134	176	226	257	303	316	340	376	377	480	462	525	513
	$P_{GB}$	85.3	122	148	194	228	244	270	404	502	558	652	691	750	940	975	*	*	*	*
	$P_{GC15}$	86.5	144	173	234	274	343	399	507	617	630	714	698	746	777	789	*	*	*	*
	$P_{GD15}$	122	197	236	325	379	452	517	708	862	902	1030	1033	1115	1295	1338	*	*	*	*
20	$P_{GA}$	46.9	59.0	73.1	85.6	104	116	127	171	214	243	284	317	330	375	399	490	500	543	566
	$P_{GB}$	84.1	114	138	180	213	236	254	389	469	521	598	668	708	918	964	*	*	*	*
	$P_{GC15}$	84.2	132	158	213	251	328	366	477	581	593	660	681	709	763	793	*	*	*	*
	$P_{GD15}$	119	181	217	298	348	434	477	670	807	843	946	996	1049	1261	1315	*	*	*	*
22.4	$P_{GA}$	43.7	55.1	68.8	83.1	98.3	109	121	161	200	–	283	–	330	–	396	–	510	–	559
	$P_{GB}$	77.9	106	131	174	203	220	242	362	445	–	596	–	685	–	941	–	*	–	*
	$P_{GC15}$	76.7	120	148	203	238	297	346	434	555	–	661	–	693	–	779	–	*	–	*
	$P_{GD15}$	108	165	204	285	332	395	451	613	772	–	944	–	1011	–	1280	–	*	–	*
25	$P_{GA}$	–	–	64.6	–	92.3	–	118	–	194	–	267	–	–	–	–	–	–	–	–
	$P_{GB}$	–	–	122	–	189	–	234	–	428	–	555	–	–	–	–	–	–	–	–
	$P_{GC15}$	–	–	136	–	217	–	331	–	539	–	620	–	–	–	–	–	–	–	–
	$P_{GD15}$	–	–	188	–	304	–	433	–	746	–	882	–	–	–	–	–	–	–	–
28	$P_{GA}$	–	–	60.2	–	89.4	–	111	–	182	–	–	–	–	–	–	–	–	–	–
	$P_{GB}$	–	–	113	–	182	–	218	–	397	–	–	–	–	–	–	–	–	–	–
	$P_{GC15}$	–	–	123	–	208	–	300	–	505	–	–	–	–	–	–	–	–	–	–
	$P_{GD15}$	–	–	172	–	291	–	394	–	695	–	–	–	–	–	–	–	–	–	–

\* on request





## Design of the gear units

### Overview tables

#### Type H2 – Thermal capacities $n_1 = 1500$ rpm

#### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type H2 $n_1 = 1500$ rpm

$i_N$		Gear unit sizes																		
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
6.3	$P_{GA}$	60.2	66.7	–	72.0	–	*	–	*	–	*	–	*	–	*	–	*	–	*	–
	$P_{GB}$	162	221	–	344	–	384	–	593	–	593	–	*	–	*	–	*	–	*	–
	$P_{GC15}$	172	287	–	363	–	592	–	622	–	508	–	293	–	516	–	*	–	*	–
	$P_{GD15}$	260	414	–	597	–	865	–	1144	–	1201	–	941	–	312	–	*	–	*	–
7.1	$P_{GA}$	63.9	74.2	–	85.2	–	*	–	*	–	*	–	*	–	*	–	*	–	*	–
	$P_{GB}$	166	224	–	335	–	381	–	598	–	652	–	456	–	*	–	*	–	*	–
	$P_{GC15}$	174	283	–	353	–	575	–	627	–	573	–	199	–	161	633	*	–	*	–
	$P_{GD15}$	263	410	–	570	–	830	–	1120	–	1230	–	1062	–	813	345	*	–	*	–
8.0	$P_{GA}$	63.9	75.5	77.9	91.0	87.5	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	159	218	239	326	364	380	385	605	670	692	663	573	483	*	*	*	*	*	*
	$P_{GC15}$	164	271	296	345	373	568	573	634	672	621	557	343	212	335	206	*	*	*	*
	$P_{GD15}$	249	393	430	552	614	812	838	1106	1236	1241	1280	1148	1085	1034	848	*	*	*	*
9.0	$P_{GA}$	63.1	76.0	85.3	94.3	99.3	99.4	*	*	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	154	212	244	317	353	374	380	600	672	720	721	659	600	638	485	*	*	*	*
	$P_{GC15}$	157	259	292	337	362	556	556	632	677	654	622	446	358	463	405	*	*	*	*
	$P_{GD15}$	238	376	426	533	585	789	804	1057	1209	1234	1306	1207	1172	1192	1067	*	*	*	*
10	$P_{GA}$	61.4	75.3	86.0	95.6	104	107	97.2	106	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	146	200	237	306	344	365	379	590	676	726	761	719	685	779	680	*	*	*	*
	$P_{GC15}$	146	238	280	326	354	542	549	625	684	672	669	522	462	236	60	*	*	*	*
	$P_{GD15}$	222	348	409	511	566	762	786	1017	1193	1216	1314	1241	1232	1303	1225	*	*	*	*
11.2	$P_{GA}$	59.4	73.2	85.9	99.4	106	111	107	125	117	128	*	*	*	*	*	*	*	*	*
	$P_{GB}$	139	191	229	308	334	353	373	593	667	745	783	757	745	878	817	*	*	*	*
	$P_{GC15}$	138	224	266	329	345	524	538	628	679	696	703	577	539	382	265	*	*	*	*
	$P_{GD15}$	210	328	390	513	546	730	763	1014	1144	1231	1306	1243	1266	1376	1336	*	*	*	*
12.5	$P_{GA}$	60.8	78.8	84.6	107	107	125	114	168	139	180	*	*	*	*	*	*	*	*	*
	$P_{GB}$	136	191	216	304	322	353	364	600	654	740	786	791	783	1002	914	*	*	*	*
	$P_{GC15}$	137	228	245	326	333	517	524	637	670	702	716	619	592	535	406	*	*	*	*
	$P_{GD15}$	205	327	361	501	524	714	737	1007	1100	1190	1284	1253	1266	1481	1406	*	*	*	*
14	$P_{GA}$	58.1	75.7	82.3	103	110	126	117	176	158	204	165	*	*	*	*	*	*	*	*
	$P_{GB}$	129	181	206	281	323	343	352	572	660	724	805	787	817	1032	1036	*	*	*	*
	$P_{GC15}$	127	211	230	305	336	491	506	612	678	693	740	639	636	597	558	*	*	*	*
	$P_{GD15}$	191	304	341	463	525	680	707	957	1096	1140	1299	1221	1277	1472	1507	*	*	*	*
16	$P_{GA}$	53.5	71.7	87.6	98.7	117	123	129	178	201	215	216	185	*	*	*	*	*	*	*
	$P_{GB}$	117	169	206	264	319	325	351	540	666	676	797	811	810	1029	1062	*	*	*	*
	$P_{GC15}$	113	193	234	288	333	454	500	582	687	654	743	678	655	639	618	*	*	*	*
	$P_{GD15}$	171	280	339	435	513	629	691	901	1086	1056	1256	1222	1242	1442	1497	*	*	*	*
18	$P_{GA}$	51.4	65.9	83.7	91.3	112	115	130	159	206	222	239	212	202	189	151	228	*	*	*
	$P_{GB}$	111	159	194	250	294	309	341	508	633	673	778	785	833	1037	1057	*	*	*	*
	$P_{GC15}$	106	179	217	276	311	426	487	552	658	654	732	666	692	680	658	*	*	*	*
	$P_{GD15}$	161	262	316	417	474	594	670	858	1030	1053	1199	1168	1242	1434	1465	*	*	*	*
20	$P_{GA}$	51.0	62.4	79.2	86.4	107	113	126	160	206	223	245	253	229	217	229	285	256	202	211
	$P_{GB}$	110	149	182	233	276	300	323	490	596	633	725	781	805	1028	1075	*	*	*	*
	$P_{GC15}$	103	164	199	259	294	407	456	537	623	620	690	676	680	686	710	*	*	*	*
	$P_{GD15}$	157	242	290	389	444	570	628	830	969	989	1109	1145	1188	1411	1465	*	*	*	*
22.4	$P_{GA}$	47.7	58.5	72.9	84.3	100	108	119	153	186	–	251	–	269	–	254	–	312	–	232
	$P_{GB}$	102	138	171	225	262	280	307	458	561	–	721	–	800	–	1063	–	*	–	*
	$P_{GC15}$	93.5	149	184	251	281	369	430	506	591	–	689	–	689	–	713	–	*	–	*
	$P_{GD15}$	143	221	272	376	426	519	593	776	922	–	1106	–	1164	–	1440	–	*	–	*
25	$P_{GA}$	–	–	68.9	–	94.2	–	116	–	186	–	251	–	–	–	–	–	–	–	–
	$P_{GB}$	–	–	160	–	244	–	298	–	541	–	677	–	–	–	–	–	–	–	–
	$P_{GC15}$	–	–	169	–	265	–	412	–	575	–	652	–	–	–	–	–	–	–	–
	$P_{GD15}$	–	–	251	–	398	–	569	–	892	–	1038	–	–	–	–	–	–	–	–
28	$P_{GA}$	–	–	64.5	–	91.6	–	111	–	178	–	–	–	–	–	–	–	–	–	–
	$P_{GB}$	–	–	148	–	236	–	279	–	504	–	–	–	–	–	–	–	–	–	–
	$P_{GC15}$	–	–	153	–	256	–	374	–	541	–	–	–	–	–	–	–	–	–	–
	$P_{GD15}$	–	–	229	–	385	–	520	–	833	–	–	–	–	–	–	–	–	–	–

\* on request



## Design of the gear units

### Overview tables

#### Type H3 – Nominal power ratings of gear unit sizes 5 to 12

##### Technical specifications (continued)

##### Nominal power ratings $P_{2N}$ (kW) type H3

$i_N$	$n_1$	$n_2$	Gear unit sizes								
			5	6	7	8	9	10	11	12	
<b>22.4</b>	1800	80	–	–	–	–	–	–	–	–	–
	1500	67	–	–	–	–	–	–	–	–	–
	1200	54	–	–	–	–	–	–	–	–	–
	1000	45	–	–	–	–	–	–	–	–	–
<b>25</b>	1800	72	87	–	163	–	–	269	–	478	–
	1500	60	72	–	136	–	–	224	–	398	–
	1200	48	58	–	109	–	–	179	–	319	–
	1000	40	48	–	90	–	–	149	–	265	–
<b>28</b>	1800	64	77	–	145	–	–	239	–	425	–
	1500	54	65	–	122	–	–	201	–	359	–
	1200	43	52	–	97	–	–	160	–	285	–
	1000	36	43	–	81	–	–	134	–	239	–
<b>31.5</b>	1800	57	69	92	129	162	213	261	379	460	
	1500	48	58	77	109	136	179	220	319	388	
	1200	38	46	61	86	108	142	174	252	307	
	1000	32	38	51	72	91	119	146	212	258	
<b>35.5</b>	1800	51	61	82	115	145	190	233	339	412	
	1500	42	51	68	95	119	157	192	279	339	
	1200	34	41	55	77	96	127	155	226	274	
	1000	28	34	45	63	79	104	128	186	226	
<b>40</b>	1800	45	54	73	102	128	168	206	299	363	
	1500	38	46	61	86	108	142	174	252	307	
	1200	30	36	48	68	85	112	137	199	242	
	1000	25	30	40	56	71	93	114	166	202	
<b>45</b>	1800	40	48	64	90	113	149	183	265	323	
	1500	33	40	53	74	93	123	151	219	266	
	1200	27	32	43	61	76	100	123	179	218	
	1000	22	26	35	49	62	82	100	146	177	
<b>50</b>	1800	36	43	58	81	102	134	165	239	291	
	1500	30	36	48	68	85	112	137	199	242	
	1200	24	29	38	54	68	89	110	159	194	
	1000	20	24	32	45	56	74	91	132	161	
<b>56</b>	1800	32	38	51	72	91	119	146	212	258	
	1500	27	32	43	61	76	100	123	179	218	
	1200	21	25	34	47	59	78	96	139	169	
	1000	17.9	21	29	40	50	66	82	119	144	
<b>63</b>	1800	29	35	47	65	82	108	133	192	234	
	1500	24	29	38	54	68	89	110	159	194	
	1200	19	23	30	43	54	71	87	126	153	
	1000	15.9	19	25	36	45	59	72	105	128	
<b>71</b>	1800	25	30	40	56	71	93	114	166	202	
	1500	21	25	34	47	59	78	96	139	169	
	1200	16.9	20	27	38	48	63	77	112	136	
	1000	14.1	17	22	32	40	52	64	93	113	
<b>80</b>	1800	23	27	37	52	65	85	105	152	185	
	1500	18.8	22	30	42	53	70	86	125	151	
	1200	15	18	24	34	42	56	68	99	121	
	1000	12.5	15	20	28	35	46	57	83	101	
<b>90</b>	1800	20	24	32	41	56	72	91	132	161	
	1500	16.7	20	27	34	47	60	76	111	134	
	1200	13.3	16	21	27	37	48	60	88	107	
	1000	11.1	13	18	23	31	40	50	73	89	
<b>100</b>	1800	18	–	27	–	51	–	82	–	145	
	1500	15	–	22	–	42	–	68	–	121	
	1200	12	–	18	–	34	–	55	–	97	
	1000	10	–	15	–	28	–	45	–	80	
<b>112</b>	1800	16.1	–	25	–	42	–	72	–	130	
	1500	13.4	–	21	–	35	–	60	–	108	
	1200	10.7	–	16	–	28	–	47	–	86	
	1000	8.9	–	13	–	23	–	39	–	71	



# Design of the gear units

## Overview tables

### Type H3 – Nominal output torque of low speed shaft (LSS) gear unit sizes 3 to 12

#### Technical specifications (continued)

#### Nominal output torque of low speed shaft (LSS) $T_{2N}$ (kNm) type H3

$i_N$	Gear unit sizes										Type	
	3	4	5	6	7	8	9	10	11	12		
1.25	2.9	–	8.0	–	15.2	–	24.7	–	–	–		H1
1.4	3.1	–	8.2	–	15.9	–	25.6	–	–	–		
1.6	3.3	–	8.6	–	16.3	–	27.1	–	46.0	–		
1.8	2.7	–	8.8	–	17.4	–	28.0	–	47.6	–		
2	2.8	–	9.4	–	17.8	–	28.7	–	49.1	–		
2.24	2.8	–	9.6	–	17.8	–	28.7	–	50.6	–		
2.5	2.9	–	9.6	–	17.8	–	28.7	–	50.6	–		
2.8	3.1	–	9.6	–	17.1	–	27.2	–	50.6	–		
3.15	3.1	–	9.6	–	17.4	–	28.1	–	48.1	–		
3.55	3.2	–	9.5	–	18.8	–	28.6	–	50.2	–		
4	3.2	–	9.6	–	17.8	–	28.7	–	50.6	–		
4.5	2.5	–	7.7	–	15.8	–	24.6	–	46.0	–		
5	2.4	–	7.2	–	13.8	–	23.5	–	38.7	–		
5.6	2.3	–	6.9	–	13.1	–	20.1	–	36.5	–		
6.3	–	6.3	10.7	–	20.3	–	33.7	–	59.3	–		
7.1	–	6.5	11.2	–	20.3	–	33.7	–	59.3	–		
8	–	6.7	11.2	13.5	20.3	25.6	33.7	42.2	59.3	73.8		
9	–	6.7	11.2	14.4	20.3	25.6	33.7	42.2	59.3	73.8		
10	–	6.3	10.5	14.4	20.3	25.6	33.7	42.2	59.3	73.8		
11.2	–	6.3	10.6	14.4	20.3	25.6	33.7	42.2	59.3	73.8		
12.5	–	6.7	11.2	13.5	20.2	25.6	33.7	42.2	59.3	73.8		
14	–	6.7	11.2	13.5	20.3	25.6	33.7	42.2	59.3	73.8		
16	–	6.7	11.2	14.4	20.3	25.6	33.7	42.2	59.3	73.8		
18	–	6.3	10.5	14.4	19.0	25.6	33.7	42.2	59.3	73.8		
20	–	6.6	11.2	14.4	19.0	25.6	33.7	42.2	59.3	73.8		
22.4	–	6.3	10.9	13.5	19.8	24	33.1	42.2	58.3	73.8		
25	–	–	11.6	14.3	21.7	24	35.7	42.2	63.5	73.8		
28	–	–	11.6	13.9	21.7	25	35.7	41.6	63.5	72.5		
31.5	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
35.5	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
40	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
45	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
50	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
56	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
63	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
71	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
80	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
90	–	–	11.6	15.5	20	27.2	34.5	43.8	63.5	77.2		
100	–	–	–	14.5	21.7	27.2	35.7	43.8	61.6	77.2		
112	–	–	–	15	21.7	25.2	35.7	42.8	61.6	77.2		
125	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0		
140	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0		
160	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0		
180	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0		
200	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0		
224	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0		
250	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0		
280	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0		
315	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0		
355	–	–	–	–	19.6	27.2	35.7	44.2	61.6	78.0		
400	–	–	–	–	–	27.2	–	44.2	–	78.0		
450	–	–	–	–	–	25.3	–	42.8	–	78.0		

Type H1, see page 3/15  
 Type H2, see page 3/22  
 Type H4, see page 3/38

### Type H3 – Nominal output torque of low speed shaft (LSS) gear unit sizes 13 to 28

#### Technical specifications (continued)

#### Nominal output torque of low speed shaft (LSS) $T_{2N}$ (kNm) type H3

$i_N$	Gear unit sizes																Type	
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
1.25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	H1
1.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
1.6	67.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
1.8	70.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2	72.9	–	129	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2.24	75.2	–	130	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2.5	77.0	–	117	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2.8	77.0	–	120	–	171	–	–	–	–	–	–	–	–	–	–	–	–	
3.15	73.1	–	124	–	173	–	–	–	–	–	–	–	–	–	–	–	–	
3.55	74.4	–	126	–	173	–	–	–	–	–	–	–	–	–	–	–	–	
4	75.7	–	130	–	173	–	245	–	–	–	–	–	–	–	–	–	–	
4.5	61.6	–	109	–	146	–	216	–	–	–	–	–	–	–	–	–	–	
5	58.3	–	95.0	–	124	–	174	–	–	–	–	–	–	–	–	–	–	
5.6	55.4	–	90.4	–	118	–	150	–	–	–	–	–	–	–	–	–	–	
6.3	86.0	–	143	–	195	–	292	–	410	–	500	–	800	–	–	–	H2	
7.1	86.0	–	143	–	195	230	292	335	410	458	520	565	825	910	–	–		
8	86.0	107	143	160	195	230	292	335	410	458	540	585	860	940	1055	–		
9	86.0	107	143	160	195	230	292	335	410	458	555	610	860	985	1085	1205		
10	86.0	107	143	160	195	230	292	335	410	458	575	625	860	1020	1130	1240		
11.2	86.0	107	143	160	195	230	292	335	410	458	575	645	860	1030	1175	1285		
12.5	86.0	107	143	160	195	230	292	335	410	458	600	650	860	1030	1210	1340		
14	86.0	107	143	160	195	230	292	335	410	458	620	675	860	1030	1230	1375		
16	86.0	107	143	160	195	230	292	335	410	458	640	695	860	1030	1230	1400		
18	86.0	107	143	160	195	230	292	335	410	458	640	725	860	1030	1230	1400		
20	86.0	107	143	160	195	230	292	335	410	458	585	725	800	1030	1150	1400		
22.4	88.0	107	153	160	200	230	300	335	420	458	600	660	860	910	1230	1310		
25	88.0	107	153	173	200	240	300	345	420	470	620	675	860	1030	1230	1400		
28	88.0	109	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400		
31.5	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
35.5	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
40	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
45	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
50	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
56	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
63	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
71	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
80	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
90	88.0	109	153	173	200	240	290	345	410	470	585	725	800	1030	1150	1400		
100	90.7	109	153	173	200	226	300	335	420	465	640	660	860	910	1230	1310	H3	
112	90.7	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
125	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
140	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
160	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
180	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
200	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
224	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
250	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
280	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
315	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
355	90.7	113	140	173	–	240	290	345	410	470	585	725	800	1030	1150	1400		
400	–	113	–	158	–	223	–	335	–	465	–	660	–	910	–	1310		
450	–	113	–	–	–	–	–	–	–	–	–	–	–	–	–	–		
																	H4	

Type H1, see page 3/15  
 Type H2, see page 3/22  
 Type H4, see page 3/38





### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type H3 $n_1 = 1200$ rpm

$i_N$	Gear unit sizes	Gear unit sizes																	
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
22.4	$P_{GA}$	–	–	–	–	–	–	–	–	203	–	219	–	289	–	297	–	*	–
	$P_{GB}$	–	–	–	–	–	–	–	–	346	–	478	–	555	–	696	–	714	–
	$P_{GC15}$	–	–	–	–	–	–	–	–	509	–	553	–	614	–	*	–	*	–
	$P_{GD15}$	–	–	–	–	–	–	–	–	636	–	782	–	851	–	*	–	*	–
25	$P_{GA}$	59.4	–	88.1	–	119	–	168	–	211	–	238	233	305	307	337	321	*	*
	$P_{GB}$	98.9	–	154	–	207	–	308	–	348	–	484	493	559	574	712	719	786	*
	$P_{GC15}$	142	–	216	–	251	–	445	–	504	–	557	565	614	627	*	*	*	*
	$P_{GD15}$	177	–	273	–	330	–	569	–	626	–	779	798	842	867	*	*	*	*
28	$P_{GA}$	57.4	–	89.1	–	119	–	163	–	210	225	243	252	307	322	355	359	*	*
	$P_{GB}$	95.1	–	154	–	204	–	295	–	339	372	478	500	548	577	714	734	817	806
	$P_{GC15}$	134	–	217	–	247	–	425	–	486	533	548	569	601	626	*	*	*	*
	$P_{GD15}$	167	–	274	–	325	–	541	–	601	665	760	793	820	857	*	*	*	*
31.5	$P_{GA}$	56.0	64.5	86.4	95.4	116	121	160	190	208	231	250	256	310	323	366	375	373	355
	$P_{GB}$	92.4	105	148	162	198	206	286	338	332	372	474	492	541	565	707	733	836	835
	$P_{GC15}$	128	145	208	221	241	246	412	474	475	527	543	558	593	613	*	*	*	*
	$P_{GD15}$	160	181	262	280	316	323	524	605	586	654	747	774	803	834	*	*	*	*
35.5	$P_{GA}$	54.4	62.3	84.1	96.4	113	120	156	185	205	229	254	262	309	325	372	385	403	393
	$P_{GB}$	89.5	101	143	163	192	203	277	324	324	362	463	488	524	557	694	725	843	852
	$P_{GC15}$	122	137	202	222	233	243	399	452	462	508	529	553	574	604	*	*	*	*
	$P_{GD15}$	154	171	254	280	306	318	505	575	568	627	720	760	771	816	*	*	*	*
40	$P_{GA}$	51.6	60.7	80.2	93.2	107	117	152	181	201	227	252	264	304	322	378	390	423	421
	$P_{GB}$	84.4	98.2	136	156	182	197	267	314	313	355	451	476	508	538	681	711	841	858
	$P_{GC15}$	113	131	192	213	222	236	385	438	447	496	516	539	558	585	*	*	*	*
	$P_{GD15}$	143	165	241	269	289	309	486	556	549	611	698	732	745	783	*	*	*	*
45	$P_{GA}$	49.7	58.9	77.4	90.7	103	114	151	176	195	223	253	262	303	316	384	394	435	439
	$P_{GB}$	80.9	95.0	131	151	174	191	264	303	302	345	448	463	503	522	678	697	827	853
	$P_{GC15}$	107	125	182	206	213	229	381	424	431	482	513	525	554	568	*	*	*	*
	$P_{GD15}$	135	158	230	260	278	299	481	537	527	592	692	710	737	756	*	*	*	*
50	$P_{GA}$	48.5	55.9	74.3	86.6	104	109	152	171	199	217	270	263	312	316	409	399	473	450
	$P_{GB}$	78.1	89.6	124	143	172	181	260	291	301	334	455	460	502	516	682	693	844	839
	$P_{GC15}$	104	116	172	195	210	218	374	409	426	466	520	522	553	563	*	*	*	*
	$P_{GD15}$	131	146	216	245	272	283	469	516	517	571	690	702	727	748	*	*	*	*
56	$P_{GA}$	46.2	53.7	71.0	83.5	99.0	105	143	170	194	211	263	280	301	324	399	423	476	487
	$P_{GB}$	74.1	85.9	118	138	163	173	242	288	291	322	438	467	481	515	656	696	822	855
	$P_{GC15}$	97.0	110	161	185	201	209	351	405	413	449	501	528	531	561	*	*	*	*
	$P_{GD15}$	122	139	203	233	259	272	439	511	500	549	660	702	696	738	*	*	*	*
63	$P_{GA}$	43.7	52.3	66.2	79.9	93.9	105	136	170	186	215	253	271	288	312	380	412	470	488
	$P_{GB}$	69.8	82.8	110	131	154	171	230	283	277	319	417	448	456	493	619	670	795	831
	$P_{GC15}$	89.7	106	147	175	191	206	334	397	394	443	478	509	507	539	*	*	*	*
	$P_{GD15}$	113	134	185	220	245	266	417	498	476	537	627	670	661	706	*	*	*	*
71	$P_{GA}$	43.5	49.8	64.8	76.4	93.1	100	135	160	182	209	249	261	279	299	377	392	454	481
	$P_{GB}$	68.8	78.6	106	124	151	162	225	264	269	309	406	427	440	468	612	631	757	804
	$P_{GC15}$	88.8	99.4	142	163	188	197	329	373	384	430	467	485	490	514	*	*	*	*
	$P_{GD15}$	112	126	179	206	241	253	409	465	462	520	611	637	638	670	*	*	*	*
80	$P_{GA}$	41.0	47.1	63.6	71.3	88.5	95.0	128	152	178	200	242	258	271	289	361	389	446	464
	$P_{GB}$	64.6	74.1	104	115	143	153	213	250	262	294	392	416	425	451	580	624	729	766
	$P_{GC15}$	81.8	92.0	137	149	179	187	313	355	375	410	453	475	475	497	*	*	*	*
	$P_{GD15}$	103	116	172	189	228	240	388	442	451	495	591	620	617	647	*	*	*	*
90	$P_{GA}$	40.4	46.9	59.9	69.6	83.6	94.1	125	150	168	195	230	250	258	281	349	372	437	455
	$P_{GB}$	63.2	72.9	97	112	135	150	207	245	247	285	371	402	401	435	555	592	711	738
	$P_{GC15}$	78.9	91.1	125	144	169	184	305	349	355	399	431	460	451	482	*	*	*	*
	$P_{GD15}$	100	115	159	182	216	235	377	434	426	480	560	600	583	625	*	*	*	*
100	$P_{GA}$	–	44.2	–	68.3	–	89.4	–	143	–	191	–	238	–	266	–	359	–	446
	$P_{GB}$	–	68.4	–	109	–	142	–	232	–	278	–	380	–	411	–	566	–	718
	$P_{GC15}$	–	83.9	–	139	–	175	–	332	–	389	–	437	–	458	–	*	–	*
	$P_{GD15}$	–	106	–	176	–	223	–	411	–	468	–	568	–	591	–	*	–	*
112	$P_{GA}$	–	43.5	–	64.3	–	84.6	–	139	–	180	–	–	–	–	–	–	–	–
	$P_{GB}$	–	67.1	–	102	–	134	–	225	–	262	–	–	–	–	–	–	–	–
	$P_{GC15}$	–	81.0	–	128	–	166	–	321	–	369	–	–	–	–	–	–	–	–
	$P_{GD15}$	–	103	–	162	–	211	–	398	–	442	–	–	–	–	–	–	–	–

\* on request

# Design of the gear units

## Overview tables

### Type H3 – Thermal capacities $n_1 = 1500$ rpm

#### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type H3 $n_1 = 1500$ rpm

$i_N$	Gear unit sizes	Gear unit sizes																	
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
22.4	$P_{GA}$	–	–	–	–	–	–	–	–	175	–	147	–	224	–	*	–	*	–
	$P_{GB}$	–	–	–	–	–	–	–	–	359	–	473	–	564	–	*	–	*	–
	$P_{GC15}$	–	–	–	–	–	–	–	–	507	–	512	–	582	–	*	–	*	–
	$P_{GD15}$	–	–	–	–	–	–	–	–	669	–	805	–	885	–	*	–	*	–
25	$P_{GA}$	61.3	–	90.0	–	118	–	160	–	189	–	187	164	260	247	*	*	*	*
	$P_{GB}$	113	–	175	–	234	–	341	–	365	–	498	492	583	587	698	677	*	*
	$P_{GC15}$	161	–	228	–	262	–	458	–	506	–	534	526	600	599	*	*	*	*
	$P_{GD15}$	206	–	302	–	364	–	617	–	661	–	813	822	888	904	*	*	*	*
28	$P_{GA}$	59.7	–	91.3	–	120	–	161	–	194	198	202	201	271	280	267	*	*	*
	$P_{GB}$	109	–	176	–	232	–	330	–	358	388	499	514	580	605	715	722	736	*
	$P_{GC15}$	151	–	229	–	259	–	441	–	492	533	535	548	595	615	*	*	*	*
	$P_{GD15}$	195	–	303	–	360	–	591	–	638	700	799	829	870	905	*	*	*	*
31.5	$P_{GA}$	58.4	66.8	89.3	97.9	118	121	159	185	198	211	213	215	281	289	297	291	*	*
	$P_{GB}$	106	120	170	185	226	233	321	374	355	393	499	516	575	599	724	739	789	*
	$P_{GC15}$	145	164	220	233	252	258	429	490	484	531	533	546	591	608	*	*	*	*
	$P_{GD15}$	187	211	291	310	349	357	572	658	625	692	789	815	855	885	*	*	*	*
35.5	$P_{GA}$	56.9	64.9	87.3	99.3	116	122	157	183	198	215	225	226	287	298	317	319	269	*
	$P_{GB}$	103	116	165	186	219	231	312	361	348	384	490	514	558	593	725	746	822	*
	$P_{GC15}$	139	155	214	234	245	255	417	470	474	515	524	545	577	604	*	*	*	*
	$P_{GD15}$	179	200	282	311	339	352	554	628	608	666	763	803	824	869	*	*	*	*
40	$P_{GA}$	54.3	63.5	84.0	96.7	111	121	154	181	197	218	229	237	289	303	332	338	319	293
	$P_{GB}$	97.1	113	156	179	207	224	301	351	340	380	480	504	546	575	714	743	843	839
	$P_{GC15}$	128	148	204	226	234	248	403	457	461	506	515	534	564	589	*	*	*	*
	$P_{GD15}$	166	192	268	299	321	342	534	609	590	652	743	777	799	837	*	*	*	*
45	$P_{GA}$	52.3	61.8	81.5	94.4	107	118	154	178	194	217	236	241	293	303	344	350	356	340
	$P_{GB}$	93.1	109	151	174	199	218	298	341	329	372	480	494	543	561	714	733	849	859
	$P_{GC15}$	121	142	197	219	225	241	401	444	447	495	516	526	563	576	*	*	*	*
	$P_{GD15}$	158	184	258	289	308	331	529	589	569	635	739	756	793	813	*	*	*	*
50	$P_{GA}$	51.4	58.9	78.8	90.8	109	113	158	174	205	215	269	247	313	306	398	362	420	374
	$P_{GB}$	90.2	103	143	165	197	206	296	329	333	362	500	494	551	559	736	731	888	863
	$P_{GC15}$	118	113	188	209	223	229	396	429	447	482	536	526	572	574	*	*	*	*
	$P_{GD15}$	153	171	245	275	303	315	518	567	562	615	749	752	791	805	*	*	*	*
56	$P_{GA}$	49.1	56.7	75.5	88.0	105	109	150	174	201	211	265	279	306	326	396	413	434	436
	$P_{GB}$	85.6	98.8	136	159	188	198	277	326	324	351	483	513	531	565	715	752	869	900
	$P_{GC15}$	110	124	180	202	214	221	372	426	435	466	520	545	552	582	*	*	*	*
	$P_{GD15}$	143	162	234	265	289	302	485	562	546	592	721	761	759	802	*	*	*	*
63	$P_{GA}$	46.6	55.6	70.5	85.0	100	111	143	177	193	221	258	274	296	318	384	411	439	449
	$P_{GB}$	80.8	95.7	127	151	177	196	263	323	309	354	463	495	506	544	678	729	845	880
	$P_{GC15}$	102	121	167	193	203	219	355	420	416	465	500	529	529	562	*	*	*	*
	$P_{GD15}$	133	157	217	251	274	297	461	550	520	585	688	732	724	771	*	*	*	*
71	$P_{GA}$	46.8	53.1	69.4	81.4	99.3	106	142	168	190	217	257	267	287	307	383	397	434	452
	$P_{GB}$	79.9	90.8	123	144	175	187	258	302	301	344	454	474	489	519	672	692	812	855
	$P_{GC15}$	101	113	162	184	201	210	350	395	406	452	492	508	513	538	*	*	*	*
	$P_{GD15}$	131	147	210	240	269	283	453	515	506	567	672	698	699	734	*	*	*	*
80	$P_{GA}$	44.1	50.3	68.1	76.0	94.7	101	136	161	186	208	252	266	280	298	370	396	438	446
	$P_{GB}$	75.0	85.6	120	134	165	177	244	286	294	328	440	465	473	501	641	686	791	822
	$P_{GC15}$	93	104	156	169	191	199	333	377	397	433	478	500	499	522	*	*	*	*
	$P_{GD15}$	121	136	202	221	256	268	430	489	494	541	650	682	677	709	*	*	*	*
90	$P_{GA}$	43.5	50.4	64.3	74.7	89.6	101	132	159	177	205	241	260	267	290	360	382	433	449
	$P_{GB}$	73.5	84.6	113	130	156	174	238	281	277	319	416	450	448	485	615	653	773	800
	$P_{GC15}$	90	104	143	164	181	197	325	372	377	422	455	486	475	507	*	*	*	*
	$P_{GD15}$	117	135	186	213	241	263	418	481	467	526	616	660	641	686	*	*	*	*
100	$P_{GA}$	–	47.6	–	73.3	–	95.8	–	152	–	200	–	249	–	277	–	372	–	443
	$P_{GB}$	–	79.4	–	127	–	165	–	266	–	311	–	426	–	459	–	627	–	782
	$P_{GC15}$	–	95.4	–	158	–	188	–	354	–	413	–	462	–	482	–	*	–	*
	$P_{GD15}$	–	124	–	206	–	250	–	456	–	513	–	626	–	650	–	*	–	*
112	$P_{GA}$	–	46.8	–	69.2	–	90.7	–	148	–	190	–	–	–	–	–	–	–	–
	$P_{GB}$	–	77.9	–	119	–	155	–	259	–	294	–	–	–	–	–	–	–	–
	$P_{GC15}$	–	92.1	–	145	–	178	–	345	–	391	–	–	–	–	–	–	–	–
	$P_{GD15}$	–	120	–	190	–	236	–	444	–	485	–	–	–	–	–	–	–	–

\* on request

### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type H3 $n_1 = 1800 \text{ rpm}$

$i_N$		Gear unit sizes																	
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
22.4	$P_{GA}$	–	–	–	–	–	–	–	–	132	–	*	–	*	–	*	–	*	–
	$P_{GB}$	–	–	–	–	–	–	–	–	357	–	440	–	536	–	*	–	*	–
	$P_{GC15}$	–	–	–	–	–	–	–	–	492	–	442	–	515	–	*	–	*	–
	$P_{GD15}$	–	–	–	–	–	–	–	–	686	–	789	–	880	–	*	–	*	–
25	$P_{GA}$	61.9	–	89.0	–	113	–	148	–	158	–	*	*	*	*	*	*	*	*
	$P_{GB}$	126	–	194	–	254	–	367	–	372	–	482	460	576	563	630	*	*	*
	$P_{GC15}$	177	–	235	–	266	–	466	–	499	–	485	458	557	536	*	*	*	*
	$P_{GD15}$	233	–	327	–	394	–	658	–	685	–	818	809	905	903	*	*	*	*
28	$P_{GA}$	60.5	–	91.2	–	117	–	152	–	172	159	139	126	215	212	*	*	*	*
	$P_{GB}$	121	–	196	–	255	–	357	–	372	389	493	502	583	601	673	*	*	*
	$P_{GC15}$	167	–	237	–	267	–	450	–	491	520	496	499	564	575	*	*	*	*
	$P_{GD15}$	220	–	330	–	389	–	630	–	666	720	815	837	894	926	*	*	*	*
31.5	$P_{GA}$	59.6	67.8	90.0	97.6	116	117	152	174	178	182	163	154	235	236	*	*	*	*
	$P_{GB}$	118	134	189	204	249	254	348	404	369	403	502	510	587	605	701	*	*	*
	$P_{GC15}$	161	181	230	241	261	263	439	498	485	525	506	509	571	581	*	*	*	*
	$P_{GD15}$	212	238	317	336	379	387	612	702	653	718	810	831	886	913	*	*	*	*
35.5	$P_{GA}$	58.3	66.2	88.5	100	115	120	153	176	182	194	188	178	255	255	232	214	318	*
	$P_{GB}$	115	129	184	206	241	254	340	391	363	400	503	518	581	608	715	726	740	*
	$P_{GC15}$	154	171	223	243	253	263	428	480	476	515	509	518	569	586	*	*	*	*
	$P_{GD15}$	203	226	307	338	368	382	594	671	637	697	792	825	861	903	*	*	*	*
40	$P_{GA}$	55.8	65.0	85.8	98.1	112	119	151	175	185	200	198	200	262	273	263	256	*	*
	$P_{GB}$	109	126	175	199	230	248	330	382	356	396	497	520	570	600	720	738	790	762
	$P_{GC15}$	142	164	213	235	242	256	416	468	466	508	505	521	560	582	*	*	*	*
	$P_{GD15}$	189	217	292	325	349	371	573	652	619	683	774	807	838	876	*	*	*	*
45	$P_{GA}$	54.0	63.5	83.6	96.3	109	118	153	175	185	203	205	210	268	279	287	286	232	*
	$P_{GB}$	104	122	169	194	220	240	327	372	348	389	497	512	568	588	730	741	821	811
	$P_{GC15}$	134	157	206	229	233	249	414	456	454	498	507	516	560	572	*	*	*	*
	$P_{GD15}$	179	208	282	315	335	360	568	631	600	665	769	788	832	852	*	*	*	*
50	$P_{GA}$	53.5	60.8	82.1	93.1	113	115	161	172	204	204	255	218	301	284	375	308	335	256
	$P_{GB}$	101	115	161	185	220	229	328	360	358	381	529	512	584	585	775	749	892	838
	$P_{GC15}$	131	145	198	219	234	238	412	442	461	487	540	518	577	572	*	*	*	*
	$P_{GD15}$	174	194	268	300	331	342	560	609	599	646	790	784	837	845	*	*	*	*
56	$P_{GA}$	51.3	58.7	78.8	90.6	109	111	154	174	203	203	258	267	300	316	378	392	371	355
	$P_{GB}$	96.4	111	153	178	210	220	307	358	350	371	516	543	566	599	754	792	893	907
	$P_{GC15}$	123	137	189	211	224	229	389	440	450	474	528	550	562	588	*	*	*	*
	$P_{GD15}$	163	184	256	289	316	329	526	604	582	625	765	804	807	850	*	*	*	*
63	$P_{GA}$	48.7	58.0	73.8	88.6	104	115	148	181	196	222	255	268	294	313	372	395	392	389
	$P_{GB}$	91.0	108	143	169	199	219	292	357	335	381	497	529	543	580	719	770	878	906
	$P_{GC15}$	113	134	177	202	213	229	372	438	432	480	511	537	543	573	*	*	*	*
	$P_{GD15}$	151	178	239	275	299	324	500	595	557	624	734	777	772	820	*	*	*	*
71	$P_{GA}$	49.3	55.5	73.0	85.1	104	111	148	173	195	220	257	265	287	307	374	387	391	408
	$P_{GB}$	90.2	102	139	162	196	209	288	335	328	371	490	509	526	557	715	734	843	890
	$P_{GC15}$	113	125	173	194	211	220	367	413	423	469	506	520	527	552	*	*	*	*
	$P_{GD15}$	149	167	232	262	295	310	492	558	543	606	721	746	747	783	*	*	*	*
80	$P_{GA}$	46.7	52.7	71.8	79.7	100	105	141	166	192	213	255	267	282	299	367	389	407	407
	$P_{GB}$	84.8	96.4	136	150	186	197	273	318	320	356	478	503	511	539	685	729	827	854
	$P_{GC15}$	104	116	171	181	202	209	350	394	414	450	496	515	514	536	*	*	*	*
	$P_{GD15}$	138	155	228	245	280	294	467	530	530	579	699	732	725	758	*	*	*	*
90	$P_{GA}$	46.0	53.3	67.8	78.7	94.3	106	138	166	183	211	246	264	271	293	362	381	409	421
	$P_{GB}$	83.1	95.5	128	146	175	195	265	313	303	348	454	489	485	523	661	699	811	837
	$P_{GC15}$	100	115	159	177	191	207	342	390	394	440	473	504	491	523	*	*	*	*
	$P_{GD15}$	133	153	212	238	265	289	455	522	502	564	663	710	688	735	*	*	*	*
100	$P_{GA}$	–	50.3	–	77.3	–	101	–	158	–	207	–	255	–	281	–	375	–	421
	$P_{GB}$	–	89.8	–	143	–	185	–	297	–	339	–	465	–	497	–	674	–	821
	$P_{GC15}$	–	106	–	175	–	198	–	371	–	431	–	481	–	499	–	*	–	*
	$P_{GD15}$	–	142	–	233	–	275	–	495	–	551	–	673	–	697	–	*	–	*
112	$P_{GA}$	–	49.6	–	73.1	–	95.6	–	154	–	197	–	–	–	–	–	–	–	–
	$P_{GB}$	–	88.0	–	134	–	174	–	289	–	321	–	–	–	–	–	–	–	–
	$P_{GC15}$	–	102	–	161	–	188	–	362	–	409	–	–	–	–	–	–	–	–
	$P_{GD15}$	–	137	–	216	–	259	–	482	–	522	–	–	–	–	–	–	–	–

\* on request

## Design of the gear units

### Overview tables

#### Type H4 – Nominal power ratings of gear unit sizes 7 to 12

##### Technical specifications (continued)

##### Nominal power ratings $P_{2N}$ (kW) type H4

$i_N$	$n_1$	$n_2$	Gear unit sizes					
			7	8	9	10	11	12
<b>100</b>	1800	18	40	–	67	–	116	–
	1500	15	34	–	56	–	96	–
	1200	12	27	–	44	–	77	–
	1000	10	22	–	37	–	64	–
<b>112</b>	1800	16.1	36	–	60	–	103	–
	1500	13.4	30	–	50	–	86	–
	1200	10.7	24	–	39	–	69	–
	1000	8.9	20	–	33	–	57	–
<b>125</b>	1800	14.4	32	41	53	66	92	117
	1500	12	27	34	44	55	77	98
	1200	9.6	21	27	35	44	61	78
	1000	8	18	22	29	37	51	65
<b>140</b>	1800	12.9	29	36	48	59	83	105
	1500	10.7	24	30	39	49	69	87
	1200	8.6	19	24	32	39	55	70
	1000	7.1	16	20	26	32	45	57
<b>160</b>	1800	11.3	25	32	42	52	72	92
	1500	9.4	21	26	35	43	60	76
	1200	7.5	17	21	28	34	48	61
	1000	6.3	14	17	23	29	40	51
<b>180</b>	1800	10	22	28	37	46	64	81
	1500	8.3	18	23	31	38	53	67
	1200	6.7	15	19	25	31	43	54
	1000	5.6	12	15	20	25	36	45
<b>200</b>	1800	9	20	25	33	41	58	73
	1500	7.5	17	21	28	34	48	61
	1200	6	13	17	22	27	38	49
	1000	5	11	14	18	23	32	40
<b>224</b>	1800	8	18	22	29	37	51	65
	1500	6.7	15	19	25	31	43	54
	1200	5.4	12	15	20	24	34	44
	1000	4.5	10	12	16	20	29	36
<b>250</b>	1800	7.2	16	20	26	33	46	58
	1500	6	13	17	22	27	38	49
	1200	4.8	10	13	17	22	30	39
	1000	4	9	11	14	18	25	32
<b>280</b>	1800	6.4	14	18	23	29	41	52
	1500	5.4	12	15	20	24	34	44
	1200	4.3	9.7	12	16	19	27	35
	1000	3.6	8.1	10	13	16	23	29
<b>315</b>	1800	5.7	12	16	21	26	36	46
	1500	4.8	10	13	17	22	30	39
	1200	3.8	8.6	10	14	17	24	31
	1000	3.2	7.2	9.1	11	14	20	26
<b>355</b>	1800	5.1	10	14	19	23	32	41
	1500	4.2	8.6	11	15	19	27	34
	1200	3.4	6.9	9.6	12	15	21	27
	1000	2.8	5.7	7.9	10	12	18	22
<b>400</b>	1800	4.5	–	12	–	20	–	36
	1500	3.8	–	10	–	17	–	31
	1200	3	–	8.5	–	13	–	24
	1000	2.5	–	7.1	–	11	–	20
<b>450</b>	1800	4	–	10	–	17	–	32
	1500	3.3	–	8.7	–	14	–	26
	1200	2.7	–	7.1	–	12	–	22
	1000	2.2	–	5.8	–	9.8	–	17

### Type H4 – Nominal power ratings of gear unit sizes 13 to 28

#### Technical specifications (continued)

#### Nominal power ratings $P_{2N}$ (kW) type H4

$i_N$	$n_1$	$n_2$	Gear unit sizes															
			13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
<b>100</b>	1800	18	170	–	288	–	376	–	565	–	791	–	1206	–	1621	–	*	–
	1500	15	142	–	240	–	314	–	471	–	659	–	1005	–	1351	–	1932	–
	1200	12	113	–	192	–	251	–	376	–	527	–	804	–	1081	–	1546	–
	1000	10	94	–	160	–	209	–	314	–	439	–	670	–	901	–	1288	–
<b>112</b>	1800	16.1	152	–	257	291	337	404	505	581	708	792	1077	1220	1447	1733	*	*
	1500	13.4	127	–	214	242	280	336	420	484	589	659	898	1017	1206	1444	1725	1963
	1200	10.7	101	–	171	193	224	268	336	386	470	526	718	813	965	1156	1380	1571
	1000	8.9	84	–	142	161	186	223	279	321	391	438	598	678	804	963	1150	1309
<b>125</b>	1800	14.4	136	170	230	260	301	361	452	520	633	708	965	1093	1297	1553	*	*
	1500	12	113	141	192	217	251	301	376	433	527	590	804	911	1081	1294	1546	1759
	1200	9.6	91	113	153	173	201	241	301	346	422	472	643	729	865	1035	1236	1407
	1000	8	75	94	128	144	167	201	251	289	351	393	536	607	720	863	1030	1173
<b>140</b>	1800	12.9	122	152	206	233	270	324	405	466	567	634	862	976	1158	1387	*	*
	1500	10.7	101	126	171	193	224	268	336	386	470	526	718	813	965	1156	1380	1571
	1200	8.6	81	101	137	155	180	216	270	310	378	423	574	651	772	924	1104	1257
	1000	7.1	67	84	113	128	148	178	223	256	312	349	479	542	643	770	920	1047
<b>160</b>	1800	11.3	107	133	181	204	236	283	354	408	496	556	754	854	1013	1213	*	*
	1500	9.4	89	111	150	170	196	236	295	339	413	462	628	712	844	1011	1207	1374
	1200	7.5	71	88	120	135	157	188	235	270	329	369	503	569	675	809	966	1099
	1000	6.3	59	74	100	114	131	158	197	227	277	310	419	474	563	674	805	916
<b>180</b>	1800	10	94	118	160	181	209	251	314	361	439	492	670	759	901	1079	1288	*
	1500	8.3	78	98	132	150	173	208	260	299	365	408	558	633	750	899	1073	1222
	1200	6.7	63	79	107	121	140	168	210	242	294	329	447	506	600	719	859	977
	1000	5.6	53	66	89	101	117	140	175	202	246	275	372	422	500	599	716	814
<b>200</b>	1800	9	85	106	144	163	188	226	282	325	395	442	603	683	810	971	1159	1319
	1500	7.5	71	88	120	135	157	188	235	270	329	369	503	569	675	809	966	1099
	1200	6	56	70	96	108	125	150	188	216	263	295	402	455	540	647	773	880
	1000	5	47	59	80	90	104	125	157	180	219	246	335	380	450	539	644	733
<b>224</b>	1800	8	75	94	128	144	167	201	251	289	351	393	539	610	724	867	1035	1178
	1500	6.7	63	79	107	121	140	168	210	242	294	329	449	508	603	722	862	982
	1200	5.4	51	63	86	97	113	135	169	195	237	265	359	407	482	578	690	785
	1000	4.5	42	53	72	81	94	113	141	162	197	221	299	339	402	481	575	654
<b>250</b>	1800	7.2	68	85	115	130	150	180	226	260	316	354	483	547	648	777	927	1055
	1500	6	56	70	96	108	125	150	188	216	263	295	402	455	540	647	773	880
	1200	4.8	45	56	76	86	100	120	150	173	211	236	322	364	432	518	618	704
	1000	4	37	47	64	72	83	100	125	144	175	196	268	304	360	431	515	586
<b>280</b>	1800	6.4	60	75	102	115	134	160	201	231	281	314	431	488	579	693	828	942
	1500	5.4	51	63	86	97	113	135	169	195	237	265	359	407	482	578	690	785
	1200	4.3	40	50	68	77	90	108	135	155	189	211	287	325	386	462	552	628
	1000	3.6	34	42	57	65	75	90	113	130	158	177	239	271	322	385	460	524
<b>315</b>	1800	5.7	54	67	91	103	119	143	179	205	250	280	383	434	515	616	736	838
	1500	4.8	45	56	76	86	100	120	150	173	211	236	319	362	429	514	613	698
	1200	3.8	36	44	60	68	79	95	119	137	167	187	255	289	343	411	491	558
	1000	3.2	30	37	51	57	67	80	100	115	140	157	213	241	286	342	409	465
<b>355</b>	1800	5.1	48	60	74	92	102	128	154	184	218	250	311	385	425	547	611	743
	1500	4.2	39	49	61	76	84	105	127	151	180	206	259	321	354	456	509	619
	1200	3.4	32	40	49	61	68	85	103	122	145	167	207	257	283	365	407	496
	1000	2.8	26	33	41	50	56	70	85	101	120	137	173	214	236	304	339	413
<b>400</b>	1800	4.5	–	53	–	74	–	105	–	157	–	219	–	311	–	429	–	617
	1500	3.8	–	44	–	62	–	88	–	133	–	185	–	259	–	357	–	514
	1200	3	–	35	–	49	–	70	–	105	–	146	–	207	–	286	–	412
	1000	2.5	–	29	–	41	–	58	–	87	–	121	–	173	–	238	–	343
<b>450</b>	1800	4	–	47	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1500	3.3	–	39	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1200	2.7	–	31	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1000	2.2	–	26	–	–	–	–	–	–	–	–	–	–	–	–	–	–

\* on request

## Design of the gear units

### Overview tables

#### Type H4 – Nominal output torque of low speed shaft (LSS) gear unit sizes 3 to 12

##### Technical specifications (continued)

##### Nominal output torque of low speed shaft (LSS) $T_{2N}$ (kNm) type H4

$i_N$	Gear unit sizes										Type
	3	4	5	6	7	8	9	10	11	12	
1.25	2.9	–	8.0	–	15.2	–	24.7	–	–	–	H1
1.4	3.1	–	8.2	–	15.9	–	25.6	–	–	–	
1.6	3.3	–	8.6	–	16.3	–	27.1	–	46.0	–	
1.8	2.7	–	8.8	–	17.4	–	28.0	–	47.6	–	
2	2.8	–	9.4	–	17.8	–	28.7	–	49.1	–	
2.24	2.8	–	9.6	–	17.8	–	28.7	–	50.6	–	
2.5	2.9	–	9.6	–	17.8	–	28.7	–	50.6	–	
2.8	3.1	–	9.6	–	17.1	–	27.2	–	50.6	–	
3.15	3.1	–	9.6	–	17.4	–	28.1	–	48.1	–	
3.55	3.2	–	9.5	–	18.8	–	28.6	–	50.2	–	
4	3.2	–	9.6	–	17.8	–	28.7	–	50.6	–	
4.5	2.5	–	7.7	–	15.8	–	24.6	–	46.0	–	
5	2.4	–	7.2	–	13.8	–	23.5	–	38.7	–	
5.6	2.3	–	6.9	–	13.1	–	20.1	–	36.5	–	
6.3	–	6.3	10.7	–	20.3	–	33.7	–	59.3	–	
7.1	–	6.5	11.2	–	20.3	–	33.7	–	59.3	–	
8	–	6.7	11.2	13.5	20.3	25.6	33.7	42.2	59.3	73.8	
9	–	6.7	11.2	14.4	20.3	25.6	33.7	42.2	59.3	73.8	
10	–	6.3	10.5	14.4	20.3	25.6	33.7	42.2	59.3	73.8	
11.2	–	6.3	10.6	14.4	20.3	25.6	33.7	42.2	59.3	73.8	
12.5	–	6.7	11.2	13.5	20.2	25.6	33.7	42.2	59.3	73.8	
14	–	6.7	11.2	13.5	20.3	25.6	33.7	42.2	59.3	73.8	
16	–	6.7	11.2	14.4	20.3	25.6	33.7	42.2	59.3	73.8	
18	–	6.3	10.5	14.4	19.0	25.6	33.7	42.2	59.3	73.8	
20	–	6.6	11.2	14.4	19.0	25.6	33.7	42.2	59.3	73.8	
22.4	–	6.3	10.9	13.5	19.8	24	33.1	42.2	58.3	73.8	
25	–	–	11.6	14.3	21.7	24	35.7	42.2	63.5	73.8	
28	–	–	11.6	13.9	21.7	25	35.7	41.6	63.5	72.5	
31.5	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
35.5	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
40	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
45	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
50	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
56	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
63	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
71	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
80	–	–	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	
90	–	–	11.6	15.5	20.0	27.2	34.5	43.8	63.5	77.2	
100	–	–	–	14.5	21.7	27.2	35.7	43.8	61.6	77.2	
112	–	–	–	15.0	21.7	25.2	35.7	42.8	61.6	77.2	
125	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
140	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
160	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
180	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
200	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
224	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
250	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
280	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
315	–	–	–	–	21.7	27.2	35.7	44.2	61.6	78.0	
355	–	–	–	–	19.6	27.2	35.7	44.2	61.6	78.0	
400	–	–	–	–	–	27.2	–	44.2	–	78.0	
450	–	–	–	–	–	25.3	–	42.8	–	78.0	

Type H1, see page 3/15  
 Type H2, see page 3/22  
 Type H3, see page 3/30

### Type H4 – Nominal output torque of low speed shaft (LSS) gear unit sizes 13 to 28

#### Technical specifications (continued)

#### Nominal output torque of low speed shaft (LSS) $T_{2N}$ (kNm) type H4

$i_N$	Gear unit sizes																Type	
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
1.25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	H1
1.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
1.6	67.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
1.8	70.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2	72.9	–	129	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2.24	75.2	–	130	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2.5	77.0	–	117	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2.8	77.0	–	120	–	171	–	–	–	–	–	–	–	–	–	–	–	–	
3.15	73.1	–	124	–	173	–	–	–	–	–	–	–	–	–	–	–	–	
3.55	74.4	–	126	–	173	–	–	–	–	–	–	–	–	–	–	–	–	
4	75.7	–	130	–	173	–	245	–	–	–	–	–	–	–	–	–	–	
4.5	61.6	–	109	–	146	–	216	–	–	–	–	–	–	–	–	–	–	
5	58.3	–	95.0	–	124	–	174	–	–	–	–	–	–	–	–	–	–	
5.6	55.4	–	90.4	–	118	–	150	–	–	–	–	–	–	–	–	–	–	
6.3	86.0	–	143	–	195	–	292	–	410	–	500	–	800	–	–	–	H2	
7.1	86.0	–	143	–	195	230	292	335	410	458	520	565	825	910	–	–		
8	86.0	107	143	160	195	230	292	335	410	458	540	585	860	940	1055	–		
9	86.0	107	143	160	195	230	292	335	410	458	555	610	860	985	1085	1205		
10	86.0	107	143	160	195	230	292	335	410	458	575	625	860	1020	1130	1240		
11.2	86.0	107	143	160	195	230	292	335	410	458	575	645	860	1030	1175	1285		
12.5	86.0	107	143	160	195	230	292	335	410	458	600	650	860	1030	1210	1340		
14	86.0	107	143	160	195	230	292	335	410	458	620	675	860	1030	1230	1375		
16	86.0	107	143	160	195	230	292	335	410	458	640	695	860	1030	1230	1400		
18	86.0	107	143	160	195	230	292	335	410	458	640	725	860	1030	1230	1400		
20	86.0	107	143	160	195	230	292	335	410	458	585	725	800	1030	1150	1400		
22.4	88.0	107	153	160	200	230	300	335	420	458	600	660	860	910	1230	1310		
25	88.0	107	153	173	200	240	300	345	420	470	620	675	860	1030	1230	1400		
28	88.0	109	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400		
31.5	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
35.5	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
40	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
45	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
50	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
56	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
63	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
71	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
80	88.0	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
90	88.0	109	153	173	200	240	290	345	410	470	585	725	800	1030	1150	1400		
100	90.7	109	153	173	200	226	300	335	420	465	640	660	860	910	1230	1310		
112	90.7	109	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
125	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
140	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
160	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
180	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
200	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
224	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
250	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
280	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
315	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400		
355	90.7	113	140	173	–	240	290	345	410	470	585	725	800	1030	1150	1400		
400	–	113	–	158	–	223	–	335	–	465	–	660	–	910	–	1310		
450	–	113	–	–	–	–	–	–	–	–	–	–	–	–	–	–		

Type H1, see page 3/15  
 Type H2, see page 3/22  
 Type H3, see page 3/30

## Design of the gear units

### Overview tables

#### Type H4 – Thermal capacities $n_1 = 1000 \text{ rpm}$ , $n_1 = 1200 \text{ rpm}$

##### Technical specifications (continued)

##### Thermal capacities $P_G$ (kW) type H4 $n_1 = 1000 \text{ rpm}$

$i_N$		Gear unit sizes															
		7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
100	$P_{GA}$	50.6	–	71.1	–	104	–	143	–	201	–	220	–	286	–	375	–
112	$P_{GA}$	48.6	–	68.2	–	104	–	140	–	192	208	210	227	274	294	366	383
125	$P_{GA}$	47.2	54.3	66.2	72.1	99.6	116	136	153	186	198	203	217	267	282	358	374
140	$P_{GA}$	45.0	52.1	64.1	69.2	96.5	115	132	150	179	191	196	209	258	274	344	365
160	$P_{GA}$	43.3	50.6	60.7	67.2	91.9	110	125	146	172	185	188	202	249	266	332	350
180	$P_{GA}$	41.8	48.3	58.3	65.0	88.6	107	120	141	169	178	184	195	240	256	327	338
200	$P_{GA}$	40.6	46.5	56.8	61.6	85.0	102	118	134	166	174	180	190	234	246	330	333
224	$P_{GA}$	37.9	44.8	54.1	59.2	81.3	98.1	113	129	155	171	168	185	225	240	315	335
250	$P_{GA}$	35.9	43.5	51.3	57.5	76.4	94.0	107	126	148	160	160	174	215	231	300	321
280	$P_{GA}$	34.7	40.6	49.5	54.9	73.0	89.9	104	121	143	152	156	165	207	221	291	305
315	$P_{GA}$	33.8	38.5	46.8	52.1	71.1	84.5	98.7	114	136	147	149	161	202	212	281	296
355	$P_{GA}$	31.9	37.1	45.7	50.2	67.1	80.7	93.6	111	133	140	145	153	191	207	267	285
400	$P_{GA}$	–	36.2	–	47.5	–	78.6	–	105	–	136	–	149	–	196	–	271
450	$P_{GA}$	–	34.3	–	46.4	–	74.2	–	99.7	–	–	–	–	–	–	–	–

##### Thermal capacities $P_G$ (kW) type H4 $n_1 = 1200 \text{ rpm}$

$i_N$		Gear unit sizes															
		7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
100	$P_{GA}$	53.6	–	75.1	–	110	–	150	–	210	–	229	–	295	–	379	–
112	$P_{GA}$	51.5	–	72.2	–	109	–	147	–	201	217	220	237	285	304	372	388
125	$P_{GA}$	50.0	57.5	70.0	76.3	105	122	143	161	195	207	213	227	278	294	367	381
140	$P_{GA}$	47.8	55.3	68.0	73.3	102	122	139	158	188	201	206	220	269	286	355	375
160	$P_{GA}$	46.0	53.7	64.4	71.2	97.3	117	132	153	181	194	198	213	260	277	344	362
180	$P_{GA}$	44.4	51.3	61.9	69.0	93.9	113	127	149	178	187	194	205	251	268	340	351
200	$P_{GA}$	43.3	49.4	60.5	65.4	90.5	108	126	141	176	183	190	201	246	258	346	346
224	$P_{GA}$	40.4	47.7	57.8	62.8	86.6	104	120	136	165	181	178	196	238	253	332	352
250	$P_{GA}$	38.3	46.4	54.8	61.3	81.5	100	114	134	157	170	170	184	227	244	317	338
280	$P_{GA}$	37.0	43.3	52.9	58.6	77.9	95.8	111	128	152	162	166	175	219	233	308	322
315	$P_{GA}$	36.1	41.1	50.0	55.6	75.9	90.1	105	122	145	157	158	172	214	225	297	313
355	$P_{GA}$	34.1	39.7	48.8	53.6	71.7	86.2	100	118	141	149	154	163	203	219	283	302
400	$P_{GA}$	–	38.7	–	50.7	–	83.9	–	112	–	145	–	159	–	208	–	287
450	$P_{GA}$	–	36.5	–	49.5	–	79.3	–	106	–	–	–	–	–	–	–	–



### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type H4 $n_1 = 1500$ rpm

$i_N$		Gear unit sizes															
		7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
100	$P_{GA}$	57.1	–	79.9	–	116	–	157	–	218	–	239	–	302	–	371	–
112	$P_{GA}$	54.9	–	76.9	–	116	–	155	–	210	225	230	248	293	312	370	381
125	$P_{GA}$	53.5	61.5	74.8	81.2	112	130	151	169	204	217	224	239	288	303	370	380
140	$P_{GA}$	51.2	59.1	72.6	78.2	109	129	147	166	198	211	217	232	281	297	362	379
160	$P_{GA}$	49.3	57.5	68.9	76.1	104	124	140	162	191	205	210	225	272	290	354	371
180	$P_{GA}$	47.7	55.0	66.3	73.8	100	121	135	158	188	198	206	217	263	281	351	362
200	$P_{GA}$	46.6	53.0	65.2	70.0	97.3	115	135	150	188	194	203	213	261	271	365	358
224	$P_{GA}$	43.6	51.2	62.3	67.4	93.3	111	129	145	177	194	191	210	252	269	351	372
250	$P_{GA}$	41.4	50.0	59.2	66.2	87.9	108	123	144	168	182	182	197	242	260	336	358
280	$P_{GA}$	40.0	46.8	57.2	63.2	84.1	103	119	138	164	173	179	188	233	249	328	342
315	$P_{GA}$	39.1	44.4	54.2	60.1	82.0	97.2	114	131	156	169	170	185	228	240	317	333
355	$P_{GA}$	36.9	43.0	52.9	58.0	77.6	93.1	108	127	152	161	166	176	217	234	302	322
400	$P_{GA}$	–	41.9	–	55.0	–	90.7	–	121	–	157	–	172	–	223	–	307
450	$P_{GA}$	–	39.5	–	53.6	–	85.8	–	115	–	–	–	–	–	–	–	–

#### Thermal capacities $P_G$ (kW) type H4 $n_1 = 1800$ rpm

$i_N$		Gear unit sizes															
		7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
100	$P_{GA}$	59.8	–	83.5	–	121	–	162	–	222	–	244	–	301	–	347	–
112	$P_{GA}$	57.7	–	80.6	–	121	–	160	–	215	229	237	254	297	313	355	359
125	$P_{GA}$	56.2	64.5	78.5	85.0	117	135	157	174	210	222	231	246	293	307	360	365
140	$P_{GA}$	53.8	62.2	76.3	82.0	114	135	153	172	205	217	225	240	287	303	360	371
160	$P_{GA}$	52.0	60.5	72.5	79.9	109	130	146	168	198	211	218	233	280	297	356	369
180	$P_{GA}$	50.3	57.9	69.9	77.6	105	126	141	164	195	205	214	226	271	289	355	365
200	$P_{GA}$	49.4	55.9	69.2	73.8	103	121	142	157	198	202	213	222	272	280	377	363
224	$P_{GA}$	46.3	54.1	66.1	71.0	98.7	117	136	151	186	204	201	220	264	280	365	385
250	$P_{GA}$	44.0	53.1	62.9	70.2	93.2	114	130	152	178	192	192	208	253	272	350	372
280	$P_{GA}$	42.6	49.7	60.8	67.2	89.3	110	126	146	173	183	189	198	245	260	343	357
315	$P_{GA}$	41.6	47.2	57.6	63.9	87.1	103	121	139	165	178	180	195	240	252	332	348
355	$P_{GA}$	39.3	45.7	56.3	61.7	82.5	98.8	115	135	161	170	176	186	228	246	317	337
400	$P_{GA}$	–	44.6	–	58.5	–	96.4	–	129	–	166	–	182	–	234	–	322
450	$P_{GA}$	–	42.1	–	57.1	–	91.3	–	122	–	–	–	–	–	–	–	–

## Design of the gear units

### Overview tables

#### Type B2 – Nominal power ratings of gear unit sizes 4 to 18

##### Technical specifications (continued)

##### Nominal power ratings $P_{2N}$ (kW) type B2

$i_N$	$n_1$	$n_2$	Gear unit sizes														
			4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<b>5</b>	1800	360	229	354	–	716	–	1127	–	1734 *	–	2585 *	–	4598 *	–	–	–
	1500	300	191	295	–	596	–	939	–	1445	–	2154	–	3832 *	–	–	–
	1200	240	153	236	–	477	–	751	–	1156	–	1723	–	3065 *	–	–	–
	1000	200	127	196	–	397	–	626	–	963	–	1436	–	2554	–	–	–
<b>5.6</b>	1800	321	208	315	–	638	–	1005	–	1616 *	–	2339 *	–	4100 *	4537 *	*	–
	1500	268	173	263	–	533	–	839	–	1349	–	1953	–	3423 *	3788 *	*	–
	1200	214	138	210	–	425	–	670	–	1077	–	1559	–	2733 *	3025 *	4369 *	–
	1000	179	116	176	–	356	–	560	–	901	–	1304	–	2286	2530	3654 *	–
<b>6.3</b>	1800	286	185	281	359	569	712	895	1138	1503 *	1760 *	2210 *	2551 *	3893 *	4222 *	*	–
	1500	238	154	234	299	473	593	745	947	1251	1465	1839	2123	3239 *	3513 *	4859 *	–
	1200	190	123	187	238	378	473	594	756	998	1169	1468	1695	2586 *	2805 *	3879 *	–
	1000	159	103	156	199	316	396	497	632	835	978	1228	1418	2164	2347	3246 *	–
<b>7.1</b>	1800	254	164	250	319	505	633	795	1010	1393 *	1619 *	2018 *	2321 *	3510 *	3856 *	*	*
	1500	211	136	207	265	419	525	660	839	1157	1345	1676	1928	2916 *	3203 *	4308 *	*
	1200	169	109	166	212	336	421	529	672	927	1077	1343	1544	2335 *	2565 *	3450 *	4070 *
	1000	141	91	138	177	280	351	441	561	773	899	1120	1288	1948	2140	2879	3395 *
<b>8</b>	1800	225	146	221	282	447	560	704	895	1272 *	1486 *	1884 *	2155 *	3109 *	3486 *	4594 *	*
	1500	188	122	185	236	374	468	588	748	1063	1242	1574	1801	2598	2913 *	3838 *	4527 *
	1200	150	97	147	188	298	373	469	596	848	991	1256	1437	2073	2324 *	3062 *	3612 *
	1000	125	81	123	157	248	311	391	497	706	825	1047	1197	1727	1937	2552	3010
<b>9</b>	1800	200	129	196	251	397	498	626	795	1130 *	1365 *	1698 *	1981 *	2764 *	3099 *	4083 *	4816 *
	1500	167	108	164	209	332	416	522	664	944	1140	1418	1654	2308	2588	3409 *	4021 *
	1200	133	86	130	167	264	331	416	529	752	908	1129	1317	1838	2061	2715 *	3203 *
	1000	111	72	109	139	220	276	347	441	627	757	942	1099	1534	1720	2266	2673
<b>10</b>	1800	180	116	177	226	358	448	563	716	1017 *	1249 *	1528 *	1862 *	2487 *	2789 *	3675 *	4335 *
	1500	150	97	147	188	298	373	469	596	848	1041	1273	1551	2073	2324	3062 *	3612 *
	1200	120	77	118	150	238	299	375	477	678	833	1019	1241	1658	1859	2450 *	2890 *
	1000	100	64	98	125	198	249	313	397	565	694	849	1034	1382	1549	2041	2408
<b>11.2</b>	1800	161	104	158	202	320	401	504	640	910 *	1117 *	1367 *	1709 *	2225 *	2495 *	3287 *	3877 *
	1500	134	86	131	168	266	333	419	533	757	930	1137	1422	1852	2076	2736 *	3227 *
	1200	107	69	105	134	212	266	335	425	605	742	908	1136	1478	1658	2184 *	2576 *
	1000	89	57	87	111	177	221	278	354	503	617	755	944	1230	1379	1817	2143
<b>12.5</b>	1800	144	–	–	180	–	358	–	572	–	999 *	–	1528 *	–	2231 *	–	3468 *
	1500	120	–	–	150	–	299	–	477	–	833	–	1274	–	1859	–	2890 *
	1200	96	–	–	120	–	239	–	381	–	666	–	1019	–	1487	–	2312 *
	1000	80	–	–	100	–	199	–	318	–	555	–	849	–	1239	–	1926
<b>14</b>	1800	129	–	–	162	–	321	–	513	–	895 *	–	1369 *	–	–	–	–
	1500	107	–	–	134	–	266	–	425	–	742	–	1136	–	–	–	–
	1200	86	–	–	108	–	214	–	342	–	597	–	913	–	–	–	–
	1000	71	–	–	89	–	176	–	282	–	492	–	753	–	–	–	–

Forced lubrication required for horizontal gear units  
\* on request

### Type B2 – Nominal output torque of low speed shaft (LSS) gear unit sizes 4 to 18

#### Technical specifications (continued)

#### Nominal output torque of low speed shaft (LSS) $T_{2N}$ (kNm) type B2

$i_N$	Gear unit sizes																			Type
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
5	6.1	9.4	–	19	–	29.9	–	46	–	68.6	–	122	–	–	–	–	–	–	–	B2
5.6	6.2	9.4	–	19	–	29.9	–	48.1	–	69.6	–	122	135	195	–	–	–	–	–	B2
6.3	6.2	9.4	12	19	23.8	29.9	38	50.2	58.8	73.8	85.2	130	141	195	–	–	–	–	–	B2
7.1	6.2	9.4	12	19	23.8	29.9	38	52.4	60.9	75.9	87.3	132	145	195	230	–	–	–	–	B2
8	6.2	9.4	12	19	23.8	29.9	38	54	63.1	80.0	91.5	132	148	195	230	–	–	–	–	B2
9	6.2	9.4	12	19	23.8	29.9	38	54	65.2	81.1	94.6	132	148	195	230	–	–	–	–	B2
10	6.2	9.4	12	19	23.8	29.9	38	54	66.3	81.1	98.8	132	148	195	230	–	–	–	–	B2
11.2	6.2	9.4	12	19	23.8	29.9	38	54	66.3	81.1	101	132	148	195	230	–	–	–	–	B2
12.5	5.5	9.4	12	17	23.8	28	38	52.4	66.3	79.5	101	132	148	195	230	250	–	340	–	B3
14	6	9.8	12	18.2	23.8	29.5	38	56.7	66.3	81.6	101	137	148	195	230	262	295	360	405	B3
16	6.6	10.5	12	19.8	21.5	31	35.6	59.9	66.3	83.8	99.4	142	154	200	230	275	308	380	422	B3
18	6.7	11.3	12.6	21.1	23.1	33.9	37.5	62	69.5	86.7	102	148	160	200	240	288	320	400	438	B3
20	6.7	11.6	13.2	21.7	26.5	35.7	39.3	63.5	72.7	90.7	105	153	167	200	240	300	332	420	455	B3
22.4	6.7	11.6	14.2	21.7	27.2	35.7	41.8	63.5	75.6	90.7	108	153	173	200	240	300	345	420	470	B3
25	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	90.7	113	153	173	200	240	300	345	420	470	B3
28	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	90.7	113	153	173	200	240	300	345	420	470	B3
31.5	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	90.7	113	153	173	200	240	300	345	420	470	B3
35.5	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	90.7	113	153	173	200	240	300	345	420	470	B3
40	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	90.7	113	153	173	200	240	300	345	420	470	B3
45	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	90.7	113	153	173	200	240	300	345	420	470	B3
50	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	90.7	113	153	173	200	240	300	345	420	470	B3
56	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	90.7	113	153	173	200	240	300	345	420	470	B3
63	6.6	11.4	15.5	21.4	27.2	35.7	43.8	63.5	77.2	90.7	113	153	173	200	240	300	345	420	470	B3
71	6.6	11	15.5	20	27.2	34	43.8	60	77.2	90.7	113	153	173	200	240	300	345	420	470	B3
80	–	11.6	14	21.7	26.9	35.7	43.8	61.6	77.2	90.7	113	153	173	200	240	300	345	420	470	B3
90	–	11.6	14	21.7	25.2	35.7	43	61.6	75	90.7	113	153	173	200	240	300	345	420	470	B3
100	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78	90.7	113	153	173	200	240	300	345	420	470	B3
112	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78	90.7	113	153	173	200	240	300	345	420	470	B3
125	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78	90.7	113	153	173	200	240	300	345	420	470	B3
140	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78	90.7	113	153	173	200	240	300	345	420	470	B3
160	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78	90.7	113	153	173	200	240	300	345	420	470	B3
180	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78	90.7	113	153	173	200	240	300	345	420	470	B3
200	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78	90.7	113	153	173	200	240	300	345	420	470	B3
224	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78	90.7	113	153	173	200	240	300	345	420	470	B3
250	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78	90.7	113	153	173	200	240	300	345	420	470	B3
280	–	11.6	15.5	21.7	27.2	35.3	44.2	61.6	78	90.7	113	153	173	200	240	300	345	420	470	B3
315	–	11.2	15.5	20.5	27.2	34	44.2	60	78	90.7	113	153	173	200	240	300	345	420	470	B3
355	–	–	15.5	–	26.5	–	44.2	–	78	–	113	–	173	–	240	–	345	–	470	B3
400	–	–	14.5	–	25.5	–	43	–	75	–	113	–	–	–	–	–	–	–	–	B4

## Design of the gear units

### Overview tables

#### Type B2 – Thermal capacities $n_1 = 1000$ rpm

#### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type B2 $n_1 = 1000$ rpm

$i_N$		Gear unit sizes														
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
5	$P_{GA}$	61.0	75.5	–	93.5	–	110	–	116	–	*	–	*	–	–	–
	$P_{GB}$	142	196	–	314	–	393	–	598	–	856	–	1033	–	–	–
	$P_{GC15}$	180	274	–	426	–	550	–	711	–	719	–	705	–	–	–
	$P_{GD15}$	251	379	–	615	–	791	–	1121	–	1403	–	1640	–	–	–
5.6	$P_{GA}$	59.1	74.1	–	94.6	–	114	–	140	–	*	–	*	82.2	*	–
	$P_{GB}$	136	189	–	298	–	376	–	591	–	860	–	1068	1060	1050	–
	$P_{GC15}$	172	263	–	392	–	508	–	703	–	736	–	757	722	554	–
	$P_{GD15}$	240	363	–	568	–	732	–	1090	–	1381	–	1648	1668	1642	–
6.3	$P_{GA}$	58.0	72.6	87.1	94.8	108	119	118	151	155	171	*	*	*	*	–
	$P_{GB}$	131	180	213	280	333	358	393	550	666	809	929	1063	1097	1102	–
	$P_{GC15}$	164	243	316	356	355	466	580	660	766	714	770	789	776	653	–
	$P_{GD15}$	229	336	425	518	555	674	814	1005	1206	1279	1486	1600	1687	1645	–
7.1	$P_{GA}$	54.9	69.5	85.0	91.8	108	119	122	160	177	187	182	193	*	*	*
	$P_{GB}$	122	169	205	264	315	340	376	540	656	799	933	1039	1098	1109	1140
	$P_{GC15}$	149	222	305	327	339	429	557	651	757	711	786	792	807	706	678
	$P_{GD15}$	209	309	409	478	525	623	774	981	1172	1257	1461	1536	1636	1618	1690
8	$P_{GA}$	51.9	66.4	82.5	89.4	106	117	126	160	185	195	208	223	*	*	*
	$P_{GB}$	114	159	194	249	296	322	358	499	608	743	871	974	1074	1068	1154
	$P_{GC15}$	137	204	290	301	322	398	532	606	708	672	757	768	815	718	730
	$P_{GD15}$	193	286	387	443	492	580	732	903	1077	1162	1349	1425	1566	1533	1663
9	$P_{GA}$	49.4	63.5	78.7	86.6	103	115	125	160	194	197	223	233	243	*	*
	$P_{GB}$	107	149	182	237	279	309	340	479	597	713	862	941	1004	1047	1110
	$P_{GC15}$	125	185	274	283	306	375	506	585	697	652	755	753	790	718	745
	$P_{GD15}$	177	260	364	417	464	548	692	866	1052	1115	1325	1374	1452	1486	1569
10	$P_{GA}$	41.8	59.2	74.9	82.2	99.2	110	123	156	192	200	228	244	252	213	*
	$P_{GB}$	88.9	136	171	220	263	290	323	450	550	675	797	889	969	1005	1088
	$P_{GC15}$	98.1	163	259	256	291	344	471	541	648	625	711	722	772	715	746
	$P_{GD15}$	141	232	342	379	438	504	644	801	966	1055	1223	1296	1401	1418	1518
11.2	$P_{GA}$	40.6	53.6	71.1	74.8	96.0	100	120	144	189	189	229	236	262	216	241
	$P_{GB}$	85.8	122	160	197	251	257	310	404	527	608	764	804	914	912	1040
	$P_{GC15}$	93.4	142	243	224	279	296	443	470	625	572	688	663	741	666	741
	$P_{GD15}$	135	203	320	333	418	437	609	701	925	952	1173	1173	1322	1286	1447
12.5	$P_{GA}$	42.3	56.1	66.1	84.4	90.8	113	115	176	183	243	230	306	254	320	242
	$P_{GB}$	85.7	121	146	204	233	269	291	433	495	661	722	862	825	997	944
	$P_{GC15}$	92.5	139	214	229	263	307	407	501	592	627	659	724	679	756	688
	$P_{GD15}$	132	198	284	336	390	447	560	729	869	1007	1107	1229	1194	1368	1313
14	$P_{GA}$	38.3	50.3	59.7	76.0	82.6	103	105	160	168	223	215	285	323	311	345
	$P_{GB}$	76.6	107	131	180	208	240	259	386	442	591	650	771	884	899	1026
	$P_{GC15}$	81.3	120	186	198	238	268	350	435	534	568	601	658	741	694	776
	$P_{GD15}$	116	172	248	292	350	391	488	636	778	901	997	1102	1251	1233	1392

\* on request

### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type B2 $n_1 = 1200$ rpm

$i_N$		Gear unit sizes														
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
5.0	$P_{GA}$	58.2	67.0	–	71.3	–	*	–	*	–	*	–	*	–	–	–
	$P_{GB}$	157	216	–	340	–	422	–	611	–	851	–	946	–	–	–
	$P_{GC15}$	197	299	–	460	–	586	–	667	–	616	–	464	–	–	–
	$P_{GD15}$	283	427	–	687	–	877	–	1168	–	1427	–	1585	–	–	–
5.6	$P_{GA}$	57.0	66.8	–	76.9	–	85.0	–	*	–	*	–	*	–	*	–
	$P_{GB}$	151	208	–	324	–	405	–	618	–	873	–	1019	969	873	–
	$P_{GC15}$	189	288	–	425	–	543	–	678	–	656	–	564	475	148	–
	$P_{GD15}$	271	409	–	636	–	815	–	1145	–	1431	–	1640	1608	1501	–
6.3	$P_{GA}$	56.6	67.8	79.4	82.0	87.9	96.5	86.4	99.0	*	*	*	*	*	*	–
	$P_{GB}$	146	199	235	307	366	389	423	585	685	845	930	1059	1046	1004	–
	$P_{GC15}$	180	266	324	387	356	503	580	646	723	660	666	646	579	375	–
	$P_{GD15}$	259	380	457	582	602	752	863	1061	1258	1341	1518	1622	1666	1591	–
7.1	$P_{GA}$	54.0	66.1	78.9	82.3	92.6	101	95.0	115	*	*	*	*	*	*	*
	$P_{GB}$	136	187	227	290	350	370	406	578	691	846	952	1056	1085	1069	1044
	$P_{GC15}$	163	244	313	356	344	464	558	640	733	672	704	687	663	500	401
	$P_{GD15}$	236	349	440	538	573	697	822	1039	1233	1323	1518	1589	1667	1603	1624
8	$P_{GA}$	51.2	63.7	79.0	84.3	97.2	103	105	124	135	*	*	*	*	*	*
	$P_{GB}$	128	177	215	281	332	353	390	536	648	790	915	1014	1094	1060	1107
	$P_{GC15}$	150	225	298	336	330	431	536	602	695	648	705	693	705	569	524
	$P_{GD15}$	218	323	417	509	539	649	780	959	1139	1230	1415	1494	1628	1552	1655
9	$P_{GA}$	49.1	61.5	76.1	82.7	96.5	104	109	128	149	143	*	*	*	*	*
	$P_{GB}$	120	165	202	269	314	339	371	517	639	761	912	991	1048	1050	1108
	$P_{GC15}$	137	203	283	315	315	407	514	584	689	632	717	691	716	591	593
	$P_{GD15}$	200	295	392	479	510	614	739	922	1115	1182	1397	1446	1527	1527	1599
10	$P_{GA}$	41.8	57.7	72.8	79.7	95.3	102	111	131	156	153	170	*	*	*	*
	$P_{GB}$	100	152	191	251	297	319	354	488	592	723	851	943	1023	1033	1097
	$P_{GC15}$	107	179	267	287	302	372	493	557	645	611	688	682	715	614	614
	$P_{GD15}$	160	263	369	438	483	565	703	870	1027	1120	1296	1370	1476	1472	1567
11.2	$P_{GA}$	40.7	52.4	69.8	73.1	93.1	93.2	110	125	158	150	176	*	*	*	*
	$P_{GB}$	96	136	178	225	284	284	340	438	569	654	817	855	973	949	1076
	$P_{GC15}$	102	156	254	251	291	321	475	503	625	562	669	633	702	585	637
	$P_{GD15}$	152	230	348	385	462	491	675	780	986	1013	1243	1243	1397	1341	1506
12.5	$P_{GA}$	43.5	56.8	65.2	84.2	89.4	111	108	171	161	230	185	259	*	*	*
	$P_{GB}$	97	136	163	229	265	300	320	480	538	726	776	936	880	1068	985
	$P_{GC15}$	102	154	236	252	275	337	444	547	595	637	646	719	650	722	612
	$P_{GD15}$	150	225	321	381	433	505	629	821	928	1088	1178	1321	1266	1457	1373
14	$P_{GA}$	39.4	51.1	59.1	76.3	81.9	102	99	157	150	215	178	253	278	245	265
	$P_{GB}$	86.5	120	146	203	238	268	286	429	481	652	701	840	960	967	1101
	$P_{GC15}$	89.6	133	205	218	249	294	384	476	539	580	593	658	734	672	740
	$P_{GD15}$	133	195	281	331	389	443	548	717	833	976	1064	1187	1346	1318	1485

\* on request

## Design of the gear units

### Overview tables

#### Type B2 – Thermal capacities $n_1 = 1500$ rpm

#### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type B2 $n_1 = 1500$ rpm

$i_N$		Gear unit sizes														
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
5.0	$P_{GA}$	48.7	*	–	*	–	*	–	*	–	*	–	*	–	–	–
	$P_{GB}$	177	239	–	374	–	439	–	583	–	764	–	662	–	–	–
	$P_{GC15}$	218	332	–	507	–	575	–	554	–	383	–	54	–	–	–
	$P_{GD15}$	327	490	–	791	–	938	–	1180	–	1369	–	1355	–	–	–
5.6	$P_{GA}$	49.3	*	–	*	–	*	–	*	–	*	–	*	–	*	–
	$P_{GB}$	171	231	–	359	–	431	–	613	–	827	–	804	677	339	–
	$P_{GC15}$	210	319	–	469	–	562	–	592	–	479	–	101	109	339	–
	$P_{GD15}$	314	471	–	735	–	898	–	1183	–	1411	–	1467	1371	1068	–
6.3	$P_{GA}$	51.4	53.8	57.6	*	*	*	*	*	*	*	*	*	*	*	–
	$P_{GB}$	166	222	262	344	398	421	442	601	658	832	842	936	824	673	–
	$P_{GC15}$	201	296	327	430	341	540	559	593	605	534	426	320	104	672	–
	$P_{GD15}$	300	438	496	675	648	851	914	1112	1277	1372	1458	1556	1487	1312	–
7.1	$P_{GA}$	50.0	55.7	59.5	*	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	155	210	253	327	383	403	434	607	690	851	906	996	961	857	707
	$P_{GC15}$	182	271	317	399	333	500	546	603	644	566	525	445	333	102	707
	$P_{GD15}$	274	404	478	627	617	790	875	1096	1277	1372	1500	1564	1580	1450	1337
8.0	$P_{GA}$	47.9	55.6	65.6	65.1	69.5	71.4	*	*	*	*	*	*	*	*	*
	$P_{GB}$	145	199	242	312	365	387	424	571	673	823	909	993	1024	949	898
	$P_{GC15}$	167	250	304	370	323	466	532	576	643	571	578	518	460	225	174
	$P_{GD15}$	253	374	454	583	585	738	835	1017	1196	1290	1455	1516	1609	1471	1485
9.0	$P_{GA}$	46.6	55.3	67.3	66.4	73.8	75.3	*	*	*	*	*	*	*	*	*
	$P_{GB}$	137	187	228	300	348	373	406	552	675	800	927	986	1033	971	988
	$P_{GC15}$	152	226	290	348	312	443	512	563	652	569	610	541	533	302	251
	$P_{GD15}$	232	341	429	551	555	699	794	981	1177	1244	1453	1488	1556	1471	1523
10	$P_{GA}$	40.1	52.8	66.2	66.9	77.8	79.1	81.2	*	*	*	*	*	*	*	*
	$P_{GB}$	114	172	215	280	331	353	389	524	632	767	892	963	1025	987	1012
	$P_{GC15}$	119	199	275	316	301	408	494	541	620	566	613	563	558	383	329
	$P_{GD15}$	185	304	404	504	527	645	757	927	1091	1186	1362	1428	1525	1463	1523
11.2	$P_{GA}$	39.2	48.3	64.4	62.6	78.6	75.6	84.2	*	*	*	*	*	*	*	*
	$P_{GB}$	110	154	202	252	317	315	376	473	610	696	863	889	1001	924	1034
	$P_{GC15}$	113	173	261	277	291	351	479	496	604	525	610	537	581	402	409
	$P_{GD15}$	177	266	381	444	505	561	728	837	1049	1076	1312	1301	1460	1361	1509
12.5	$P_{GA}$	44.1	55.9	61.0	80.8	77.7	104	88	153	105	189	*	*	*	*	*
	$P_{GB}$	112	156	185	261	297	339	355	535	578	801	823	1013	919	1122	970
	$P_{GC15}$	114	173	243	282	277	374	457	561	580	632	602	678	559	602	425
	$P_{GD15}$	176	262	352	442	474	584	687	900	993	1182	1250	1421	1330	1537	1398
14	$P_{GA}$	40.1	50.6	55.6	74.1	72.3	96.2	83.1	144	105	188	102	174	182	110	101
	$P_{GB}$	100	138	166	232	267	304	318	480	521	722	747	915	1039	1028	1156
	$P_{GC15}$	101	149	220	244	252	327	415	511	530	582	557	630	693	589	624
	$P_{GD15}$	155	227	316	385	427	512	619	808	893	1065	1130	1282	1448	1399	1572

\* on request

**Technical specifications (continued)**
**Thermal capacities  $P_G$  (kW) type B2**  
 **$n_1 = 1800 \text{ rpm}$** 

$i_N$		Gear unit sizes																		
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18				
<b>5.0</b>	$P_{GA}$	*	*	–	*	–	*	–	*	–	*	–	*	–	*	–	*	–	*	–
	$P_{GB}$	192	254	–	384	–	430	–	498	–	583	–	76	–	185	–	–	–	–	–
	$P_{GC15}$	235	357	–	535	–	522	–	388	–	76	–	185	–	–	–	–	–	–	–
	$P_{GD15}$	366	545	–	867	–	961	–	1124	–	1229	–	975	–	–	–	–	–	–	–
<b>5.6</b>	$P_{GA}$	*	*	–	*	–	*	–	*	–	*	–	*	–	*	–	*	–	*	–
	$P_{GB}$	186	247	–	376	–	431	–	562	–	700	–	420	180	*	–	–	–	–	–
	$P_{GC15}$	227	344	–	495	–	523	–	467	–	214	–	419	179	–	–	–	–	–	–
	$P_{GD15}$	351	524	–	808	–	926	–	1160	–	1309	–	1162	969	317	–	–	–	–	–
<b>6.3</b>	$P_{GA}$	39.60	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	181	239	281	364	412	434	436	576	570	765	660	675	*	*	–	–	–	–	–
	$P_{GC15}$	217	321	324	458	307	526	508	501	429	354	105	675	430	109	–	–	–	–	–
	$P_{GD15}$	337	489	526	746	675	892	937	1125	1217	1322	1316	1339	1174	839	–	–	–	–	–
<b>7.1</b>	$P_{GA}$	42.0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	170	228	272	348	402	421	437	594	635	805	775	822	696	446	133	–	–	–	–
	$P_{GC15}$	197	294	315	425	309	511	510	526	513	418	251	73	696	445	133	–	–	–	–
	$P_{GD15}$	308	451	508	693	648	851	905	1119	1257	1349	1397	1440	1357	1108	861	–	–	–	–
<b>8.0</b>	$P_{GA}$	41.9	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	160	216	262	333	388	408	438	575	647	799	840	899	845	697	482	–	–	–	–
	$P_{GC15}$	181	271	304	394	309	493	513	524	546	457	395	254	80	696	481	–	–	–	–
	$P_{GD15}$	284	419	484	646	618	811	872	1048	1210	1304	1408	1444	1465	1273	1135	–	–	–	–
<b>9.0</b>	$P_{GA}$	41.9	44.7	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	151	204	248	320	370	395	425	563	666	788	880	915	926	771	733	–	–	–	–
	$P_{GC15}$	165	244	290	371	300	468	498	522	573	469	460	321	267	771	733	–	–	–	–
	$P_{GD15}$	261	382	457	610	587	770	832	1014	1204	1264	1436	1439	1490	1316	1305	–	–	–	–
<b>10</b>	$P_{GA}$	36.7	44.6	52.6	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	126	188	235	301	354	375	412	541	643	775	868	921	946	854	810	–	–	–	–
	$P_{GC15}$	129	215	277	340	292	430	485	509	569	483	498	386	336	90	810	–	–	–	–
	$P_{GD15}$	208	340	432	559	559	711	796	964	1126	1214	1381	1417	1482	1358	1358	–	–	–	–
<b>11.2</b>	$P_{GA}$	36.1	41.6	55.4	45.5	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	122	169	221	272	341	336	398	491	627	710	857	860	957	824	893	–	–	–	–
	$P_{GC15}$	123	187	264	298	284	373	472	470	564	461	509	395	402	132	70	–	–	–	–
	$P_{GD15}$	199	299	408	493	537	620	767	871	1087	1108	1338	1311	1456	1282	1411	–	–	–	–
<b>12.5</b>	$P_{GA}$	43.5	53.1	53.7	74.1	58.3	89.8	*	*	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	125	173	203	287	320	370	378	575	599	853	839	1047	897	1095	871	–	–	–	–
	$P_{GC15}$	125	189	247	308	271	406	453	559	548	613	522	585	410	430	157	–	–	–	–
	$P_{GD15}$	199	296	377	496	504	651	726	957	1032	1252	1284	1481	1344	1560	1330	–	–	–	–
<b>14</b>	$P_{GA}$	39.8	48.5	49.5	68.7	56.7	85.9	*	*	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	112	154	182	255	289	332	341	519	541	772	765	956	1075	1041	1132	–	–	–	–
	$P_{GC15}$	110	163	224	267	249	354	413	512	504	569	496	568	602	453	454	–	–	–	–
	$P_{GD15}$	176	257	339	432	456	572	655	862	931	1130	1168	1344	1510	1436	1594	–	–	–	–

\* on request

## Design of the gear units

### Overview tables

#### Type B3 – Nominal power ratings of gear unit sizes 4 to 12

##### Technical specifications (continued)

##### Nominal power ratings $P_{2N}$ (kW) type B3

$i_N$	$n_1$	$n_2$	Gear unit sizes									
			4	5	6	7	8	9	10	11	12	
12.5	1800	144.0	82	141	–	256	–	422	–	790	–	
	1500	120.0	69	118	–	213	–	351	–	658	–	
	1200	96.0	55	94	–	170	–	281	–	526	–	
	1000	80.0	46	78	–	142	–	234	–	438	–	
14	1800	129.0	81	132	–	245	–	398	–	765	–	
	1500	107.0	67	109	–	203	–	330	–	635	–	
	1200	86.0	54	88	–	163	–	265	–	510	–	
	1000	71.0	44	72	–	135	–	219	–	421	–	
16	1800	113.0	78	124	141	234	254	366	421	708	784	
	1500	94.0	64	103	118	194	211	305	350	589	652	
	1200	75.0	51	82	94	155	168	243	279	470	520	
	1000	63.0	43	69	79	130	141	204	234	395	437	
18	1800	100.0	70	118	131	220	241	354	392	649	727	
	1500	83.0	58	98	109	183	200	294	325	538	604	
	1200	67.0	47	79	88	148	162	237	263	434	487	
	1000	56.0	39	66	73	123	135	198	219	363	407	
20	1800	90.0	63	109	124	204	235	336	370	598	685	
	1500	75.0	52	91	103	170	196	280	308	498	570	
	1200	60.0	42	72	82	136	157	224	246	398	456	
	1000	50.0	35	60	69	113	130	186	205	332	380	
22.4	1800	80.0	56	97	118	181	221	299	350	531	633	
	1500	67.0	47	81	99	152	185	250	293	445	530	
	1200	54.0	37	65	80	122	149	201	236	359	427	
	1000	45.0	31	54	66	102	124	168	196	299	356	
25	1800	72.0	50	87	116	163	205	269	330	478	582	
	1500	60.0	42	72	97	136	170	224	275	398	485	
	1200	48.0	33	58	77	109	136	179	220	319	388	
	1000	40.0	28	48	64	90	113	149	183	265	323	
28	1800	64.0	44	77	103	145	182	239	293	425	517	
	1500	54.0	37	65	87	122	153	201	247	359	436	
	1200	43.0	30	52	69	97	122	160	197	285	347	
	1000	36.0	25	43	58	81	102	134	165	239	291	
31.5	1800	57.0	39	69	92	129	162	213	261	379	460	
	1500	48.0	33	58	77	109	136	179	220	319	388	
	1200	38.0	26	46	61	86	108	142	174	252	307	
	1000	32.0	22	38	51	72	91	119	146	212	258	
35.5	1800	51.0	35	61	82	115	145	190	233	339	412	
	1500	42.0	29	51	68	95	119	157	192	279	339	
	1200	34.0	23	41	55	77	96	127	155	226	274	
	1000	28.0	19	34	45	63	79	104	128	186	226	
40	1800	45.0	31	54	73	102	128	168	206	299	363	
	1500	38.0	26	46	61	86	108	142	174	252	307	
	1200	30.0	21	36	48	68	85	112	137	199	242	
	1000	25.0	17	30	40	56	71	93	114	166	202	
45	1800	40.0	28	48	64	90	113	149	183	265	323	
	1500	33.0	23	40	53	74	93	123	151	219	266	
	1200	27.0	18	32	43	61	76	100	123	179	218	
	1000	22.0	15	26	35	49	62	82	100	146	177	
50	1800	36.0	25	43	58	81	102	134	165	239	291	
	1500	30.0	21	36	48	68	85	112	137	199	242	
	1200	24.0	16	29	38	54	68	89	110	159	194	
	1000	20.0	14	24	32	45	56	74	91	132	161	
56	1800	32.0	22	38	51	72	91	119	146	212	258	
	1500	27.0	18	32	43	61	76	100	123	179	218	
	1200	21.0	14	25	34	47	59	78	96	139	169	
	1000	17.9	12	21	29	40	50	66	82	119	144	



### Technical specifications (continued)

#### Nominal power ratings $P_{2N}$ (kW) type B3 (continued)

$i_N$	$n_1$	$n_2$	Gear unit sizes								
			4	5	6	7	8	9	10	11	12
<b>63</b>	1800	29.0	20	34	47	64	82	108	133	192	234
	1500	24.0	16	28	38	53	68	89	110	159	194
	1200	19.0	13	22	30	42	54	71	87	126	153
	1000	15.9	10	18	25	35	45	59	72	105	128
<b>71</b>	1800	25.0	17	28	40	52	71	89	114	157	202
	1500	21.0	14	24	34	43	59	74	96	131	169
	1200	16.9	11	19	27	35	48	60	77	106	136
	1000	14.1	9.7	16	22	29	40	50	64	88	113
<b>80</b>	1800	23.0	–	–	33	–	64	–	105	–	185
	1500	18.8	–	–	27	–	52	–	86	–	151
	1200	15.0	–	–	21	–	42	–	68	–	121
	1000	12.5	–	–	18	–	35	–	57	–	101
<b>90</b>	1800	20.0	–	–	29	–	52	–	90	–	157
	1500	16.7	–	–	24	–	44	–	75	–	131
	1200	13.3	–	–	19	–	35	–	59	–	104
	1000	11.1	–	–	16	–	29	–	49	–	87

# Design of the gear units

## Overview tables

### Type B3 – Nominal power ratings of gear unit sizes 13 to 28

#### Technical specifications (continued)

#### Nominal power ratings $P_{2N}$ (kW) type B3

$i_N$	$n_1$	$n_2$	Gear unit sizes															
			13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
12.5	1800	144.0	1198	–	1990 *	–	2940 *	–	3769 *	–	–	–	–	–	–	–	–	
	1500	120.0	998	–	1658	–	2450	–	3141 *	–	4272 *	–	–	–	–	–	–	
	1200	96.0	799	–	1326	–	1960	–	2513 *	–	3417 *	–	–	–	–	–	–	
	1000	80.0	665	–	1105	–	1633	–	2094	–	2848	–	–	–	–	–	–	
14	1800	129.0	1102	–	1850 *	1999 *	2634 *	3106 *	3539 *	3984 *	4862 *	–	–	–	–	–	–	
	1500	107.0	914	–	1534	1658	2184	2576	2935 *	3305 *	4033 *	4537 *	–	–	–	–	–	
	1200	86.0	734	–	1233	1332	1756	2071	2359 *	2656 *	3241 *	3647 *	–	–	–	–	–	
	1000	71.0	606	–	1018	1100	1449	1709	1947	2193	2676	3010	–	–	–	–	–	
16	1800	113.0	991	1176	1680 *	1822 *	2366 *	2721 *	3253 *	3644 *	4496 *	4993 *	–	–	–	–	–	
	1500	94.0	824	978	1397	1515	1968	2263	2706 *	3031 *	3740 *	4153 *	–	–	–	–	–	
	1200	75.0	658	780	1115	1209	1570	1806	2159 *	2418 *	2984 *	3314 *	–	–	–	–	–	
	1000	63.0	552	655	936	1015	1319	1517	1814	2031	2506	2783	–	–	–	–	–	
18	1800	100.0	907	1068	1549 *	1675 *	2094 *	2513 *	3015 *	3350 *	4188 *	4586 *	–	–	–	–	–	
	1500	83.0	753	886	1286	1390	1738	2085	2503 *	2781 *	3476 *	3806 *	–	–	–	–	–	
	1200	67.0	608	715	1038	1122	1403	1683	2020 *	2245 *	2806 *	3072 *	–	–	–	–	–	
	1000	56.0	508	598	867	938	1172	1407	1688	1876	2345	2568	–	–	–	–	–	
20	1800	90.0	854	989	1441 *	1573 *	1884 *	2261 *	2827 *	3128 *	3958 *	4287 *	–	–	–	–	–	
	1500	75.0	712	824	1201	1311	1570	1884	2356 *	2607 *	3298 *	3573 *	–	–	–	–	–	
	1200	60.0	569	659	961	1049	1256	1507	1884	2085 *	2638	2858 *	–	–	–	–	–	
	1000	50.0	474	549	801	874	1047	1256	1570	1738	2198	2382	3351	–	4503	–	–	
22.4	1800	80.0	759	904	1281 *	1449 *	1675 *	2010 *	2513 *	2890 *	3518 *	3937 *	–	–	–	–	–	
	1500	67.0	636	757	1073	1213	1403	1683	2104	2420 *	2946 *	3297 *	–	–	–	–	–	
	1200	54.0	512	610	865	978	1130	1357	1696	1950	2374 *	2657	–	–	–	–	–	
	1000	45.0	427	508	720	815	942	1130	1413	1625	1979	2214	2992	3389	4020	4815	–	–
25	1800	72.0	683	851	1153 *	1304 *	1507 *	1809 *	2261 *	2601 *	3166 *	3543 *	–	–	–	–	–	
	1500	60.0	569	709	961	1086	1256	1507	1884	2167	2638 *	2952 *	–	–	–	–	–	
	1200	48.0	455	567	769	869	1005	1206	1507	1734	2110 *	2362 *	–	–	–	–	–	
	1000	40.0	379	473	640	724	837	1005	1256	1445	1759	1968	2681	3037	3602	4314	–	–
28	1800	64.0	607	757	1025 *	1159 *	1340 *	1608 *	2010 *	2312 *	2814 *	3149 *	–	–	–	–	–	
	1500	54.0	512	638	865	978	1130	1357	1696	1950	2374	2657 *	–	–	–	–	–	
	1200	43.0	408	508	688	778	900	1080	1350	1553	1891	2116 *	–	–	–	–	–	
	1000	36.0	341	425	576	652	753	904	1130	1300	1583	1771	2393	2711	3216	3852	–	–
31.5	1800	57.0	541	674	913 *	1032 *	1193 *	1432 *	1790 *	2059 *	2506 *	2805 *	–	–	–	–	–	
	1500	48.0	455	567	769	869	1005	1206	1507	1734	2110	2362	–	–	–	–	–	
	1200	38.0	360	449	608	688	795	954	1193	1372	1671	1870	–	–	–	–	–	
	1000	32.0	303	378	512	579	670	804	1005	1156	1407	1574	2127	2410	2859	3424	–	–
35.5	1800	51.0	484	603	817 *	923 *	1068 *	1281 *	1602 *	1842 *	2242 *	2509 *	–	–	–	–	–	
	1500	42.0	398	496	672	760	879	1055	1319	1517	1847	2067	–	–	–	–	–	
	1200	34.0	322	402	544	615	712	854	1068	1228	1495	1673	–	–	–	–	–	
	1000	28.0	265	331	448	507	586	703	879	1011	1231	1378	1858	2138	2537	3038	–	–
40	1800	45.0	427	532	720 *	815 *	942 *	1130 *	1413 *	1625 *	1979 *	2214 *	–	–	–	–	–	
	1500	38.0	360	449	608	688	795	954	1193	1372	1671	1870	–	–	–	–	–	
	1200	30.0	284	354	480	543	628	753	942	1083	1319	1476	–	–	–	–	–	
	1000	25.0	237	295	400	452	523	628	785	903	1099	1230	1649	1832	2251	2696	–	–
45	1800	40.0	379	473	640 *	724 *	837 *	1005 *	1256 *	1445 *	1759 *	1968 *	–	–	–	–	–	
	1500	33.0	313	390	528	597	691	829	1036	1192	1451	1624	–	–	–	–	–	
	1200	27.0	256	319	432	489	565	678	848	975	1187	1328	–	–	2401	–	–	
	1000	22.0	208	260	352	398	460	552	691	794	967	1082	1466	1629	2001	2397	2862	–
50	1800	36.0	341	425	576	652 *	753 *	904 *	1130 *	1300 *	1583 *	1771 *	–	–	–	–	–	
	1500	30.0	284	354	480	543	628	753	942	1083	1319	1476	–	–	–	–	–	
	1200	24.0	227	283	384	434	502	603	753	867	1055	1181	1583	–	2161	2588	–	–
	1000	20.0	189	236	320	362	418	502	628	722	879	984	1319	1466	1801	2157	2576	2932
56	1800	32.0	303	378	512	579	670 *	804 *	1005 *	1156 *	1407 *	1574 *	–	–	–	–	–	
	1500	27.0	256	319	432	489	565	678	848	975	1187	1328	–	–	–	–	–	
	1200	21.0	199	248	336	380	439	527	659	758	923	1033	1414	1571	1930	2311	–	–
	1000	17.9	170	211	286	324	374	449	562	646	787	880	1178	1309	1608	1926	2300	2618

Forced lubrication required for horizontal gear units

\* on request

### Type B3 – Nominal power ratings of gear unit sizes 13 to 28

#### Technical specifications (continued)

#### Nominal power ratings $P_{2N}$ (kW) type B3 (continued)

$i_N$	$n_1$	$n_2$	Gear unit sizes															
			13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
<b>63</b>	1800	29.0	275	343	464	525	607 *	728 *	910 *	1047 *	1275 *	1427 *	*	*	*	*	*	*
	1500	24.0	227	283	384	434	502	603	753	867	1055	1181	*	*	*	*	*	*
	1200	19.0	180	224	304	344	397	477	596	686	835	935	1257	1396	1715	2054	*	*
	1000	15.9	151	188	254	288	332	399	499	574	699	782	1047	1163	1429	1712	2044	2327
<b>71</b>	1800	25.0	237	295	400	452	523 *	628 *	785 *	903 *	1099 *	1230 *	*	*	*	*	*	*
	1500	21.0	199	248	336	380	439	527	659	758	923	1033	*	*	*	*	*	*
	1200	16.9	160	199	270	306	353	424	530	610	743	831	1115	1239	1416	1823	*	*
	1000	14.1	133	166	225	255	295	354	442	509	620	693	929	1032	1180	1519	1696	2065
<b>80</b>	1800	23.0	–	272	–	416	–	578 *	–	830 *	–	1131 *	–	*	–	*	–	*
	1500	18.8	–	222	–	340	–	472	–	679	–	925	–	*	–	*	–	*
	1200	15.0	–	177	–	271	–	376	–	541	–	738	–	1099	–	1429	–	*
	1000	12.5	–	147	–	226	–	314	–	451	–	615	–	916	–	1191	–	1715
<b>90</b>	1800	20.0	–	236	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1500	16.7	–	197	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1200	13.3	–	157	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1000	11.1	–	131	–	–	–	–	–	–	–	–	–	–	–	–	–	–

\* on request

## Design of the gear units

### Overview tables

#### Type B3 – Nominal output torque of low speed shaft (LSS) gear unit sizes 4 to 12

##### Technical specifications (continued)

##### Nominal output torque of low speed shaft (LSS) $T_{2N}$ (kNm) type B3

$i_N$	Gear unit sizes										Type
	4	5	6	7	8	9	10	11	12		
5	6.1	9.4	–	19	–	29.9	–	46	–		B2
5.6	6.2	9.4	–	19	–	29.9	–	48.1	–		
6.3	6.2	9.4	12	19	23.8	29.9	38	50.2	58.8		
7.1	6.2	9.4	12	19	23.8	29.9	38	52.4	60.9		
8	6.2	9.4	12	19	23.8	29.9	38	54	63.1		
9	6.2	9.4	12	19	23.8	29.9	38	54	65.2		
10	6.2	9.4	12	19	23.8	29.9	38	54	66.3		
11.2	6.2	9.4	12	19	23.8	29.9	38	54	66.3		
12.5	5.5	9.4	12	17	23.8	28	38	52.4	66.3		
14	6	9.8	12	18.2	23.8	29.5	38	56.7	66.3		
16	6.6	10.5	12	19.8	21.5	31	35.6	59.9	66.3		
18	6.7	11.3	12.6	21.1	23.1	33.9	37.5	62	69.5		
20	6.7	11.6	13.2	21.7	26.5	35.7	39.3	63.5	72.7		
22.4	6.7	11.6	14.2	21.7	27.2	35.7	41.8	63.5	75.6		
25	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
28	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
31.5	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	B3	
35.5	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
40	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
45	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
50	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
56	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
63	6.6	11.4	15.5	21.4	27.2	35.7	43.8	63.5	77.2		
71	6.6	11	15.5	20	27.2	34	43.8	60	77.2		
80	–	11.6	14	21.7	26.9	35.7	43.8	61.6	77.2		
90	–	11.6	14	21.7	25.2	35.7	43	61.6	75		
100	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
112	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
125	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
140	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
160	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
180	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
200	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
224	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
250	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
280	–	11.6	15.5	21.7	27.2	35.3	44.2	61.6	78		
315	–	11.2	15.5	20.5	27.2	34	44.2	60	78		
355	–	–	15.5	–	26.5	–	44.2	–	78		
400	–	–	14.5	–	25.5	–	43	–	75		

### Type B3 – Nominal output torque of low speed shaft (LSS) gear unit sizes 13 to 28

#### Technical specifications (continued)

#### Nominal output torque of low speed shaft (LSS) $T_{2N}$ (kNm) type B3

$i_N$	Gear unit sizes																Type	
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
5	68.6	–	122	–	–	–	–	–	–	–	–	–	–	–	–	–	–	B2
5.6	69.6	–	122	135	195	–	–	–	–	–	–	–	–	–	–	–	–	
6.3	73.8	85.2	130	141	195	–	–	–	–	–	–	–	–	–	–	–	–	
7.1	75.9	87.3	132	145	195	230	–	–	–	–	–	–	–	–	–	–	–	
8	80.0	91.5	132	148	195	230	–	–	–	–	–	–	–	–	–	–	–	
9	81.1	94.6	132	148	195	230	–	–	–	–	–	–	–	–	–	–	–	
10	81.1	98.8	132	148	195	230	–	–	–	–	–	–	–	–	–	–	–	
11.2	81.1	101	132	148	195	230	–	–	–	–	–	–	–	–	–	–	–	
12.5	79.5	101	132	148	195	230	250	–	340	–	–	–	–	–	–	–	–	
14	81.6	101	137	148	195	230	262	295	360	405	–	–	–	–	–	–	–	
16	83.8	99.4	142	154	200	230	275	308	380	422	–	–	–	–	–	–	–	
18	86.7	102	148	160	200	240	288	320	400	438	–	–	–	–	–	–	–	
20	90.7	105	153	167	200	240	300	332	420	455	640	–	860	–	1230	–	–	
22.4	90.7	108	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400	–	
25	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400	–	
28	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400	–	
31.5	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400	–	
35.5	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400	–	
40	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400	–	
45	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400	–	
50	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400	–	
56	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400	–	
63	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400	–	
71	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1150	1400	–	
80	90.7	113	153	173	200	240	300	345	420	470	640	700	860	910	1225	1310	–	
90	90.7	113	153	173	200	240	300	345	420	470	640	725	860	960	1225	1400	–	
100	90.7	113	153	173	200	240	300	345	420	470	640	725	860	970	1220	1400	–	
112	90.7	113	153	173	200	240	300	345	420	470	640	725	860	990	1220	1400	–	
125	90.7	113	153	173	200	240	300	345	420	470	640	725	860	990	1215	1400	–	
140	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1215	1400	–	
160	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1210	1400	–	
180	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1210	1400	–	
200	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1205	1400	–	
224	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1205	1400	–	
250	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1200	1400	–	
280	90.7	113	153	173	200	240	300	345	420	470	640	710	860	1030	1200	1400	–	
315	90.7	113	153	173	200	240	300	345	420	470	585	690	800	1030	1150	1400	–	
355	–	113	–	173	–	240	–	345	–	470	–	660	–	910	–	1310	–	
400	–	113	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	

Type B2, see page 3/43  
Type B4, see page 3/64

# Design of the gear units

## Overview tables

### Type B3 – Thermal capacities $n_1 = 1000$ rpm

#### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type B3 $n_1 = 1000$ rpm

$i_N$		Gear unit sizes																		
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
12.5	$P_{GA}$	46.3	61.8	–	95.2	–	125	–	173	–	229	–	274	–	259	–	*	–	*	–
	$P_{GB}$	81.9	116	–	180	–	248	–	404	–	545	–	709	–	923	–	1021	–	1135	–
	$P_{GC15}$	95.3	158	–	249	–	415	–	498	–	570	–	665	–	673	–	*	–	*	–
	$P_{GD15}$	128	206	–	324	–	521	–	703	–	853	–	1054	–	1282	–	*	–	*	–
14	$P_{GA}$	44.8	59.8	–	92.3	–	122	–	169	–	230	–	269	290	251	292	*	*	*	*
	$P_{GB}$	79.2	112	–	174	–	242	–	394	–	546	–	692	737	885	983	1000	1090	1115	1170
	$P_{GC15}$	92.2	153	–	241	–	404	–	485	–	572	–	648	681	647	717	*	*	*	*
	$P_{GD15}$	124	199	–	313	–	508	–	686	–	855	–	1026	1080	1227	1351	*	*	*	*
16	$P_{GA}$	43.2	58.4	67.1	88.4	103.8	119	134	166	194	223	253	284	285	296	273	*	*	*	*
	$P_{GB}$	76.0	109	123	166	190	235	260	380	434	512	578	689	716	902	906	996	1038	1140	1144
	$P_{GC15}$	88.3	148	161	228	254	391	423	467	518	534	596	647	662	673	663	*	*	*	*
	$P_{GD15}$	118	193	211	297	330	490	531	657	733	793	890	1010	1048	1234	1245	*	*	*	*
18	$P_{GA}$	41.8	56.6	65.2	85.5	101	116	125	163	193	224	254	279	300	285	330	*	*	*	*
	$P_{GB}$	73.6	106	119	160	185	229	243	371	433	513	579	671	714	863	959	970	1056	1119	1175
	$P_{GC15}$	85.4	143	156	220	246	380	394	455	517	535	598	630	662	645	714	*	*	*	*
	$P_{GD15}$	114	186	204	287	321	478	495	640	731	794	891	982	1035	1179	1302	*	*	*	*
20	$P_{GA}$	39.3	54.5	63.3	82.1	95.9	112	128	157	186	211	245	273	292	284	306	257	280	308	328
	$P_{GB}$	68.9	101	116	154	174	220	245	356	407	484	541	648	692	836	882	942	1003	1090	1145
	$P_{GC15}$	80.1	137	150	211	232	364	398	436	485	505	558	608	642	628	659	*	*	*	*
	$P_{GD15}$	107	178	197	274	302	457	500	612	684	749	825	944	1003	1136	1196	*	*	*	*
22.4	$P_{GA}$	38.3	53.8	61.5	79.5	93.2	109	119	152	185	208	246	277	287	297	302	284	289	342	340
	$P_{GB}$	67.0	100	112	148	169	212	229	339	406	463	543	629	668	820	855	940	971	1090	1113
	$P_{GC15}$	77.8	136	146	203	226	353	371	418	484	486	559	595	620	625	642	*	*	*	*
	$P_{GD15}$	104	177	191	263	294	442	465	584	682	715	827	914	964	1108	1151	*	*	*	*
25	$P_{GA}$	36.4	51.4	59.1	77.1	89.5	105	115	146	179	202	232	267	289	298	315	310	313	370	371
	$P_{GB}$	63.3	94.7	107	142	162	201	220	318	390	437	512	588	648	772	838	925	967	1070	1112
	$P_{GC15}$	73.3	129	140	196	216	331	355	396	464	463	528	562	606	601	638	*	*	*	*
	$P_{GD15}$	97.9	167	183	253	281	413	445	550	652	675	779	854	932	1037	1123	*	*	*	*
28	$P_{GA}$	35.1	49.8	58.4	73.4	86.5	100	111	140	173	194	228	266	279	299	313	321	335	384	395
	$P_{GB}$	60.8	91.2	106	134	156	191	212	302	371	415	488	571	605	754	789	901	947	1044	1090
	$P_{GC15}$	69.0	121	139	186	208	306	344	379	444	443	507	549	572	593	613	*	*	*	*
	$P_{GD15}$	92.5	158	181	240	270	384	430	523	621	642	743	828	870	1012	1051	*	*	*	*
31.5	$P_{GA}$	33.4	47.5	55.8	70.1	83.7	96.3	107	134	165	186	220	252	277	290	314	325	344	387	407
	$P_{GB}$	57.6	86.5	100	127	150	182	201	286	348	393	461	532	589	706	770	860	923	992	1061
	$P_{GC15}$	64.5	113	131	178	200	286	327	361	421	423	483	517	559	563	604	*	*	*	*
	$P_{GD15}$	86.7	148	171	228	259	360	408	496	585	610	701	773	845	947	1024	*	*	*	*
35.5	$P_{GA}$	31.7	45.0	54.0	66.7	79.7	91.5	103	129	158	180	211	245	263	285	304	323	345	385	406
	$P_{GB}$	54.2	81.1	96.7	120	142	171	191	274	330	378	437	512	549	680	721	836	880	961	1006
	$P_{GC15}$	59.3	103	124	169	191	259	311	348	401	409	461	500	526	546	573	*	*	*	*
	$P_{GD15}$	80.0	135	162	216	246	329	387	477	556	587	667	745	788	913	958	*	*	*	*
40	$P_{GA}$	27.7	39.5	51.5	58.8	76.1	85.8	98.4	122	151	172	202	235	255	275	298	319	342	380	403
	$P_{GB}$	46.8	70.3	91.6	104	134	159	182	256	312	355	415	483	528	644	694	795	854	915	975
	$P_{GC15}$	49.2	85.2	115	140	182	232	291	327	382	388	440	476	509	523	556	*	*	*	*
	$P_{GD15}$	66.9	113	151	180	234	296	363	446	526	554	633	704	759	866	925	*	*	*	*
45	$P_{GA}$	27.0	38.4	48.7	57.0	72.3	79.5	93.7	113	146	158	196	218	244	259	287	308	337	365	397
	$P_{GB}$	45.5	68.1	86.0	101	126	146	171	236	299	325	399	445	498	597	658	744	812	851	927
	$P_{GC15}$	47.7	81.8	105	133	173	208	264	294	368	359	425	443	485	490	532	*	*	*	*
	$P_{GD15}$	64.9	109	139	172	222	267	332	403	506	509	609	651	718	804	876	*	*	*	*
50	$P_{GA}$	27.0	38.3	42.7	56.9	63.7	79.3	87.8	117	137	164	186	234	227	286	270	340	324	419	381
	$P_{GB}$	44.7	66.7	74.5	98.6	110	143	159	235	279	326	375	455	458	616	609	758	759	894	863
	$P_{GC15}$	46.8	79.4	87	129	143	200	237	291	348	362	403	455	451	513	498	*	*	*	*
	$P_{GD15}$	63.3	105	116	167	185	256	299	396	475	508	575	658	663	821	815	*	*	*	*
56	$P_{GA}$	24.5	35.1	41.6	52.4	61.8	72.6	81.6	108	127	151	171	216	242	266	296	319	356	392	433
	$P_{GB}$	40.4	60.7	72.2	90.2	106	130	147	214	257	298	342	416	469	566	629	698	772	822	904
	$P_{GC15}$	41.6	71.1	83.7	116	137	177	213	258	323	334	373	420	462	476	521	*	*	*	*
	$P_{GD15}$	56.4	94.3	112	150	177	228	270	353	439	466	528	604	671	755	830	*	*	*	*

\* on request

### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type B3 $n_1 = 1000$ rpm (continued)

$i_N$		Gear unit sizes																		
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
<b>63</b>	$P_{GA}$	23.4	33.6	41.3	50.2	61.6	69.4	81.1	103	131	145	177	208	223	257	276	312	334	383	404
	$P_{GB}$	38.3	57.6	70.6	85.9	104	123	143	203	257	283	344	398	428	541	577	677	712	797	831
	$P_{GC15}$	38.9	66.3	81.2	109	133	165	204	241	324	321	375	405	427	460	483	*	*	*	*
	$P_{GD15}$	52.8	88.3	108	141	171	213	259	330	436	445	526	579	615	725	764	*	*	*	*
<b>71</b>	$P_{GA}$	22.0	31.5	37.9	47.2	56.6	64.2	74.3	94.9	120	134	163	196	215	244	266	298	326	366	395
	$P_{GB}$	35.9	53.6	64.3	80.1	95.2	113	130	185	233	260	313	373	409	509	552	638	689	750	805
	$P_{GC15}$	35.7	60.5	72.8	99.3	119	148	181	214	297	299	346	384	411	438	467	*	*	*	*
	$P_{GD15}$	48.7	80.8	97.0	129	154	191	231	295	398	412	482	545	589	684	733	*	*	*	*
<b>80</b>	$P_{GA}$	–	–	36.2	–	54.3	–	71.1	–	115	–	156	–	203	–	253	–	311	–	377
	$P_{GB}$	–	–	61.0	–	90.8	–	124	–	221	–	298	–	383	–	519	–	649	–	758
	$P_{GC15}$	–	–	68.0	–	112	–	169	–	286	–	332	–	390	–	444	–	*	–	*
	$P_{GD15}$	–	–	90.9	–	145	–	216	–	380	–	461	–	555	–	692	–	*	–	*
<b>90</b>	$P_{GA}$	–	–	34.1	–	51.0	–	66	–	106	–	144	–	–	–	–	–	–	–	–
	$P_{GB}$	–	–	57.1	–	84.6	–	114	–	201	–	273	–	–	–	–	–	–	–	–
	$P_{GC15}$	–	–	62.2	–	102	–	151	–	264	–	310	–	–	–	–	–	–	–	–
	$P_{GD15}$	–	–	83.5	–	133	–	194	–	349	–	426	–	–	–	–	–	–	–	–

\* on request

# Design of the gear units

## Overview tables

### Type B3 – Thermal capacities $n_1 = 1200$ rpm

#### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type B3 $n_1 = 1200$ rpm

$i_N$		Gear unit sizes																		
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
12.5	$P_{GA}$	47.5	62.9	–	95.5	–	122	–	164	–	206	–	208	–	*	–	*	–	*	–
	$P_{GB}$	91.9	130	–	201	–	275	–	448	–	589	–	743	–	933	–	987	–	1062	–
	$P_{GC15}$	105	174	–	258	–	429	–	512	–	571	–	630	–	581	–	*	–	*	–
	$P_{GD15}$	145	234	–	351	–	561	–	765	–	913	–	1107	–	1310	–	*	–	*	–
14	$P_{GA}$	46.1	61.1	–	92.7	–	120	–	161	–	208	–	207	225	*	*	*	*	*	*
	$P_{GB}$	88.9	126	–	194	–	268	–	438	–	592	–	726	773	896	996	974	1066	1051	1107
	$P_{GC15}$	101	169	–	249	–	419	–	500	–	573	–	617	647	560	624	*	*	*	*
	$P_{GD15}$	140	226	–	339	–	546	–	745	–	915	–	1080	1138	1255	1384	*	*	*	*
16	$P_{GA}$	44.5	59.9	68.8	89.1	105	118	133	162	187	209	232	245	222	210	*	*	*	*	*
	$P_{GB}$	85.2	123	138	185	211	261	288	424	482	560	626	733	752	940	922	984	1020	1112	1091
	$P_{GC15}$	97.1	164	177	237	263	405	438	483	534	542	599	629	631	621	578	*	*	*	*
	$P_{GD15}$	134	219	239	322	358	528	572	715	797	854	953	1074	1105	1287	1278	*	*	*	*
18	$P_{GA}$	43.2	58.0	66.8	86.4	102	116	125	159	188	211	233	241	261	205	246	*	*	*	*
	$P_{GB}$	82.7	119	134	179	205	254	269	414	481	561	629	715	762	900	1001	961	1052	1097	1159
	$P_{GC15}$	94.0	158	172	229	256	395	409	471	532	544	602	614	646	597	662	*	*	*	*
	$P_{GD15}$	130	212	231	311	348	514	533	697	795	856	955	1045	1103	1231	1357	*	*	*	*
20	$P_{GA}$	40.6	56.0	65.2	83.2	97.3	112	127	154	183	201	234	243	256	216	231	*	*	*	*
	$P_{GB}$	77.6	114	130	171	194	244	273	398	455	530	592	694	739	879	923	947	1007	1086	1137
	$P_{GC15}$	88.2	152	166	219	242	378	413	452	502	515	567	599	627	591	613	*	*	*	*
	$P_{GD15}$	122	203	224	297	328	492	539	668	746	808	890	1010	1069	1194	1250	*	*	*	*
22.4	$P_{GA}$	39.7	55.5	63.3	80.7	94.7	109	119	152	183	199	235	255	258	247	239	*	*	*	*
	$P_{GB}$	75.4	112	126	165	189	236	254	380	454	509	594	682	718	871	900	960	984	1106	1119
	$P_{GC15}$	85.8	151	161	211	235	366	385	435	501	498	569	594	611	601	607	*	*	*	*
	$P_{GD15}$	118	201	217	286	319	476	502	638	744	773	892	980	1031	1174	1213	*	*	*	*
25	$P_{GA}$	37.8	53.2	61.0	78.6	91.1	106	115	147	178	198	223	252	268	264	268	*	*	*	*
	$P_{GB}$	71.4	107	121	159	181	225	244	359	436	483	562	641	704	830	893	961	995	1108	1136
	$P_{GC15}$	80.9	143	154	204	225	350	369	415	481	476	539	568	605	586	615	*	*	*	*
	$P_{GD15}$	111	190	208	275	305	453	480	603	712	732	841	919	1002	1111	1191	*	*	*	*
28	$P_{GA}$	36.6	51.7	60.4	75.3	88.4	102	112	142	174	193	221	254	264	272	281	258	259	303	*
	$P_{GB}$	68.5	103	119	150	174	214	236	341	416	459	538	626	661	817	849	947	990	1091	1133
	$P_{GC15}$	76.1	135	154	195	216	335	357	397	462	457	520	557	579	584	599	*	*	*	*
	$P_{GD15}$	105	180	206	261	293	431	465	575	680	697	804	894	938	1086	1126	*	*	*	*
31.5	$P_{GA}$	34.8	49.3	57.8	72.0	86.0	98.3	109	137	168	187	218	245	265	269	289	276	285	325	332
	$P_{GB}$	65.0	97.6	113	143	168	204	224	324	393	436	510	584	645	768	835	915	973	1052	1112
	$P_{GC15}$	71.0	125	145	186	209	318	341	379	440	437	497	527	568	563	596	*	*	*	*
	$P_{GD15}$	98.6	168	194	249	282	408	442	545	642	663	761	837	912	1021	1101	*	*	*	*
35.5	$P_{GA}$	33.1	46.8	56.1	68.8	82.1	93.9	105	133	162	182	211	241	257	266	284	281	301	331	350
	$P_{GB}$	61.2	91.6	109	135	159	192	214	311	373	419	485	563	602	741	784	893	938	1027	1070
	$P_{GC15}$	65.3	114	137	177	199	288	327	366	421	423	476	511	537	548	574	*	*	*	*
	$P_{GD15}$	91.1	154	184	236	268	373	421	525	611	638	724	807	853	984	1034	*	*	*	*
40	$P_{GA}$	29.0	41.2	53.5	60.8	78.5	88.3	101	126	155	174	204	232	251	263	281	284	304	335	354
	$P_{GB}$	52.8	79.5	103	117	151	178	204	292	353	395	460	533	581	704	756	856	915	980	1044
	$P_{GC15}$	54.0	94.3	128	154	190	258	313	348	402	402	456	488	520	528	559	*	*	*	*
	$P_{GD15}$	76.1	129	172	204	255	337	402	495	580	602	688	764	822	935	997	*	*	*	*
45	$P_{GA}$	28.3	40.1	50.7	59.1	74.9	82.0	96.4	118	151	161	198	217	242	250	276	277	305	325	356
	$P_{GB}$	51.3	77.0	97.1	113	142	164	192	268	339	361	442	491	549	653	719	801	876	914	996
	$P_{GC15}$	52.4	90.5	117	147	181	231	294	324	388	373	441	455	497	495	537	*	*	*	*
	$P_{GD15}$	73.8	124	158	196	241	303	376	458	558	554	662	706	779	870	948	*	*	*	*
50	$P_{GA}$	29.1	40.4	44.7	59.7	66.2	82.8	90.5	122	143	169	189	239	226	290	262	324	296	408	344
	$P_{GB}$	51.6	75.7	84.2	112	124	161	179	266	318	365	416	508	506	684	667	828	820	977	929
	$P_{GC15}$	52.6	88.2	96.3	143	158	223	263	321	368	378	418	473	463	530	505	*	*	*	*
	$P_{GD15}$	73.5	120	132	190	210	292	340	449	526	555	625	720	720	897	882	*	*	*	*
56	$P_{GA}$	26.6	37.1	43.5	55.0	64.3	75.9	84.2	112	133	157	174	222	248	271	302	312	345	386	426
	$P_{GB}$	46.7	68.9	81.6	102	120	146	165	242	293	334	381	465	522	628	697	766	845	901	990
	$P_{GC15}$	46.8	78.9	92.5	129	151	197	237	286	342	349	387	438	481	493	539	*	*	*	*
	$P_{GD15}$	65.6	108	127	171	201	259	307	402	485	509	575	661	733	826	908	*	*	*	*

\* on request



### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type B3 $n_1 = 1200$ rpm (continued)

$i_N$		Gear unit sizes																		
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
<b>63</b>	$P_{GA}$	25.4	35.5	43.7	52.8	64.7	72.7	84.8	107	137	150	183	214	230	263	282	306	329	380	402
	$P_{GB}$	44.4	65.4	80.1	97.2	118	139	161	229	289	317	384	444	478	602	640	743	781	875	912
	$P_{GC15}$	43.8	73.6	90.1	121	147	184	228	267	339	336	393	423	445	478	502	*	*	*	*
	$P_{GD15}$	61.5	101	123	161	195	242	295	376	476	487	575	634	673	794	837	*	*	*	*
<b>71</b>	$P_{GA}$	23.2	33.4	40.1	49.7	59.6	67.3	77.9	98.9	125	140	169	203	222	251	273	295	323	366	395
	$P_{GB}$	40.2	60.9	73.0	90.6	108	127	147	209	263	291	351	417	457	566	613	701	758	826	886
	$P_{GC15}$	39.1	67.1	81	110	132	164	202	237	312	313	362	401	430	456	485	*	*	*	*
	$P_{GD15}$	55.1	92.3	111	147	175	218	263	336	435	450	528	597	646	749	804	*	*	*	*
<b>80</b>	$P_{GA}$	–	–	38.3	–	57.2	–	74.6	–	120	–	162	–	211	–	260	–	311	–	379
	$P_{GB}$	–	–	69.3	–	103	–	140	–	249	–	334	–	428	–	577	–	715	–	835
	$P_{GC15}$	–	–	75.3	–	124	–	188	–	300	–	348	–	408	–	463	–	*	–	*
	$P_{GD15}$	–	–	104	–	165	–	246	–	415	–	504	–	608	–	758	–	*	–	*
<b>90</b>	$P_{GA}$	–	–	36.0	–	53.8	–	69.1	–	111	–	151	–	–	–	–	–	–	–	–
	$P_{GB}$	–	–	64.5	–	95.7	–	128	–	227	–	306	–	–	–	–	–	–	–	–
	$P_{GC15}$	–	–	68.7	–	113	–	168	–	277	–	325	–	–	–	–	–	–	–	–
	$P_{GD15}$	–	–	95.0	–	151	–	221	–	381	–	466	–	–	–	–	–	–	–	–

\* on request

# Design of the gear units

## Overview tables

### Type B3 – Thermal capacities $n_1 = 1500$ rpm

#### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type B3 $n_1 = 1500$ rpm

$i_N$	Gear unit sizes	Gear unit sizes																		
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
12.5	$P_{GA}$	47.9	62.8	–	91.6	–	113	–	135	–	146	–	*	–	*	–	*	–	*	–
	$P_{GB}$	105	149	–	227	–	308	–	494	–	630	–	742	–	890	–	*	–	*	–
	$P_{GC15}$	117	196	–	265	–	443	–	512	–	550	–	531	–	394	–	*	–	*	–
	$P_{GD15}$	169	272	–	386	–	610	–	829	–	972	–	1135	–	1300	–	*	–	*	–
14	$P_{GA}$	46.6	61.0	–	89.2	–	111	–	133	–	149	–	*	*	*	*	*	*	*	*
	$P_{GB}$	102	145	–	220	–	301	–	483	–	633	–	728	775	859	955	814	911	*	*
	$P_{GC15}$	113	190	–	257	–	432	–	501	–	553	–	524	549	386	430	*	*	*	*
	$P_{GD15}$	163	263	–	373	–	595	–	808	–	976	–	1109	1169	1249	1375	*	*	*	*
16	$P_{GA}$	45.3	60.4	69.1	87.1	102	111	125	143	161	176	175	*	*	*	*	*	*	*	*
	$P_{GB}$	98.3	141	158	210	239	294	323	472	533	610	671	761	758	932	888	880	886	965	876
	$P_{GC15}$	109	185	199	245	272	420	452	490	537	536	580	570	539	483	408	*	*	*	*
	$P_{GD15}$	157	255	278	355	395	577	624	781	867	923	1017	1125	1138	1301	1274	*	*	*	*
18	$P_{GA}$	44.0	58.7	67.2	84.5	99.8	109	117	140	162	178	177	*	*	*	*	*	*	*	*
	$P_{GB}$	95.2	137	154	203	233	286	302	462	533	612	674	744	793	896	995	870	965	968	1033
	$P_{GC15}$	105	179	193	237	265	409	423	478	536	538	583	559	587	467	522	*	*	*	*
	$P_{GD15}$	152	247	270	343	383	562	582	762	864	925	1021	1095	1156	1247	1374	*	*	*	*
20	$P_{GA}$	41.4	56.7	66.2	81.8	96.3	106	122	138	166	174	201	*	*	*	*	*	*	*	*
	$P_{GB}$	89.5	131	149	195	221	275	307	446	508	583	647	732	770	895	922	868	929	978	1026
	$P_{GC15}$	99.0	172	187	228	251	393	429	462	511	513	564	557	573	487	487	*	*	*	*
	$P_{GD15}$	142	237	261	328	362	539	589	732	816	877	963	1066	1121	1228	1269	*	*	*	*
22.4	$P_{GA}$	40.8	56.5	64.3	80.0	93.9	104	114	140	166	179	203	*	*	*	*	*	*	*	*
	$P_{GB}$	87.1	130	145	188	215	267	287	428	507	562	650	728	757	906	917	914	923	1035	1029
	$P_{GC15}$	96.4	171	182	220	244	381	400	446	510	502	567	566	570	526	509	*	*	*	*
	$P_{GD15}$	138	235	253	316	352	520	549	700	813	842	965	1051	1091	1225	1247	*	*	*	*
25	$P_{GA}$	39.1	54.4	62.3	78.8	90.6	104	111	140	165	183	199	211	214	*	*	*	*	*	*
	$P_{GB}$	82.5	124	139	182	206	255	276	406	489	536	619	697	753	875	928	954	961	1087	1081
	$P_{GC15}$	91.0	162	175	213	234	365	384	427	492	485	540	552	579	536	546	*	*	*	*
	$P_{GD15}$	130	222	242	305	337	496	526	663	781	800	915	993	1074	1175	1244	*	*	*	*
28	$P_{GA}$	37.9	53.2	61.9	76.0	88.5	101	108	138	164	182	201	221	225	204	202	*	*	*	*
	$P_{GB}$	79.2	119	137	172	199	243	267	387	468	512	594	686	720	871	897	965	993	1100	1123
	$P_{GC15}$	85.5	153	174	204	226	351	372	410	474	467	526	551	565	545	551	*	*	*	*
	$P_{GD15}$	123	211	240	290	324	473	509	633	747	764	877	970	1014	1161	1193	*	*	*	*
31.5	$P_{GA}$	36.2	50.9	59.6	73.2	86.7	98.2	107	134	162	180	205	220	234	220	225	*	*	*	*
	$P_{GB}$	75.2	113	131	164	192	233	255	368	444	488	567	644	707	831	891	949	1000	1081	1129
	$P_{GC15}$	79.8	142	164	195	218	336	357	393	454	449	507	528	563	535	559	*	*	*	*
	$P_{GD15}$	115	197	227	276	313	453	485	602	707	727	833	912	992	1101	1178	*	*	*	*
35.5	$P_{GA}$	34.4	48.5	58.0	70.3	83.5	94.6	105	131	158	177	202	219	232	223	236	*	*	*	*
	$P_{GB}$	70.9	106	126	155	182	220	244	353	422	470	541	622	665	806	850	935	978	1066	1108
	$P_{GC15}$	73.4	130	155	186	209	321	342	381	436	436	488	514	538	528	548	*	*	*	*
	$P_{GD15}$	107	181	216	262	297	429	463	580	674	701	794	880	930	1065	1116	*	*	*	*
40	$P_{GA}$	30.2	42.9	55.5	62.4	80.2	89.4	102	125	154	171	199	216	231	226	240	*	*	*	*
	$P_{GB}$	61.2	92.2	120	135	173	204	233	332	401	444	515	591	642	770	824	908	963	1035	1089
	$P_{GC15}$	60.5	107	145	166	200	293	329	362	418	415	469	494	524	517	541	*	*	*	*
	$P_{GD15}$	89.1	151	202	230	283	392	443	547	641	663	756	835	899	1015	1080	*	*	*	*
45	$P_{GA}$	29.5	41.8	52.8	60.9	76.9	83.4	97.7	117	150	159	194	205	227	218	242	210	234	239	263
	$P_{GB}$	59.6	89.4	112	131	164	188	220	306	386	406	496	546	609	716	786	860	933	974	1055
	$P_{GC15}$	58.6	102	132	161	191	262	314	337	404	385	454	462	503	489	529	*	*	*	*
	$P_{GD15}$	86.4	145	185	223	268	354	420	506	616	610	729	773	853	946	1029	*	*	*	*
50	$P_{GA}$	30.9	42.9	46.6	62.7	68.3	86.1	92.5	126	143	174	187	241	215	284	232	283	234	366	264
	$P_{GB}$	60.3	88.3	97.6	129	143	186	205	305	362	415	468	573	563	765	732	907	883	1072	993
	$P_{GC15}$	59.4	100	109	160	170	254	296	338	384	396	433	492	471	544	499	*	*	*	*
	$P_{GD15}$	86.4	141	155	219	236	341	393	499	581	616	689	798	789	991	959	*	*	*	*
56	$P_{GA}$	28.3	39.4	45.4	57.9	66.5	79.2	86.3	116	133	161	174	225	251	270	298	277	309	356	391
	$P_{GB}$	54.6	80.5	94.7	118	138	169	189	278	333	380	428	526	590	705	780	841	929	992	1087
	$P_{GC15}$	52.8	89.6	104	146	165	224	268	312	357	367	402	457	501	509	554	*	*	*	*
	$P_{GD15}$	77.1	127	149	200	229	303	358	457	537	565	633	734	813	915	1003	*	*	*	*

\* on request

### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type B3 $n_1 = 1500$ rpm (continued)

$i_N$		Gear unit sizes																		
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
<b>63</b>	$P_{GA}$	27.1	37.7	46.4	55.7	68.1	75.9	88.4	111	141	155	188	218	234	263	281	277	300	355	378
	$P_{GB}$	51.8	76.5	93.5	113	136	161	186	264	332	361	437	504	541	677	719	817	861	964	1006
	$P_{GC15}$	49.4	83.6	102	137	164	209	259	300	358	353	412	441	465	494	518	*	*	*	*
	$P_{GD15}$	72.4	119	145	188	225	284	345	436	530	540	638	704	748	880	926	*	*	*	*
<b>71</b>	$P_{GA}$	24.7	35.5	42.6	52.4	62.9	70.5	81.5	103	130	144	175	208	226	253	274	275	298	349	376
	$P_{GB}$	46.9	71.2	85.2	105	125	147	170	241	302	332	399	473	518	638	690	775	836	914	979
	$P_{GC15}$	43.9	76.1	91.4	125	150	186	230	268	329	330	381	420	449	473	502	*	*	*	*
	$P_{GD15}$	64.7	109	130	172	205	255	307	391	484	500	586	664	718	832	891	*	*	*	*
<b>80</b>	$P_{GA}$	–	–	40.8	–	60.4	–	78.2	–	125	–	168	–	216	–	264	–	295	–	367
	$P_{GB}$	–	–	80.9	–	119	–	161	–	287	–	380	–	487	–	650	–	792	–	926
	$P_{GC15}$	–	–	85.4	–	141	–	214	–	316	–	367	–	428	–	481	–	*	–	*
	$P_{GD15}$	–	–	122	–	193	–	287	–	462	–	560	–	677	–	842	–	*	–	*
<b>90</b>	$P_{GA}$	–	–	38.4	–	56.9	–	72.6	–	115	–	156	–	–	–	–	–	–	–	–
	$P_{GB}$	–	–	75.3	–	111	–	148	–	261	–	349	–	–	–	–	–	–	–	–
	$P_{GC15}$	–	–	77.8	–	128	–	191	–	293	–	342	–	–	–	–	–	–	–	–
	$P_{GD15}$	–	–	112	–	177	–	258	–	424	–	518	–	–	–	–	–	–	–	–

\* on request

## Design of the gear units

## Overview tables

Type B3 – Thermal capacities  $n_1 = 1800$  rpm

## Technical specifications (continued)

Thermal capacities  $P_G$  (kW) type B3  
 $n_1 = 1800$  rpm

$i_N$	Gear unit sizes																			
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
12.5	$P_{GA}$	47.1	60.6	–	83.5	–	97.1	–	*	–	*	–	*	–	*	–	*	–	*	–
	$P_{GB}$	117	166	–	248	–	334	–	522	–	637	–	706	–	776	–	846	–	916	–
	$P_{GC15}$	128	215	–	268	–	449	–	499	–	498	–	407	–	148	–	*	–	*	–
	$P_{GD15}$	191	307	–	414	–	651	–	873	–	1004	–	1128	–	1211	–	*	–	*	–
14	$P_{GA}$	45.8	59.0	–	81.8	–	96.3	–	*	–	*	–	*	–	*	–	*	–	*	–
	$P_{GB}$	114	161	–	240	–	326	–	511	–	642	–	697	741	755	838	*	*	*	*
	$P_{GC15}$	124	208	–	260	–	438	–	488	–	503	–	407	424	156	178	*	*	*	*
	$P_{GD15}$	185	298	–	401	–	634	–	852	–	1008	–	1105	1162	1169	1287	*	*	*	*
16	$P_{GA}$	44.7	59.1	67.3	81.1	95.6	99.3	110	112	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	110	157	176	231	262	320	351	506	565	633	683	747	731	883	788	*	*	*	*
	$P_{GC15}$	119	203	218	249	275	428	460	485	523	509	530	476	422	300	183	*	*	*	*
	$P_{GD15}$	177	289	314	382	425	616	666	829	914	966	1052	1131	1136	1273	1198	*	*	*	*
18	$P_{GA}$	43.5	57.5	65.6	79.0	93.7	97.9	104	112	*	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	107	152	171	223	255	312	329	495	564	637	687	734	782	851	948	*	*	*	*
	$P_{GC15}$	115	197	212	241	268	417	430	474	524	511	534	469	493	297	343	*	*	*	*
	$P_{GD15}$	172	280	304	369	413	601	622	809	913	970	1056	1104	1164	1224	1349	*	*	*	*
20	$P_{GA}$	41.0	55.6	65.4	76.8	91.7	96.1	111	114	138	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	100	147	166	215	243	301	335	480	545	611	674	730	763	854	880	*	*	*	*
	$P_{GC15}$	109	189	206	232	255	401	437	460	508	494	537	483	485	320	326	*	*	*	*
	$P_{GD15}$	161	268	295	354	391	577	630	780	868	925	1010	1083	1133	1211	1250	*	*	*	*
22.4	$P_{GA}$	40.6	55.5	63.6	75.8	89.6	95.5	104	120	139	*	*	*	*	*	*	*	*	*	*
	$P_{GB}$	98	145	162	208	237	292	313	462	544	596	677	743	759	890	885	780	763	865	825
	$P_{GC15}$	106	189	200	224	248	390	408	448	507	489	540	512	497	397	348	*	*	*	*
	$P_{GD15}$	157	267	286	341	380	559	588	749	866	891	1014	1080	1110	1226	1234	*	*	*	*
25	$P_{GA}$	39.3	54.0	61.8	76.1	86.8	96.9	102	126	142	158	158	*	*	*	*	*	*	*	*
	$P_{GB}$	92.7	138	156	201	227	280	302	441	528	575	651	720	770	882	915	873	844	975	930
	$P_{GC15}$	100	179	192	218	239	375	393	432	492	482	522	515	525	454	423	*	*	*	*
	$P_{GD15}$	148	252	274	330	364	533	564	712	833	852	965	1039	1108	1196	1248	*	*	*	*
28	$P_{GA}$	38.4	53.3	61.6	74.4	85.3	95.9	101	126	146	162	170	*	*	*	*	*	*	*	*
	$P_{GB}$	89.1	134	154	191	220	268	293	422	507	551	632	718	746	887	905	924	927	1036	1027
	$P_{GC15}$	94.0	169	191	210	231	361	382	416	478	468	515	521	527	479	470	*	*	*	*
	$P_{GD15}$	140	240	272	314	351	509	547	680	799	815	930	1021	1061	1193	1216	*	*	*	*
31.5	$P_{GA}$	36.7	51.5	59.7	72.2	84.9	94.9	102	126	149	164	181	180	183	*	*	*	*	*	*
	$P_{GB}$	84.5	127	147	182	212	257	281	402	483	528	608	684	743	857	910	937	966	1054	1077
	$P_{GC15}$	87.6	157	182	201	224	347	367	401	460	453	506	509	534	484	495	*	*	*	*
	$P_{GD15}$	131	224	258	299	339	487	521	647	759	778	887	963	1044	1145	1212	*	*	*	*
35.5	$P_{GA}$	35.1	49.2	58.7	70.0	82.6	92.7	101	124	148	164	183	184	192	155	161	*	*	*	*
	$P_{GB}$	79.7	120	142	173	202	243	268	388	462	510	582	664	706	839	878	934	974	1050	1089
	$P_{GC15}$	80.5	143	172	192	215	332	353	388	443	440	490	502	521	485	499	*	*	*	*
	$P_{GD15}$	121	205	245	284	322	462	498	624	724	751	849	934	985	1116	1163	*	*	*	*
40	$P_{GA}$	30.9	43.6	56.4	62.6	79.8	88.4	99.1	120	147	161	184	187	196	172	175	*	*	*	*
	$P_{GB}$	69.0	104	135	151	192	227	257	365	440	482	557	633	685	811	859	919	969	1036	1084
	$P_{GC15}$	66.2	118	160	172	206	313	339	370	426	421	473	486	513	483	499	*	*	*	*
	$P_{GD15}$	101	171	229	250	307	433	477	589	690	711	810	889	955	1070	1134	*	*	*	*
45	$P_{GA}$	30.2	42.6	53.8	61.2	77.2	82.8	96.3	113	144	151	183	180	199	171	190	*	*	*	*
	$P_{GB}$	67.1	101	127	146	182	209	244	337	423	442	538	586	653	757	830	877	949	988	1064
	$P_{GC15}$	64.2	113	145	167	197	290	325	346	413	391	460	457	496	462	496	*	*	*	*
	$P_{GD15}$	98.1	165	210	243	292	400	453	546	664	655	781	824	909	999	1085	*	*	*	*
50	$P_{GA}$	32.3	44.6	47.5	64.5	69.0	87.6	91.8	127	138	173	179	235	191	265	187	222	145	302	*
	$P_{GB}$	68.4	100	110	145	159	208	227	339	398	457	508	627	604	829	774	959	905	1133	1013
	$P_{GC15}$	65.5	111	120	167	176	282	307	351	393	409	440	501	466	546	474	*	*	*	*
	$P_{GD15}$	98.7	161	176	239	257	387	424	542	627	667	739	862	842	1066	1014	*	*	*	*
56	$P_{GA}$	29.6	41.1	46.4	59.7	67.3	80.8	86.0	117	130	162	167	221	245	256	280	227	255	304	334
	$P_{GB}$	61.9	91.3	107	133	154	189	210	309	367	418	466	577	645	766	845	894	985	1056	1157
	$P_{GC15}$	58.2	99.4	115	155	171	249	286	324	366	380	408	467	511	514	557	*	*	*	*
	$P_{GD15}$	88.0	145	169	220	249	344	394	496	580	613	681	794	878	987	1080	*	*	*	*

\* on request

### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type B3 $n_1 = 1800 \text{ rpm}$ (continued)

$i_N$		Gear unit sizes																		
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
<b>63</b>	$P_{GA}$	28.4	39.4	48.3	57.5	70.3	77.6	90.5	113	143	156	189	216	231	255	270	230	256	308	332
	$P_{GB}$	58.8	86.7	106	127	153	180	208	294	369	399	480	553	593	737	781	871	919	1029	1076
	$P_{GC15}$	54.4	92.7	113	149	171	232	284	312	371	365	426	453	476	500	523	*	*	*	*
	$P_{GD15}$	82.6	135	165	211	246	322	386	474	576	586	692	763	809	950	999	*	*	*	*
<b>71</b>	$P_{GA}$	25.8	37.1	44.5	54.3	65.1	72.4	83.6	105	132	146	176	207	225	247	267	235	258	312	334
	$P_{GB}$	53.2	80.7	96.4	119	141	165	190	268	336	367	440	520	568	696	751	828	894	978	1047
	$P_{GC15}$	48.2	84.2	101	138	158	207	255	289	342	342	395	432	461	480	510	*	*	*	*
	$P_{GD15}$	73.8	124	148	195	226	289	348	435	526	542	635	720	777	899	961	*	*	*	*
<b>80</b>	$P_{GA}$	–	–	42.7	–	62.6	–	80.2	–	127	–	170	–	215	–	259	–	260	–	336
	$P_{GB}$	–	–	91.7	–	134	–	181	–	319	–	419	–	535	–	710	–	848	–	993
	$P_{GC15}$	–	–	94.5	–	153	–	238	–	329	–	380	–	440	–	489	–	*	–	*
	$P_{GD15}$	–	–	139	–	217	–	326	–	502	–	608	–	734	–	911	–	*	–	*
<b>90</b>	$P_{GA}$	–	–	40.2	–	59.1	–	74.8	–	118	–	159	–	–	–	–	–	–	–	–
	$P_{GB}$	–	–	85.3	–	125	–	166	–	291	–	386	–	–	–	–	–	–	–	–
	$P_{GC15}$	–	–	85.9	–	141	–	212	–	305	–	355	–	–	–	–	–	–	–	–
	$P_{GD15}$	–	–	127	–	201	–	293	–	461	–	562	–	–	–	–	–	–	–	–

\* on request

## Design of the gear units

### Overview tables

#### Type B4 – Nominal power ratings of gear unit sizes 5 to 12

##### Technical specifications (continued)

##### Nominal power ratings $P_{2N}$ (kW) type B4

$i_N$	$n_1$	$n_2$	Gear unit sizes							
			5	6	7	8	9	10	11	12
<b>80</b>	1800	23	27	–	52	–	85	–	148	–
	1500	18.8	22	–	42	–	70	–	121	–
	1200	15	18	–	34	–	56	–	96	–
	1000	12.5	15	–	28	–	46	–	80	–
<b>90</b>	1800	20	24	–	45	–	74	–	129	–
	1500	16.7	20	–	37	–	62	–	107	–
	1200	13.3	16	–	30	–	49	–	85	–
	1000	11.1	13	–	25	–	41	–	71	–
<b>100</b>	1800	18	21	29	40	51	67	83	116	147
	1500	15	18	24	34	42	56	69	96	122
	1200	12	14	19	27	34	44	55	77	98
	1000	10	12	16	22	28	37	46	64	81
<b>112</b>	1800	16.1	19	26	36	45	60	74	103	131
	1500	13.4	16	21	30	38	50	62	86	109
	1200	10.7	12	17	24	30	39	49	69	87
	1000	8.9	10	14	20	25	33	41	57	72
<b>125</b>	1800	14.4	17	23	32	41	53	66	92	117
	1500	12	14	19	27	34	44	55	77	98
	1200	9.6	11	15	21	27	35	44	61	78
	1000	8	9.7	12	18	22	29	37	51	65
<b>140</b>	1800	12.9	15	20	29	36	48	59	83	105
	1500	10.7	12	17	24	30	39	49	69	87
	1200	8.6	10	13	19	24	32	39	55	70
	1000	7.1	8.6	11	16	20	26	32	45	57
<b>160</b>	1800	11.3	13	18	25	32	42	52	72	92
	1500	9.4	11	15	21	26	35	43	60	76
	1200	7.5	9.1	12	17	21	28	34	48	61
	1000	6.3	7.6	10	14	17	23	29	40	51
<b>180</b>	1800	10	12	16	22	28	37	46	64	81
	1500	8.3	10	13	18	23	31	38	53	67
	1200	6.7	8.1	10	15	19	25	31	43	54
	1000	5.6	6.8	9	12	15	20	25	36	45
<b>200</b>	1800	9	10	14	20	25	33	41	58	73
	1500	7.5	9.1	12	17	21	28	34	48	61
	1200	6	7.2	9.7	13	17	22	27	38	49
	1000	5	6	8.1	11	14	18	23	32	40
<b>224</b>	1800	8	9.7	12	18	22	29	37	51	65
	1500	6.7	8.1	10	15	19	25	31	43	54
	1200	5.4	6.5	8.7	12	15	20	24	34	44
	1000	4.5	5.4	7.3	10	12	16	20	29	36
<b>250</b>	1800	7.2	8.7	11	16	20	26	33	46	58
	1500	6	7.2	9.7	13	17	22	27	38	49
	1200	4.8	5.8	7.7	10	13	17	22	30	39
	1000	4	4.8	6.4	9	11	14	18	25	32
<b>280</b>	1800	6.4	7.7	10	14	18	23	29	41	52
	1500	5.4	6.5	8.7	12	15	19	24	34	44
	1200	4.3	5.2	6.9	9.7	12	15	19	27	35
	1000	3.6	4.3	5.8	8.1	10	13	16	23	29
<b>315</b>	1800	5.7	6.6	9.2	12	16	20	26	35	46
	1500	4.8	5.6	7.7	10	13	17	22	30	39
	1200	3.8	4.4	6.1	8.1	10	13	17	23	31
	1000	3.2	3.7	5.1	6.8	9.1	11	14	20	26
<b>355</b>	1800	5.1	–	8.2	–	14	–	23	–	41
	1500	4.2	–	6.8	–	11	–	19	–	34
	1200	3.4	–	5.5	–	9.4	–	15	–	27
	1000	2.8	–	4.5	–	7.7	–	12	–	22
<b>400</b>	1800	4.5	–	6.8	–	12	–	20	–	35
	1500	3.8	–	5.7	–	10	–	17	–	29
	1200	3	–	4.5	–	8	–	13	–	23
	1000	2.5	–	3.7	–	6.6	–	11	–	19

### Type B4 – Nominal power ratings of gear unit sizes 13 to 28

#### Technical specifications (continued)

#### Nominal power ratings $P_{2N}$ (kW) type B4

$i_N$	$n_1$	$n_2$	Gear unit sizes															
			13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
80	1800	23	218	–	368	–	481	–	722 *	–	1011 *	–	*	–	*	–	*	–
	1500	18.8	178	–	301	–	393	–	590	–	826	–	1257	–	1649	–	*	–
	1200	15	142	–	240	–	314	–	471	–	659	–	1005	–	1319	–	1924	–
	1000	12.5	118	–	200	–	261	–	392	–	549	–	838	–	1099	–	1603	–
90	1800	20	189	–	320	362	418	502	628 *	722 *	879 *	984 *	*	*	*	*	*	*
	1500	16.7	158	–	267	302	349	419	524	603	734	821	1117	1265	1483	1675	*	*
	1200	13.3	126	–	213	240	278	334	417	480	584	654	894	1012	1187	1340	1710	1955
	1000	11.1	105	–	177	201	232	278	348	400	488	546	745	844	989	1117	1425	1629
100	1800	18	170	212	288	326	376	452	565 *	650 *	791 *	885 *	*	*	*	*	*	*
	1500	15	142	177	240	271	314	376	471	541	659	738	1005	1139	1351	1524	*	*
	1200	12	113	141	192	217	251	301	376	433	527	590	804	911	1081	1219	1533	1759
	1000	10	94	118	160	181	209	251	314	361	439	492	670	759	901	1016	1277	1466
112	1800	16.1	152	190	257	291	337	404	505 *	581 *	708 *	792 *	*	*	*	*	*	*
	1500	13.4	127	158	214	242	280	336	420	484	589	659	898	1017	1206	1388	*	*
	1200	10.7	101	126	171	193	224	268	336	386	470	526	718	813	965	1111	1369	1571
	1000	8.9	84	105	142	161	186	223	279	321	391	438	598	678	804	926	1141	1309
125	1800	14.4	136	170	230	260	301	361	452 *	520 *	633 *	708 *	*	*	*	*	*	*
	1500	12	113	141	192	217	251	301	376	433	527	590	804	911	1081	1244	*	*
	1200	9.6	91	113	153	173	201	241	301	346	422	472	643	729	865	995	1221	1407
	1000	8	75	94	128	144	167	201	251	289	351	393	536	607	720	825	1018	1173
140	1800	12.9	122	152	206	233	270	324	405 *	466 *	567 *	634 *	*	*	*	*	*	*
	1500	10.7	101	126	171	193	224	268	336	386	470	526	718	813	965	1133	*	*
	1200	8.6	81	101	137	155	180	216	270	310	378	423	574	651	772	907	1091	1257
	1000	7.1	67	84	113	128	148	178	223	256	312	349	479	542	643	755	909	1047
160	1800	11.3	107	133	181	204	236	283	354 *	408 *	496 *	556 *	*	*	*	*	*	*
	1500	9.4	89	111	150	170	196	236	295	339	413	462	628	712	844	991	*	*
	1200	7.5	71	88	120	135	157	188	235	270	329	369	503	569	675	793	950	1099
	1000	6.3	59	74	100	114	131	158	197	227	277	310	419	474	563	661	792	916
180	1800	10	94	118	160	181	209	251	314 *	361 *	439 *	492 *	670	*	901	*	*	*
	1500	8.3	78	98	132	150	173	208	260	299	365	408	558	633	750	899	1056	*
	1200	6.7	63	79	107	121	140	168	210	242	294	329	447	506	600	719	845	977
	1000	5.6	53	66	89	101	117	140	175	202	246	275	372	422	500	599	704	814
200	1800	9	85	106	144	163	188	226	282 *	325 *	395 *	442 *	603	683	810	971	*	*
	1500	7.5	71	88	120	135	157	188	235	270	329	369	503	569	675	809	946	1099
	1200	6	56	70	96	108	125	150	188	216	263	295	402	455	540	647	757	880
	1000	5	47	59	80	90	104	125	157	180	219	246	335	380	450	539	631	733
224	1800	8	75	94	128	144	167	201	251 *	289 *	351 *	393 *	539	610	724	867	*	*
	1500	6.7	63	79	107	121	140	168	210	242	294	329	449	508	603	722	845	982
	1200	5.4	51	63	86	97	113	135	169	195	237	265	359	407	482	578	676	785
	1000	4.5	42	53	72	81	94	113	141	162	197	221	299	339	402	481	563	654
250	1800	7.2	68	85	115	130	150	180	226 *	260 *	316 *	354 *	475	547	648	777	*	*
	1500	6	56	70	96	108	125	150	188	216	263	295	396	455	540	647	754	880
	1200	4.8	45	56	76	86	100	120	150	173	211	236	317	364	432	518	603	704
	1000	4	37	47	64	72	83	100	125	144	175	196	264	304	360	431	503	586
280	1800	6.4	60	75	102	115	134	160	201 *	231 *	281 *	314 *	411	478	579	693	*	*
	1500	5.4	51	63	86	97	113	135	169	195	237	265	342	398	482	578	673	785
	1200	4.3	40	50	68	77	90	108	135	155	189	211	274	319	386	462	539	628
	1000	3.6	34	42	57	65	75	90	113	130	158	177	228	266	322	385	449	524
315	1800	5.7	54	67	91	103	119	143	179 *	205 *	250 *	280 *	350	413	479	616	*	*
	1500	4.8	45	56	76	86	100	120	150	173	211	236	292	344	399	514	573	698
	1200	3.8	36	44	60	68	79	95	119	137	167	187	233	275	319	411	459	558
	1000	3.2	30	37	51	57	67	80	100	115	140	157	194	229	266	342	382	465
355	1800	5.1	–	60	–	92	–	128	–	184 *	–	250 *	–	350	–	483	–	*
	1500	4.2	–	49	–	76	–	105	–	151	–	206	–	292	–	403	–	580
	1200	3.4	–	40	–	61	–	85	–	122	–	167	–	234	–	322	–	464
	1000	2.8	–	33	–	50	–	70	–	101	–	137	–	195	–	268	–	386
400	1800	4.5	–	53	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1500	3.8	–	44	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1200	3	–	35	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1000	2.5	–	29	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Forced lubrication required for horizontal gear units

\* on request

## Design of the gear units

### Overview tables

#### Type B4 – Nominal output torque of low speed shaft (LSS) gear unit sizes 4 to 12

##### Technical specifications (continued)

##### Nominal output torque of low speed shaft (LSS) $T_{2N}$ (kNm) type B4

$i_N$	Gear unit sizes										Type
	4	5	6	7	8	9	10	11	12		
5	6.1	9.4	–	19	–	29.9	–	46	–		B2
5.6	6.2	9.4	–	19	–	29.9	–	48.1	–		
6.3	6.2	9.4	12	19	23.8	29.9	38	50.2	58.8		
7.1	6.2	9.4	12	19	23.8	29.9	38	52.4	60.9		
8	6.2	9.4	12	19	23.8	29.9	38	54	63.1		
9	6.2	9.4	12	19	23.8	29.9	38	54	65.2		
10	6.2	9.4	12	19	23.8	29.9	38	54	66.3		
11.2	6.2	9.4	12	19	23.8	29.9	38	54	66.3		
12.5	5.5	9.4	12	17	23.8	28	38	52.4	66.3		
14	6	9.8	12	18.2	23.8	29.5	38	56.7	66.3		
16	6.6	10.5	12	19.8	21.5	31	35.6	59.9	66.3		
18	6.7	11.3	12.6	21.1	23.1	33.9	37.5	62	69.5		
20	6.7	11.6	13.2	21.7	26.5	35.7	39.3	63.5	72.7		
22.4	6.7	11.6	14.2	21.7	27.2	35.7	41.8	63.5	75.6		
25	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
28	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
31.5	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2	B3	
35.5	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
40	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
45	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
50	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
56	6.7	11.6	15.5	21.7	27.2	35.7	43.8	63.5	77.2		
63	6.6	11.4	15.5	21.4	27.2	35.7	43.8	63.5	77.2		
71	6.6	11	15.5	20	27.2	34	43.8	60	77.2		
80	–	11.6	14	21.7	26.9	35.7	43.8	61.6	77.2		
90	–	11.6	14	21.7	25.2	35.7	43	61.6	75		
100	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78	B4	
112	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
125	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
140	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
160	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
180	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
200	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
224	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
250	–	11.6	15.5	21.7	27.2	35.7	44.2	61.6	78		
280	–	11.6	15.5	21.7	27.2	35.3	44.2	61.6	78		
315	–	11.2	15.5	20.5	27.2	34	44.2	60	78		
355	–	–	15.5	–	26.5	–	44.2	–	78		
400	–	–	14.5	–	25.5	–	43	–	75		



### Type B4 – Nominal output torque of low speed shaft (LSS) gear unit sizes 13 to 28

#### Technical specifications (continued)

#### Nominal output torque of low speed shaft (LSS) $T_{2N}$ (kNm) type B4

$i_N$	Gear unit sizes																Type	
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
5	68.6	–	122	–	–	–	–	–	–	–	–	–	–	–	–	–	–	B2
5.6	69.6	–	122	135	195	–	–	–	–	–	–	–	–	–	–	–	–	
6.3	73.8	85.2	130	141	195	–	–	–	–	–	–	–	–	–	–	–	–	
7.1	75.9	87.3	132	145	195	230	–	–	–	–	–	–	–	–	–	–	–	
8	80.0	91.5	132	148	195	230	–	–	–	–	–	–	–	–	–	–	–	
9	81.1	94.6	132	148	195	230	–	–	–	–	–	–	–	–	–	–	–	
10	81.1	98.8	132	148	195	230	–	–	–	–	–	–	–	–	–	–	–	
11.2	81.1	101	132	148	195	230	–	–	–	–	–	–	–	–	–	–	–	
12.5	79.5	101	132	148	195	230	250	–	340	–	–	–	–	–	–	–	–	
14	81.6	101	137	148	195	230	262	295	360	405	–	–	–	–	–	–	–	
16	83.8	99.4	142	154	200	230	275	308	380	422	–	–	–	–	–	–	–	
18	86.7	102	148	160	200	240	288	320	400	438	–	–	–	–	–	–	–	
20	90.7	105	153	167	200	240	300	332	420	455	640	–	860	–	1230	–	–	
22.4	90.7	108	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400	–	
25	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400	–	
28	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400	–	
31.5	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400	–	
35.5	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1230	1400	–	
40	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400	–	
45	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400	–	
50	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400	–	
56	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400	–	
63	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1230	1400	–	
71	90.7	113	153	173	200	240	300	345	420	470	640	700	860	1030	1150	1400	–	
80	90.7	113	153	173	200	240	300	345	420	470	640	700	860	910	1225	1310	–	
90	90.7	113	153	173	200	240	300	345	420	470	640	725	860	960	1225	1400	–	
100	90.7	113	153	173	200	240	300	345	420	470	640	725	860	970	1220	1400	–	
112	90.7	113	153	173	200	240	300	345	420	470	640	725	860	990	1220	1400	–	
125	90.7	113	153	173	200	240	300	345	420	470	640	725	860	990	1215	1400	–	
140	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1215	1400	–	
160	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1210	1400	–	
180	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1210	1400	–	
200	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1205	1400	–	
224	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1205	1400	–	
250	90.7	113	153	173	200	240	300	345	420	470	640	725	860	1030	1200	1400	–	
280	90.7	113	153	173	200	240	300	345	420	470	640	710	860	1030	1200	1400	–	
315	90.7	113	153	173	200	240	300	345	420	470	585	690	800	1030	1150	1400	–	
355	–	113	–	173	–	240	–	345	–	470	–	660	–	910	–	1310	–	
400	–	113	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	

Type B2, see page 3/43  
Type B3, see page 3/52

## Design of the gear units

### Overview tables

#### Type B4 – Thermal capacities $n_1 = 1000$ rpm, $n_1 = 1200$ rpm

##### Technical specifications (continued)

##### Thermal capacities $P_G$ (kW) type B4 $n_1 = 1000$ rpm

$i_N$		Gear unit sizes																	
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
80	$P_{GA}$	33.5	–	50.6	–	72.1	–	108	–	148	–	203	–	222	–	285	–	370	–
90	$P_{GA}$	32.7	–	49.1	–	70.6	–	104	–	144	–	196	210	215	230	277	295	364	379
100	$P_{GA}$	31.2	36.0	46.7	54.5	67.4	73.5	100	120	137	159	187	203	204	222	266	286	351	372
112	$P_{GA}$	30.1	35.2	45.1	52.9	65.3	71.9	96	116	131	154	179	193	196	211	256	274	343	358
125	$P_{GA}$	28.8	33.6	43.2	50.3	62.6	68.6	92	112	126	147	171	185	187	203	246	264	327	350
140	$P_{GA}$	27.4	32.4	41.0	48.6	59.2	66.4	87	106	120	140	165	176	181	193	238	253	318	334
160	$P_{GA}$	24.7	31.0	36.7	46.5	53.4	63.7	79	102	112	135	156	170	171	187	227	245	304	324
180	$P_{GA}$	24.1	29.4	35.7	44.1	51.8	60.3	76	97	106	128	147	161	161	177	213	234	287	310
200	$P_{GA}$	23.2	26.6	35.0	39.5	50.7	54.4	74	87	103	120	146	151	160	167	214	220	298	293
224	$P_{GA}$	21.6	25.9	32.5	38.5	47.2	52.8	69	84	96	113	136	151	149	166	200	220	279	304
250	$P_{GA}$	21.1	24.9	31.4	37.6	45.6	51.6	67	82	92	110	130	140	143	154	192	205	268	284
280	$P_{GA}$	20.1	23.3	29.9	35.1	43.5	48.2	64	77	87	102	121	134	134	148	180	197	255	273
315	$P_{GA}$	18.8	22.7	27.8	33.9	41.0	46.6	60	74	83	98	115	125	127	139	170	185	236	259
355	$P_{GA}$	–	21.6	–	32.2	–	44.4	–	71	–	92	–	119	–	131	–	176	–	241
400	$P_{GA}$	–	20.2	–	30.0	–	42.0	–	66.0	–	88.5	–	–	–	–	–	–	–	–

##### Thermal capacities $P_G$ (kW) type B4 $n_1 = 1200$ rpm

$i_N$		Gear unit sizes																	
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
80	$P_{GA}$	35.3	–	53.1	–	75.6	–	113	–	154	–	209	–	230	–	288	–	364	–
90	$P_{GA}$	34.5	–	51.7	–	74.1	–	109	–	149	–	203	216	223	238	282	298	362	373
100	$P_{GA}$	33.0	38.0	49.2	57.3	70.8	77.1	105	126	143	165	194	210	213	231	272	291	351	371
112	$P_{GA}$	31.8	37.1	47.5	55.7	68.7	75.5	101	121	137	160	187	201	205	221	263	281	346	360
125	$P_{GA}$	30.5	35.5	45.6	52.9	65.9	72.1	96.4	117	132	153	179	193	197	213	254	272	332	354
140	$P_{GA}$	28.9	34.3	43.3	51.2	62.5	69.9	91.6	112	125	147	173	185	190	203	246	261	324	340
160	$P_{GA}$	26.2	32.8	38.8	49.1	56.4	67.2	82.7	107	118	141	164	179	181	197	235	254	311	331
180	$P_{GA}$	25.6	31.1	37.8	46.6	54.8	63.7	80.2	102	111	134	155	170	171	187	222	243	295	318
200	$P_{GA}$	24.7	28.2	37.8	41.9	53.9	57.6	79.0	91.7	109	126	154	160	169	177	224	229	312	301
224	$P_{GA}$	22.8	27.5	34.9	40.8	50.1	55.9	73.6	88.9	101	119	144	159	158	175	209	231	292	318
250	$P_{GA}$	22.1	26.5	33.5	40.6	48.0	54.9	70.7	87.4	97.2	117	138	148	151	163	202	216	282	298
280	$P_{GA}$	21.0	24.5	31.3	37.6	45.6	51.1	66.7	81.4	90.7	108	128	142	141	156	189	208	268	287
315	$P_{GA}$	19.7	23.8	29.7	36.1	43.0	49.0	62.4	78.1	86.7	104	121	132	133	146	180	195	249	273
355	$P_{GA}$	–	22.6	–	33.8	–	46.6	–	73.8	–	96.8	–	125	–	138	–	185	–	254
400	$P_{GA}$	–	21.2	–	32.0	–	44.0	–	69.1	–	92.7	–	–	–	–	–	–	–	–

### Technical specifications (continued)

#### Thermal capacities $P_G$ (kW) type B4 $n_1 = 1500$ rpm

$i_N$		Gear unit sizes																	
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
80	$P_{GA}$	37.3	–	55.8	–	79.2	–	117	–	159	–	210	–	232	–	284	–	336	–
90	$P_{GA}$	36.5	–	54.4	–	77.8	–	114	–	154	–	205	217	228	242	280	295	344	348
100	$P_{GA}$	34.9	40.1	51.9	60.4	74.6	80.9	110	131	149	171	199	213	220	237	275	291	341	354
112	$P_{GA}$	33.7	39.3	50.3	58.8	72.5	79.4	106	127	143	166	192	205	212	228	268	285	339	351
125	$P_{GA}$	32.4	37.7	48.3	56.1	69.8	76.1	102	123	138	160	185	199	204	220	259	277	330	349
140	$P_{GA}$	30.8	36.4	45.9	54.3	66.3	74.0	96.7	118	132	154	180	191	198	212	253	268	324	338
160	$P_{GA}$	27.9	34.9	41.3	52.2	60.0	71.2	87.5	113	124	148	171	186	189	206	243	261	313	332
180	$P_{GA}$	27.2	33.2	40.3	49.6	58.4	67.7	84.9	108	117	141	162	177	179	196	229	251	298	321
200	$P_{GA}$	26.6	30.1	40.6	44.6	57.8	61.3	84.4	97.1	116	133	163	167	180	185	235	237	325	306
224	$P_{GA}$	24.6	29.3	37.6	43.5	53.9	59.6	78.8	94.3	108	125	152	169	168	186	221	243	306	333
250	$P_{GA}$	23.8	28.5	36.1	43.7	51.6	59.0	75.7	93.5	104	124	146	157	161	174	213	228	296	313
280	$P_{GA}$	22.4	26.4	33.3	40.5	48.8	55.0	71.5	87.2	96.8	115	136	151	150	167	200	219	282	302
315	$P_{GA}$	20.9	25.6	31.4	38.8	45.7	52.7	66.6	83.8	92.8	111	129	141	143	155	191	206	263	288
355	$P_{GA}$	–	24.1	–	35.9	–	49.8	–	79.1	–	104	–	133	–	148	–	197	–	268
400	$P_{GA}$	–	22.5	–	33.9	–	46.7	–	73.6	–	99.0	–	–	–	–	–	–	–	–

#### Thermal capacities $P_G$ (kW) type B4 $n_1 = 1800$ rpm

$i_N$		Gear unit sizes																	
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
80	$P_{GA}$	38.5	–	57.5	–	81.3	–	120	–	159	–	204	–	229	–	269	–	287	–
90	$P_{GA}$	37.8	–	56.2	–	80.0	–	117	–	156	–	202	212	226	239	270	282	309	300
100	$P_{GA}$	36.3	41.6	53.8	62.5	77.0	83.3	113.3	134	151	173	198	210	221	236	269	282	317	322
112	$P_{GA}$	35.2	40.9	52.2	61.0	75.1	81.9	109	131	146	168	193	206	215	230	265	280	320	328
125	$P_{GA}$	33.8	39.3	50.2	58.3	72.4	78.8	105	127	142	163	186	200	207	224	259	275	316	331
140	$P_{GA}$	32.2	38.0	47.9	56.6	69.1	76.8	100	122	135	158	181	193	202	216	254	268	313	326
160	$P_{GA}$	29.2	36.5	43.2	54.4	62.6	74.1	90.8	117	128	153	174	188	193	210	245	263	305	322
180	$P_{GA}$	28.6	34.8	42.1	51.9	61.0	70.6	88.2	112	121	146	165	180	183	201	232	253	294	315
200	$P_{GA}$	28.1	31.5	42.9	46.7	61.0	64.2	88.6	101	121	138	170	171	187	190	242	240	332	302
224	$P_{GA}$	26.0	30.8	39.8	45.6	56.9	62.4	82.8	98.2	113	130	159	175	175	194	228	250	314	340
250	$P_{GA}$	25.3	30.2	38.2	46.2	54.6	62.3	79.7	98.2	109	130	152	164	168	181	220	235	304	322
280	$P_{GA}$	23.8	28.0	35.3	42.9	51.6	58.2	75.3	91.8	102	121	142	157	157	174	208	227	291	312
315	$P_{GA}$	22.2	27.1	33.3	41.1	48.4	55.8	70.3	88.2	97.7	116	136	147	150	163	199	214	272	298
355	$P_{GA}$	–	25.5	–	38.0	–	52.7	–	83.4	–	109	–	140	–	155	–	205	–	278
400	$P_{GA}$	–	23.8	–	35.9	–	49.5	–	77.7	–	104	–	–	–	–	–	–	–	–

## Design of the gear units

### Overview tables

#### Type H1, H2 – Mass moments of inertia $J_1$ gear unit sizes 3 to 12

##### Technical specifications (continued)

The mass moment of inertia  $J_2$  in  $\text{kgm}^2$  relative to the low speed shaft (LSS) of a gear unit is calculated according to the following formula:

$$J_2 = i_N^2 \times J_1.$$

The mass moments of inertia  $J_1$  in  $\text{kgm}^2$  are relative to the high speed shaft (HSS) of the gear unit and apply to the high speed shaft (HSS) without fan.

For the high speed shaft (HSS) with fan,  $J_L$  must be added.

Values for flanged shaft gear units on request.

##### Mass moments of inertia $J_1$ in $\text{kgm}^2$ relative to the high speed shaft (HSS)

$i_N$	Gear unit sizes											Type
	3	4	5	6	7	8	9	10	11	12		
1.25	0.02855	–	0.15709	–	0.42300	–	0.92932	–	–	–		H1
1.4	0.02589	–	0.14349	–	0.38558	–	0.84322	–	–	–		
1.6	0.02243	–	0.12352	–	0.33519	–	0.72861	–	1.74977	–		
1.8	0.01974	–	0.10903	–	0.30515	–	0.66019	–	1.58798	–		
2.0	0.01820	–	0.09932	–	0.27747	–	0.59704	–	1.43757	–		
2.24	0.01677	–	0.09029	–	0.23964	–	0.53840	–	1.29698	–		
2.5	0.01479	–	0.08187	–	0.21652	–	0.48366	–	1.16495	–		
2.8	0.01347	–	0.07398	–	0.20156	–	0.44378	–	1.04055	–		
3.15	0.00915	–	0.05006	–	0.14031	–	0.31089	–	0.84211	–		
3.55	0.00807	–	0.04369	–	0.12256	–	0.27320	–	0.73595	–		
4.0	0.00702	–	0.03797	–	0.10584	–	0.23756	–	0.64640	–		
4.5	0.00522	–	0.02975	–	0.08623	–	0.19980	–	0.49550	–		
5.0	0.00451	–	0.02756	–	0.07492	–	0.17089	–	0.40618	–		
5.6	0.00384	–	0.02332	–	0.06407	–	0.14114	–	0.37471	–		
$J_L$	0.060	–	0.045	–	0.100	–	0.100	–	0.290	–		
6.3	–	0.01493	0.03380	–	0.09209	–	0.20124	–	0.52103	–	H2	
7.1	–	0.01340	0.02812	–	0.07563	–	0.16652	–	0.45488	–		
8.0	–	0.01138	0.02503	0.03969	0.06630	0.11062	0.14592	0.23956	0.39684	0.63968		
9.0	–	0.01020	0.02227	0.03260	0.05805	0.08946	0.12771	0.19511	0.32236	0.55211		
10	–	0.00860	0.01857	0.02877	0.05058	0.07759	0.11102	0.16927	0.27967	0.47606		
11.2	–	0.00757	0.01619	0.02538	0.04457	0.06721	0.09506	0.14665	0.25168	0.37982		
12.5	–	0.00527	0.01187	0.02089	0.03379	0.05794	0.07209	0.12624	0.19234	0.32553		
14	–	0.00453	0.01013	0.01809	0.02691	0.05063	0.06102	0.10716	0.16348	0.29072		
16	–	0.00384	0.00853	0.01340	0.02264	0.03872	0.05133	0.08159	0.13633	0.22357		
18	–	0.00320	0.00758	0.01136	0.02005	0.03044	0.04385	0.06852	0.12189	0.18813		
20	–	0.00276	0.00649	0.00949	0.01712	0.02542	0.04039	0.05722	0.10460	0.15546		
22.4	–	0.00230	0.00550	0.00834	0.01578	0.02227	0.03414	0.04838	0.08840	0.13769		
25	–	–	–	0.00710	–	0.01888	–	0.04442	–	0.11733		
28	–	–	–	0.00598	–	0.01734	–	0.03728	–	0.09842		
$J_L$	–	0.006	0.010	0.010	0.045	0.045	0.045	0.045	0.100	0.100		

Mass moments of inertia for sizes 23 to 28 on request.

### Type H3, H4 – Mass moments of inertia $J_1$ gear unit sizes 3 to 12

#### Technical specifications (continued)

The mass moment of inertia  $J_2$  in  $\text{kgm}^2$  relative to the low speed shaft (LSS) of a gear unit is calculated according to the following formula:

$$J_2 = i_N^2 \times J_1.$$

The mass moments of inertia  $J_1$  in  $\text{kgm}^2$  are relative to the high speed shaft (HSS) of the gear unit and apply to the high speed shaft (HSS) without fan.

For the high speed shaft (HSS) with fan,  $J_L$  must be added.

Values for flanged shaft gear units on request.

#### Mass moments of inertia $J_1$ in $\text{kgm}^2$ relative to the high speed shaft (HSS)

$i_N$	Gear unit sizes										Type	
	3	4	5	6	7	8	9	10	11	12		
22.4	–	–	–	–	–	–	–	–	–	–	–	H3
25	–	–	0.00645	–	0.01629	–	0.03910	–	0.10272	–	–	
28	–	–	0.00536	–	0.01447	–	0.03237	–	0.08333	–	–	
31.5	–	–	0.00474	0.00682	0.01209	0.01734	0.02874	0.04142	0.07242	0.11030	–	
35.5	–	–	0.00418	0.00565	0.01070	0.01536	0.02550	0.03413	0.06284	0.08898	–	
40	–	–	0.00343	0.00498	0.00888	0.01278	0.02129	0.03021	0.05440	0.07704	–	
45	–	–	0.00301	0.00438	0.00782	0.01129	0.01874	0.02673	0.04799	0.06659	–	
50	–	–	0.00228	0.00358	0.00570	0.00933	0.01359	0.02221	0.03603	0.05741	–	
56	–	–	0.00194	0.00313	0.00487	0.00819	0.01162	0.01949	0.02835	0.05047	–	
63	–	–	0.00163	0.00238	0.00413	0.00597	0.00982	0.01419	0.02386	0.03805	–	
71	–	–	0.00123	0.00202	0.00324	0.00509	0.00738	0.01210	0.01900	0.02979	–	
80	–	–	0.00102	0.00169	0.00278	0.00430	0.00624	0.01020	0.01595	0.02500	–	
90	–	–	0.00088	0.00128	0.00229	0.00337	0.00520	0.00768	0.01453	0.01991	–	
100	–	–	–	0.00106	–	0.00289	–	0.00648	–	0.01667	–	
112	–	–	–	0.00091	–	0.00238	–	0.00539	–	0.01517	–	
$J_L$	–	–	0.006	0.006	0.010	0.010	0.020	0.020	0.045	0.045	–	
100	–	–	–	–	0.00328	–	0.00667	–	0.01753	–	–	H4
112	–	–	–	–	0.00274	–	0.00552	–	0.01560	–	–	
125	–	–	–	–	0.00243	0.00334	0.00486	0.00683	0.01310	0.01796	–	
140	–	–	–	–	0.00202	0.00279	0.00428	0.00564	0.01164	0.01597	–	
160	–	–	–	–	0.00176	0.00247	0.00348	0.00496	0.00970	0.01338	–	
180	–	–	–	–	0.00153	0.00205	0.00300	0.00436	0.00848	0.01188	–	
200	–	–	–	–	0.00124	0.00178	0.00230	0.00354	0.00595	0.00988	–	
224	–	–	–	–	0.00097	0.00155	0.00195	0.00305	0.00508	0.00863	–	
250	–	–	–	–	0.00081	0.00126	0.00163	0.00234	0.00428	0.00606	–	
280	–	–	–	–	0.00065	0.00098	0.00134	0.00199	0.00354	0.00517	–	
315	–	–	–	–	0.00060	0.00082	0.00112	0.00165	0.00304	0.00435	–	
355	–	–	–	–	0.00050	0.00066	0.00097	0.00136	0.00252	0.00360	–	
400	–	–	–	–	–	0.00060	–	0.00114	–	0.00309	–	
450	–	–	–	–	–	0.00050	–	0.00098	–	0.00256	–	

Mass moments of inertia for sizes 23 to 28 on request.

## Design of the gear units

### Overview tables

#### Type H1, H2 – Mass moments of inertia $J_1$ gear unit sizes 13 to 22

##### Technical specifications (continued)

The mass moment of inertia  $J_2$  in  $\text{kgm}^2$  relative to the low speed shaft (LSS) of a gear unit is calculated according to the following formula:

$$J_2 = i_N^2 \times J_1.$$

The mass moments of inertia  $J_1$  in  $\text{kgm}^2$  are relative to the high speed shaft (HSS) of the gear unit and apply to the high speed shaft (HSS) without fan.

For the high speed shaft (HSS) with fan,  $J_L$  must be added.

Values for flanged shaft gear units on request.

##### Mass moments of inertia $J_1$ in $\text{kgm}^2$ relative to the high speed shaft (HSS)

$i_N$	Gear unit sizes										Type	
	13	14	15	16	17	18	19	20	21	22		
1.25	–	–	–	–	–	–	–	–	–	–	–	H1
1.4	–	–	–	–	–	–	–	–	–	–	–	
1.6	3.74077	–	–	–	–	–	–	–	–	–	–	
1.8	3.22057	–	–	–	–	–	–	–	–	–	–	
2.0	2.90582	–	6.86903	–	–	–	–	–	–	–	–	
2.24	2.61258	–	6.15225	–	–	–	–	–	–	–	–	
2.5	2.33813	–	5.52442	–	–	–	–	–	–	–	–	
2.8	2.08042	–	4.95982	–	8.44258	–	–	–	–	–	–	
3.15	1.67273	–	3.91162	–	6.72168	–	–	–	–	–	–	
3.55	1.47399	–	3.40747	–	5.86409	–	–	–	–	–	–	
4.0	1.28613	–	2.93210	–	5.05491	–	9.52270	–	–	–	–	
4.5	0.96567	–	2.30308	–	4.00905	–	7.87489	–	–	–	–	
5.0	0.89360	–	1.96108	–	3.55977	–	6.66044	–	–	–	–	
5.6	0.75803	–	1.65759	–	3.01084	–	5.50473	–	–	–	–	
$J_L$	0.290	–	0.690	–	0.690	–	0.690	–	–	–	–	
6.3	1.10195	–	2.69450	–	5.30249	–	10.62628	–	14.12289	–	–	H2
7.1	0.95997	–	2.36587	2.93445	4.38152	5.79425	9.32889	11.42554	12.30855	15.24965	–	
8.0	0.83523	1.28897	2.07496	2.56276	3.85101	4.74843	8.17656	9.98029	10.71777	13.22687	–	
9.0	0.72509	1.11239	1.81611	2.23558	3.37587	4.15070	7.14706	8.70419	9.31584	11.46160	–	
10	0.62735	0.95870	1.58473	1.94622	2.94834	3.61890	6.27857	7.57118	8.14946	9.91374	–	
11.2	0.55925	0.82433	1.37708	1.68919	2.56216	3.14368	5.52433	6.62132	7.14789	8.63265	–	
12.5	0.42550	0.70636	1.14218	1.46006	2.04515	2.71748	4.44852	5.80139	5.67579	7.53848	–	
14	0.36723	0.62499	0.97937	1.20991	1.76837	2.16566	3.81731	4.67000	4.86012	5.98802	–	
16	0.31417	0.47348	0.82110	1.03247	1.51448	1.86457	3.23981	3.99197	4.12526	5.10635	–	
18	0.28054	0.40553	0.68720	0.86324	1.21881	1.59010	2.59172	3.37526	3.27028	4.31621	–	
20	0.23699	0.34428	0.56007	0.72007	1.10345	1.27695	2.24548	2.69238	2.81401	3.41219	–	
22.4	–	0.30627	–	0.58429	–	1.15512	–	2.32662	–	2.92840	–	
25	–	0.25717	–	–	–	–	–	–	–	–	–	
28	–	–	–	–	–	–	–	–	–	–	–	
$J_L$	0.290	0.290	0.290	0.290	0.690	0.690	0.690	0.690	0.690	0.690	0.690	

Mass moments of inertia for sizes 23 to 28 on request.

### Type H3, H4 – Mass moments of inertia $J_1$ gear unit sizes 13 to 22

#### Technical specifications (continued)

The mass moment of inertia  $J_2$  in  $\text{kgm}^2$  relative to the low speed shaft (LSS) of a gear unit is calculated according to the following formula:

$$J_2 = i_N^2 \times J_1.$$

The mass moments of inertia  $J_1$  in  $\text{kgm}^2$  are relative to the high speed shaft (HSS) of the gear unit and apply to the high speed shaft (HSS) without fan.

For the high speed shaft (HSS) with fan,  $J_L$  must be added.

Values for flanged shaft gear units on request.

#### Mass moments of inertia $J_1$ in $\text{kgm}^2$ relative to the high speed shaft (HSS)

$i_N$	Gear unit sizes										Type
	13	14	15	16	17	18	19	20	21	22	
<b>22.4</b>	0.28093	–	0.74161	–	0.81650	–	1.65788	–	3.73410	–	<b>H3</b>
<b>25</b>	0.22706	–	0.60098	0.76346	0.65739	0.85893	1.33246	1.72711	3.03258	3.82925	
<b>28</b>	0.18629	0.29678	0.52263	0.61732	0.56883	0.68913	1.15173	1.38384	2.63821	3.10389	
<b>31.5</b>	0.16244	0.23899	0.45433	0.53601	0.49253	0.59483	0.99457	1.19361	2.29194	2.69673	
<b>35.5</b>	0.14149	0.19520	0.36744	0.46523	0.39559	0.51371	0.85730	1.02850	1.98651	2.33968	
<b>40</b>	0.12303	0.16971	0.31814	0.37536	0.34093	0.41097	0.73692	0.88457	1.71599	2.02518	
<b>45</b>	0.10672	0.14739	0.28778	0.32445	0.30742	0.35319	0.65396	0.75863	1.47554	1.74703	
<b>50</b>	0.07610	0.12778	0.21066	0.29316	0.22462	0.31786	0.46753	0.67202	1.20329	1.50020	
<b>56</b>	0.06432	0.11049	0.17805	0.21496	0.18897	0.23297	0.39842	0.48071	1.01816	1.22342	
<b>63</b>	0.05428	0.07906	0.14889	0.18145	0.15726	0.19556	0.33619	0.40895	0.86937	1.03395	
<b>71</b>	0.04221	0.06666	0.12167	0.15152	0.13362	0.16237	0.28899	0.34446	0.69699	0.88189	
<b>80</b>	0.03866	0.05611	0.10341	0.12385	0.11393	0.13785	0.24205	0.29606	0.55341	0.70676	
<b>90</b>	0.03176	0.04362	0.08646	0.10516	0.09573	0.11733	0.19751	0.24759	0.50692	0.56061	
<b>100</b>	–	0.03992	–	0.08784	–	0.09841	–	0.20171	–	0.51330	
<b>112</b>	–	0.03274	–	–	–	–	–	–	–	–	
<b><math>J_L</math></b>	0.045	0.045	0.100	0.100	0.100	0.100					
<b>100</b>	0.03962	–	0.10814	–	0.11315	–	0.23894	–	0.60939	–	<b>H4</b>
<b>112</b>	0.03254	–	0.08764	0.10910	0.09173	0.11518	0.19488	0.24222	0.52729	0.61425	
<b>125</b>	0.02873	0.04034	0.07613	0.08829	0.07972	0.09324	0.16925	0.19732	0.45584	0.53127	
<b>140</b>	0.02534	0.03309	0.06605	0.07672	0.06922	0.08096	0.14680	0.17125	0.36516	0.45909	
<b>160</b>	0.02087	0.02919	0.05704	0.06652	0.05986	0.07022	0.12654	0.14842	0.31382	0.36751	
<b>180</b>	0.01806	0.02572	0.04990	0.05742	0.05247	0.06066	0.10759	0.12785	0.28076	0.31570	
<b>200</b>	0.01339	0.02115	0.03803	0.05022	0.03937	0.05313	0.08150	0.10862	0.21559	0.28235	
<b>224</b>	0.01135	0.01829	0.02994	0.03828	0.03102	0.03991	0.06851	0.08231	0.18183	0.21687	
<b>250</b>	0.00948	0.01358	0.02503	0.03013	0.02596	0.03140	0.05728	0.06915	0.15057	0.18284	
<b>280</b>	0.00794	0.01150	0.02100	0.02517	0.02181	0.02626	0.04677	0.05779	0.12952	0.15135	
<b>315</b>	0.00670	0.00960	0.01768	0.02111	0.01840	0.02206	0.04283	0.04716	0.10994	0.13017	
<b>355</b>	0.00559	0.00803	0.01616	0.01777	0.01685	0.01859	0.03572	0.04318	0.09172	0.11046	
<b>400</b>	–	0.00678	–	0.01625	–	0.01702	–	0.03599	–	0.09213	
<b>450</b>	–	0.00565	–	–	–	–	–	–	–	–	

Mass moments of inertia for sizes 23 to 28 on request.

## Design of the gear units

### Overview tables

#### Type B2, B3, B4 – Mass moments of inertia $J_1$ gear unit sizes 4 to 12

##### Technical specifications (continued)

The mass moment of inertia  $J_2$  in  $\text{kgm}^2$  relative to the low speed shaft (LSS) of a gear unit is calculated according to the following formula:

$$J_2 = i_N^2 \times J_1.$$

The mass moments of inertia  $J_1$  in  $\text{kgm}^2$  are relative to the high speed shaft (HSS) of the gear unit and apply to the high speed shaft (HSS) without fan.

For the high speed shaft (HSS) with fan,  $J_L$  must be added.

Values for flanged shaft gear units on request.

##### Mass moments of inertia $J_1$ in $\text{kgm}^2$ relative to the high speed shaft (HSS)

Gear unit sizes										
$i_N$	4	5	6	7	8	9	10	11	12	Type
5.0	0.03211	0.07501	–	0.20154	–	0.44627	–	1.29058	–	B2
5.6	0.03024	0.06915	–	0.17137	–	0.37934	–	1.08250	–	
6.3	0.02673	0.05791	0.08406	0.13819	0.23057	0.30248	0.50622	0.85265	1.48203	
7.1	0.02249	0.04955	0.07668	0.11905	0.19554	0.25734	0.42923	0.73360	1.23242	
8.0	0.01814	0.03799	0.06347	0.08858	0.15603	0.18973	0.33932	0.53110	0.96847	
9.0	0.01486	0.03115	0.05410	0.07952	0.13365	0.17287	0.28749	0.48051	0.82632	
10	0.01037	0.02538	0.04185	0.06883	0.09965	0.14614	0.21259	0.41113	0.60295	
11.2	0.00931	0.02176	0.03406	0.05956	0.08888	0.12482	0.19220	0.35269	0.54127	
12.5	–	–	0.02760	–	0.07596	–	0.16085	–	0.45737	
14	–	–	0.02366	–	0.06566	–	0.13741	–	0.39227	
$J_L$	0.020	0.045	0.045	0.100	0.100	0.100	0.100	0.290	0.290	
12.5	0.00756	0.01615	–	0.04549	–	0.10285	–	0.27616	–	B3
14	0.00734	0.01575	–	0.04455	–	0.09999	–	0.26878	–	
16	0.00623	0.01371	0.01750	0.03768	0.04966	0.08727	0.11205	0.23571	0.30357	
18	0.00610	0.01346	0.01695	0.03713	0.04831	0.08550	0.10750	0.23105	0.29302	
20	0.00569	0.01248	0.01458	0.03464	0.04011	0.07999	0.09297	0.21547	0.25301	
22.4	0.00527	0.01157	0.01422	0.03229	0.03933	0.07329	0.09015	0.18297	0.24635	
25	0.00456	0.01073	0.01308	0.02828	0.03637	0.06097	0.08364	0.14675	0.22734	
28	0.00394	0.00881	0.01206	0.02376	0.03369	0.05206	0.07633	0.12605	0.19285	
31.5	0.00335	0.00730	0.01109	0.01922	0.02934	0.04011	0.06322	0.09389	0.15405	
35.5	0.00271	0.00586	0.00911	0.01568	0.02463	0.03275	0.05390	0.08401	0.13203	
40	0.00190	0.00416	0.00755	0.01100	0.01996	0.02660	0.04168	0.07225	0.09842	
45	0.00177	0.00393	0.00605	0.00984	0.01624	0.02280	0.03393	0.06249	0.08784	
50	0.00129	0.00301	0.00431	0.00812	0.01143	0.01784	0.02750	0.04683	0.07516	
56	0.00105	0.00248	0.00405	0.00682	0.01020	0.01462	0.02357	0.03850	0.06498	
63	0.00087	0.00207	0.00310	0.00589	0.00840	0.01242	0.01844	0.03265	0.04876	
71	0.00067	0.00157	0.00256	0.00467	0.00705	0.00997	0.01509	0.02622	0.04002	
80	–	–	0.00213	–	0.00607	–	0.01280	–	0.03390	
90	–	–	0.00162	–	0.00481	–	0.01027	–	0.02719	
$J_L$	0.006	0.010	0.010	0.020	0.020	0.045	0.045	0.100	0.100	
80	–	0.00240	–	0.00589	–	0.01293	–	0.03573	–	B4
90	–	0.00227	–	0.00543	–	0.01193	–	0.03317	–	
100	–	0.00200	0.00244	0.00468	0.00600	0.01100	0.01317	0.02895	0.03644	
112	–	0.00176	0.00230	0.00404	0.00551	0.00903	0.01212	0.02431	0.03375	
125	–	0.00145	0.00202	0.00344	0.00474	0.00749	0.01114	0.01969	0.02939	
140	–	0.00117	0.00178	0.00278	0.00409	0.00600	0.00915	0.01603	0.02467	
160	–	0.00091	0.00147	0.00195	0.00348	0.00427	0.00759	0.01127	0.01999	
180	–	0.00085	0.00118	0.00181	0.00281	0.00402	0.00608	0.01007	0.01626	
200	–	0.00058	0.00092	0.00132	0.00198	0.00308	0.00433	0.00830	0.01145	
224	–	0.00047	0.00086	0.00108	0.00183	0.00254	0.00407	0.00696	0.01021	
250	–	0.00043	0.00058	0.00090	0.00134	0.00211	0.00312	0.00600	0.00841	
280	–	0.00033	0.00047	0.00069	0.00109	0.00160	0.00257	0.00476	0.00705	
315	–	0.00028	0.00043	0.00058	0.00091	0.00136	0.00214	0.00405	0.00608	
355	–	–	0.00034	–	0.00070	–	0.00162	–	0.00482	
400	–	–	0.00028	–	0.00059	–	0.00138	–	0.00409	

Mass moments of inertia for sizes 23 to 28 on request.



### Type B2, B3, B4 – Mass moments of inertia $J_1$ gear unit sizes 13 to 22

#### Technical specifications (continued)

The mass moment of inertia  $J_2$  in  $\text{kgm}^2$  relative to the low speed shaft (LSS) of a gear unit is calculated according to the following formula:

$$J_2 = i_N^2 \times J_1.$$

The mass moments of inertia  $J_1$  in  $\text{kgm}^2$  are relative to the high speed shaft (HSS) of the gear unit and apply to the high speed shaft (HSS) without fan.

For the high speed shaft (HSS) with fan,  $J_L$  must be added.

Values for flanged shaft gear units on request.

#### Mass moments of inertia $J_1$ in $\text{kgm}^2$ relative to the high speed shaft (HSS)

$i_N$	Gear unit sizes										Type	
	13	14	15	16	17	18	19	20	21	22		
5.0	2.79496	–	6.25795	–	–	–	–	–	–	–	–	B2
5.6	2.36141	–	5.40648	6.66677	10.37011	–	–	–	–	–	–	
6.3	1.86785	3.10156	4.49760	5.72660	8.58657	–	–	–	–	–	–	
7.1	1.63448	2.60149	3.77001	4.74810	7.14219	9.06446	–	–	–	–	–	
8.0	1.18384	2.05333	2.78214	3.96800	5.01824	7.51989	–	–	–	–	–	
9.0	1.06973	1.78297	2.53133	2.93557	4.52494	5.31094	–	–	–	–	–	
10	0.92751	1.29891	2.16711	2.66107	3.85677	4.77245	–	–	–	–	–	
11.2	0.80120	1.16704	1.81377	2.26584	3.32075	4.04511	–	–	–	–	–	
12.5	–	1.00155	–	1.89831	–	3.48202	–	–	–	–	–	
14	–	0.86460	–	–	–	–	–	–	–	–	–	
$J_L$	0.690	0.690	0.690	0.690	0.690	0.690	–	–	–	–	–	
12.5	0.61844	–	1.69718	–	3.48560	–	7.8896	–	8.3877	–	–	B3
14	0.60537	–	1.65740	1.76004	3.44624	3.60423	7.7305	8.0659	8.2186	8.6052	–	
16	0.51600	0.66451	1.48103	1.70973	3.06690	3.54418	6.9989	7.8400	7.4408	8.3643	–	
18	0.50838	0.64618	1.45557	1.52126	3.04252	3.14038	6.8398	6.9560	7.2717	7.4142	–	
20	0.47566	0.54284	1.37309	1.48906	2.88266	3.10318	6.37936	6.8399	6.79596	7.2972	–	
22.4	0.40380	0.53216	1.14711	1.39966	2.43009	2.93035	5.50155	6.46478	5.82775	6.91637	–	
25	0.32054	0.49435	0.90256	1.16792	1.92090	2.46743	4.57199	5.56843	4.82726	5.92204	–	
28	0.27212	0.41936	0.77356	0.91864	1.67696	1.94976	3.82881	4.62433	4.03056	4.90105	–	
31.5	0.20094	0.33203	0.56206	0.78643	1.21675	1.70005	2.82771	3.87017	2.98405	4.08888	–	
35.5	0.18235	0.28152	0.50670	0.57204	1.09757	1.23465	2.56986	2.85976	2.70207	3.02924	–	
40	0.15335	0.20806	0.43106	0.51513	0.94869	1.11270	2.19643	2.59697	2.29704	2.74029	–	
45	0.13099	0.18837	0.36975	0.43748	0.81933	0.96021	1.83887	2.21706	1.92502	2.32612	–	
50	0.10268	0.15794	0.27673	0.37524	0.57171	0.82919	1.40288	1.85654	1.46929	1.94992	–	
56	0.08549	0.13492	0.22863	0.28096	0.46952	0.57931	1.14615	1.41650	1.19871	1.48849	–	
63	0.07262	0.10571	0.19582	0.23198	0.40563	0.47553	1.04477	1.15693	1.08801	1.21390	–	
71	0.05866	0.08789	0.15881	0.19858	0.33347	0.41058	0.84654	1.05364	0.87983	1.10050	–	
80	–	0.07459	–	0.16093	–	0.33728	–	0.85337	–	0.88945	–	
90	–	0.06017	–	–	–	–	–	–	–	–	–	
$J_L$	0.290	0.290	0.290	0.290	0.690	0.690	0.690	0.690	0.690	0.690	–	
80	0.08226	–	0.22213	–	0.22783	–	0.49622	–	1.41079	–	–	
90	0.07518	–	0.18851	0.22377	0.19326	0.23101	0.42091	0.50136	1.17663	1.41869	–	
100	0.06237	0.08339	0.15085	0.18988	0.15435	0.19590	0.33318	0.42519	0.92537	1.18281	–	
112	0.05320	0.07613	0.12941	0.15185	0.13227	0.15630	0.28247	0.33633	0.79182	0.93015	–	
125	0.04108	0.06307	0.09644	0.13023	0.09861	0.13387	0.20878	0.28505	0.57621	0.79564	–	
140	0.03348	0.05377	0.08616	0.09706	0.08799	0.09982	0.18898	0.21073	0.51866	0.57917	–	
160	0.02716	0.04157	0.07389	0.08669	0.07528	0.08902	0.15840	0.19063	0.44016	0.52117	–	
180	0.02328	0.03385	0.06389	0.07429	0.06509	0.07606	0.13531	0.15966	0.37754	0.44207	–	
200	0.01821	0.02744	0.04791	0.06423	0.04883	0.06575	0.10601	0.13639	0.28273	0.37918	–	
224	0.01491	0.02352	0.03935	0.04818	0.04008	0.04935	0.08813	0.10684	0.23338	0.28399	–	
250	0.01266	0.01840	0.03335	0.03956	0.03395	0.04049	0.07479	0.08879	0.19973	0.23438	–	
280	0.01016	0.01506	0.02676	0.03353	0.02723	0.03429	0.06032	0.07533	0.16181	0.20055	–	
315	0.00812	0.01278	0.02169	0.02690	0.02207	0.02748	0.04934	0.06074	0.12885	0.16245	–	
355	–	0.01025	–	0.02180	–	0.02228	–	0.04968	–	0.12937	–	
400	–	0.00820	–	–	–	–	–	–	–	–	–	

Mass moments of inertia for sizes 23 to 28 on request.

## Design of the gear units

### Overview tables

#### Type H1, H2, H3, H4 – Actual ratios $i$ gear unit sizes 3 to 12

#### Technical specifications (continued)

#### Actual ratios $i$ for types H1, H2, H3, H4

$i_N$	Gear unit sizes										Type
	3	4	5	6	7	8	9	10	11	12	
1.25	1.243	–	1.256	–	1.263	–	1.270	–	–	–	H1
1.4	1.371	–	1.378	–	1.389	–	1.400	–	–	–	
1.6	1.594	–	1.588	–	1.606	–	1.625	–	1.636	–	
1.8	1.829	–	1.839	–	1.774	–	1.800	–	1.806	–	
2.0	2.000	–	2.034	–	1.966	–	2.000	–	2.000	–	
2.24	2.194	–	2.259	–	2.308	–	2.231	–	2.222	–	
2.5	2.536	–	2.520	–	2.583	–	2.500	–	2.480	–	
2.8	2.808	–	2.826	–	2.800	–	2.741	–	2.783	–	
3.15	3.125	–	3.190	–	3.130	–	3.208	–	3.080	–	
3.55	3.500	–	3.591	–	3.524	–	3.591	–	3.478	–	
4.0	3.950	–	4.050	–	4.000	–	4.050	–	3.905	–	
4.5	4.435	–	4.619	–	4.400	–	4.381	–	4.421	–	
5.0	4.952	–	4.900	–	4.905	–	4.947	–	5.150	–	
5.6	5.579	–	5.556	–	5.526	–	5.684	–	5.474	–	
6.3	–	6.319	6.286	–	6.088	–	6.260	–	6.246	–	
7.1	–	6.857	7.213	–	7.048	–	7.247	–	6.900	–	
8.0	–	7.778	7.889	7.792	7.799	7.676	8.018	7.848	7.644	7.941	
9.0	–	8.485	8.652	8.940	8.660	8.887	8.904	9.085	8.974	8.772	
10	–	9.722	10.002	9.778	9.660	9.833	9.932	10.053	10.046	9.718	
11.2	–	10.694	11.075	10.724	10.648	10.920	11.138	11.163	10.889	11.410	
12.5	–	12.444	12.326	12.397	11.807	12.180	12.574	12.452	12.174	12.773	
14	–	13.865	13.806	13.726	13.939	13.426	14.152	13.964	13.704	13.844	
16	–	15.556	15.581	15.278	15.717	14.887	15.962	15.765	15.556	15.478	
18	–	17.602	17.493	17.111	17.598	17.576	18.204	17.743	17.111	17.423	
20	–	19.444	19.534	19.311	19.742	19.817	19.312	20.012	19.074	19.778	
22.4	–	22.037	22.006	21.681	20.982	22.189	21.895	22.824	21.491	21.756	
25	–	–	25.011	24.212	25.540	24.892	25.439	24.212	24.706	24.251	
28	–	–	28.490	27.275	27.711	26.456	29.187	27.451	28.602	27.325	
31.5	–	–	31.161	30.999	31.433	32.202	31.924	31.894	31.648	31.412	
35.5	–	–	34.177	35.312	34.291	34.940	35.013	36.593	35.144	36.366	
40	–	–	39.508	38.622	39.292	39.633	40.474	40.024	39.200	40.238	
45	–	–	43.745	42.360	43.221	43.236	44.816	43.897	43.210	44.683	
50	–	–	48.689	48.967	50.293	49.542	49.881	50.744	47.911	49.840	
56	–	–	54.532	54.220	56.033	54.496	55.866	56.187	56.566	54.938	
63	–	–	61.543	60.347	62.867	63.413	63.049	62.537	63.778	60.916	
71	–	–	69.742	67.589	71.139	70.651	70.787	70.041	71.414	71.919	
80	–	–	78.723	76.279	78.583	79.267	79.049	79.046	80.111	81.089	
90	–	–	86.806	86.440	89.061	89.696	89.050	88.748	85.146	90.798	
100	–	–	–	97.572	101.554	99.083	101.210	99.106	103.639	101.856	
112	–	–	–	107.590	115.256	112.294	115.290	111.645	112.450	108.257	
125	–	–	–	–	125.733	128.046	126.098	126.890	127.556	131.769	
140	–	–	–	–	143.985	145.322	138.301	144.542	139.152	142.973	
160	–	–	–	–	158.251	158.533	159.874	158.093	159.444	162.178	
180	–	–	–	–	174.630	181.856	177.022	173.392	175.389	176.921	
200	–	–	–	–	193.629	199.533	197.028	200.439	204.089	202.722	
224	–	–	–	–	228.606	220.185	220.671	221.938	227.382	222.994	
250	–	–	–	–	257.753	244.141	249.043	247.020	255.111	259.484	
280	–	–	–	–	288.615	288.242	282.219	276.663	288.678	289.100	
315	–	–	–	–	305.352	324.993	318.563	312.234	318.889	324.356	
355	–	–	–	–	344.112	363.906	351.273	353.827	361.407	367.034	
400	–	–	–	–	–	385.010	–	399.393	–	405.444	
450	–	–	–	–	–	433.881	–	440.402	–	459.504	

### Type H1, H2, H3, H4 – Actual ratios $i$ gear unit sizes 13 to 24

#### Technical specifications (continued)

#### Actual ratios $i$ for types H1, H2, H3, H4

$i_N$	Gear unit sizes												Type	
	13	14	15	16	17	18	19	20	21	22	23	24		
1.25	–	–	–	–	–	–	–	–	–	–	–	–	–	H1
1.4	–	–	–	–	–	–	–	–	–	–	–	–	–	
1.6	1.588	–	–	–	–	–	–	–	–	–	–	–	–	
1.8	1.839	–	–	–	–	–	–	–	–	–	–	–	–	
2.0	2.034	–	2.000	–	–	–	–	–	–	–	–	–	–	
2.24	2.259	–	2.231	–	–	–	–	–	–	–	–	–	–	
2.5	2.520	–	2.481	–	–	–	–	–	–	–	–	–	–	
2.8	2.826	–	2.760	–	2.760	–	–	–	–	–	–	–	–	
3.15	3.208	–	3.087	–	3.087	–	–	–	–	–	–	–	–	
3.55	3.591	–	3.476	–	3.476	–	–	–	–	–	–	–	–	
4.0	4.050	–	3.947	–	3.947	–	3.944	–	–	–	–	–	–	
4.5	4.619	–	4.579	–	4.526	–	4.400	–	–	–	–	–	–	
5.0	4.900	–	5.100	–	4.900	–	4.950	–	–	–	–	–	–	
5.6	5.556	–	5.778	–	5.556	–	5.700	–	–	–	–	–	–	
6.3	6.410	–	6.449	–	6.154	–	6.410	–	6.500	–	6.448	–	–	
7.1	7.100	–	7.120	7.316	7.125	7.147	7.100	7.312	7.200	7.265	7.222	7.242	–	
8.0	7.889	7.944	7.882	8.076	7.884	8.274	7.889	8.100	8.000	8.047	8.125	8.111	–	
9.0	8.799	8.800	8.758	8.941	8.755	9.155	8.799	9.000	8.923	8.941	8.961	9.125	–	
10	9.861	9.778	9.774	9.935	9.765	10.167	9.788	10.038	9.926	9.973	9.967	10.064	–	
11.2	10.811	10.906	10.967	11.087	10.951	11.340	10.887	11.167	11.040	11.094	11.147	11.193	–	
12.5	12.655	12.222	12.139	12.440	12.432	12.717	12.176	12.420	12.348	12.339	12.553	12.519	–	
14	14.164	13.399	13.708	13.769	13.915	14.438	13.712	13.891	13.905	13.801	14.254	14.098	–	
16	15.975	15.685	15.389	15.550	15.694	16.159	15.570	15.643	15.789	15.541	16.345	16.009	–	
18	17.280	17.556	17.424	17.457	17.899	18.225	18.061	17.763	18.316	17.647	17.694	18.357	–	
20	19.515	19.800	20.297	19.765	18.988	20.786	20.117	20.605	20.400	20.471	19.328	19.872	–	
22.4	22.020	21.418	21.374	23.024	20.930	22.050	21.782	22.950	22.368	22.800	23.325	21.778	–	
25	25.372	24.187	24.716	24.245	24.202	24.306	25.283	24.850	25.837	25.000	25.750	26.196	–	
28	29.373	27.292	27.304	28.036	26.736	28.106	28.006	28.844	28.523	28.877	28.509	28.919	–	
31.5	32.501	31.447	30.248	30.971	29.619	31.048	31.117	31.950	31.579	31.879	31.676	32.018	–	
35.5	36.092	36.406	35.514	34.311	34.776	34.397	34.708	35.500	35.088	35.294	35.351	35.575	–	
40	40.257	40.283	39.756	40.284	38.929	40.385	38.897	39.596	39.158	39.216	39.664	39.702	–	
45	45.147	44.733	43.090	45.096	42.194	45.208	42.642	44.375	43.936	43.765	43.904	44.546	–	
50	50.968	49.896	48.175	48.878	47.174	49.000	49.917	48.648	48.632	49.105	49.580	49.307	–	
56	57.365	55.957	54.229	54.647	53.102	54.783	55.870	56.948	54.920	54.353	55.660	55.683	–	
63	64.699	63.171	61.557	61.514	60.278	61.667	63.013	63.739	61.654	61.381	63.019	62.510	–	
71	73.789	71.100	67.713	69.826	66.306	70.000	68.162	71.888	69.806	68.908	73.410	70.776	–	
80	78.278	80.190	75.481	76.809	73.912	77.000	76.974	77.762	81.316	78.019	78.024	82.445	–	
90	88.750	91.457	85.046	85.620	83.279	85.833	88.439	87.816	86.427	90.882	85.226	87.627	–	
100	103.114	97.020	97.768	96.471	95.735	96.711	100.079	100.895	99.020	96.594	98.752	96.030	–	
112	118.306	110.000	113.186	110.901	110.833	111.176	115.862	114.174	109.386	110.670	109.401	110.906	–	
125	129.398	127.803	125.238	128.390	122.634	128.710	128.198	132.180	121.182	122.255	128.446	122.865	–	
140	141.920	146.633	139.074	142.060	136.183	142.414	142.362	146.254	142.279	135.439	143.788	144.255	–	
160	164.058	160.380	155.125	157.756	151.9	158.147	158.792	162.413	159.273	159.017	155.848	161.485	–	
180	181.654	175.901	170.993	175.962	167.438	176.400	178.079	181.156	172.632	178.011	174.240	175.029	–	
200	202.184	203.339	189.597	193.962	185.656	194.444	201.040	203.160	193.004	192.941	196.135	195.685	–	
224	226.446	225.149	223.845	215.065	219.192	215.600	226.272	229.355	217.257	215.711	222.640	220.275	–	
250	255.560	250.594	252.385	253.914	247.139	254.545	255.201	258.141	246.617	242.817	244.904	250.042	–	
280	286.925	280.665	282.605	286.288	276.730	287.000	291.058	291.144	271.278	275.630	272.999	275.046	–	
315	320.413	316.751	317.021	320.566	310.431	321.364	308.761	332.052	302.399	303.193	307.595	306.599	–	
355	360.951	355.625	336.946	359.606	329.942	360.500	350.069	352.249	340.720	337.975	335.988	345.452	–	
400	–	397.131	–	382.207	–	383.158	–	399.375	–	380.805	–	378.578	–	
450	–	447.376	–	–	–	–	–	–	–	–	–	–	–	

## Design of the gear units

### Overview tables

#### Type H1, H2, H3, H4 – Actual ratios $i$ gear unit sizes 25 to 28

#### Technical specifications (continued)

#### Actual ratios $i$ for types H1, H2, H3, H4

$i_N$	Gear unit sizes				Type
	25	26	27	28	
1.25	–	–	–	–	H1
1.4	–	–	–	–	
1.6	–	–	–	–	
1.8	–	–	–	–	
2.0	–	–	–	–	
2.24	–	–	–	–	
2.5	–	–	–	–	
2.8	–	–	–	–	
3.15	–	–	–	–	
3.55	–	–	–	–	
4.0	–	–	–	–	
4.5	–	–	–	–	
5.0	–	–	–	–	
5.6	–	–	–	–	
6.3	6.432	–	–	–	
7.1	7.102	7.323	–	–	
8.0	8.292	8.085	8.164	–	
9.0	9.244	9.440	8.949	9.295	
10	10.362	10.524	10.146	10.188	
11.2	11.693	11.797	11.594	11.550	
12.5	12.458	13.312	12.734	13.199	
14	14.244	14.183	14.657	14.497	
16	15.889	16.216	16.651	16.686	
18	17.875	18.089	17.843	18.957	
20	19.218	20.350	19.183	20.314	
22.4	22.623	22.129	23.817	21.799	
25	26.190	25.755	26.382	27.115	
28	28.979	29.817	29.314	30.035	
31.5	32.180	32.991	32.696	33.373	
35.5	35.894	36.636	36.371	37.223	
40	40.254	40.864	40.453	41.407	
45	45.699	45.828	45.245	46.054	
50	51.148	52.026	50.950	51.510	
56	57.688	58.230	57.856	58.005	
63	65.793	65.675	67.113	65.867	
71	69.795	74.903	74.750	76.406	
80	79.132	79.459	84.684	85.100	
90	85.076	90.089	91.045	96.410	
100	103.838	97.967	104.514	103.460	
112	115.375	118.215	115.712	118.985	
125	128.688	131.350	128.569	131.734	
140	144.219	146.506	143.483	146.371	
160	158.107	179.998	160.991	163.350	
180	185.081	179.998	178.197	183.282	
200	207.151	210.707	201.238	202.870	
224	233.634	235.833	225.914	229.102	
250	252.726	265.984	255.785	257.195	
280	285.401	287.719	297.959	291.201	
315	327.908	324.919	316.686	339.214	
355	352.538	373.311	340.473	360.535	
400	–	405.953	–	386.901	
450	–	–	–	–	

### Type B2, B3, B4 – Actual ratios $i$ gear unit sizes 4 to 12

#### Technical specifications (continued)

#### Actual ratios $i$ for types B2, B3, B4

$i_N$	Gear unit sizes										Type
	4	5	6	7	8	9	10	11	12		
5.0	4.936	5.006	–	4.865	–	5.002	–	4.897	–		B2
5.6	5.480	5.488	–	5.333	–	5.483	–	5.534	–		
6.3	6.296	6.386	6.205	6.206	6.135	6.381	6.271	6.296	6.226		
7.1	6.959	7.058	6.802	6.860	6.725	7.053	6.875	7.037	7.036		
8.0	7.549	7.657	7.915	7.880	7.825	8.101	8.000	7.994	8.005		
9.0	8.693	8.817	8.749	8.569	8.649	8.810	8.842	8.693	8.947		
10	9.872	10.108	9.490	9.823	9.935	10.099	10.157	9.965	10.164		
11.2	10.769	10.923	10.928	10.615	10.804	10.914	11.045	10.769	11.052		
12.5	12.034	12.703	12.528	12.433	12.385	12.554	12.662	12.334	12.670		
14	13.484	13.964	13.538	13.515	13.385	14.137	13.683	13.821	13.692		
16	15.601	15.835	15.826	16.275	15.773	15.952	15.693	15.522	15.888		
18	17.482	17.407	17.307	17.692	17.041	17.963	17.724	17.393	17.572		
20	19.614	19.645	19.729	19.948	20.648	20.259	19.940	19.744	19.995		
22.4	21.919	21.954	21.575	22.146	22.308	22.208	22.520	21.643	22.114		
25	25.380	25.421	24.349	25.446	25.152	25.843	25.400	25.185	25.103		
28	27.836	27.881	27.211	28.125	27.923	28.563	27.842	27.836	27.517		
31.5	30.196	30.245	31.508	30.509	32.084	30.985	32.400	31.975	32.021		
35.5	34.771	34.827	34.557	35.131	35.461	35.679	35.811	34.771	35.392		
40	39.487	39.551	37.486	39.896	38.468	40.902	38.846	39.861	40.654	B3	
45	43.077	43.146	43.166	43.523	44.296	44.202	44.732	43.077	44.209		
50	49.060	49.139	49.021	49.568	50.304	50.341	51.280	49.060	50.681		
56	55.152	55.240	53.477	55.723	54.877	56.592	55.417	55.152	54.769		
63	60.808	60.906	60.904	61.438	62.499	62.396	63.114	60.808	62.376		
71	69.293	69.404	68.467	70.011	70.259	71.102	70.951	69.293	70.121		
80	–	77.598	75.489	79.267	77.465	79.497	78.228	80.949	77.313		
90	–	86.720	86.022	88.585	88.274	88.842	89.143	89.869	88.101		
100	–	100.413	96.178	102.572	99.945	102.869	99.667	103.259	102.921		
112	–	110.130	107.484	112.498	111.694	112.824	111.384	114.129	114.262		
125	–	119.466	124.455	122.035	129.330	122.389	128.971	123.804	131.287		
140	–	137.567	136.499	140.525	141.846	140.933	141.452	142.562	145.106		
160	–	156.225	148.071	159.585	153.871	160.047	153.443	161.897	157.408		
180	–	170.427	170.506	174.092	177.184	174.597	176.692	176.615	181.258		
200	–	194.098	193.631	198.272	201.215	198.847	200.656	201.145	205.841		
224	–	218.199	211.234	222.891	219.508	223.537	218.898	226.121	224.554		
250	–	240.578	240.572	245.752	249.995	246.464	249.300	249.313	255.742		
280	–	274.147	270.443	280.042	281.036	280.855	280.256	284.101	287.497		
315	–	302.121	298.181	308.618	309.861	309.513	309.000	313.091	316.984		
355	–	–	339.788	–	353.097	–	352.116	–	361.214		
400	–	–	374.460	–	389.127	–	388.046	–	398.073		

## Design of the gear units

### Overview tables

#### Type B2, B3, B4 – Actual ratios $i$ gear unit sizes 13 to 24

#### Technical specifications (continued)

#### Actual ratios $i$ for types B2, B3, B4

$i_N$	Gear unit sizes												Type	
	13	14	15	16	17	18	19	20	21	22	23	24		
5.0	4.967	–	4.963	–	–	–	–	–	–	–	–	–	–	B2
5.6	5.613	–	5.609	5.630	5.514	–	–	–	–	–	–	–	–	
6.3	6.386	6.156	6.340	6.362	6.234	–	–	–	–	–	–	–	–	
7.1	7.138	6.957	7.132	7.192	7.012	7.239	–	–	–	–	–	–	–	
8.0	8.108	7.915	8.101	8.090	7.965	8.143	–	–	–	–	–	–	–	
9.0	8.817	8.847	8.810	9.190	8.662	9.250	–	–	–	–	–	–	–	
10	10.108	10.049	10.099	9.993	9.930	10.059	–	–	–	–	–	–	–	
11.2	10.923	10.928	10.914	11.456	10.731	11.531	–	–	–	–	–	–	–	
12.5	12.482	12.528	12.172	12.380	12.770	12.462	12.062	–	12.256	–	–	–	–	
14	13.721	13.538	13.810	13.832	13.790	14.654	13.709	13.698	13.902	13.719	–	–	–	
16	16.354	15.552	15.215	15.665	16.226	16.014	15.192	15.640	15.436	15.538	–	–	–	
18	17.978	17.007	17.262	17.290	17.522	18.620	17.267	17.252	17.510	17.279	–	–	–	
20	20.276	20.376	19.379	19.581	19.762	20.348	19.607	19.698	19.883	19.570	20.285	–	–	
22.4	22.226	22.282	21.900	21.982	22.333	22.950	22.158	22.368	22.470	22.222	22.931	22.782	–	
25	25.864	25.131	24.916	24.842	25.409	25.936	25.048	25.278	25.400	25.113	25.794	25.753	–	
28	28.587	27.548	27.847	28.263	28.398	29.507	28.175	28.576	28.571	28.389	29.301	28.968	–	
31.5	32.838	32.057	31.634	31.588	32.259	32.979	32.005	32.143	32.456	31.933	31.863	32.907	–	
35.5	35.709	35.432	34.400	35.883	35.080	37.463	34.804	36.513	35.294	36.275	34.804	35.784	–	
40	40.936	40.700	39.435	39.021	40.215	40.738	39.899	39.706	40.461	39.446	39.899	39.216	–	
45	44.238	44.259	42.617	44.732	43.460	46.702	43.117	45.518	43.725	45.221	43.117	44.956	–	
50	50.383	50.737	48.536	48.341	49.496	50.469	49.106	49.190	49.798	48.869	49.106	48.583	–	
56	56.639	54.831	54.562	55.055	55.641	57.479	55.203	56.022	55.981	55.656	55.203	55.331	–	
63	62.448	62.446	60.158	61.892	61.348	64.616	60.865	62.978	61.722	62.567	60.865	62.201	–	
71	71.161	70.200	68.553	68.239	69.909	71.243	69.358	69.438	70.335	68.984	69.358	68.581	–	
80	82.118	77.400	78.131	77.761	76.506	81.184	79.977	79.127	77.639	78.610	79.208	78.150	–	
90	90.016	88.200	85.645	88.626	83.865	88.846	87.670	91.242	87.739	86.772	90.116	88.957	–	
100	104.750	101.780	99.664	97.150	97.593	97.391	102.020	100.017	99.821	98.061	100.718	101.207	–	
112	115.777	111.569	110.155	113.052	107.865	113.333	112.759	116.389	111.565	111.565	114.412	113.114	–	
125	125.592	129.831	126.535	124.952	123.904	125.263	129.526	128.641	126.733	124.690	124.416	128.494	–	
140	144.621	143.498	137.599	143.532	134.739	143.889	140.851	147.769	137.815	141.643	142.629	139.729	–	
160	165.791	155.663	157.741	156.082	154.462	156.471	161.470	160.690	157.989	154.029	154.135	160.183	–	
180	179.166	179.248	170.467	178.930	166.923	179.375	174.496	184.212	170.735	176.576	175.543	173.106	–	
200	204.050	205.487	194.143	193.365	190.107	193.846	198.732	199.073	194.448	190.821	197.340	197.148	–	
224	229.386	222.065	218.249	220.222	213.712	220.769	223.408	226.722	218.592	217.324	217.580	221.628	–	
250	252.913	252.907	240.634	247.566	235.631	248.182	246.322	254.874	241.012	244.309	247.940	244.359	–	
280	288.204	284.310	274.210	272.957	268.510	273.636	280.692	281.015	274.641	269.366	273.240	278.456	–	
315	317.612	313.470	302.191	311.045	295.909	311.818	309.334	320.226	302.666	306.952	298.462	306.869	–	
355	–	357.210	–	342.784	–	343.636	–	352.902	–	338.273	–	336.295	–	
400	–	393.660	–	–	–	–	–	–	–	–	–	–	–	

### Technical specifications (continued)

#### Actual ratios $i$ for types B2, B3, B4

$i_N$	Gear unit sizes				Type
	25	26	27	28	
5.0	–	–	–	–	B2
5.6	–	–	–	–	
6.3	–	–	–	–	
7.1	–	–	–	–	
8.0	–	–	–	–	
9.0	–	–	–	–	
10	–	–	–	–	
11.2	–	–	–	–	
12.5	–	–	–	–	
14	–	–	–	–	
16	–	–	–	–	
18	–	–	–	–	
20	20.270	–	20.764	–	
22.4	22.914	23.077	23.578	23.639	B3
25	25.775	26.087	26.522	26.843	
28	29.279	29.343	30.128	30.194	
31.5	31.839	33.333	32.762	34.300	
35.5	36.500	36.246	37.558	37.299	
40	39.444	41.554	40.588	42.759	
45	44.923	44.906	46.225	46.208	
50	50.501	51.143	51.965	52.626	
56	55.680	57.493	57.295	59.160	
63	63.450	63.390	65.290	65.228	
71	68.216	72.235	70.194	74.330	
80	82.094	78.551	82.334	79.766	
90	93.399	93.461	93.073	93.734	
100	104.387	106.331	104.692	105.960	
112	118.580	118.841	118.926	119.188	
125	128.949	134.999	129.325	135.393	
140	147.824	146.803	148.256	147.232	
160	159.750	168.292	160.217	168.784	
180	181.938	181.869	182.469	182.401	
200	204.528	207.129	205.126	207.734	
224	225.506	232.848	226.165	233.528	
250	256.972	256.730	257.722	257.480	
280	283.193	292.552	284.021	293.407	
315	304.465	322.405	305.354	323.347	
355	–	350.596	–	346.993	
400	–	–	–	–	
					B4

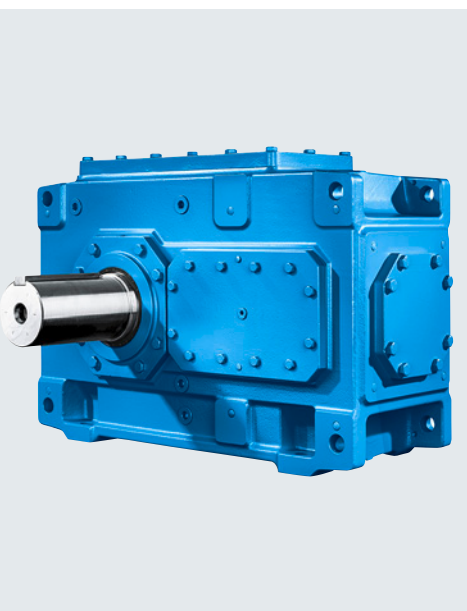
## Design of the gear units

### Notes

3



## Helical gear units Horizontal mounting position



<b>4/2</b>	<b>Type H1</b>
4/2	<u>Gear unit dimensions</u>
4/2	Single-stage, gear unit sizes 3 to 11
4/4	Single-stage, gear unit sizes 13 to 19
<b>4/6</b>	<b>Type H2</b>
4/6	<u>Gear unit dimensions</u>
4/6	Two-stage, gear unit sizes 4 to 8
4/8	Two-stage, gear unit sizes 9 to 12
4/10	Two-stage, gear unit sizes 13 to 18
4/12	Two-stage, gear unit sizes 19 to 24
4/14	Two-stage, gear unit sizes 25 to 28
<b>4/16</b>	<b>Type H3</b>
4/16	<u>Gear unit dimensions</u>
4/16	Three-stage, gear unit sizes 5 to 8
4/18	Three-stage, gear unit sizes 9 to 12
4/20	Three-stage, gear unit sizes 13 to 18
4/22	Three-stage, gear unit sizes 19 to 22
4/24	Three-stage, gear unit sizes 23 to 28
<b>4/26</b>	<b>Type H4</b>
4/26	<u>Gear unit dimensions</u>
4/26	Four-stage, gear unit sizes 7 to 12
4/28	Four-stage, gear unit sizes 13 to 18
4/30	Four-stage, gear unit sizes 19 to 24
4/32	Four-stage, gear unit sizes 25 to 28
<b>4/33</b>	<b>Types H1, H2, H3 and H4</b>
4/33	<u>Article No. overview</u>
4/33	Article No., 10th to 12th position
4/34	Article No., 13th position
4/36	Article No. supplement, 14th position
4/37	Article No. supplement, 15th and 16th position
4/38	Shaft extension on both sides – Gear unit versions G, H and I

# Helical gear units horizontal mounting position

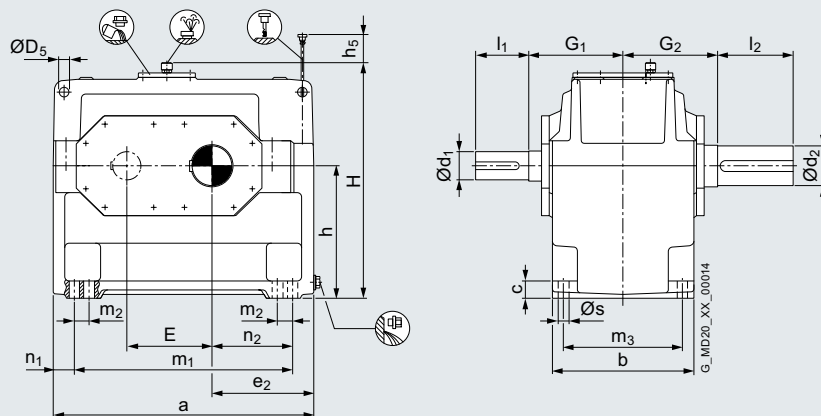
## Type H1

### Gear unit dimensions, single-stage, gear unit sizes 3 to 11

#### Selection and ordering data

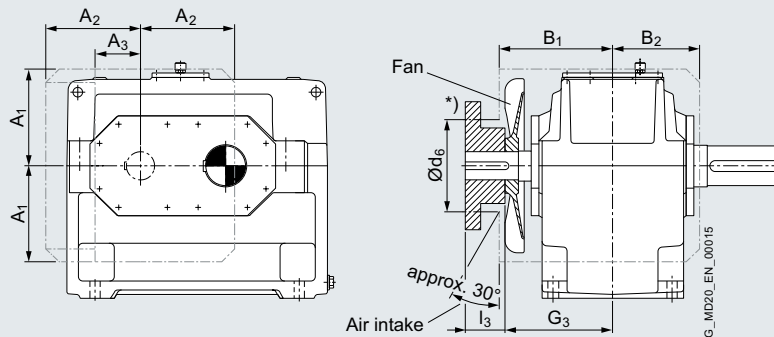
##### H1.H

2LP302-...30-...



##### H1.H with fan

2LP302-...30-...



Remove air guide cover before fitting the foundation bolts.

\*) For combinations of type H1 gear units with fan and coupling N-EUPEX-A on the high speed shaft, the coupling part 2/3 must be mounted on the motor side.

Gear unit size	Dimensions in mm						Fan					
	$i_N$	$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$A_3$	$B_1$	$B_2$	$d_6$
3	1.25 - 2.8	60m6	125	105	170	190	150	145	80	205	130	130
	3.15 - 4	45m6	100	80								
	4.5 - 5.6	32m6	80	60								
5	1.25 - 2.8	85m6	160	130	210	240	225	215	115	255	185	190
	3.15 - 4	60m6	135	105								
	4.5 - 5.6	50m6	110	80								
7	1.25 - 2.8	100m6	200	165	250	285	255	250	120	300	230	245
	3.15 - 4	75m6	140	105								
	4.5 - 5.6	60m6	140	105								
9	1.25 - 2.8	110n6	200	165	280	315	300	265	140	330	265	280
	3.15 - 4	90m6	165	130								
	4.5 - 5.6	75m6	140	105								
11	1.6 - 2.8	130n6	240	205	325	360	360	330	190	375	320	350
	3.15 - 4	110n6	205	170								
	4.5 - 5.6	90m6	170	135								

Gear unit size	Dimensions in mm													
	a	b	c	$D_5$	E	$e_2$	$h^{1)}$	$h_5$	H	$m_1$	$m_3$	$n_1$	$n_2$	s
3	420	200	28	18	130	165	200	85	375	310	160	55	110	19
5	580	285	35	24	185	230	290	100	525	440	240	70	160	24
7	690	375	45	24	225	270	350	75	625	540	315	75	195	28
9	805	425	50	28	265	315	420	50	735	625	350	90	225	35
11	960	515	60	36	320	375	500	40	875	770	440	95	280	35

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

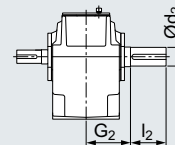
## Helical gear units horizontal mounting position Type H1

### Gear unit dimensions, single-stage, gear unit sizes 3 to 11

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity <sup>1)</sup> H1.H WDR	Oil quantity <sup>1)</sup> H1.H Labyrinth seal	Weight <sup>1)2)</sup> H1.H	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37	
				Article No.: <b>2LP302</b>		■ - ■ ■ .30-....		
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	Solid shaft with parallel key <sup>3)</sup>
<b>H1SH</b>	<b>3</b>	60 m6	125	170	7	5.2	128	<b>0 - 2 A</b>
	<b>5</b>	85 m6	160	210	22	18	302	<b>0 - 4 A</b>
	<b>7</b>	105 n6	200	250	42	34	547	<b>0 - 6 A</b>
	<b>9</b>	125 n6	210	270	68	57	862	<b>0 - 8 A</b>
	<b>11</b>	150 n6	240	320	120	100	1515	<b>1 - 1 A</b>



#### Information on type H1:

H1 housings in the version according to the catalog are generally designed as split housings.

Shaft seals, [see page 10/2 onwards](#).

For details on the shafts, [see Chapter 9](#).

Cooling options, [see page 10/11 onwards](#).

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, [see page 9/7](#).

# Helical gear units horizontal mounting position

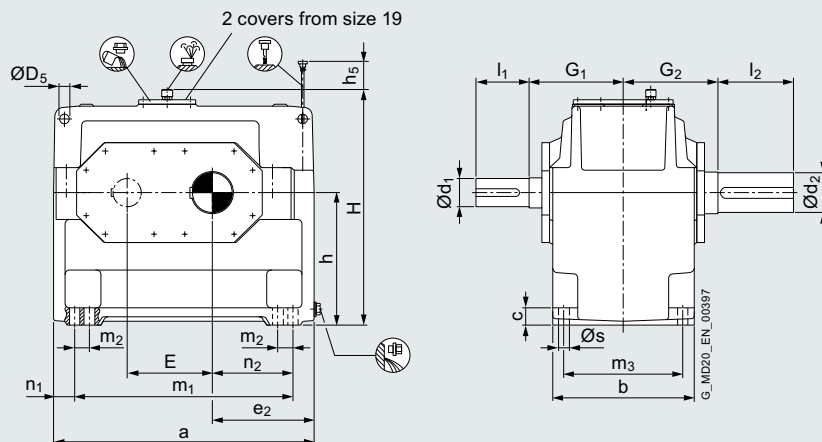
## Type H1

### Gear unit dimensions, single-stage, gear unit sizes 13 to 19

#### Selection and ordering data

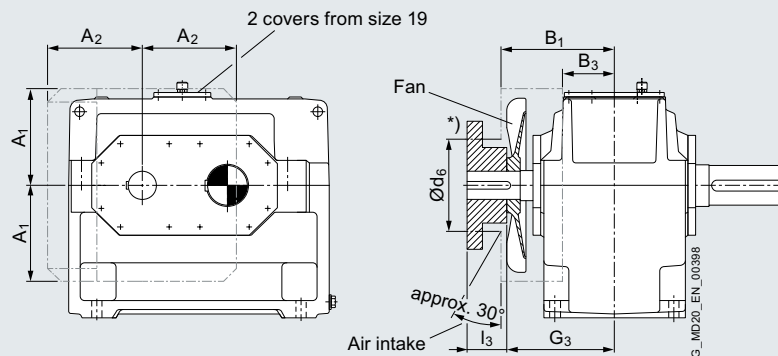
##### H1.H

2LP302-...30-....



##### H1.H with fan

2LP302-...30-....



Remove air guide cover before fitting the foundation bolts.

\*) For combinations of type H1 gear units with fan and coupling N-EUPEX-A on the high speed shaft, the coupling part 2/3 must be mounted on the motor side.

Gear unit size	$i_N$	Dimensions in mm					Fan					
		High speed shaft (HSS)					Fan					
		$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$B_1$	$B_3$	$d_6$	
13	1.6 - 2.8	150n6	245	200	365	410	415	350	430	150	350	
	3.15 - 4	130n6	245	200								
	4.5 - 5.6	100m6	210	165								
15	2 - 2.8	180n6	290	240	360	410	500	430	430	120	450	
	3.15 - 4	150n6	250	200								
	4.5 - 5.6	125n6	250	200								
17	2.8	200n6	330	280	400	450	550	430	470	150	445	
	3.15 - 4	170n6	290	240								
	4.5 - 5.6	140n6	250	200								
19	4	190n6	340	290	440	490	630	475	510	190	445	
	4.5 - 5.6	160n6	300	250								

Gear unit size	Dimensions in mm														
	a	b	c	$D_5$	E	$e_2$	$h^{1)}$	$h_5$	H	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	s
13	1100	580	70	39	370	430	580	40	1020	870	–	490	115	315	42
15	1295	545	80	48	442	505	600	10	1115	1025	–	450	135	370	48
17	1410	615	80	48	490	545	670	–	1235	1170	130	530	120	425	42
19	1590	690	90	55	555	615	760	–	1395	1290	150	590	150	465	48

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

# Helical gear units horizontal mounting position

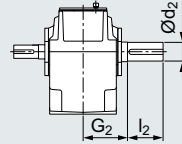
## Type H1

### Gear unit dimensions, single-stage, gear unit sizes 13 to 19

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity <sup>1)</sup> H1.H WDR	Oil quantity <sup>1)</sup> H1.H Labyrinth seal	Weight <sup>1)2)</sup> H1.H	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37	
Article No.:						2LP302	-	.30-....
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	Solid shaft with parallel key <sup>3)</sup>
<b>H1SH</b>	<b>13</b>	180 n6	310	360	175	155	2395	1 - 3 A
	<b>15</b>	220 n6	350	360	190	156	3200	1 - 5 A
	<b>17</b>	240 n6	400	400	270	225	4250	1 - 7 A
	<b>19</b>	270 n6	450	440	390	330	5800	2 - 0 A



#### Information on type H1:

H1 housings in the version according to the catalog are generally designed as split housings.

Shaft seals, [see page 10/2 onwards](#).

For details on the shafts, [see Chapter 9](#).

Cooling options, [see page 10/11 onwards](#).

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, [see page 9/7](#).

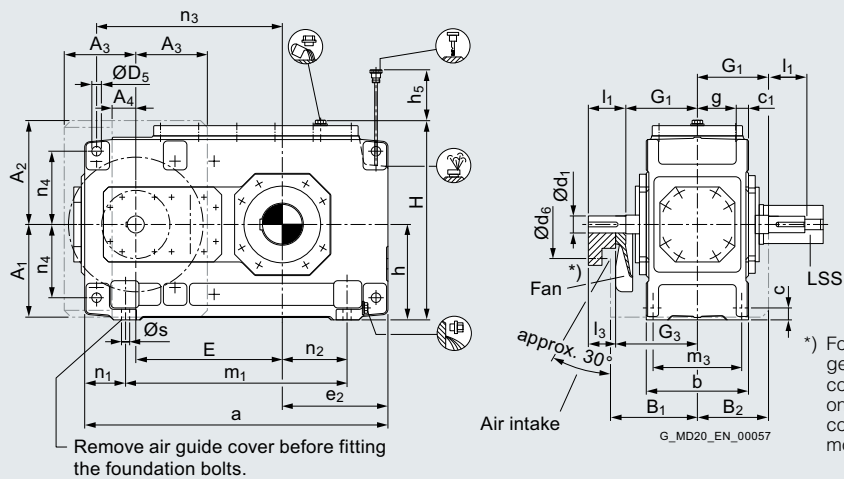
# Helical gear units horizontal mounting position

Type H2

## Gear unit dimensions, two-stage, gear unit sizes 4 to 8

### Selection and ordering data

**H2.H**  
2LP302-...40-...



Gear unit size	Dimensions in mm												
	$i_N$	High speed shaft (HSS)					Fan						
		$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$A_3$	$A_4$	$B_1$	$B_2$	$d_6$
4	6.3-11.2	45 m6	100	80	170	190	195	225	150	30	205	158	136
	12.5-22.4	32 m6	80	60									
5	6.3-11.2	50 m6	100	80	195	215	225	260	175	55	230	178	150
	12.5-22.4	38 m6	80	60									
6	8-14	50 m6	100	80	195	215	225	260	175	55	230	178	150
	16-28	38 m6	80	60									
7	6.3-11.2	60 m6	135	105	210	240	272	305	210	70	255	210	200
	12.5-22.4	50 m6	110	80									
8	8-14	60 m6	135	105	210	240	272	305	210	70	255	210	200
	16-28	50 m6	110	80									

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_5$	$m_1$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
4	565	215	28	30±1	24H9	270	190	77.5	415	200	110	355	180	105	85	345	150	19
5	640	255	28	30±1	24H9	315	205	97.5	482	230	150	430	220	105	100	405	180	19
6	720	255	28	30±1	24H9	350	250	97.5	482	230	150	510	220	105	145	440	180	19
7	785	300	35	36±1	28H9	385	250	114	572	280	190	545	260	120	130	500	215	24
8	890	300	35	36±1	28H9	430	310	114	582	280	190	650	260	120	190	545	215	24

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

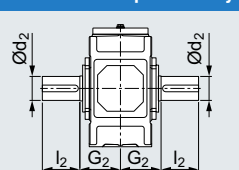
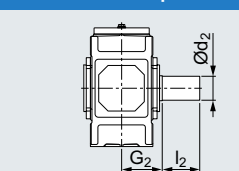
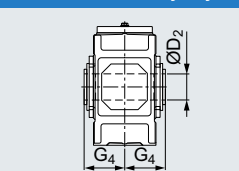
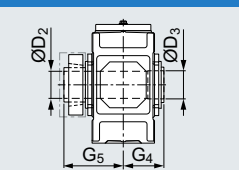
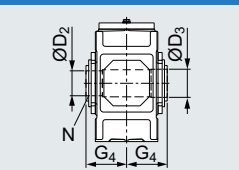
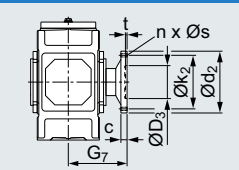
# Helical gear units horizontal mounting position

## Type H2

### Gear unit dimensions, two-stage, gear unit sizes 4 to 8

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity <sup>1)</sup> H2.H WDR	Oil quantity <sup>1)</sup> H2.H Labyrinth	Weight <sup>1) 2)</sup> H2.H	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37	
		Article No.:		2LP302		- - - .40-....		
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	
<b>H2SH</b>	4	80 m6	170	140	10	7	190	0 - 3 A
	5	100 m6	210	165	15	11	300	0 - 4 A
	6	110 n6	210	165	16	12	355	0 - 5 A
	7	120 n6	210	195	27	21	505	0 - 6 A
8	130 n6	250	195	30	23	590	0 - 7 A	
<b>Solid shaft with parallel key<sup>3)</sup></b>								
								
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	
<b>H2CH</b>	4	95 h8	125	140	10	7	190	0 - 3 F
	5	115 h8	125	165	15	11	300	0 - 4 F
	6	115 h8	125	165	16	12	355	0 - 5 F
	7	140 h8	155	195	27	21	505	0 - 6 F
8	140 h8	155	195	30	23	590	0 - 7 F	
<b>Solid shaft without parallel key</b>								
								
Type	Size	D <sub>2</sub>	G <sub>4</sub>	l	l	kg		
<b>H2HH</b>	4	80 H7	140	10	7	190	0 - 3 B	
	5	95 H7	165	15	11	300	0 - 4 B	
	6	105 H7	165	16	12	355	0 - 5 B	
	7	115 H7	195	27	21	505	0 - 6 B	
8	125 H7	195	30	23	590	0 - 7 B		
<b>Hollow shaft with keyway</b>								
								
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	l	kg
<b>H2DH</b>	4	85 H7	85	140	205	10	7	190
	5	100 H7	100	165	240	15	11	300
	6	110 H7	110	165	240	16	12	355
	7	120 H7	120	195	280	27	21	505
8	130 H7	130	195	285	30	23	590	
<b>Hollow shaft for shrink disk</b>								
								
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	l	kg
<b>H2KH</b>	5	N95×3×30×30×9H	89 H11	100	165	15	11	300
	6	N95×3×30×30×9H	89 H11	110	165	16	12	355
	7	N120×3×30×38×9H	114 H11	120	195	27	21	505
	8	N120×3×30×38×9H	114 H11	130	195	30	23	590
<b>Hollow shaft with spline</b>								
								
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n x s	t	G <sub>7</sub>
<b>H2FH</b>	5	25	300	150 H6	260	16×22	10	255
	6	25	320	160 H6	280	18×22	10	255
	7	30	370	180 H6	320	16×26	10	300
	8	30	390	190 H6	340	18×26	10	300
<b>Flanged shaft</b>								
								

Shaft seals, [see page 10/2 onwards](#).

For details on the shafts, [see Chapter 9](#).

Cooling options, [see page 10/11 onwards](#).

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, [see page 9/7](#).

# Helical gear units horizontal mounting position

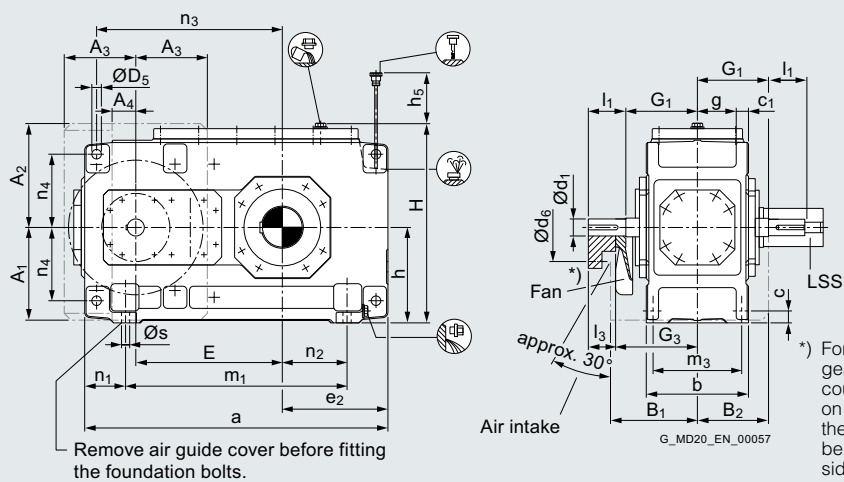
Type H2

## Gear unit dimensions, two-stage, gear unit sizes 9 to 12

### Selection and ordering data

**H2.H**

2LP302-...40-...



\*) For combinations of type H2 gear units with fan and coupling N-EUPEX-A on the high speed shaft, the coupling part 2/3 must be mounted on the motor side.

Gear unit size	Dimensions in mm												
	High speed shaft (HSS)						Fan						
	$i_N$	$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$A_3$	$A_4$	$B_1$	$B_2$	$d_6$
<b>9</b>	6.3-11.2	75 m6	140	110	240	270	312	355	240	100	285	245	200
	12.5-22.4	60 m6	140	110									
<b>10</b>	8-14	75 m6	140	110	240	270	312	355	240	100	285	245	200
	16-28	60 m6	140	110									
<b>11</b>	6.3-11.2	90 m6	165	130	275	310	372	420	285	135	325	285	210
	12.5-22.4	70 m6	140	105									
<b>12</b>	8-14	90 m6	165	130	275	310	372	420	285	135	325	285	210
	16-28	70 m6	140	105									

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_5$	$m_1$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
<b>9</b>	925	370	40	45±1.5	36H9	450	300	140	662	320	205	635	320	145	155	585	245	28
<b>10</b>	1025	370	40	45±1.5	36H9	500	350	140	662	320	215	735	320	145	205	635	245	28
<b>11</b>	1105	430	50	54±1.5	40H9	545	345	161	782	380	250	775	370	165	180	710	300	35
<b>12</b>	1260	430	50	54±1.5	40H9	615	430	161	790	380	250	930	370	165	265	780	300	35

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.



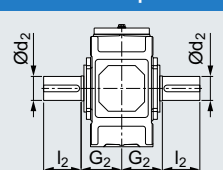
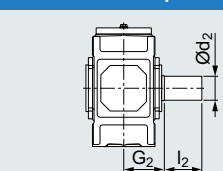
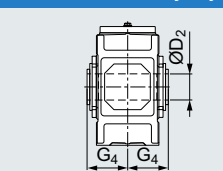
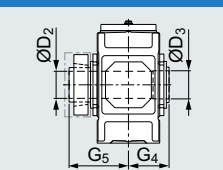
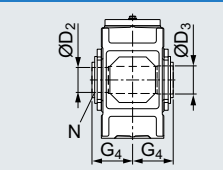
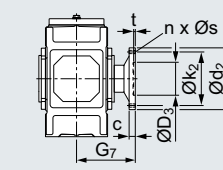
# Helical gear units horizontal mounting position

## Type H2

### Gear unit dimensions, two-stage, gear unit sizes 9 to 12

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> H2.H WDR	Oil quantity <sup>1)</sup> H2.H Labyrinth	Weight <sup>1)2)</sup> H2.H	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37							
		Article No.:			2LP302 ■ - ■ ■ .40-...							
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg					
<b>H2SH</b>	<b>9</b>	140 n6	250	235	42	33	830	0 - 8 A				
	<b>10</b>	160 n6	300	235	45	34	960	1 - 0 A				
	<b>11</b>	170 n6	300	270	71	58	1335	1 - 1 A				
	<b>12</b>	180 n6	300	270	76	60	1615	1 - 2 A				
		<b>Solid shaft with parallel key<sup>3)</sup></b>										
												
<b>H2CH</b>	<b>9</b>	140 h8	155	235	42	33	830	0 - 8 F				
	<b>10</b>	170 h8	155	235	45	34	960	1 - 0 F				
	<b>11</b>	170 h8	155	270	71	58	1335	1 - 1 F				
	<b>12</b>	210 h8	170	270	76	60	1615	1 - 2 F				
		<b>Solid shaft without parallel key</b>										
												
<b>H2HH</b>	<b>9</b>	135 H7		235	42	33	830	0 - 8 B				
	<b>10</b>	150 H7		235	45	34	960	1 - 0 B				
	<b>11</b>	165 H7		270	71	58	1335	1 - 1 B				
	<b>12</b>	180 H7		270	76	60	1615	1 - 2 B				
		<b>Hollow shaft with keyway</b>										
												
<b>H2DH</b>	<b>9</b>	140 H7	145	235	330	42	33	830	0 - 8 C			
	<b>10</b>	150 H7	155	235	350	45	34	960	1 - 0 C			
	<b>11</b>	165 H7	170	270	400	71	58	1335	1 - 1 C			
	<b>12</b>	180 H7	185	270	405	76	60	1615	1 - 2 C			
		<b>Hollow shaft for shrink disk</b>										
												
<b>H2KH</b>	<b>9</b>	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	42	33	830	0 - 8 D			
	<b>10</b>	N140×3×30×45×9H	134 H11	145	235	45	34	960	1 - 0 D			
	<b>11</b>	N170×5×30×32×9H	160 H11	170	270	71	58	1335	1 - 1 D			
	<b>12</b>	N170×5×30×32×9H	160 H11	185	270	76	60	1615	1 - 2 D			
		<b>Hollow shaft with spline</b>										
												
<b>H2FH</b>	<b>9</b>	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n x s	t	G <sub>7</sub>	42	33	915	0 - 8 E
	<b>10</b>	38	430	220 H6	380	20×26	12	350	45	34	1050	1 - 0 E
	<b>11</b>	38	470	240 H6	420	22×26	12	350	71	58	1465	1 - 1 E
	<b>12</b>	42	510	260 H6	450	18×33	12	400	76	60	1755	1 - 2 E
		<b>Flanged shaft</b>										
												

Shaft seals, [see page 10/2 onwards](#).

For details on the shafts, [see Chapter 9](#).

Cooling options, [see page 10/11 onwards](#).

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, [see page 9/7](#).

# Helical gear units horizontal mounting position

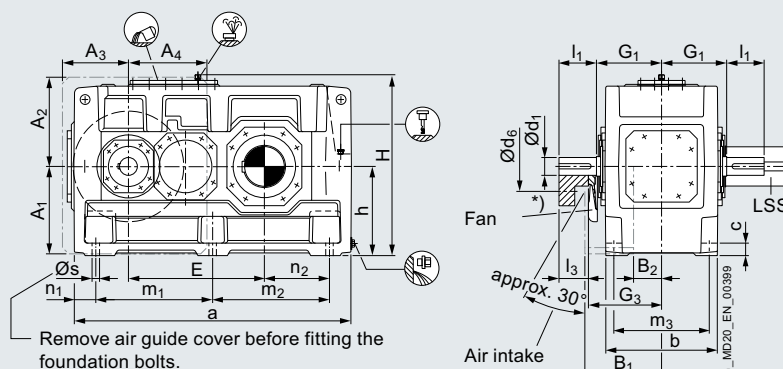
## Type H2

### Gear unit dimensions, two-stage, gear unit sizes 13 to 18

#### Selection and ordering data

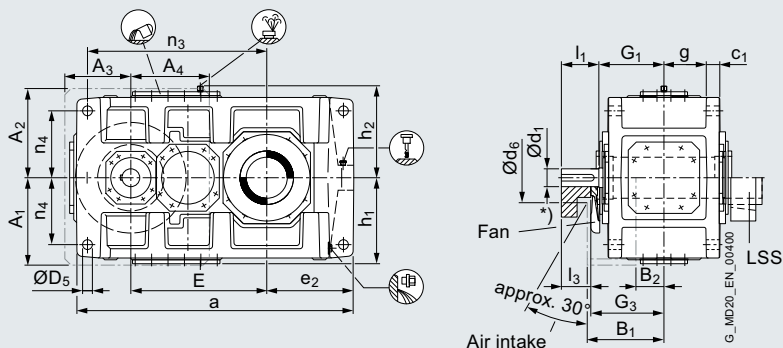
##### H2.H

2LP302-...40-....



##### H2.M

2LP302-...41-....



\*) For combinations of type H2 gear units with fan and coupling N-EUPEX-A on the high speed shaft, the coupling part 2/3 must be mounted on the motor side.

Gear unit size	Dimensions in mm												
	High speed shaft (HSS)						Fan						
$i_N$	$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$A_3$	$A_4$	$B_1$	$B_2$	$d_6$	
13	6.3-11.2	100 m6	205	170	330	365	430	460	330	365	385	135	250
	12.5-20	85 m6	170	135									
14	8-14	100 m6	205	170	330	365	430	460	330	365	385	135	250
	16-25	85 m6	170	135									
15	6.3-11.2	120 n6	210	165	365	410	490	500	370	440	430	155	280
	12.5-20	100 m6	210	165									
16	7.1-12.5	120 n6	210	165	365	410	490	500	370	440	430	155	280
	14-22.5	100 m6	210	165									
17	6.3-11.2	125 n6	245	200	420	465	540	565	435	505	485	140	280
	12.5-20	110 n6	210	165									
18	7.1-12.5	125 n6	245	200	420	465	540	565	435	505	485	140	280
	14-22.5	110 n6	210	165									

Gear unit size	Dimensions in mm																			
	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_1$	$n_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
13	1290	550	60	61±2	48H9	635	405	211.5	900	440	450	460	545	545	475	100	305	835	340	35
14	1430	550	60	61±2	48H9	705	475	211.5	900	440	450	460	545	685	475	100	375	905	340	35
15	1550	625	70	72±2	55 H9	762	485	238	1000	500	490	500	655	655	535	120	365	1005	375	42
16	1640	625	70	72±2	55 H9	808	530	238	1000	500	490	500	655	745	535	120	410	1050	375	42
17	1740	690	80	81±2	55 H9	860	525	259	1110	550	555	560	735	735	600	135	390	1145	425	42
18	1860	690	80	81±2	55 H9	920	585	259	1110	550	555	560	735	855	600	135	450	1205	425	42

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

# Helical gear units horizontal mounting position

## Type H2

### Gear unit dimensions, two-stage, gear unit sizes 13 to 18

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> H2.H WDR	Oil quantity <sup>1)</sup> H2.H Labyrinth	Oil quantity <sup>1)</sup> H2.M	Weight <sup>1) 2)</sup> H2.H	Weight <sup>1) 2)</sup> H2.M	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37								
		Article No.:			2LP302		- - - .4.-...								
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	l	kg	kg						
<b>Solid shaft with parallel key<sup>3)</sup></b>															
H2SH	13	200 n6	350	335	135	120	-	2000	-	1 - 3	A				
	14	210 n6	350	335	140	130	-	2570	-	1 - 4	A				
	15	230 n6	410	380	210	190	-	3430	-	1 - 5	A				
	16	240 n6	410	380	215	200	-	3655	-	1 - 6	A				
	17	250 n6	410	415	290	260	-	4650	-	1 - 7	A				
	18	270 n6	470	415	300	270	-	5125	-	1 - 8	A				
<b>Solid shaft without parallel key</b>															
H2CH/ H2CM <sup>4)</sup>	13	210 h8	170	335	135	120	110	2000	1880	1 - 3	F				
	14	210 h8	170	335	140	130	115	2570	2430	1 - 4	F				
	15	250 h8	190	380	210	190	160	3430	3240	1 - 5	F				
	16	250 h8	190	380	215	200	165	3655	3465	1 - 6	F				
<b>Hollow shaft with keyway</b>															
H2HH/ H2HM <sup>4) 5)</sup>	13	190 H7		335	135	120	110	2000	1880	1 - 3	B				
	14	210 H7		335	140	130	115	2570	2430	1 - 4	B				
	15	230 H7		380	210	190	160	3430	3240	1 - 5	B				
	16	240 H7		380	215	200	165	3655	3465	1 - 6	B				
	17	250 H7		415	290	260	230	4650	4420	1 - 7	B				
	18	275 H7		415	300	270	240	5125	4870	1 - 8	B				
<b>Hollow shaft for shrink disk</b>															
H2DH/ H2DM <sup>4) 5)</sup>	13	190 H7	195	335	135	120	110	2000	1880	1 - 3	C				
	14	210 H7	215	335	140	130	115	2570	2430	1 - 4	C				
	15	230 H7	235	380	210	190	160	3430	3240	1 - 5	C				
	16	240 H7	245	380	215	200	165	3655	3465	1 - 6	C				
	17	250 H7	260	415	290	260	230	4650	4420	1 - 7	C				
	18	280 H7	285	415	300	270	240	5125	4870	1 - 8	C				
<b>Hollow shaft with spline</b>															
H2KH/ H2KM <sup>4) 5)</sup>	13	N 190x5x30x36x9H	180 H11	195	335	135	120	110	2000	1880	1 - 3	D			
	14	N 190x5x30x36x9H	180 H11	215	335	140	130	115	2570	2430	1 - 4	D			
	15	N 220x5x30x42x9H	210 H11	235	380	210	190	160	3430	3240	1 - 5	D			
	16	N 220x5x30x42x9H	210 H11	245	380	215	200	165	3655	3465	1 - 6	D			
	17	N 250x5x30x48x9H	240 H11	260	415	290	260	230	4650	4420	1 - 7	D			
	18	N 250x5x30x48x9H	240 H11	285	415	300	270	240	5125	4870	1 - 8	D			
<b>Flanged shaft</b>															
H2FH/ H2FM <sup>4)</sup>	13	48	580	310 H6	500	20x33	14	480	135	120	110	2160	2040	1 - 3	E
	14	48	620	310 H6	540	24x33	14	480	140	130	115	2740	2600	1 - 4	E
	15	55	710	360 H6	630	28x33	17	550	210	190	160	3670	3480	1 - 5	E
	16	55	740	360 H6	660	30x33	17	550	215	200	165	3910	3720	1 - 6	E
	17	60	750	410 H6	660	24x39	18	600	290	260	230	4950	4720	1 - 7	E
	18	60	800	410 H6	710	26x39	18	600	300	270	240	5475	5220	1 - 8	E

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, see page 9/7.

<sup>4)</sup> Slip-on gear units (H2.M) without labyrinth seal.

<sup>5)</sup> Sizes 13 and 15 only  $i_N = 6.3-18$ , sizes 17 and 19 only  $i_N = 6.3-16$ .

# Helical gear units horizontal mounting position

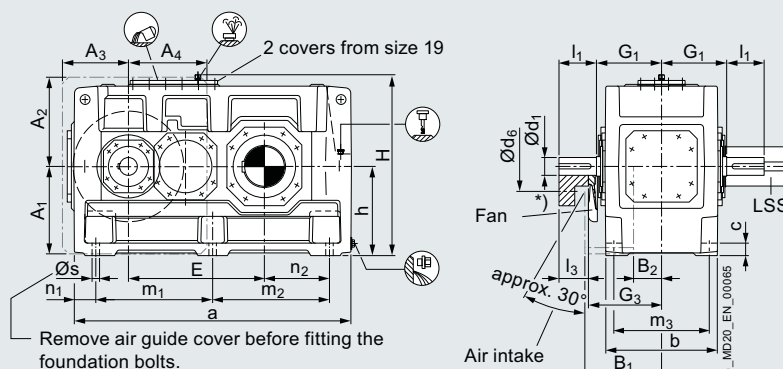
Type H2

## Gear unit dimensions, two-stage, gear unit sizes 19 to 24

### Selection and ordering data

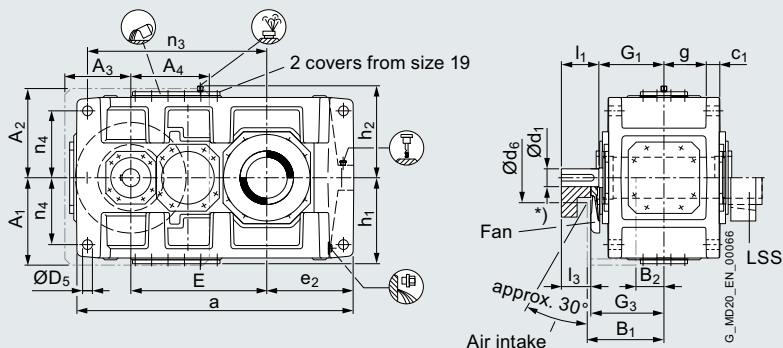
#### H2.H

2LP302-...40-....



#### H2.M

2LP302-...41-....



\*) For combinations of type H2 gear units with fan and coupling N-EUPEX-A on the high speed shaft, the coupling part 2/3 must be mounted on the motor side.

Gear unit size	Dimensions in mm						Fan						
	$i_N$	High speed shaft (HSS)				Fan							
		$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$A_3$	$A_4$	$B_1$	$B_2$	$d_6$
19	6.3-11.2	150 n6	245	200	475	520	600	600	500	450	540	190	310
	12.5-20	120 n6	210	165									
20	7.1-12.5	150 n6	245	200	475	520	600	600	500	450	540	190	310
	14-22.5	120 n6	210	165									
21	6.3-11.2	170 n6	290	240	495	545	680	680	500	610	565	200	450
	12.5-20	140 n6	250	200									
22	7.1-12.5	170 n6	290	240	495	545	680	680	500	610	565	200	450
	14-22.5	140 n6	250	200									
23	6.3-10	190 n6	330	On request	560	On request	On request	On request	On request	On request	On request	On request	On request
	11.2-20	150 n6	250										
24	7.1-11.2	190 n6	330	On request	560	On request	On request	On request	On request	On request	On request	On request	On request
	12.5-22.4	150 n6	250										

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_1$	$h_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
19	2010	790	90	91±2	65H9	997	590	299	1240	620	615	620	850	850	690	155	435	1345	475	48
20	2130	790	90	91±2	65H9	1057	650	299	1240	620	615	620	850	970	690	155	495	1405	475	48
21	2140	830	100	100±2	75H9	1067	655	310	1390	700	685	690	900	900	720	170	485	1400	520	56
22	2250	830	100	100±2	75H9	1122	710	310	1390	700	685	690	900	1010	720	170	540	1455	520	56
23	2380	930	115	120±2	80H9	1185	730	342	1565	780	765	785	1010	1010	810	180	550	1560	580	56
24	2510	930	115	120±2	80H9	1250	795	342	1565	780	765	785	1010	1140	810	180	615	1625	580	56

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

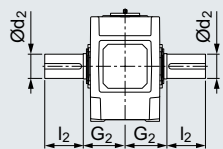
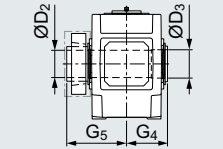
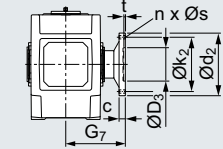
# Helical gear units horizontal mounting position

## Type H2

### Gear unit dimensions, two-stage, gear unit sizes 19 to 24

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity 1)	Oil quantity 1)	Weight 1) 2)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37								
		H2.H WDR	H2.M	H2.H	H2.M									
		Article No.:		2LP302		4-....								
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg	kg							
H2SH	19	290 n6	470	465	320	-	6600		2 - 0 A					
	20	300 n6	500	465	340	-	7500		2 - 1 A					
	21	320 n6	500	490	320	-	8900		2 - 2 A					
	22	340 n6	550	490	340	-	9600		2 - 3 A					
	23	360 n6	590	540	430	-	11600		2 - 4 A					
24	380 n6	590	540	450	-	13000	2 - 5 A							
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg	kg					
H2DH/ H2DM 3)4)	19	285 H7	295	465	670	320	300	6600	6300		2 - 0 C			
	20	310 H7	315	465	670	340	320	7500	7200		2 - 1 C			
	21	330 H7	335	490	715	320	350	8900	8400		2 - 2 C			
	22	340 H7	345	490	725	340	370	9600	9200		2 - 3 C			
	23	370 H7	375	540	800	430	470	11600	11000		2 - 4 C			
24	390 H7	395	540	825	450	500	13000	12300	2 - 5 C					
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg	kg					
H2KH/ H2KM 3)4)	19	On request									2 - 0 D			
	20	On request									2 - 1 D			
	21	On request									2 - 2 D			
	22	On request									2 - 3 D			
	23	On request									2 - 4 D			
24	On request								2 - 5 D					
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	$l$	kg	kg		
H2FH/ H2FM 3)	19	65	860	460 H6	770	30x39	18	670	320	300	On request			2 - 0 E
	20	65	930	460 H6	830	32x39	18	670	340	320	On request			2 - 1 E
	21	75	950	520 H6	850	28x45	20	710	320	350	On request			2 - 2 E
	22	75	1040	520 H6	940	28x45	20	710	340	370	On request			2 - 3 E

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

3) Slip-on gear units (H2.M) without labyrinth seal.

4) Sizes 13 and 15 only  $i_N = 6.3-18$ , sizes 17 and 19 only  $i_N = 6.3-16$ .

# Helical gear units horizontal mounting position

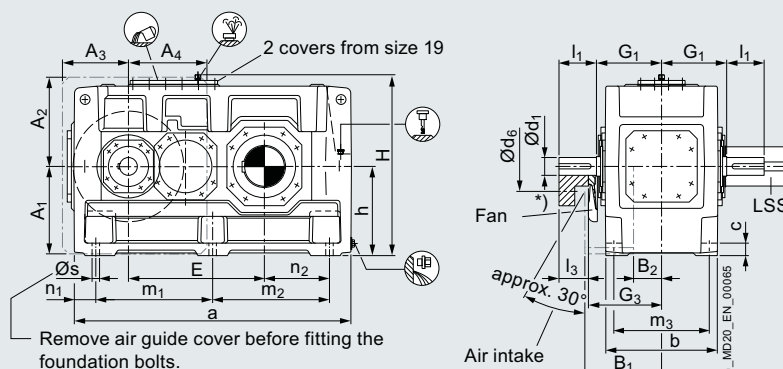
Type H2

## Gear unit dimensions, two-stage, gear unit sizes 25 to 28

### Selection and ordering data

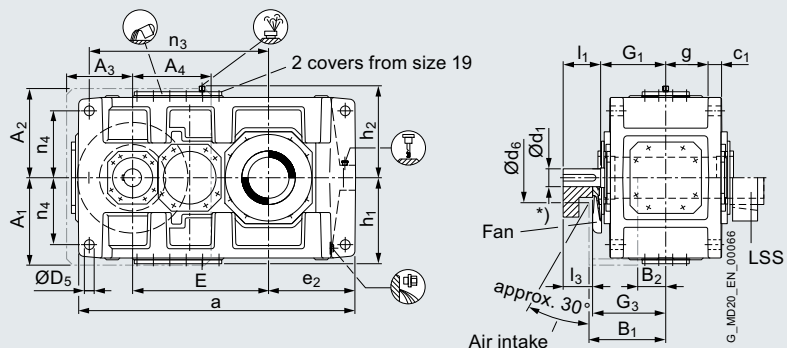
#### H2.H

2LP302-...40-....



#### H2.M

2LP302-...41-....



\*) For combinations of type H2 gear units with fan and coupling N-EUPEX-A on the high speed shaft, the coupling part 2/3 must be mounted on the motor side.

Gear unit size	Dimensions in mm						Fan							
	$i_N$	High speed shaft (HSS)				Fan								
		$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$A_3$	$A_4$	$B_1$	$B_2$	$B_3$	$d_6$
25	6.3-10	200 n6	340	On request	600	On request	On request	On request	On request	On request	On request	On request	On request	On request
	11.2-20	170 n6	300	On request	600	On request	On request	On request	On request	On request	On request	On request	On request	On request
26	7.1-11.2	200 n6	340	On request	600	On request	On request	On request	On request	On request	On request	On request	On request	On request
	12.5-22.4	170 n6	300	On request	600	On request	On request	On request	On request	On request	On request	On request	On request	On request
27	8.0-10	240 n6	380	On request	670	On request	On request	On request	On request	On request	On request	On request	On request	On request
	11.2-20	200 n6	340	On request	670	On request	On request	On request	On request	On request	On request	On request	On request	On request
28	9.0-11.2	240 n6	380	On request	670	On request	On request	On request	On request	On request	On request	On request	On request	On request
	12.5-22.4	200 n6	340	On request	670	On request	On request	On request	On request	On request	On request	On request	On request	On request

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_1$	$h_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
25	2645	1045	130	120±2	90H9	1325	790	400	1740	860	860	880	1155	1090	910	200	590	1750	660	66
26	2825	1045	130	120±2	90H9	1415	880	400	1740	860	860	880	1155	1270	910	200	680	1840	660	66
27	2960	1170	150	145±2	100H9	1485	880	440	1900	950	930	950	1130	1390	1030	220	660	2000	720	74
28	3150	1170	150	145±2	100H9	1580	975	440	1900	950	930	950	1130	1580	1030	220	755	2095	720	74

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

# Helical gear units horizontal mounting position Type H2

## Gear unit dimensions, two-stage, gear unit sizes 25 to 28

### Selection and ordering data (continued)

#### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> H2.H WDR	Oil quantity <sup>1)</sup> H2.M	Weight <sup>1) 2)</sup> H2.H	Weight <sup>1) 2)</sup> H2.M	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37		
		Article No.:		<b>2LP302</b>		■ - ■ ■ ■ .4.-....		
<b>Type</b>	<b>Size</b>	<b>d<sub>2</sub></b>	<b>l<sub>2</sub></b>	<b>G<sub>2</sub></b>	<b>l</b>	<b>kg</b>	<b>kg</b>	
<b>H2SH</b>	<b>25</b>	400 n6	650	605	640	-	15600	
	<b>26</b>	420 n6	650	605	680	-	17500	
	<b>27</b>	440 n6	690	680	880	-	22000	
	<b>28</b>	460 n6	750	680	940	-	25000	
<b>Type</b>	<b>Size</b>	<b>D<sub>2</sub></b>	<b>D<sub>3</sub></b>	<b>G<sub>4</sub></b>	<b>G<sub>5</sub></b>	<b>kg</b>	<b>kg</b>	
<b>H2DH/ H2DM<sup>3)</sup></b>	<b>25</b>	410 H7	415	610	895	640	700	
	<b>26</b>	430 H7	435	610	925	680	740	
	<b>27</b>	460 H7	465	680	1000	880	970	
	<b>28</b>	470 H7	475	680	1020	940	1030	
<b>Type</b>	<b>Size</b>	<b>N/DIN 5480</b>	<b>D<sub>2</sub></b>	<b>D<sub>3</sub></b>	<b>G<sub>4</sub></b>	<b>kg</b>	<b>kg</b>	
<b>H2KH/ H2KM<sup>3)</sup></b>	<b>25</b>	On request						
	<b>26</b>	On request						
	<b>27</b>	On request						
	<b>28</b>	On request						



Shaft seals, [see page 10/2 onwards](#).

For details on the shafts, [see Chapter 9](#).

Cooling options, [see page 10/11 onwards](#).

- 1) Approximate values; exact data acc. to order-related documentation.
- 2) Without oil filling.
- 3) Slip-on gear units (H2.M) without labyrinth seal.

# Helical gear units horizontal mounting position

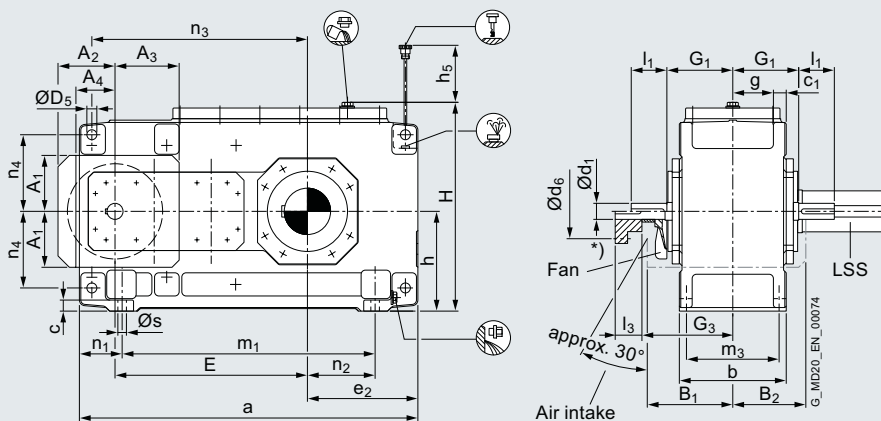
Type H3

Gear unit dimensions, three-stage, gear unit sizes 5 to 8

## Selection and ordering data

**H3.H**

2LP302-...50-...



\*) For combinations of type H3 gear units with fan and coupling N-EUPEX-A on the high speed shaft, the coupling part 2/3 must be mounted on the motor side.

Gear unit size	Dimensions in mm												
	High speed shaft (HSS)					Fan							
	$i_N$	$d_1$	$l_1$	$G_1$	$l_3$	$G_3$	$A_1$	$A_2$	$A_3$	$A_4$	$B_1$	$B_2$	$d_6$
5	25-45	40 m6	70	160	70	220	137	135	140	80	215	175	60
	50-63	30 m6	50		50								
	71-90	24 k6	40		40								
6	31.5-56	40 m6	70	160	70	220	137	135	140	80	215	175	60
	63-80	30 m6	50		50								
	90-112	24 k6	40		40								
7	25-45	45 m6	80	185	80	250	157	160	180	100	245	205	75
	50-63	35 m6	60		60								
	71-90	28 m6	50		50								
8	31.5-56	45 m6	80	185	80	250	157	160	180	100	245	205	75
	63-80	35 m6	60		60								
	90-112	28 m6	50		50								

Gear unit size	Dimensions in mm																	
	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_5$	$m_1$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
5	690	255	28	$30 \pm 1$	24 H9	405	205	97.5	482	230	130	480	220	105	100	455	180	19
6	770	255	28	$30 \pm 1$	24 H9	440	250	97.5	482	230	130	560	220	105	145	490	180	19
7	845	300	35	$36 \pm 1$	28 H9	495	250	114	572	280	170	605	260	120	130	560	215	24
8	950	300	35	$36 \pm 1$	28 H9	540	310	114	582	280	160	710	260	120	190	605	215	24

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.



# Helical gear units horizontal mounting position

## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 5 to 8

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

										Oil quantity <sup>1)</sup> H3.H	Weight <sup>1)2)</sup> H3.H	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37		
										Article No.:	2LP302	■ - ■ ■ ■	.50-....	
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg				Solid shaft with parallel key <sup>3)</sup>				
<b>H3SH</b>	5	100 m6	210	165	16	320	0	-	4 A					
	6	110 n6	210	165	18	365	0	-	5 A					
	7	120 n6	210	195	29	540	0	-	6 A					
	8	130 n6	250	195	32	625	0	-	7 A					
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg				Solid shaft without parallel key				
<b>H3CH</b>	5	115 h8	125	165	16	320	0	-	4 F					
	6	115 h8	125	165	18	365	0	-	5 F					
	7	140 h8	155	195	29	540	0	-	6 F					
	8	140 h8	155	195	32	625	0	-	7 F					
Type	Size	$D_2$	$G_4$		$l$	kg				Hollow shaft with keyway				
<b>H3HH</b>	5	95 H7	165		16	320	0	-	4 B					
	6	105 H7	165		18	365	0	-	5 B					
	7	115 H7	195		29	540	0	-	6 B					
	8	125 H7	195		32	625	0	-	7 B					
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	kg				Hollow shaft for shrink disk			
<b>H3DH</b>	5	100 H7	100	165	240	16	320	0	-	4 C				
	6	110 H7	110	165	240	18	365	0	-	5 C				
	7	120 H7	120	195	280	29	540	0	-	6 C				
	8	130 H7	130	195	285	32	625	0	-	7 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	kg				Hollow shaft with spline			
<b>H3KH</b>	5	N95×3×30×30×9H	89 H11	100	165	16	320	0	-	4 D				
	6	N95×3×30×30×9H	89 H11	110	165	18	365	0	-	5 D				
	7	N120×3×30×38×9H	114 H11	120	195	29	540	0	-	6 D				
	8	N120×3×30×38×9H	114 H11	130	195	32	625	0	-	7 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	n x s	t	$G_7$	$l$	kg			Flanged shaft	
<b>H3FH</b>	5	25	300	150 H6	260	16 x 22	10	255	16	355	0	-	4 E	
	6	25	320	160 H6	280	18 x 22	10	255	18	405	0	-	5 E	
	7	30	370	180 H6	320	16 x 26	10	300	29	590	0	-	6 E	
	8	30	390	190 H6	340	18 x 26	10	300	32	675	0	-	7 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, see page 9/7.

# Helical gear units horizontal mounting position

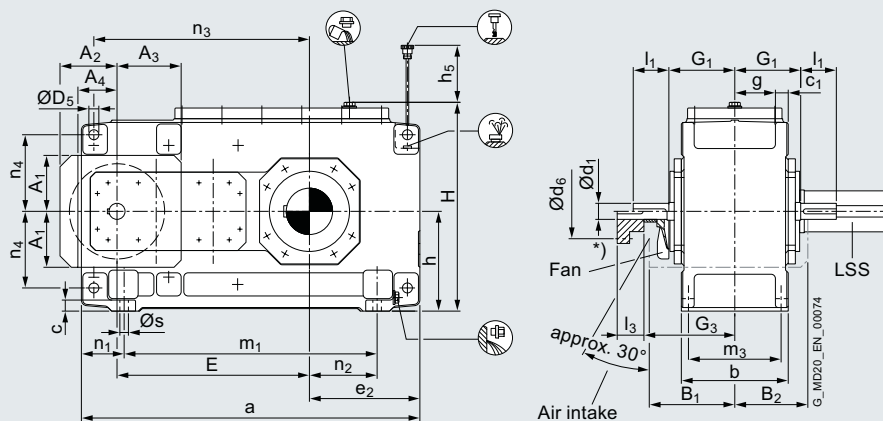
Type H3

Gear unit dimensions, three-stage, gear unit sizes 9 to 12

## Selection and ordering data

**H3.H**

2LP302-...50-....



\*) For combinations of type H3 gear units with fan and coupling N-EUPEX-A on the high speed shaft, the coupling part 2/3 must be mounted on the motor side.

Gear unit size	Dimensions in mm															
	High speed shaft (HSS)								Fan with radial shaft seal							
	Radial shaft seal				Taconite seal				(Dimensions with Taconite seal on request!)							
	$i_N$	$d_1$	$l_1$	$G_1$	$l_3$	$d_1$	$l_1$	$G_1$	$G_3$	$A_1$	$A_2$	$A_3$	$A_4$	$B_1$	$B_2$	$d_6$
<b>9</b>	25-45	60 m6	125	230	105	60 m6	105	250	300	182	190	205	120	295	240	90
	50-63	45 m6	100		80	45 m6	80									
	71-90	32 m6	80		60	32 m6	60									
<b>10</b>	31.5-56	60 m6	125	230	105	60 m6	105	250	300	182	190	205	120	295	240	90
	63-80	45 m6	100		80	45 m6	80									
	90-112	32 m6	80		60	32 m6	60									
<b>11</b>	25-45	70 m6	120	255	120	70 m6	100	275	330	218	220	255	150	325	280	100
	50-63	50 m6	80		80	50 m6	80	255								
	71-90	42 m6	70		70	42 m6	70									
<b>12</b>	31.5-56	70 m6	120	255	120	70 m6	100	275	330	218	220	255	150	325	280	100
	63-80	50 m6	80		80	50 m6	80	255								
	90-112	42 m6	70		70	42 m6	70									

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_5$	$m_1$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
<b>9</b>	1000	370	40	45 ± 1.5	36 H9	580	300	140	662	320	185	710	320	145	155	660	245	28
<b>10</b>	1100	370	40	45 ± 1.5	36 H9	630	350	140	662	320	185	810	320	145	205	710	245	28
<b>11</b>	1200	430	50	54 ± 1.5	40 H9	705	345	161	782	380	180	870	370	165	180	805	300	35
<b>12</b>	1355	430	50	54 ± 1.5	40 H9	775	430	161	790	380	170	1025	370	165	265	875	300	35

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

# Helical gear units horizontal mounting position

## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 9 to 12

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

				Oil quantity <sup>1)</sup> H3.H	Weight <sup>1) 2)</sup> H3.H	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37						
				Article No.: <b>2LP302</b>		■ - ■ ■ .50-....						
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	kg		Solid shaft with parallel key <sup>3)</sup>				
<b>H3SH</b>	<b>9</b>	140 n6	250	235	48	875	0 - 8 A					
	<b>10</b>	160 n6	300	235	49	1020	1 - 0 A					
	<b>11</b>	170 n6	300	270	85	1400	1 - 1 A					
	<b>12</b>	180 n6	300	270	90	1675	1 - 2 A					
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	kg		Solid shaft without parallel key				
<b>H3CH</b>	<b>9</b>	140 h8	155	235	48	875	0 - 8 F					
	<b>10</b>	170 h8	155	235	49	1020	1 - 0 F					
	<b>11</b>	170 h8	155	270	85	1400	1 - 1 F					
	<b>12</b>	210 h8	170	270	90	1675	1 - 2 F					
Type	Size	D <sub>2</sub>	G <sub>4</sub>		l	kg		Hollow shaft with keyway				
<b>H3HH</b>	<b>9</b>	135 H7	235		48	875	0 - 8 B					
	<b>10</b>	150 H7	235		49	1020	1 - 0 B					
	<b>11</b>	165 H7	270		85	1400	1 - 1 B					
	<b>12</b>	180 H7	270		90	1675	1 - 2 B					
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	kg	Hollow shaft for shrink disk				
<b>H3DH</b>	<b>9</b>	140 H7	145	235	330	48	875	0 - 8 C				
	<b>10</b>	150 H7	155	235	350	49	1020	1 - 0 C				
	<b>11</b>	165 H7	170	270	400	85	1400	1 - 1 C				
	<b>12</b>	180 H7	185	270	405	90	1675	1 - 2 C				
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	kg	Hollow shaft with spline				
<b>H3KH</b>	<b>9</b>	N 140x3x30x45x9H	134 H11	145	235	48	875	0 - 8 D				
	<b>10</b>	N 140x3x30x45x9H	134 H11	155	235	49	1020	1 - 0 D				
	<b>11</b>	N 170x5x30x32x9H	160 H11	170	270	85	1400	1 - 1 D				
	<b>12</b>	N 170x5x30x32x9H	160 H11	185	270	90	1675	1 - 2 D				
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n x s	t	G <sub>7</sub>	l	kg		Flanged shaft
<b>H3FH</b>	<b>9</b>	38	430	220 H6	380	20x26	12	350	48	960	0 - 8 E	
	<b>10</b>	38	470	240 H6	420	22x26	12	350	49	1110	1 - 0 E	
	<b>11</b>	42	510	260 H6	450	18 x33	12	400	85	1530	1 - 1 E	
	<b>12</b>	42	540	280 H6	480	22x33	12	400	90	1815	1 - 2 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, see page 9/7.

# Helical gear units horizontal mounting position

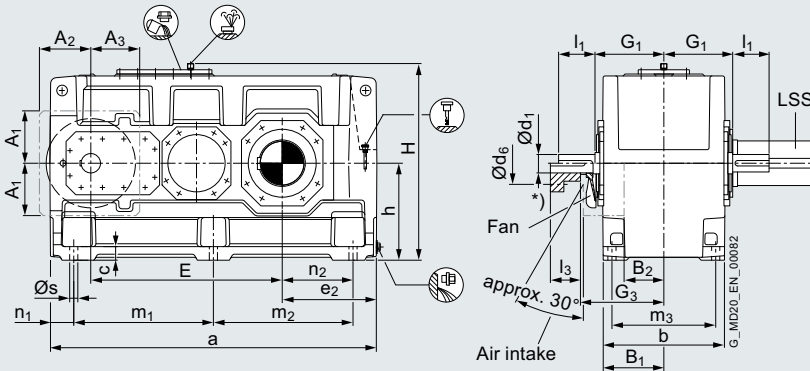
## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 13 to 18

#### Selection and ordering data

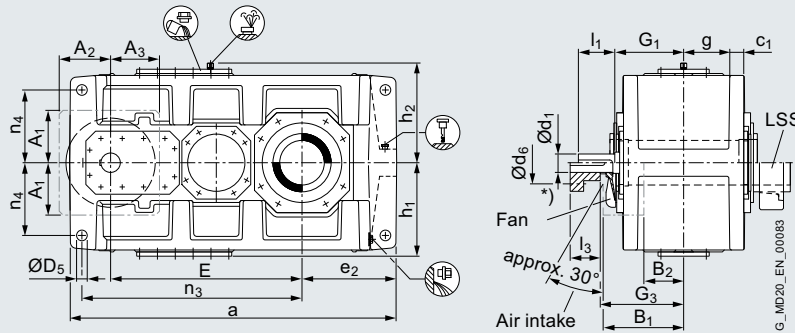
##### H3.H

2LP302-...50-....



##### H3.M

2LP302-...51-....



\*) For combinations of type H3 gear units with fan and coupling N-EUPEX-A on the high speed shaft, the coupling part 2/3 must be mounted on the motor side.

Gear unit size	Dimensions in mm														
	High speed shaft (HSS)				Taconite seal					Fan with radial shaft seal (Dimensions with Taconite seal on request!)					
	$i_N$	$d_1$	$l_1$	$G_1$	$l_3$	$d_1$	$l_1$	$G_1$	$G_3$	$A_1$	$A_2$	$A_3$	$B_1$	$B_2$	$d_6$
13	22.4-45	85 m6	160	310	130	85 m6	130	340	385	225	225	212	380	195	120
	50-63	60 m6	135		105	60 m6	105								
	71-90	50 m6	110		80	50 m6	80								
14	28-56	85 m6	160	310	130	85 m6	130	340	385	225	225	212	380	195	120
	63-80	60 m6	135		105	60 m6	105								
	90-112	50 m6	110		80	50 m6	80								
15	22.4-45	100 m6	200	350	165	100 m6	165	385	420	270	265	252	415	205	150
	50-63	75 m6	140		105	75 m6	105								
	71-90	60 m6	140		105	60 m6	105								
16	25-50	100 m6	200	350	165	100 m6	165	385	420	270	265	252	415	205	150
	56-71	75 m6	140		105	75 m6	105								
	80-100	60 m6	140		105	60 m6	105								
17	22.4-45	100 m6	200	380	165	100 m6	165	415	450	270	265	252	455	235	150
	50-63	75 m6	140		105	75 m6	105								
	71-90	60 m6	140		105	60 m6	105								
18	25-50	100 m6	200	380	165	100 m6	165	415	450	270	265	252	455	235	150
	56-71	75 m6	140		105	75 m6	105								
	80-100	60 m6	140		105	60 m6	105								

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_1$	$h_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
13	1395	550	60	$61 \pm 2$	48 H9	820	405	211.5	900	440	450	460	597.5	597.5	475	100	305	940	340	35
14	1535	550	60	$61 \pm 2$	48 H9	890	475	211.5	900	440	450	460	597.5	737.5	475	100	375	1010	340	35
15	1680	625	70	$72 \pm 2$	55 H9	987	485	238	1000	500	490	500	720	720	535	120	365	1135	375	42
16	1770	625	70	$72 \pm 2$	55 H9	1033	530	238	1000	500	490	500	720	810	535	120	410	1180	375	42
17	1770	690	80	$81 \pm 2$	55 H9	1035	525	259	1110	550	555	560	750	750	600	135	390	1175	425	42
18	1890	690	80	$81 \pm 2$	55 H9	1095	585	259	1110	550	555	560	750	870	600	135	450	1235	425	42

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

<sup>1)</sup> Permissible tolerance: -1 mm.

# Helical gear units horizontal mounting position

## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 13 to 18

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> H3.H	Oil quantity <sup>1)</sup> H3.M	Weight <sup>1) 2)</sup> H3.H	Weight <sup>1) 2)</sup> H3.M	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37							
		Article No.:		2LP302		- .5-....							
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	kg					
<b>Solid shaft with parallel key<sup>3)</sup></b>													
H3SH	13	200 n6	350	335	160	-	2295	-	1 - 3 A				
	14	210 n6	350	335	165	-	2625	-	1 - 4 A				
	15	230 n6	410	380	235	-	3475	-	1 - 5 A				
	16	240 n6	410	380	245	-	3875	-	1 - 6 A				
	17	250 n6	410	415	305	-	4560	-	1 - 7 A				
	18	270 n6	470	415	315	-	5030	-	1 - 8 A				
<b>Solid shaft without parallel key</b>													
H3CH/ H3CM	13	210 h8	170	335	160	125	2295	2155	1 - 3 F				
	14	210 h8	170	335	165	130	2625	2490	1 - 4 F				
	15	250 h8	190	380	235	190	3475	3260	1 - 5 F				
	16	250 h8	190	380	245	195	3875	3625	1 - 6 F				
<b>Hollow shaft with keyway</b>													
H3HH/ H3HM	13	190 H7		335	160	125	2295	2155	1 - 3 B				
	14	210 H7		335	165	130	2625	2490	1 - 4 B				
	15	230 H7		380	235	190	3475	3260	1 - 5 B				
	16	240 H7		380	245	195	3875	3625	1 - 6 B				
	17	250 H7		415	305	240	4560	4250	1 - 7 B				
	18	275 H7		415	315	250	5030	4740	1 - 8 B				
<b>Hollow shaft for shrink disk</b>													
H3DH/ H3DM	13	190 H7	195	335	480	160	125	2295	2155	1 - 3 C			
	14	210 H7	215	335	480	165	130	2625	2490	1 - 4 C			
	15	230 H7	235	380	550	235	190	3475	3260	1 - 5 C			
	16	240 H7	245	380	550	245	195	3875	3625	1 - 6 C			
	17	250 H7	260	415	600	305	240	4560	4250	1 - 7 C			
	18	280 H7	285	415	600	315	250	5030	4740	1 - 8 C			
<b>Hollow shaft with spline</b>													
H3KH/ H3KM	13	N 190×5×30×36×9H	180 H11	195	335	160	125	2295	2155	1 - 3 D			
	14	N 190×5×30×36×9H	180 H11	215	335	165	130	2625	2490	1 - 4 D			
	15	N 220×5×30×42×9H	210 H11	235	380	235	190	3475	3260	1 - 5 D			
	16	N 220×5×30×42×9H	210 H11	245	380	245	195	3875	3625	1 - 6 D			
	17	N 250×5×30×48×9H	240 H11	260	415	305	240	4560	4250	1 - 7 D			
	18	N 250×5×30×48×9H	240 H11	285	415	315	250	5030	4740	1 - 8 D			
<b>Flanged shaft</b>													
H3FH/ H3FM	13	48	580	310 H6	500	20×33	14	480	160	125	2455	2305	1 - 3 E
	14	48	620	310 H6	540	24×33	14	480	165	130	2795	2660	1 - 4 E
	15	55	710	360 H6	630	28×33	17	550	235	190	3715	3500	1 - 5 E
	16	55	740	360 H6	660	30×33	17	550	245	195	4130	3880	1 - 6 E
	17	60	750	410 H6	660	24×39	18	600	305	240	4860	4550	1 - 7 E
	18	60	800	410 H6	710	26×39	18	600	315	250	5380	5090	1 - 8 E

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, see page 9/7.



# Helical gear units horizontal mounting position

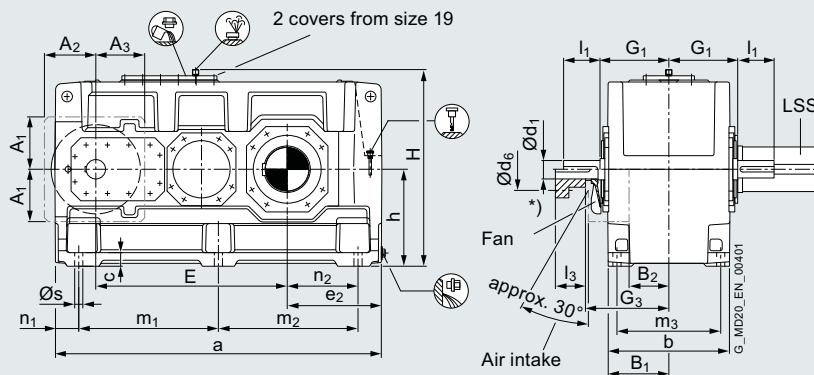
## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 19 to 22

#### Selection and ordering data

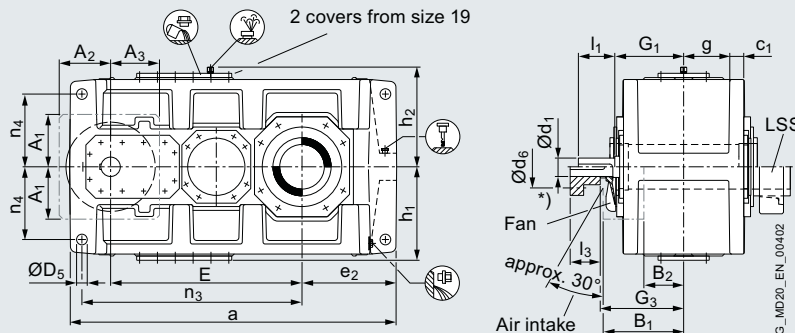
##### H3.H

2LP302-...50-....



##### H3.M

2LP302-...51-....



\*) For combinations of type H3 gear units with fan and coupling N-EUPEX-A on the high speed shaft, the coupling part 2/3 must be mounted on the motor side.

Gear unit size	Dimensions in mm																			
	High speed shaft (HSS)									Fan with radial shaft seal										
	Radial shaft seal					Taconite seal				(Dimensions with Taconite seal on request!)										
$i_N$	$d_1$	$l_1$	$G_1$	$l_3$	$d_1$	$l_1$	$G_1$	$G_3$	$A_1$	$A_2$	$A_3$	$B_1$	$B_2$	$d_6$						
19	22.4-45	110 n6	200	430	165	On request			465	360	360	430	500	155	210					
	50-63	90 m6	165		115				480	360	360	430	500	155	210					
	71-90	75 m6	140		95				475	360	360	430	500	155	210					
20	25-50	110 n6	200	430	165	On request			465	360	360	430	500	155	210					
	56-71	90 m6	165		115				480	360	360	430	500	155	210					
	80-100	75 m6	140		95				475	360	360	430	500	155	210					
21	22.4-45	130 n6	240	470	190	On request			520	400	360	360	550	365	270					
	50-63	110 n6	205		190				520	400	360	360	550	365	250					
	71-90	90 m6	170		135				505	400	360	360	550	365	250					
22	25-50	130 n6	240	470	190	On request			520	400	360	360	550	365	270					
	56-71	110 n6	205		190				520	400	360	360	550	365	250					
	80-100	90 m6	170		135				505	400	360	360	550	365	250					
Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_1$	$h_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
	19	2030	790	90	91 ±2	65 H9	1190	590	299	1240	620	615	620	860	860	690	155	435	1365	475
20	2150	790	90	91 ±2	65 H9	1250	650	299	1240	620	615	620	860	980	690	155	495	1425	475	48
21	2340	830	100	100 ±2	75 H9	1387	655	310	1390	700	685	690	1000	1000	720	170	485	1600	520	56
22	2450	830	100	100 ±2	75 H9	1442	710	310	1390	700	685	690	1000	1110	720	170	540	1655	520	56

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

# Helical gear units horizontal mounting position

## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 19 to 22

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> H3.H	Oil quantity <sup>1)</sup> H3.M	Weight <sup>1)2)</sup> H3.H	Weight <sup>1)2)</sup> H3.M	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37							
		Article No.:		2LP302		■ - ■ ■ .5-....							
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg	kg	Solid shaft with parallel key				
<b>H3SH</b>	<b>19</b>	290 n6	470	465	420	–	6700	–	–	<b>0 A</b>			
	<b>20</b>	300 n6	500	465	450	–	8100	–	–	<b>1 A</b>			
	<b>21</b>	320 n6	500	490	470	–	9100	–	–	<b>2 A</b>			
	<b>22</b>	340 n6	550	490	490	–	9800	–	–	<b>3 A</b>			
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg	kg	Hollow shaft for shrink disk			
<b>H3DH/ H3DM</b>	<b>19</b>	285 H7	295	465	670	420	390	6700	6200	<b>2 - 0 C</b>			
	<b>20</b>	310 H7	315	465	670	450	415	8100	7600	<b>2 - 1 C</b>			
	<b>21</b>	330 H7	335	490	715	470	515	9100	8500	<b>2 - 2 C</b>			
	<b>22</b>	340 H7	345	490	725	490	540	9800	9300	<b>2 - 3 C</b>			
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg	kg	Hollow shaft with spline			
<b>H3KH/ H3KM</b>	<b>19</b>	On request								<b>2 - 0 D</b>			
	<b>20</b>	On request								<b>2 - 1 D</b>			
	<b>21</b>	On request								<b>2 - 2 D</b>			
	<b>22</b>	On request								<b>2 - 3 D</b>			
Type	Size	$c$	$d_2$	$D_3$	$k_2$	$n \times s$	$t$	$G_7$	$l$	$l$	kg	kg	Flanged shaft
<b>H3FH/ H3FM</b>	<b>19</b>	65	860	460 H6	770	30x39	18	670	420	390	On request		<b>2 - 0 E</b>
	<b>20</b>	65	930	460 H6	830	32x39	18	670	450	415	On request		<b>2 - 1 E</b>
	<b>21</b>	75	950	520 H6	850	28x45	20	710	470	515	On request		<b>2 - 2 E</b>
	<b>22</b>	75	1040	520 H6	940	28x45	20	710	490	540	On request		<b>2 - 3 E</b>

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

# Helical gear units horizontal mounting position

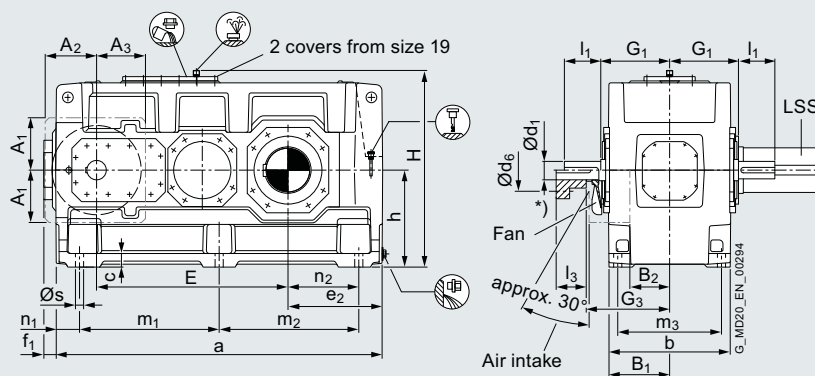
Type H3

Gear unit dimensions, three-stage, gear unit sizes 23 to 28

## Selection and ordering data

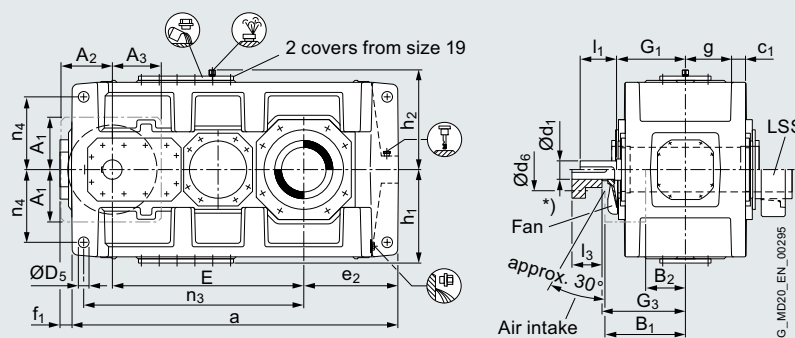
### H3.H

2LP302-...50-....



### H3.M

2LP302-...51-....



\*) For combinations of type H3 gear units with fan and coupling N-EUPEX-A on the high speed shaft, the coupling part 2/3 must be mounted on the motor side.

Gear unit size	Dimensions in mm											
	High speed shaft (HSS)						Fan					
	$l_N$	$d_1$	$l_1$	$G_1$	$l_3$	$G_3$	$A_1$	$A_2$	$A_3$	$B_1$	$B_2$	$d_6$
23	22.4-40	130 n6	255	515	200	570	415	415	415	590	305	350
	45-56	110 n6	220		165							
	63-90	90 m6	185		130							
24	25-45	130 n6	255	515	200	570	415	415	415	590	305	350
	50-63	110 n6	220		165							
	71-100	90 m6	185		130							
25	22.4-40	150 n6	255	580	200	635	440	440	440	655	335	414
	45-56	130 n6	255		200							
	63-90	100 m6	220		165							
26	25-45	150 n6	255	580	200	635	440	440	440	655	335	414
	50-63	130 n6	255		200							
	71-100	100 m6	220		165							
27	22.4-40	180 n6	295	650	240	705	510	510	510	725	380	446
	45-56	150 n6	255		200							
	63-90	125 n6	255		200							
28	25-45	180 n6	295	650	240	705	510	510	510	725	380	446
	50-63	150 n6	255		200							
	71-100	125 n6	255		200							

Gear unit size	Dimensions in mm																				
	a	b	c	$c_1$	$D_5$	E	$e_2$	$f_1$	g	H	$h^{1)}$	$h_1$	$h_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
23	2530	930	115	120 ±2	80 H9	1505	730	35	342	1565	780	765	785	1085	1085	810	180	550	1725	580	56
24	2660	930	115	120 ±2	80 H9	1570	795	35	342	1565	780	765	785	1085	1215	810	180	615	1790	580	56
25	2830	1045	130	120 ±2	90 H9	1695	790	35	400	1740	860	860	880	1215	1215	910	200	590	1965	660	66
26	3010	1045	130	120 ±2	90 H9	1785	880	35	400	1740	860	860	880	1215	1395	910	200	680	2055	660	66
27	3220	1170	150	145 ±2	100 H9	1927	880	40	440	1900	950	930	950	1390	1390	1030	220	660	2260	720	74
28	3410	1170	150	145 ±2	100 H9	2022	975	40	440	1900	950	930	950	1390	1580	1030	220	755	2355	720	74

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.



# Helical gear units horizontal mounting position

## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 23 to 28

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> H3.H	Oil quantity <sup>1)</sup> H3.M	Weight <sup>1)2)</sup> H3.H	Weight <sup>1)2)</sup> H3.M	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37						
		Article No.:		2LP302		■ - ■ ■ .5-....						
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	kg	Solid shaft with parallel key			
<b>H3SH</b>	<b>23</b>	360 n6	590	540	620	-	11800	-	2	-	4 A	
	<b>24</b>	380 n6	590	540	650	-	13200	-	2	-	5 A	
	<b>25</b>	400 n6	650	605	880	-	16100	-	2	-	6 A	
	<b>26</b>	420 n6	650	605	935	-	17700	-	2	-	7 A	
	<b>27</b>	440 n6	690	680	1270	-	22700	-	2	-	8 A	
	<b>28</b>	460 n6	750	680	1345	-	25500	-	3	-	0 A	
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	l	kg	kg	Hollow shaft for shrink disk		
<b>H3DH/ H3DM</b>	<b>23</b>	370 H7	375	540	800	620	690	11800	11200	2	-	4 C
	<b>24</b>	390 H7	395	540	825	650	725	13200	12500	2	-	5 C
	<b>25</b>	410 H7	415	610	895	880	970	16100	15300	2	-	6 C
	<b>26</b>	430 H7	435	610	925	935	1030	17700	16800	2	-	7 C
	<b>27</b>	460 H7	465	680	1000	1270	1410	22700	21700	2	-	8 C
	<b>28</b>	470 H7	475	680	1020	1345	1490	25500	24200	3	-	0 C
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	l	kg	kg	Hollow shaft with spline		
<b>H3KH/ H3KM</b>	<b>23</b>	On request								2	-	4 D
	<b>24</b>	On request								2	-	5 D
	<b>25</b>	On request								2	-	6 D
	<b>26</b>	On request								2	-	7 D
	<b>27</b>	On request								2	-	8 D
	<b>28</b>	On request								3	-	0 D

Shaft seals, [see page 10/2 onwards](#).

For details on the shafts, [see Chapter 9](#).

Cooling options, [see page 10/11 onwards](#).

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

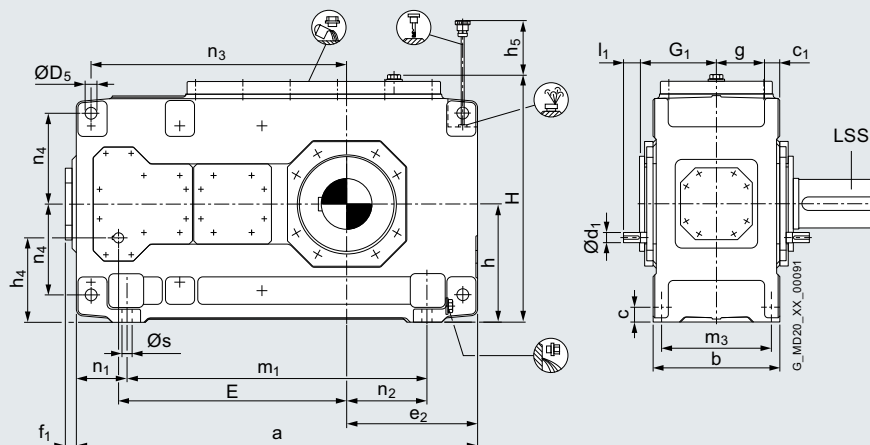
# Helical gear units horizontal mounting position

Type H4

Gear unit dimensions, four-stage, gear unit sizes 7 to 12

## Selection and ordering data

**H4.H**  
2LP302-...60-....



Gear unit size	$i_N$	Dimensions in mm					
		High speed shaft (HSS) with radial shaft seal			High speed shaft (HSS) with Taconite E seal		
		$d_1$	$l_1$	$G_1$	$d_1$	$l_1$	$G_1$
7	100-180	30 m6	50	180	30 m6	50	180
	200-355	24 k6	40	180	24 k6	40	180
8	125-224	30 m6	50	180	30 m6	50	180
	250-450	24 k6	40	180	24 k6	40	180
9	100-180	35 m6	60	215	35 m6	60	215
	200-355	28 m6	50	215	28 m6	50	215
10	125-224	35 m6	60	215	35 m6	60	215
	250-450	28 m6	50	215	28 m6	50	215
11	100-180	45 m6	100	250	45 m6	80	270
	200-355	32 m6	80	250	32 m6	60	270
12	125-224	45 m6	100	250	45 m6	80	270
	250-450	32 m6	80	250	32 m6	60	270

Gear unit size	Dimensions in mm																			
	a	b	c	$c_1$	$D_5$	E	$e_2$	$f_1$	g	H	$h^{1)}$	$h_4$	$h_5$	$m_1$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
7	845	300	35	$36 \pm 1$	28 H9	495	250	37	114	572	280	200	140	605	260	120	130	560	215	24
8	950	300	35	$36 \pm 1$	28 H9	540	310	37	114	582	280	200	140	710	260	120	190	605	215	24
9	1000	370	40	$45 \pm 1.5$	36 H9	580	300	43	140	662	320	230	150	710	320	145	155	660	245	28
10	1100	370	40	$45 \pm 1.5$	36 H9	630	350	43	140	662	320	230	150	810	320	145	205	710	245	28
11	1200	430	50	$54 \pm 1.5$	40 H9	705	345	47	161	782	380	270	165	870	370	165	180	805	300	35
12	1355	430	50	$54 \pm 1.5$	40 H9	775	430	47	161	790	380	270	165	1025	370	165	265	875	300	35

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

# Helical gear units horizontal mounting position

## Type H4

### Gear unit dimensions, four-stage, gear unit sizes 7 to 12

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> H4.H	Weight <sup>1)2)</sup> H4.H	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37									
		Article No.: <b>2LP302</b>		■ - ■ ■ .60-....									
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	kg			Solid shaft with parallel key <sup>3)</sup>				
<b>H4SH</b>	7	120 n6	210	195	25	550	0 - 6 A						
	8	130 n6	250	195	27	645	0 - 7 A						
	9	140 n6	250	235	48	875	0 - 8 A						
	10	160 n6	300	235	50	1010	1 - 0 A						
	11	170 n6	300	270	80	1460	1 - 1 A						
	12	180 n6	300	270	87	1725	1 - 2 A						
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	kg			Solid shaft without parallel key				
<b>H4CH</b>	7	140 h8	155	195	25	550	0 - 6 F						
	8	140 h8	155	195	27	645	0 - 7 F						
	9	140 h8	155	235	48	875	0 - 8 F						
	10	170 h8	155	235	50	1010	1 - 0 F						
	11	170 h8	155	270	80	1460	1 - 1 F						
	12	210 h8	170	270	87	1725	1 - 2 F						
Type	Size	D <sub>2</sub>		G <sub>4</sub>	l	kg			Hollow shaft with keyway				
<b>H4HH</b>	7	115 H7		195	25	550	0 - 6 B						
	8	125 H7		195	27	645	0 - 7 B						
	9	135 H7		235	48	875	0 - 8 B						
	10	150 H7		235	50	1010	1 - 0 B						
	11	165 H7		270	80	1460	1 - 1 B						
	12	180 H7		270	87	1725	1 - 2 B						
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	kg		Hollow shaft for shrink disk				
<b>H4DH</b>	7	120 H7	120	195	280	25	550	0 - 6 C					
	8	130 H7	130	195	285	27	645	0 - 7 C					
	9	140 H7	145	235	330	48	875	0 - 8 C					
	10	150 H7	155	235	350	50	1010	1 - 0 C					
	11	165 H7	170	270	400	80	1460	1 - 1 C					
	12	180 H7	185	270	405	87	1725	1 - 2 C					
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	kg		Hollow shaft with spline				
<b>H4KH</b>	7	N 120x3x30x38x9H	114 H11	120	195	25	550	0 - 6 D					
	8	N 120x3x30x38x9H	114 H11	130	195	27	645	0 - 7 D					
	9	N 140x3x30x45x9H	134 H11	145	235	48	875	0 - 8 D					
	10	N 140x3x30x45x9H	134 H11	155	235	50	1010	1 - 0 D					
	11	N 170x5x30x32x9H	160 H11	170	270	80	1460	1 - 1 D					
	12	N 170x5x30x32x9H	160 H11	185	270	87	1725	1 - 2 D					
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n x s	t	G <sub>7</sub>	l	kg			Flanged shaft
<b>H4FH</b>	7	30	370	180 H6	320	16 x 26	10	300	25	600	0 - 6 E		
	8	30	390	190 H6	340	18 x 26	10	300	27	700	0 - 7 E		
	9	38	430	220 H6	380	20 x 26	12	350	48	960	0 - 8 E		
	10	38	470	240 H6	420	22 x 26	12	350	50	1100	1 - 0 E		
	11	42	510	260 H6	450	18 x 33	12	400	80	1590	1 - 1 E		
	12	42	540	280 H6	480	22 x 33	12	400	87	1865	1 - 2 E		

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, see page 9/7.



# Helical gear units horizontal mounting position

## Type H4

### Gear unit dimensions, four-stage, gear unit sizes 13 to 18

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> H4.H	Oil quantity <sup>1)</sup> H4.M	Weight <sup>1) 2)</sup> H4.H	Weight <sup>1) 2)</sup> H4.M	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37																		
		Article No.:		2LP302		.6-....																		
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	kg																
<b>Solid shaft with parallel key<sup>3)</sup></b>																								
H4SH	13	200 n6	350	335	130	-	2390	-	1	-	3	A												
	14	210 n6	350	335	140	-	2730	-	1	-	4	A												
	15	230 n6	410	380	230	-	3635	-	1	-	5	A												
	16	240 n6	410	380	235	-	3965	-	1	-	6	A												
	17	250 n6	410	415	290	-	4680	-	1	-	7	A												
	18	270 n6	470	415	305	-	5185	-	1	-	8	A												
<b>Solid shaft without parallel key</b>																								
H4CH/ H4CM	13	210 h8	170	335	130	120	2390	2270	1	-	3	F												
	14	210 h8	170	335	140	125	2730	2600	1	-	4	F												
	15	250 h8	190	380	230	170	3635	3440	1	-	5	F												
	16	250 h8	190	380	235	175	3965	3740	1	-	6	F												
<b>Hollow shaft with keyway</b>																								
H4HH/ H4HM	13	190 H7		335	130	120	2390	2270	1	-	3	B												
	14	210 H7		335	140	125	2730	2600	1	-	4	B												
	15	230 H7		380	230	170	3635	3440	1	-	5	B												
	16	240 H7		380	235	175	3965	3740	1	-	6	B												
	17	250 H7		415	290	225	4680	4445	1	-	7	B												
	18	275 H7		415	305	230	5185	4915	1	-	8	B												
<b>Hollow shaft for shrink disk</b>																								
H4DH/ H4DM	13	190 H7	195	335	480	130	120	2390	2270	1	-	3	C											
	14	210 H7	215	335	480	140	125	2730	2600	1	-	4	C											
	15	230 H7	235	380	550	230	170	3635	3440	1	-	5	C											
	16	240 H7	245	380	550	235	175	3965	3740	1	-	6	C											
	17	250 H7	260	415	600	290	225	4680	4445	1	-	7	C											
	18	280 H7	285	415	600	305	230	5185	4915	1	-	8	C											
<b>Hollow shaft with spline</b>																								
H4KH/ H4KM	13	N190x5x30x36x9H	180 H11	195	335	130	120	2390	2270	1	-	3	D											
	14	N190x5x30x36x9H	180 H11	215	335	140	125	2730	2600	1	-	4	D											
	15	N220x5x30x42x9H	210 H11	235	380	230	170	3635	3440	1	-	5	D											
	16	N220x5x30x42x9H	210 H11	245	380	235	175	3965	3740	1	-	6	D											
	17	N250x5x30x48x9H	240 H11	260	415	290	225	4680	4445	1	-	7	D											
	18	N250x5x30x48x9H	240 H11	285	415	305	230	5185	4915	1	-	8	D											
<b>Flanged shaft</b>																								
H4FH/ H4FM	13	48	580	310 H6	500	20x33	14	480	130	120	2550	2430	1	-	3	E								
	14	48	620	310 H6	540	24x33	14	480	140	125	2900	2770	1	-	4	E								
	15	55	710	360 H6	630	28x33	17	550	230	170	3875	3680	1	-	5	E								
	16	55	740	360 H6	660	30x33	17	550	235	175	4220	3995	1	-	6	E								
	17	60	750	410 H6	660	24x39	18	600	290	225	4980	4745	1	-	7	E								
	18	60	800	410 H6	710	26x39	18	600	305	230	5535	5265	1	-	8	E								

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, see page 9/7.

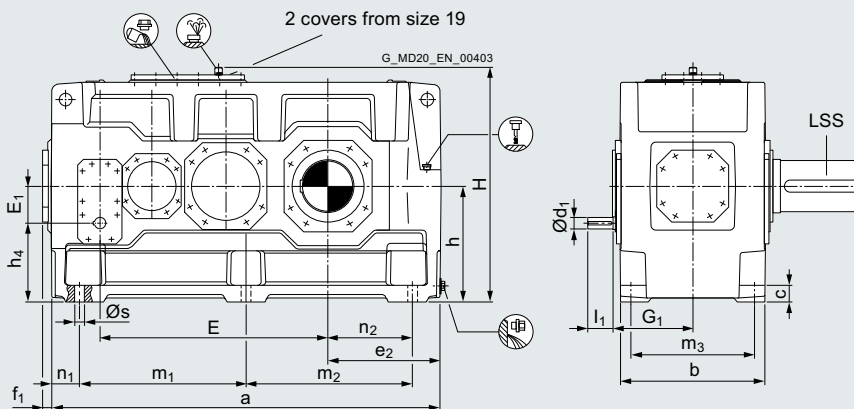
# Helical gear units horizontal mounting position

Type H4

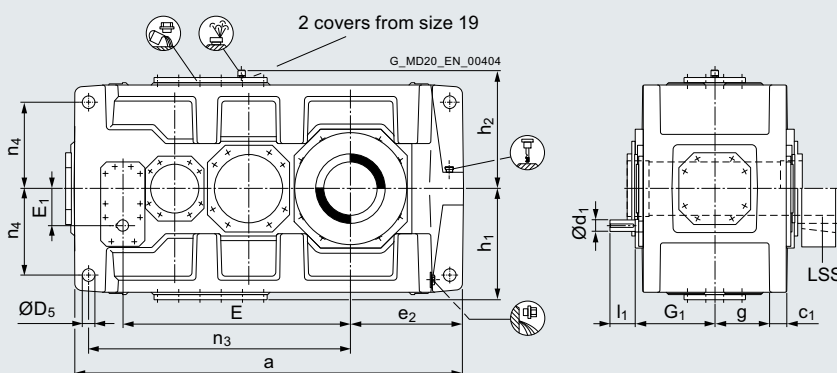
Gear unit dimensions, four-stage, gear unit sizes 19 to 24

## Selection and ordering data

**H4.H**  
2LP302-...60-....



**H4.M**  
2LP302-...61-....



Gear unit size	Dimensions in mm						
	High speed shaft (HSS) with radial shaft seal			High speed shaft (HSS) with Taconite E seal			
	$i_N$	$d_1$	$l_1$	$G_1$	$d_1$	$l_1$	$G_1$
19	100-180	75 m6	105	440	On request	On request	On request
	200-355	60 m6	105	440	On request	On request	On request
20	112-200	75 m6	105	440	On request	On request	On request
	224-400	60 m6	105	440	On request	On request	On request
21	100-180	90 m6	165	460	On request	On request	On request
	200-355	70 m6	140	460	On request	On request	On request
22	112-200	90 m6	165	460	On request	On request	On request
	224-400	70 m6	140	460	On request	On request	On request
23	100-160	90 m6	165	515	90 m6	165	515
	180-355	70 m6	140	515	70 m6	140	515
24	112-180	90 m6	165	515	90 m6	165	515
	200-400	70 m6	140	515	70 m6	140	515

Gear unit size	Dimensions in mm																							
	a	b	c	$c_1$	$D_5$	E	$E_1$	$e_2$	$f_1$	g	H	$h^{1)}$	$n_1$	$n_2$	$n_4$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s	
19	2030	790	90	91 ±2	65 H9	1190	185	590	53	299	1240	620	615	620	435	860	860	690	155	435	1365	475	48	
20	2150	790	90	91 ±2	65 H9	1250	185	650	53	299	1240	620	615	620	435	980	690	155	495	1425	475	48		
21	2340	830	100	100 ±2	75 H9	1387	225	655	62	310	1390	700	685	690	475	1000	1000	720	170	485	1600	520	56	
22	2450	830	100	100 ±2	75 H9	1442	225	710	62	310	1390	700	685	690	475	1000	1110	720	170	540	1655	520	56	
23	2530	930	115	120 ±2	80 H9	1505	225	730	35	342	1565	780	765	785	555	1085	1085	810	180	550	1725	580	56	
24	2660	930	115	120 ±2	80 H9	1570	225	795	35	342	1565	780	765	785	555	1085	1215	810	180	615	1790	580	56	

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

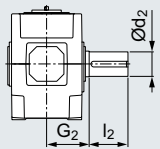
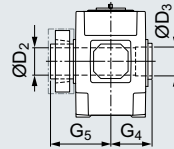
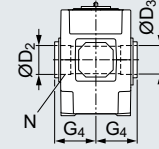
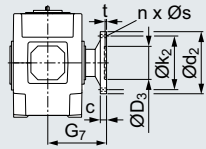
# Helical gear units horizontal mounting position

## Type H4

### Gear unit dimensions, four-stage, gear unit sizes 19 to 24

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> H4.H	Oil quantity <sup>1)</sup> H4.M	Weight <sup>1)2)</sup> H4.H	Weight <sup>1)2)</sup> H4.M	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37								
		Article No.:		2LP302		.6.-....								
<b>Solid shaft with parallel key</b>														
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	kg						
<b>H4SH</b>	19	290 n6	470	465	360		6800		2 - 0 A					
	20	300 n6	500	465	380		8200		2 - 1 A					
	21	320 n6	500	490	395		9200		2 - 2 A					
	22	340 n6	550	490	420		9900		2 - 3 A					
	23	360 n6	590	540	520		12000		2 - 4 A					
	24	380 n6	590	540	550		13500		2 - 5 A					
<b>Hollow shaft for shrink disk</b>														
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	l	kg	kg					
<b>H4DH/ H4DM</b>	19	285 H7	295	465	670	360	310	6800	6300	2 - 0 C				
	20	310 H7	315	465	670	380	330	8200	7700	2 - 1 C				
	21	330 H7	335	490	715	395	430	9200	8600	2 - 2 C				
	22	340 H7	345	490	725	420	450	9900	9400	2 - 3 C				
	23	370 H7	375	540	800	520	565	12000	11400	2 - 4 C				
	24	390 H7	395	540	825	550	600	13500	12800	2 - 5 C				
<b>Hollow shaft with spline</b>														
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	l	kg	kg					
<b>H4KH/ H4KM</b>	19	On request				360	310	6800	6300	2 - 0 D				
	20	On request				380	330	8200	7700	2 - 1 D				
	21	On request				395	430	9200	8600	2 - 2 D				
	22	On request				420	450	9900	9400	2 - 3 D				
	23	On request								2 - 4 D				
	24	On request								2 - 5 D				
<b>Flanged shaft</b>														
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n x s	t	G <sub>7</sub>	l	l	kg	kg		
<b>H4FH/ H4FM</b>	19	65	860	460 H6	770	30x39	18	670	360	310	On request		2 - 0 E	
	20	65	930	460 H6	830	32x39	18	670	380	330	On request		2 - 1 E	
	21	75	950	520 H6	850	28x45	20	710	395	430	On request		2 - 2 E	
	22	75	1040	520 H6	940	28x45	20	710	420	450	On request		2 - 3 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

# Helical gear units horizontal mounting position

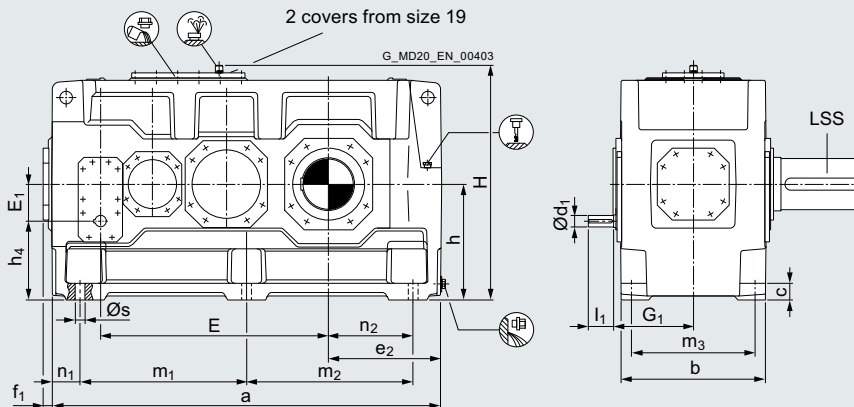
## Type H4

### Gear unit dimensions, four-stage, gear unit sizes 25 to 28

#### Selection and ordering data

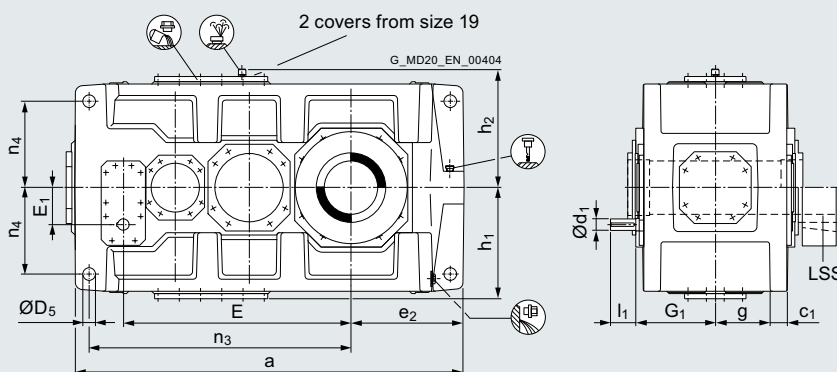
##### H4.H

2LP302-...60-....



##### H4.M

2LP302-...61-....



Gear unit size		Dimensions in mm			
		<b>High speed shaft (HSS)</b>			
	$i_N$	$d_1$	$l_1$	$G_1$	
<b>25</b>	100-160	100 m6	205	575	
	180-355	85 m6	170	575	
<b>26</b>	112-180	100 m6	205	575	
	200-400	85 m6	170	575	
<b>27</b>	100-160	120 n6	210	645	
	180-355	100 m6	210	645	
<b>28</b>	112-180	120 n6	210	645	
	200-400	100 m6	210	645	

Gear unit size	Dimensions in mm																							
	a	b	c	$c_1$	$D_5$	E	$E_1$	$e_2$	$f_1$	g	H	$h^{1)}$	$h_1$	$h_2$	$h_4$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s	
<b>25</b>	2830	1045	130	120 ±2	90 H9	1695	265	790	35	400	1740	860	860	880	595	1215	1215	910	200	590	1965	660	66	
<b>26</b>	3010	1045	130	120 ±2	90 H9	1785	265	880	35	400	1740	860	860	880	595	1215	1395	910	200	680	2055	660	66	
<b>27</b>	3220	1170	150	145 ±2	100 H9	1927	320	880	40	440	1900	950	930	950	630	1390	1390	1030	220	660	2260	720	74	
<b>28</b>	3410	1170	150	145 ±2	100 H9	2022	320	975	40	440	1900	950	930	950	630	1390	1580	1030	220	755	2355	720	74	

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.



# Helical gear units horizontal mounting position

Type H4 / Types H1, H2, H3 and H4

## Gear unit dimensions, four-stage, gear unit sizes 25 to 28

### Selection and ordering data (continued)

#### Low speed shaft (LSS)

		Oil quantity 1)	Oil quantity 1)	Weight 1) 2)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 4/33 to 4/37								
		H4.H	H4.M	H4.H	H4.M	Article No.: <b>2LP302</b> ■ - ■ ■ .6-....								
<b>Type</b>	<b>Size</b>	<b>d<sub>2</sub></b>	<b>l<sub>2</sub></b>	<b>G<sub>2</sub></b>	<b>l</b>	<b>l</b>	<b>kg</b>	<b>kg</b>					<b>Solid shaft with parallel key</b>	
<b>H4SH</b>	<b>25</b>	400 n6	650	605	735		16300		2	-	6	A		
	<b>26</b>	420 n6	650	605	780		18000		2	-	7	A		
	<b>27</b>	440 n6	690	680	1055		23000		2	-	8	A		
	<b>28</b>	460 n6	750	680	1110		26200		3	-	0	A		
<b>Type</b>	<b>Size</b>	<b>D<sub>2</sub></b>	<b>D<sub>3</sub></b>	<b>G<sub>4</sub></b>	<b>G<sub>5</sub></b>	<b>l</b>	<b>l</b>	<b>kg</b>	<b>kg</b>				<b>Hollow shaft for shrink disk</b>	
<b>H4DH/ H4DM</b>	<b>25</b>	410 H7	415	610	895	735	800	16300	15500	2	-	6	C	
	<b>26</b>	430 H7	435	610	925	780	850	18000	17100	2	-	7	C	
	<b>27</b>	460 H7	465	680	1000	1055	1150	23000	22000	2	-	8	C	
	<b>28</b>	470 H7	475	680	1020	1110	1210	26200	25000	3	-	0	C	
<b>Type</b>	<b>Size</b>	<b>N/DIN 5480</b>	<b>D<sub>2</sub></b>	<b>D<sub>3</sub></b>	<b>G<sub>4</sub></b>	<b>l</b>	<b>l</b>	<b>kg</b>	<b>kg</b>				<b>Hollow shaft with spline</b>	
<b>H4KH/ H4KM</b>	<b>25</b>	On request								2	-	6	D	
	<b>26</b>	On request								2	-	7	D	
	<b>27</b>	On request								2	-	8	D	
	<b>28</b>	On request								3	-	0	D	

Shaft seals, see page 10/2 onwards.  
For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.  
1) Approximate values; exact data acc. to order-related documentation.  
2) Without oil filling.

### Article No. overview

### Selection and ordering data

#### Article No., 10th to 12th position

					Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code	
					Article No.	<b>2LP302</b>	.	.	.	■	■	■	.	.	.	.	<b>-Z</b>	
<b>Ratio</b>																		
	Type																	
	H1.H	H2.H	H3.H	H4.H														
<b>i<sub>N</sub></b>	1.25	6.3	22.4	100														<b>A</b>
<b>i<sub>N</sub></b>	1.4	7.1	25	112														<b>B</b>
<b>i<sub>N</sub></b>	1.6	8	28	125														<b>C</b>
<b>i<sub>N</sub></b>	1.8	9	31.5	140														<b>D</b>
<b>i<sub>N</sub></b>	2	10	35.5	160														<b>E</b>
<b>i<sub>N</sub></b>	2.24	11.2	40	180														<b>F</b>
<b>i<sub>N</sub></b>	2.5	12.5	45	200														<b>G</b>
<b>i<sub>N</sub></b>	2.8	14	50	224														<b>H</b>
<b>i<sub>N</sub></b>	3.15	16	56	250														<b>J</b>
<b>i<sub>N</sub></b>	3.55	18	63	280														<b>K</b>
<b>i<sub>N</sub></b>	4	20	71	315														<b>L</b>
<b>i<sub>N</sub></b>	4.5	22.4	80	355														<b>M</b>
<b>i<sub>N</sub></b>	5	25	90	400														<b>N</b>
<b>i<sub>N</sub></b>	5.6	28	100	450														<b>P</b>
<b>i<sub>N</sub></b>	-	-	112	-														<b>Q</b>
<b>Type designation</b>																		
	Type H1																	<b>3</b>
	Type H2																	<b>4</b>
	Type H3																	<b>5</b>
	Type H4																	<b>6</b>
<b>Mounting position</b>																		
	Mounting position H																	<b>0</b>
	Mounting position M																	<b>1</b>



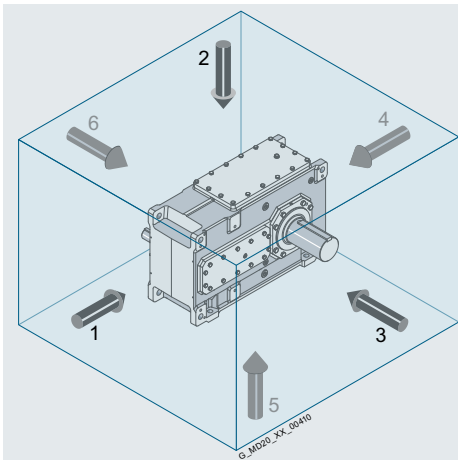
# Helical gear units horizontal mounting position

Types H1, H2, H3 and H4

## Article No. overview

### Overview

#### Article No., 13th position



Irrespective of the mounting position of the gear unit, the face designations "right" and "left" always refer to the horizontal mounting position with the view on side 1.  
 Side 2 is on top.  
 Mounting cover on top (2),  
 looking at drive front face (1):  
 Side 3 = right  
 Side 6 = left

Data position of the Article No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code	
Article No.																		2LP302 . . . . . - Z . . . . .

#### Variants/shaft arrangement (looking at side 2)

Type	H1.H	H2.H	H3.H	H4.H
A	 G_MD20_XX_00018	 G_MD20_XX_00022	 G_MD20_XX_00031	 G_MD20_XX_00040
B	 G_MD20_XX_00019	 G_MD20_XX_00023	 G_MD20_XX_00032	 G_MD20_XX_00041
C	---	 G_MD20_XX_00024	 G_MD20_XX_00033	 G_MD20_XX_00042
D	---	 G_MD20_XX_00025	 G_MD20_XX_00034	 G_MD20_XX_00043

0  
1  
2  
3

For details on the backstops  $G_8$ , see page 10/23 onwards.

□/■ Backstop

--- Extended version of the fan cover up to size 12

① Backstop size 7 – 10

② Backstop size 11 or larger

# Helical gear units horizontal mounting position

Types H1, H2, H3 and H4

Article No. overview

## Selection and ordering data (continued)

				Data position of the Article No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
				Article No.	2LP302 . . . . .																Z . . . .
Variants/shaft arrangement (looking at side 2)																					
Type	H1.H	H2.H	H3.H	H4.H																	
E -																					
	G_MD20_XX_00026	G_MD20_XX_00035	G_MD20_XX_00044																		
F -																					
	G_MD20_XX_00027	G_MD20_XX_00036	G_MD20_XX_00045																		
G -																					
	G_MD20_XX_00028	G_MD20_XX_00037	G_MD20_XX_00046																		
H -																					
	G_MD20_XX_00029	G_MD20_XX_00038	G_MD20_XX_00047																		
I -																					
	G_MD20_XX_00030	G_MD20_XX_00039	G_MD20_XX_00048																		

Detailed information on the versions "high speed shaft both ends" G, H, I are available [on page 4/38](#).

The versions E and F with slow speed shaft at both ends are only relevant for the shaft variants

- "S" (solid shaft with parallel key acc. to DIN 6885/1)
- "V" (reinforced solid shaft with parallel key acc. to DIN 6885/1)
- "C" (solid shaft for zero-backlash taper clamping connection)

The solid shaft extension shown represents the driven machine shaft insertion side for hollow shafts.

The slow speed hollow shaft "H" (hollow shaft with keyway according to DIN 6885/1) is generally suitable for fitting on both ends.

For details on the backstops  $G_8$ , see [page 10/23 onwards](#).

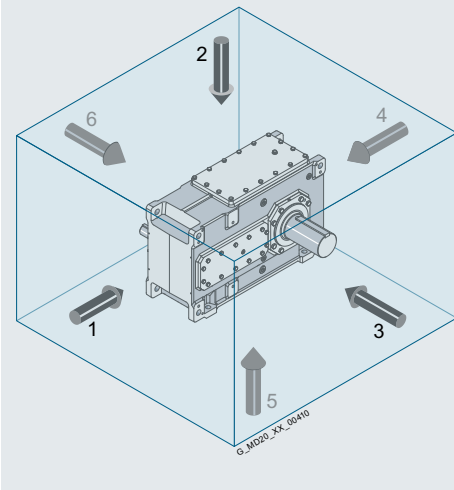
- /■ Backstop
- Extended version of the fan cover up to size 12
- ① Backstop size 7 – 10
- ② Backstop size 11 or larger

# Helical gear units horizontal mounting position

Types H1, H2, H3 and H4

## Article No. overview

### Selection and ordering data (continued)



Irrespective of the mounting position of the gear unit, the face designations "right" and "left" always refer to the horizontal mounting position with the view on side 1.

Side 2 is on top.

Mounting cover on top (2),

looking at drive front face (1):

Side 3 = right

Side 6 = left

### Article No. supplement, 14th position

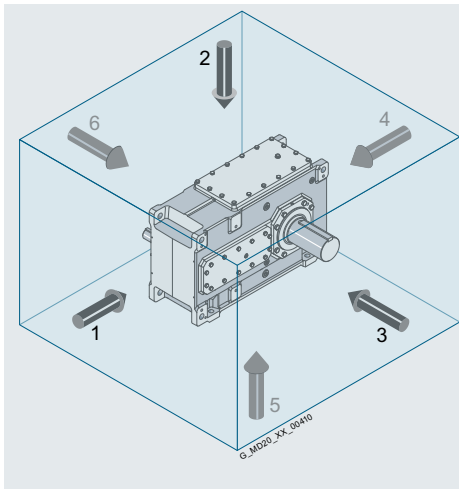
	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.		<b>2LP302</b>	.	-	.	.	.	.	.	.	■	.	-Z ■ ■ ■
<b>Sealing single-side high speed shaft (HSS)</b>													
Radial shaft seal													A
Labyrinth													C
Labyrinth with V-seal													D
Taconite E													E
<b>Sealing double-extended high speed shaft (HSS)</b>													
Side 3: Radial shaft seal/Side 6: Radial shaft seal													Z P 0 A
Side 3: Labyrinth/Side 6: Labyrinth													Z P 0 C
Side 3: Labyrinth with V-seal/Side 6: Labyrinth with V-seal													Z P 0 D
Side 3: Taconite E/Side 6: Taconite E													Z P 0 E
Side 3: Radial shaft seal/Side 6: Taconite E													Z P 1 A
Side 3: Taconite E/Side 6: Radial shaft seal													Z P 1 B

# Helical gear units horizontal mounting position

## Types H1, H2, H3 and H4

Article No. overview

### Selection and ordering data (continued)



Irrespective of the mounting position of the gear unit, the face designations "right" and "left" always refer to the horizontal mounting position with the view on side 1.

Side 2 is on top.  
Mounting cover on top (2),  
looking at drive front face (1):  
Side 3 = right  
Side 6 = left

### Article No. supplement, 15th and 16th position

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.	<b>2LP302</b>	.	-	.	.	.	.	.	.	.	.	<b>-Z</b>
<b>Sealing low speed shaft (LSS)</b>												
Radial shaft seal												<b>A</b>
Labyrinth												<b>C</b>
Labyrinth with V-seal												<b>D</b>
Taconite F												<b>E</b>
Taconite F-F												<b>F</b>
Taconite F-H												<b>G</b>
Taconite F-K												<b>H</b>
<b>Sealing double-extended low speed shaft (LSS)</b>												
Side 3: Radial shaft seal/Side 6: Radial shaft seal												<b>Z</b> <b>Q 0 A</b>
Side 3: Labyrinth/Side 6: Labyrinth												<b>Z</b> <b>Q 0 C</b>
Side 3: Labyrinth with V-seal/Side 6: Labyrinth with V-seal												<b>Z</b> <b>Q 0 D</b>
Side 3: Taconite F/Side 6: Taconite F												<b>Z</b> <b>Q 0 E</b>
Side 3: Radial shaft seal/Side 6: Taconite F												<b>Z</b> <b>Q 1 A</b>
Side 3: Taconite F/Side 6: Radial shaft seal												<b>Z</b> <b>Q 1 B</b>
<b>Shaft version</b>												
High speed shaft (HSS) version: Catalog version, low speed shaft (LSS) version: Catalog version												<b>0</b>
High speed shaft (HSS) version: Reinforced version, low speed shaft (LSS) version: Catalog version												<b>1</b>



## Helical gear units horizontal mounting position

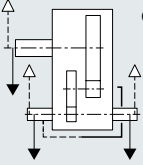
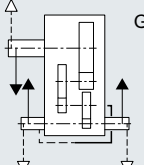
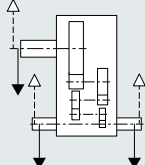
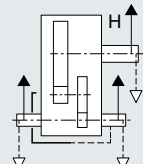
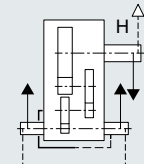
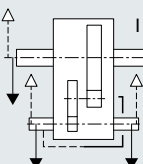
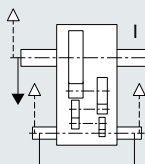
Types H1, H2, H3 and H4

### Shaft extension on both sides – Gear unit versions G, H and I

#### Overview

Types and ratio ranges for standardized shaft extension on both sides with identical dimensions of both shaft ends in the dimensions of high speed single-sided shafts (HSS).

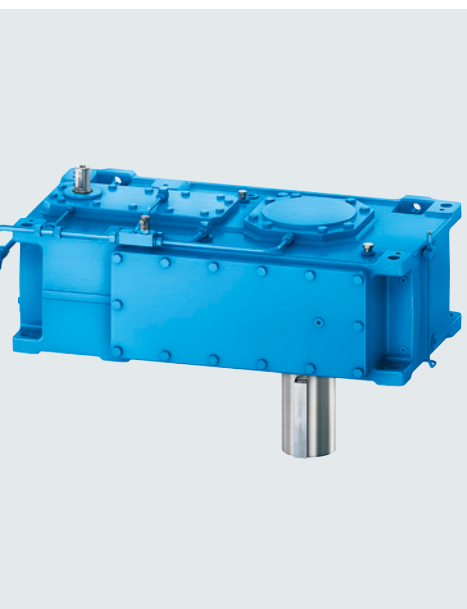
#### Versions G, H and I

Type H2			Type H3			Type H4		
Version G			Version G			Version G		
								
G_MD20_XX_00028			G_MD20_XX_00037			G_MD20_XX_00046		
Version H			Version H			Version H		
								
G_MD20_XX_00029			G_MD20_XX_00038			G_MD20_XX_00047		
Version I			Version I			Version I		
								
G_MD20_XX_00030			G_MD20_XX_00039			G_MD20_XX_00048		
Type	Gear unit size	Ratio	Type	Gear unit size	Ratio	Type	Gear unit size	Ratio
H2	4	6.3 - 18	–	–	–	–	–	–
H2	5	6.3 - 18	H3	5	25 - 90	–	–	–
H2	6	8 - 22.4	H3	6	31.5 - 112	–	–	–
H2	7	6.3 - 16	H3	7	25 - 90	H4	7	100 - 224
H2	8	8 - 20	H3	8	31.5 - 112	H4	8	125 - 280
H2	9	6.3 - 16	H3	9	25 - 90	H4	9	100 - 250
H2	10	8 - 20	H3	10	31.5 - 112	H4	10	125 - 315
H2	11	6.3 - 18	H3	11	25 - 90	H4	11	100 - 250
H2	12	8 - 22.4	H3	12	31.5 - 112	H4	12	125 - 315
H2	13	6.3 - 16	H3	13	22.4 - 90	H4	13	100 - 250
H2	14	8 - 20	H3	14	28 - 112	H4	14	125 - 315
H2	15	6.3 - 16	H3	15	22.4 - 90	H4	15	100 - 250
H2	16	7.1 - 18	H3	16	25 - 100	H4	16	112 - 280
H2	17	6.3 - 16	H3	17	22.4 - 90	–	–	–
H2	18	7.1 - 18	H3	18	25 - 100	–	–	–

For other ratios for solutions with different diameters, please contact Flender.

Please contact Flender regarding types and sizes that are not listed.

## Helical gear units Vertical mounting position



### 5/2

#### **Type H2**

##### Gear unit dimensions

5/2	Two-stage, gear unit sizes 4 to 8
5/4	Two-stage, gear unit sizes 9 to 18
5/6	Two-stage, gear unit sizes 13 to 18
5/8	Two-stage, gear unit sizes 19 to 24
5/10	Two-stage, gear unit sizes 25 and 26

### 5/12

#### **Type H3**

##### Gear unit dimensions

5/12	Three-stage, gear unit sizes 5 to 8
5/14	Three-stage, gear unit sizes 9 to 12
5/16	Three-stage, gear unit sizes 13 to 16
5/18	Three-stage, gear unit sizes 17 to 20
5/20	Three-stage, gear unit sizes 21 to 24
5/22	Three-stage, gear unit sizes 25 and 26

### 5/24

#### **Type H4**

##### Gear unit dimensions

5/24	Four-stage, gear unit sizes 7 to 12
5/26	Four-stage, gear unit sizes 13 to 18
5/28	Four-stage, gear unit sizes 19 to 22
5/30	Four-stage, gear unit sizes 23 to 26

### 5/31

#### **Type H4 / Types H2, H3 and H4**

##### Article No. overview

5/31	Article No., 10th to 12th position
5/32	Article No., 13th position
5/34	Article No. supplement, 14th position
5/35	Article No. supplement, 15th and 16th position

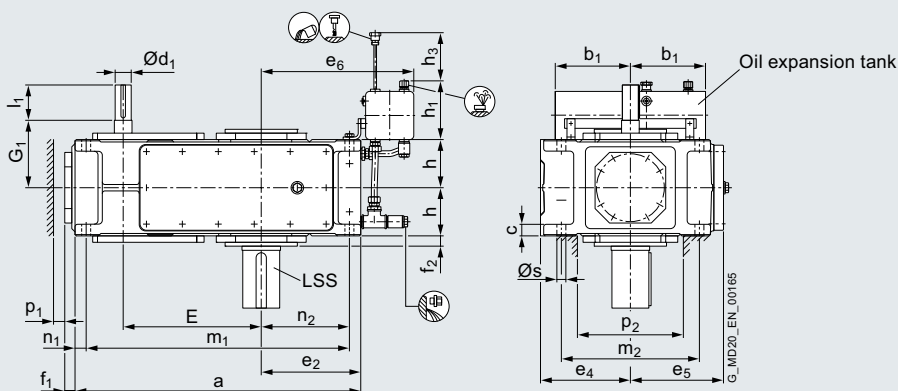
# Helical gear units vertical mounting position

Type H2

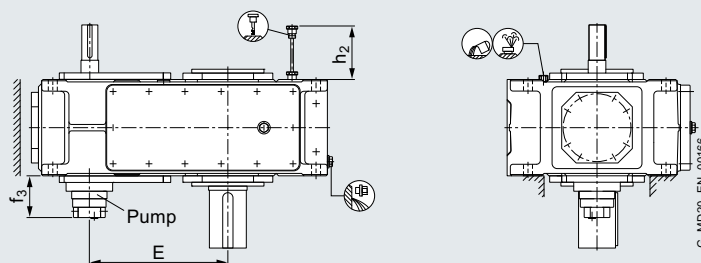
## Gear unit dimensions, two-stage, gear unit sizes 4 to 8

### Selection and ordering data

**H2.V**  
Dip lubrication  
2LP302-...42-....



**H2.V**  
Forced lubrication  
by flange-mounted pump  
2LP302-...42-....



Gear unit size		Dimensions in mm			
Gear unit size		High speed shaft (HSS)			
	$l_N$	$d_1$	$l_1$	$G_1$	
4	6.3 - 11.2	45 m6	100	170	
	12.5 - 22.4	32 m6	80		
5	6.3 - 11.2	50 m6	100	195	
	12.5 - 22.4	38 m6	80		
6	8 - 14	50 m6	100	195	
	16 - 28	38 m6	80		
7	6.3 - 11.2	60 m6	135	210	
	12.5 - 22.4	50 m6	110		
8	8 - 14	60 m6	135	210	
	16 - 28	50 m6	110		

Gear unit size	a	$b_1$	c	$e_2$	$e_4$	$e_5$	$e_6$	E	$f_1$	$f_2$	$f_3^{1)}$	h	$h_1$	$h_2^{2)}$	$h_3$	$m_1$	$m_2$	$n_1$	$n_2$	$p_1$	$p_2^{3)}$	s
4	565	150	$30 \pm 1$	190	200	215	320	270	28	22	-	107.5	165	-	180	505	300	30	160	35	220	24 H9
5	640	240	$30 \pm 1$	205	230	252	385	315	38	28	150	127.5	205	190	240	580	360	30	175	35	270	24 H9
6	720	240	$30 \pm 1$	250	230	252	425	350	38	28	150	127.5	205	190	240	660	360	30	220	35	270	24 H9
7	785	240	$36 \pm 1$	250	280	292	425	385	42	30	145	150	205	165	250	715	430	35	215	35	330	28 H9
8	890	240	$36 \pm 1$	310	280	302	485	430	42	32	145	150	205	165	250	820	430	35	275	35	330	28 H9

For details on the shafts, see Chapter 9.

- 1) Flange-mounted pump not in connection with versions G, H and I.
- 2) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.
- 3) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.



# Helical gear units vertical mounting position

## Type H2

### Gear unit dimensions, two-stage, gear unit sizes 4 to 8

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity 1)	Oil quantity 1)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35						
				H2.V with dip lubrication	H2.V with forced lubrication	H2.V							
				Article No.: <b>2LP302</b> - - - - <b>.42-....</b>									
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg	Solid shaft with parallel key <sup>4)</sup>					
<b>H2SV</b>	4	80 m6	170	140	23	–	190	0 - 3 A					
	5	100 m6	210	165	35	17.5	300	0 - 4 A					
	6	110 n6	210	165	37	18.5	355	0 - 5 A					
	7	120 n6	210	195	62	31	505	0 - 6 A					
	8	130 n6	250	195	69	35	590	0 - 7 A					
Type	Size	$D_2$	$G_4$	$l$	$l$	kg	Hollow shaft with keyway						
<b>H2HV</b>	4	80 H7	140	23	–	190	0 - 3 B						
	5	95 H7	165	35	17.5	300	0 - 4 B						
	6	105 H7	165	37	18.5	355	0 - 5 B						
	7	115 H7	195	62	31	505	0 - 6 B						
	8	125 H7	195	69	35	590	0 - 7 B						
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg	Hollow shaft for shrink disk				
<b>H2DV</b> <sup>3)</sup>	4	85 H7	85	140	205	23	–	190	0 - 3 C				
	5	100 H7	100	165	240	35	17.5	300	0 - 4 C				
	6	110 H7	110	165	240	37	18.5	355	0 - 5 C				
	7	120 H7	120	195	280	62	31	505	0 - 6 C				
	8	130 H7	130	195	285	69	35	590	0 - 7 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg	Hollow shaft with spline				
<b>H2KV</b>	5	N 95 × 3 × 30 × 30 × 9H	89 H11	100	165	35	17.5	300	0 - 4 D				
	6	N 95 × 3 × 30 × 30 × 9H	89 H11	110	165	37	18.5	355	0 - 5 D				
	7	N 120 × 3 × 30 × 38 × 9H	114 H11	120	195	62	31	505	0 - 6 D				
	8	N 120 × 3 × 30 × 38 × 9H	114 H11	130	195	69	35	590	0 - 7 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	$l$	kg	Flanged shaft	
<b>H2FV</b>	5	25	300	150 H6	260	16 × 22	10	255	35	17.5	335	0 - 4 E	
	6	25	320	160 H6	280	18 × 22	10	255	37	18.5	395	0 - 5 E	
	7	30	370	180 H6	320	16 × 26	10	300	62	31	555	0 - 6 E	
	8	30	390	190 H6	340	18 × 26	10	300	69	35	645	0 - 7 E	

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Shaft version with reinforced bearing (size 7 or larger), see page 9/7.

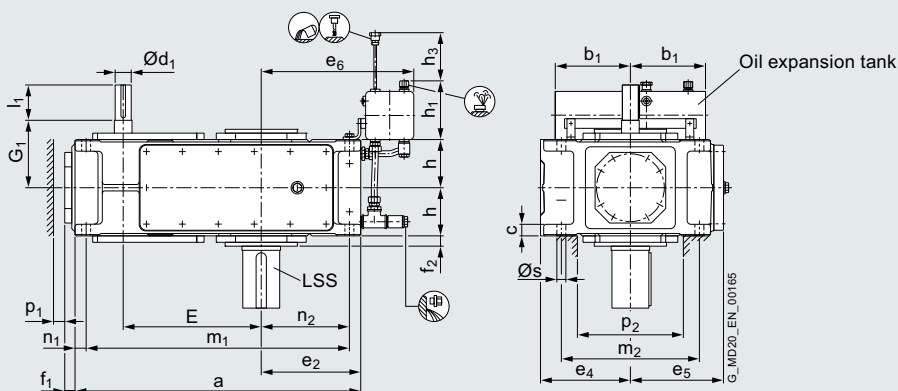
# Helical gear units vertical mounting position

Type H2

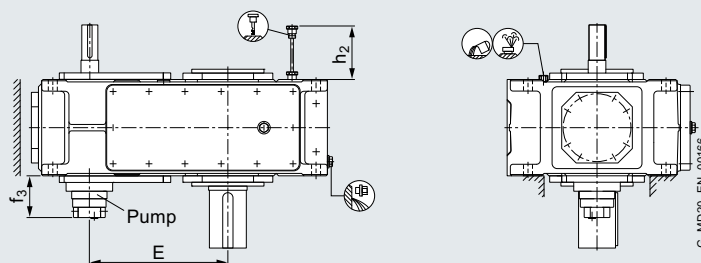
## Gear unit dimensions, two-stage, gear unit sizes 9 to 12

### Selection and ordering data

**H2.V**  
Dip lubrication  
2LP302-...42-...



**H2.V**  
Forced lubrication  
by flange-mounted pump  
2LP302-...42-...



Gear unit size		Dimensions in mm			
Gear unit size		High speed shaft (HSS)			
	$l_N$	$d_1$	$l_1$	$G_1$	
<b>9</b>	6.3 - 11.2	75 m6	140	240	
	12.5 - 22.4	60 m6	140		
<b>10</b>	8 - 14	75 m6	140	240	
	16 - 28	60 m6	140		
<b>11</b>	6.3 - 11.2	90 m6	165	275	
	12.5 - 22.4	70 m6	140		
<b>12</b>	8 - 14	90 m6	165	275	
	16 - 28	70 m6	140		

Gear unit size	a	$b_1$	c	$e_2$	$e_4$	$e_5$	$e_6$	E	$f_1$	$f_2$	$f_3^{1)}$	h	$h_1$	$h_2^{2)}$	$h_3$	$m_1$	$m_2$	$n_1$	$n_2$	$p_1$	$p_2^{3)}$	s
<b>9</b>	925	330	45 ± 1.5	300	320	342	560	450	42	32	135	185	275	205	330	845	490	40	260	40	370	36 H9
<b>10</b>	1025	330	45 ± 1.5	350	320	342	610	500	42	32	135	185	275	205	330	945	490	40	310	40	370	36 H9
<b>11</b>	1105	330	54 ± 1.5	345	380	402	595	545	48	35	145	215	275	240	340	1005	600	50	295	50	440	40 H9
<b>12</b>	1260	330	54 ± 1.5	430	380	410	680	615	48	35	145	215	275	240	340	1160	600	50	380	50	440	40 H9

For details on the shafts, see Chapter 9.

- 1) Flange-mounted pump not in connection with versions G, H and I.
- 2) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.
- 3) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

# Helical gear units vertical mounting position

## Type H2

### Gear unit dimensions, two-stage, gear unit sizes 9 to 12

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

					Oil quantity 1)	Oil quantity 1)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35							
					H2.V with dip lubrication	H2.V with forced lubrication	H2.V								
					Article No.: <b>2LP302</b> - - - - <b>.42-....</b>										
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg				Solid shaft with parallel key <sup>4)</sup>				
<b>H2SV</b>	<b>9</b>	140 n6	250	235	98	49	830	0	-	8 A					
	<b>10</b>	160 n6	300	235	110	55	960	1	-	0 A					
	<b>11</b>	170 n6	300	270	160	80	1335	1	-	1 A					
	<b>12</b>	180 n6	300	270	180	90	1615	1	-	2 A					
Type	Size	$D_2$	$G_4$	$l$	$l$	kg					Hollow shaft with keyway				
<b>H2HV</b>	<b>9</b>	135 H7	235	98	49	830	0	-	8 B						
	<b>10</b>	150 H7	235	110	55	960	1	-	0 B						
	<b>11</b>	165 H7	270	160	80	1335	1	-	1 B						
	<b>12</b>	180 H7	270	180	90	1615	1	-	2 B						
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg			Hollow shaft for shrink disk				
<b>H2DV</b> <sup>3)</sup>	<b>9</b>	140 H7	145	235	330	98	49	830	0	-	8 C				
	<b>10</b>	150 H7	155	235	350	110	55	960	1	-	0 C				
	<b>11</b>	165 H7	170	270	400	160	80	1335	1	-	1 C				
	<b>12</b>	180 H7	185	270	405	180	90	1615	1	-	2 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg			Hollow shaft with spline				
<b>H2KV</b>	<b>9</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	145	235	98	49	830	0	-	8 D				
	<b>10</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	155	235	110	55	960	1	-	0 D				
	<b>11</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	170	270	160	80	1335	1	-	1 D				
	<b>12</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	185	270	180	90	1615	1	-	2 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	$l$	kg			Flanged shaft	
<b>H2FV</b>	<b>9</b>	38	430	220 H6	380	20 × 26	12	350	98	49	915	0	-	8 E	
	<b>10</b>	38	470	240 H6	420	22 × 26	12	350	110	55	1050	1	-	0 E	
	<b>11</b>	42	510	260 H6	450	18 × 33	12	400	160	80	1465	1	-	1 E	
	<b>12</b>	42	540	280 H6	480	22 × 33	12	400	180	90	1755	1	-	2 E	

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Shaft version with reinforced bearing, see page 9/7.

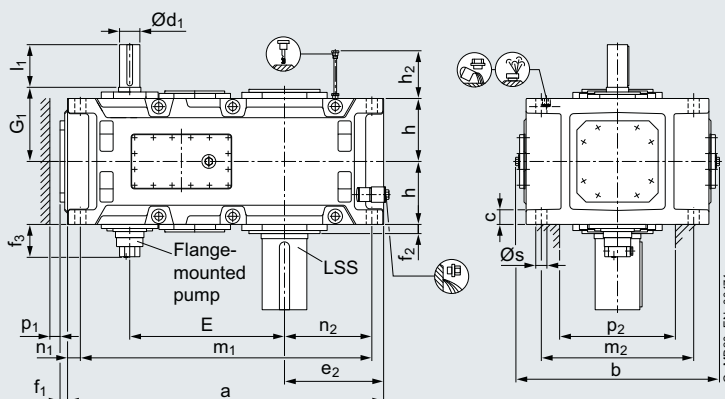
## Helical gear units vertical mounting position

Type H2

### Gear unit dimensions, two-stage, gear unit sizes 13 to 18

#### Selection and ordering data

**H2.V**  
Forced lubrication  
by flange-mounted pump  
2LP302-...42-....



Gear unit size	Dimensions in mm			
	$l_N$	$d_1$	$l_1$	$G_1$
<b>13</b>	6.3 - 11.2	100 m6	205	330
	12.5 - 20	85 m6	170	
<b>14</b>	8 - 14	100 m6	205	330
	16 - 25	85 m6	170	
<b>15</b>	6.3 - 11.2	120 n6	210	365
	12.5 - 20	100 m6	210	
<b>16</b>	7.1 - 12.5	120 n6	210	365
	14 - 22.5	100 m6	210	
<b>17</b>	6.3 - 11.2	125 n6	245	420
	12.5 - 20	110 n6	210	
<b>18</b>	7.1 - 12.5	125 n6	245	420
	14 - 22.5	110 n6	210	

Gear unit size	Dimensions in mm																
	a	b	c	$e_2$	E	$f_1$	$f_2$	$f_3^{1)}$	h	$h_2^{2)}$	$m_1$	$m_2$	$n_1$	$n_2$	$p_1$	$p_2^{3)}$	s
<b>13</b>	1290	900	61 ± 2	405	635	53	35	130	272.5	300	1195	680	50	360	50	500	48
<b>14</b>	1430	900	61 ± 2	475	705	53	35	130	272.5	300	1335	680	50	430	50	500	48
<b>15</b>	1550	980	72 ± 2	485	762	63	42	130	310	340	1435	750	60	430	50	570	55
<b>16</b>	1640	980	72 ± 2	530	808	63	42	130	310	340	1525	750	60	475	50	570	55
<b>17</b>	1740	1110	81 ± 2	525	860	60	42	170	340	374	1610	850	70	465	70	630	55
<b>18</b>	1860	1110	81 ± 2	585	920	60	42	170	340	374	1730	850	70	525	70	630	55

For details on the shafts, see Chapter 9.

- 1) Flange-mounted pump not in connection with versions G, H and I.
- 2) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.
- 3) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

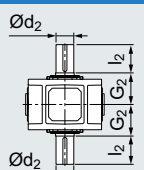
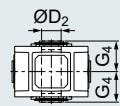
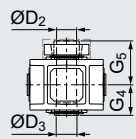
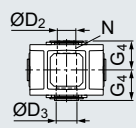
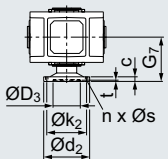
# Helical gear units vertical mounting position

## Type H2

### Gear unit dimensions, two-stage, gear unit sizes 13 to 18

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

						Oil quantity <sup>1)</sup> H2.V with forced lubrication	Weight <sup>1) 2)</sup> H2.V			10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35			
						Article No.: <b>2LP302</b> ■ - ■ ■ .42-....							
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>		l	kg			Solid shaft with parallel key <sup>5)</sup>			
<b>H2SV</b>	<b>13</b>	200 n6	350	335		120	1880	1 - 3 A					
	<b>14</b>	210 n6	350	335		135	2430	1 - 4 A					
	<b>15</b>	230 n6	410	380		185	3240	1 - 5 A					
	<b>16</b>	240 n6	410	380		200	3465	1 - 6 A					
	<b>17</b>	250 n6	410	415		265	4420	1 - 7 A					
	<b>18</b>	270 n6	470	415		285	4870	1 - 8 A					
Type	Size	D <sub>2</sub>	G <sub>4</sub>		l	kg			Hollow shaft with keyway				
<b>H2HV</b> <sup>4)</sup>	<b>13</b>	190 H7	335		120	1880	1 - 3 B						
	<b>14</b>	210 H7	335		135	2430	1 - 4 B						
	<b>15</b>	230 H7	380		185	3240	1 - 5 B						
	<b>16</b>	240 H7	380		200	3465	1 - 6 B						
	<b>17</b>	250 H7	415		265	4420	1 - 7 B						
	<b>18</b>	275 H7	415		285	4870	1 - 8 B						
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	kg			Hollow shaft for shrink disk			
<b>H2DV</b> <sup>3) 4)</sup>	<b>13</b>	190 H7	195	335	480	120	1880	1 - 3 C					
	<b>14</b>	210 H7	215	335	480	135	2430	1 - 4 C					
	<b>15</b>	230 H7	235	380	550	185	3240	1 - 5 C					
	<b>16</b>	240 H7	245	380	550	200	3465	1 - 6 C					
	<b>17</b>	250 H7	260	415	600	265	4420	1 - 7 C					
	<b>18</b>	280 H7	285	415	600	285	4870	1 - 8 C					
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	kg			Hollow shaft with spline			
<b>H2KV</b> <sup>4)</sup>	<b>13</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	195	335	120	1880	1 - 3 D					
	<b>14</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	215	335	135	2430	1 - 4 D					
	<b>15</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	235	380	185	3240	1 - 5 D					
	<b>16</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	245	380	200	3465	1 - 6 D					
	<b>17</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	260	415	265	4420	1 - 7 D					
	<b>18</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	285	415	285	4870	1 - 8 D					
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n × s	t	G <sub>7</sub>	l	kg			Flanged shaft
<b>H2FV</b>	<b>13</b>	48	580	310 H6	500	20 × 33	14	480	120	2040	1 - 3 E		
	<b>14</b>	48	620	310 H6	540	24 × 33	14	480	135	2600	1 - 4 E		
	<b>15</b>	55	710	360 H6	630	28 × 33	17	550	185	3480	1 - 5 E		
	<b>16</b>	55	740	360 H6	660	30 × 33	17	550	200	3720	1 - 6 E		
	<b>17</b>	60	750	410 H6	660	24 × 39	18	600	265	4720	1 - 7 E		
	<b>18</b>	60	800	410 H6	710	26 × 39	18	600	285	5220	1 - 8 E		

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Sizes 13 and 15 only  $i_N = 6.3 - 18$   
Size 17 only  $i_N = 6.3 - 16$

<sup>5)</sup> Shaft version with reinforced bearing, see page 9/7  
(except size 13 with  $i_N = 20$  and size 17 with  $i_N = 18$  and 20)

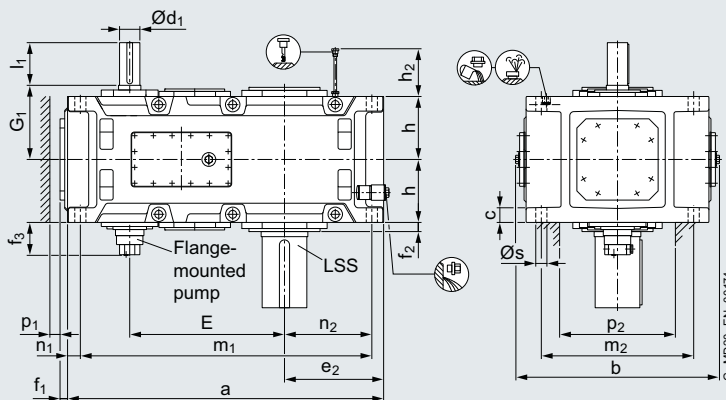
# Helical gear units vertical mounting position

Type H2

## Gear unit dimensions, two-stage, gear unit sizes 19 to 24

### Selection and ordering data

**H2.V**  
Forced lubrication  
by flange-mounted pump  
2LP302-...42-....



Gear unit size	Dimensions in mm			
	$l_N$	$d_1$	$l_1$	$G_1$
<b>19</b>	6.3 - 11.2	150 n6	245	475
	12.5 - 20	120 n6	210	
<b>20</b>	7.1 - 12.5	150 n6	245	475
	14 - 22.5	120 n6	210	
<b>21</b>	6.3 - 11.2	170 n6	290	495
	12.5 - 20	140 n6	250	
<b>22</b>	7.1 - 12.5	170 n6	290	495
	14 - 22.5	140 n6	250	
<b>23</b>	6.3 - 10	190 n6	330	560
	11.2 - 20	150 n6	250	
<b>24</b>	7.1 - 11.2	190 n6	330	560
	12.5 - 22.4	150 n6	250	

Gear unit size	Dimensions in mm																
	a	b	c	$e_2$	E	$f_1$	$f_2$	$f_3$ <sup>1)</sup>	h	$h_2$ <sup>2)</sup>	$m_1$	$m_2$	$n_1$	$n_2$	$p_1$	$p_2$ <sup>3)</sup>	s
<b>19</b>	2010	1222	91 ± 2	590	997	24	55	O. r.	390	380	1865	950	78	520	70	700	65
<b>20</b>	2130	1222	91 ± 2	650	1057	24	55	O. r.	390	380	1985	950	78	580	70	700	65
<b>21</b>	2140	1378	100 ± 2	655	1067	27	60	O. r.	410	390	1985	1040	90	585	70	720	75
<b>22</b>	2250	1378	100 ± 2	710	1122	27	60	O. r.	410	390	2095	1040	90	640	70	720	75
<b>23</b>	On request																
<b>24</b>	On request																

For details on the shafts, see Chapter 9.

- 1) Values  $f_3$  for size 19 or larger on request; flange-mounted pump not in connection with versions G, H and I.
- 2) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.
- 3) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

# Helical gear units vertical mounting position

## Type H2

### Gear unit dimensions, two-stage, gear unit sizes 19 to 24

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity H2.V with forced lubrication	Weight H2.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35					
Article No.: <b>2LP302</b> - - - .42-....											
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg		Solid shaft with parallel key			
<b>H2SV</b>	<b>19</b>	290 n6	470	465	On request						
	<b>20</b>	300 n6	500	465							
	<b>21</b>	320 n6	500	490							
	<b>22</b>	340 n6	550	490							
	<b>23</b>	360 n6	590	540							
	<b>24</b>	380 n6	590	540							
								2 - 0 A 2 - 1 A 2 - 2 A 2 - 3 A 2 - 4 A 2 - 5 A			
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	kg	Hollow shaft for shrink disk			
<b>H2DV</b> 1) 2)	<b>19</b>	285 H7	295	465	670	On request					
	<b>20</b>	310 H7	315	465	670						
	<b>21</b>	330 H7	335	490	715						
	<b>22</b>	340 H7	345	490	725						
	<b>23</b>	370 H7	375	540	800						
	<b>24</b>	390 H7	395	540	825						
								2 - 0 C 2 - 1 C 2 - 2 C 2 - 3 C 2 - 4 C 2 - 5 C			
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	kg	Hollow shaft with spline			
<b>H2KV</b> 2)	<b>19</b>	On request				On request					
	<b>20</b>										
	<b>21</b>										
	<b>22</b>										
								2 - 0 D 2 - 1 D 2 - 2 D 2 - 3 D			
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	kg	Flanged shaft
<b>H2FV</b>	<b>19</b>	65	860	460 H6	770	30 × 39	18	670	On request		
	<b>20</b>	65	930	460 H6	830	32 × 39	18	670			
	<b>21</b>	75	950	520 H6	850	28 × 45	20	710			
	<b>22</b>	75	1040	520 H6	940	28 × 45	20	710			
											2 - 0 E 2 - 1 E 2 - 2 E 2 - 3 E

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>2)</sup> Size 19 only  $i_N = 6.3 - 16$

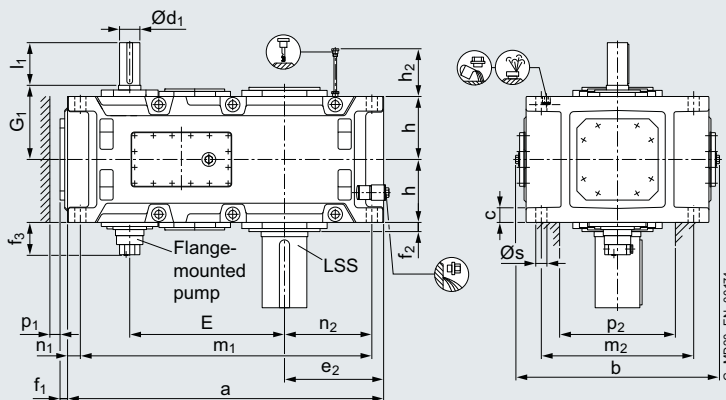
# Helical gear units vertical mounting position

Type H2

Gear unit dimensions, two-stage, gear unit sizes 25 and 26

## Selection and ordering data

**H2.V**  
Forced lubrication  
by flange-mounted pump  
2LP302-...42-....



Gear unit size		Dimensions in mm		
		<b>High speed shaft (HSS)</b>		
	$l_N$	$d_1$	$l_1$	$G_1$
<b>25</b>	6.3 - 10	200 n6	340	600
	11.2 - 20	170 n6	300	
<b>26</b>	7.1 - 11.2	200 n6	340	600
	12.5 - 22.4	170 n6	300	

Gear unit size	Dimensions in mm															
	a	b	c	$e_2$	E	$f_1$	$f_2$	$f_3^{1)}$	$h$	$h_2^{2)}$	$m_1$	$m_2$	$n_1$	$n_2$	$p_1$	$p_2$
<b>25</b>	On request															
<b>26</b>	On request															

For details on the shafts, see Chapter 9.

- 1) Flange-mounted pump not in connection with versions G, H and I.
- 2) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.



# Helical gear units vertical mounting position

## Type H2

### Gear unit dimensions, two-stage, gear unit sizes 25 and 26

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

					Oil quantity H2.V with forced lubrication	Weight H2.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35	
					Article No.: <b>2LP302</b> ■ - ■ ■ .42-....			
Type	Size	$d_2$	$l_2$	$G_2$	l	kg	Solid shaft with parallel key	
<b>H2SV</b>	<b>25</b>	400 n6	650	605	On request		2 - 6 A	
	<b>26</b>	420 n6	650	605			2 - 7 A	
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	l	kg	Hollow shaft for shrink disk
<b>H2DV</b> 1)	<b>25</b>	410 H7	415	610	895	On request		2 - 6 C
	<b>26</b>	430 H7	435	610	925			2 - 7 C

Shaft seals, [see pages 10/2 onwards](#).

For details on the shafts, [see Chapter 9](#).

Cooling options, [see page 10/11 onwards](#).

<sup>1)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

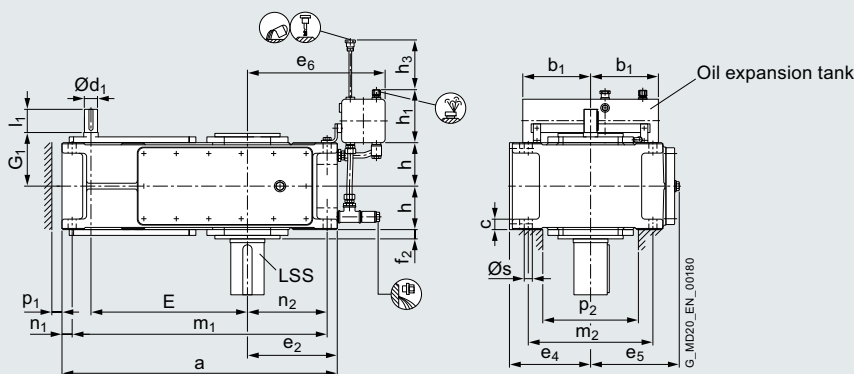
# Helical gear units vertical mounting position

Type H3

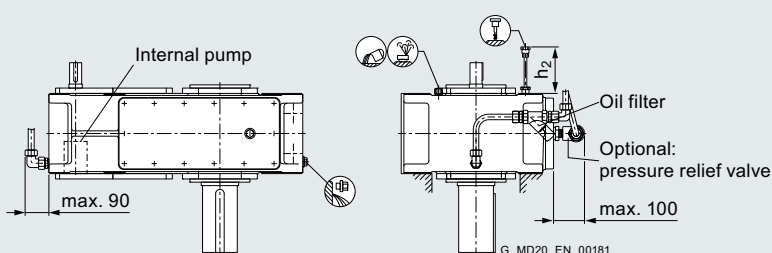
Gear unit dimensions, three-stage, gear unit sizes 5 to 8

## Selection and ordering data

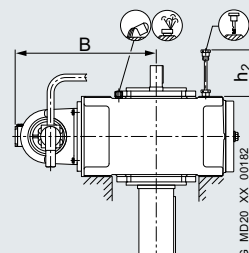
**H3.V**  
Dip lubrication  
2LP302-...52-....



**H3.V**  
Forced lubrication by flange-mounted pump  
2LP302-...52-....



**H3.V**  
Forced lubrication by motor pump  
2LP302-...52-....



Gear unit size		Dimensions in mm															
		High speed shaft (HSS)															
	$l_N$	$d_1$	$l_1$	$G_1$													
5	25 - 45	40 m6	70	160													
	50 - 63	30 m6	50														
	71 - 90	24 k6	40														
6	31.5 - 56	40 m6	70	160													
	63 - 80	30 m6	50														
	90 - 112	24 k6	40														
7	25 - 45	45 m6	80	185													
	50 - 63	35 m6	60														
	71 - 90	28 m6	50														
8	31.5 - 56	45 m6	80	185													
	63 - 80	35 m6	60														
	90 - 112	28 m6	50														

Gear unit size	Dimensions in mm																							
	a	$b_1$	c	E	$e_2$	$e_4$	$e_5$	$e_6$	$f_2$	$f_3^{1)}$	h	$h_1$	$h_2^{2)}$	$h_3$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$p_1^{3)}$	$p_2^{3)}$	s	B <sup>4)</sup>	
5	690	240	30 ± 1	405	205	230	252	385	28	190	128	205	190	240	630	360	220	30	175	35	270	24 H9	480	
6	770	240	30 ± 1	440	250	230	252	425	28	190	128	205	190	240	710	360	220	30	220	35	270	24 H9	480	
7	845	240	36 ± 1	495	250	280	292	425	30	185	150	205	165	250	775	430	260	35	215	35	330	28 H9	530	
8	950	240	36 ± 1	540	310	280	302	485	32	185	150	205	165	250	880	430	260	35	275	35	330	28 H9	530	

For details on the shafts, see Chapter 9.

1) Flange-mounted pump not in connection with versions G, H and I.  
 2) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

3) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.  
 4) Max. dimensions; details acc. to order-related documentation.

# Helical gear units vertical mounting position

## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 5 to 8

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

				Oil quantity 1)	Oil quantity 1)	Weight 1) 2)			10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35				
				H3.V with dip lubrication	H3.V with forced lubrication	H3.V							
				Article No.:		<b>2LP302</b>	- - -		<b>.52-....</b>				
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg			Solid shaft with parallel key <sup>4)</sup>			
<b>H3SV</b>	<b>5</b>	100 m6	210	165	36	24	320	0 - 4	<b>A</b>				
	<b>6</b>	110 n6	210	165	40	27	365	0 - 5	<b>A</b>				
	<b>7</b>	120 n6	210	195	64	42	540	0 - 6	<b>A</b>				
	<b>8</b>	130 n6	250	195	70	47	625	0 - 7	<b>A</b>				
Type	Size	$D_2$	$G_4$	$l$	$l$	kg			Hollow shaft with keyway				
<b>H3HV</b>	<b>5</b>	95 H7	165	36	24	320	0 - 4	<b>B</b>					
	<b>6</b>	105 H7	165	40	27	365	0 - 5	<b>B</b>					
	<b>7</b>	115 H7	195	64	42	540	0 - 6	<b>B</b>					
	<b>8</b>	125 H7	195	70	47	625	0 - 7	<b>B</b>					
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg	Hollow shaft for shrink disk				
<b>H3DV</b> <sup>3)</sup>	<b>5</b>	100 H7	100	165	240	36	24	320	0 - 4	<b>C</b>			
	<b>6</b>	110 H7	110	165	240	40	27	365	0 - 5	<b>C</b>			
	<b>7</b>	120 H7	120	195	280	64	42	540	0 - 6	<b>C</b>			
	<b>8</b>	130 H7	130	195	285	70	47	625	0 - 7	<b>C</b>			
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg	Hollow shaft with spline				
<b>H3KV</b>	<b>5</b>	N 95 × 3 × 30 × 30 × 9H	89 H11	100	165	36	24	320	0 - 4	<b>D</b>			
	<b>6</b>	N 95 × 3 × 30 × 30 × 9H	89 H11	110	165	40	27	365	0 - 5	<b>D</b>			
	<b>7</b>	N 120 × 3 × 30 × 38 × 9H	114 H11	120	195	64	42	540	0 - 6	<b>D</b>			
	<b>8</b>	N 120 × 3 × 30 × 38 × 9H	114 H11	130	195	70	47	625	0 - 7	<b>D</b>			
Type	Size	c	$d_2$	$D_3$	$k_2$	n × s	t	$G_7$	$l$	$l$	kg	Flanged shaft	
<b>H3FV</b>	<b>5</b>	25	300	150 H6	260	16 × 22	10	255	36	24	355	0 - 4	<b>E</b>
	<b>6</b>	25	320	160 H6	280	18 × 22	10	255	40	27	405	0 - 5	<b>E</b>
	<b>7</b>	30	370	180 H6	320	16 × 26	10	300	64	42	590	0 - 6	<b>E</b>
	<b>8</b>	30	390	190 H6	340	18 × 26	10	300	70	47	680	0 - 7	<b>E</b>

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Shaft version with reinforced bearing (size 7 or larger), see page 9/7.

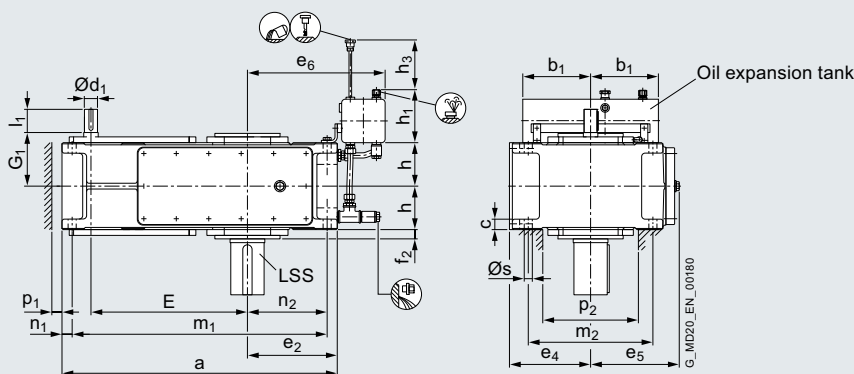
# Helical gear units vertical mounting position

Type H3

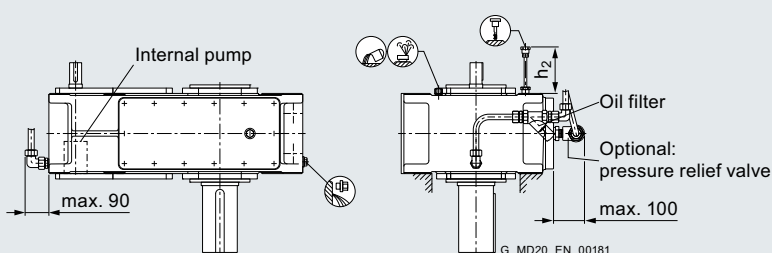
Gear unit dimensions, three-stage, gear unit sizes 9 to 12

## Selection and ordering data

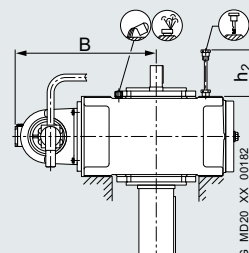
**H3.V**  
Dip lubrication  
2LP302-...52-....



**H3.V**  
Forced lubrication by flange-mounted pump  
2LP302-...52-....



**H3.V**  
Forced lubrication by motor pump  
2LP302-...52-....



Gear unit size		Dimensions in mm			
		High speed shaft (HSS)			
	$l_N$	$d_1$	$l_1$	$G_1$	
<b>9</b>	25 - 45	60 m6	125	230	
	50 - 63	45 m6	100		
	71 - 90	32 m6	80		
<b>10</b>	31.5 - 56	60 m6	125	230	
	63 - 80	45 m6	100		
	90 - 112	32 m6	80		
<b>11</b>	25 - 45	70 m6	120	255	
	50 - 63	50 m6	80		
	71 - 90	42 m6	70		
<b>12</b>	31.5 - 56	70 m6	120	255	
	63 - 80	50 m6	80		
	90 - 112	42 m6	70		

Gear unit size	Dimensions in mm																						
	a	$b_1$	c	E	$e_2$	$e_4$	$e_5$	$e_6$	$f_2$	$f_3^{1)}$	h	$h_1$	$h_2^{2)}$	$h_3$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$p_1^{3)}$	$p_2^{3)}$	s	$B^{4)}$
<b>9</b>	1000	330	45 ± 1.5	580	300	320	342	560	32	170	185	275	205	330	920	490	320	40	260	40	370	36 H9	570
<b>10</b>	1100	330	45 ± 1.5	630	350	320	342	610	32	170	185	275	205	330	1020	490	320	40	310	40	370	36 H9	570
<b>11</b>	1200	330	54 ± 1.5	705	345	380	402	595	35	170	215	275	240	340	1100	600	370	50	295	50	440	40 H9	630
<b>12</b>	1355	330	54 ± 1.5	775	430	380	410	680	35	170	215	275	240	340	1255	600	370	50	380	50	440	40 H9	630

For details on the shafts, see Chapter 9.

1) Flange-mounted pump not in connection with versions G, H and I.  
2) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

3) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.  
4) Max. dimensions; details acc. to order-related documentation.

# Helical gear units vertical mounting position

## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 9 to 12

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

					Oil quantity 1)	Oil quantity 1)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35					
					H3.V with dip lubrication	H3.V with forced lubrication	H3.V						
					Article No.:		<b>2LP302</b>	- - ■ ■ ■ .52-....					
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg	Solid shaft with parallel key <sup>4)</sup>					
<b>H3SV</b>	<b>9</b>	140 n6	250	235	110	73	875	<b>0 - 8 A</b>					
	<b>10</b>	160 n6	300	235	120	80	1020	<b>1 - 0 A</b>					
	<b>11</b>	170 n6	300	270	190	110	1400	<b>1 - 1 A</b>					
	<b>12</b>	180 n6	300	270	205	120	1675	<b>1 - 2 A</b>					
Type	Size	$D_2$	$G_4$	$l$	$l$	kg	Hollow shaft with keyway						
<b>H3HV</b>	<b>9</b>	135 H7	235	110	73	875	<b>0 - 8 B</b>						
	<b>10</b>	150 H7	235	120	80	1020	<b>1 - 0 B</b>						
	<b>11</b>	165 H7	270	190	110	1400	<b>1 - 1 B</b>						
	<b>12</b>	180 H7	270	205	120	1675	<b>1 - 2 B</b>						
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg	Hollow shaft for shrink disk				
<b>H3DV</b> <sup>3)</sup>	<b>9</b>	140 H7	145	235	330	110	73	875	<b>0 - 8 C</b>				
	<b>10</b>	150 H7	155	235	350	120	80	1020	<b>1 - 0 C</b>				
	<b>11</b>	165 H7	170	270	400	190	110	1400	<b>1 - 1 C</b>				
	<b>12</b>	180 H7	185	270	405	205	120	1675	<b>1 - 2 C</b>				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg	Hollow shaft with spline				
<b>H3KV</b>	<b>9</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	145	235	110	73	875	<b>0 - 8 D</b>				
	<b>10</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	155	235	120	80	1020	<b>1 - 0 D</b>				
	<b>11</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	170	270	190	110	1400	<b>1 - 1 D</b>				
	<b>12</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	185	270	205	120	1675	<b>1 - 2 D</b>				
Type	Size	c	$d_2$	$D_3$	$k_2$	n × s	t	$G_7$	$l$	$l$	kg	Flanged shaft	
<b>H3FV</b>	<b>9</b>	38	430	220 H6	380	20 × 26	12	350	110	73	960	<b>0 - 8 E</b>	
	<b>10</b>	38	470	240 H6	420	22 × 26	12	350	120	80	1110	<b>1 - 0 E</b>	
	<b>11</b>	42	510	260 H6	450	18 × 33	12	400	190	110	1530	<b>1 - 1 E</b>	
	<b>12</b>	42	540	280 H6	480	22 × 33	12	400	205	120	1815	<b>1 - 2 E</b>	

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Shaft version with reinforced bearing, see page 9/7.

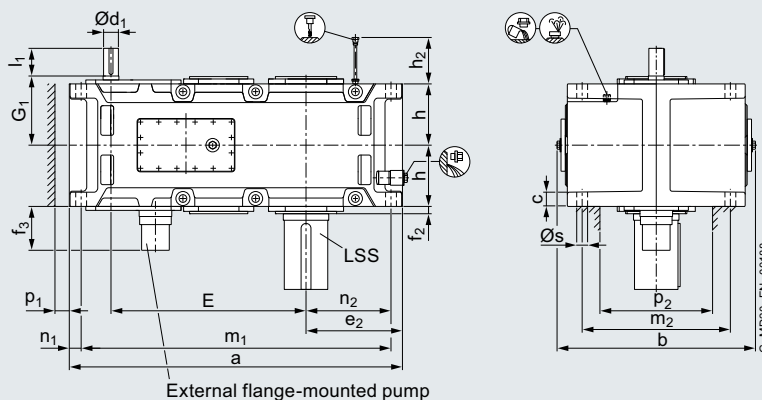
# Helical gear units vertical mounting position

Type H3

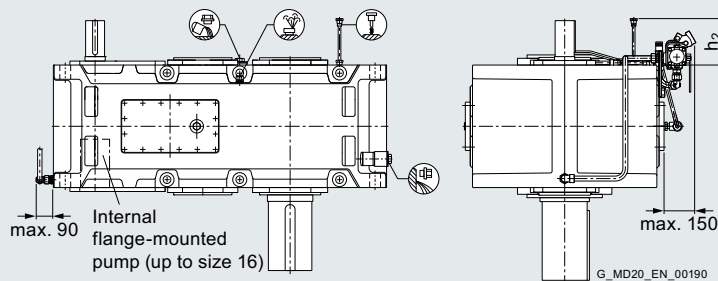
Gear unit dimensions, three-stage, gear unit sizes 13 to 16

## Selection and ordering data

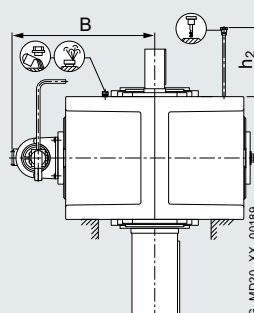
**H3.V**  
Forced lubrication by external flange-mounted pump  
2LP302-...52-....



**H3.V**  
Forced lubrication by internal flange-mounted pump  
2LP302-...52-....



**H3.V**  
Forced lubrication by motor pump  
2LP302-...52-....



Gear unit size		Dimensions in mm			
		High speed shaft (HSS)			
	$l_N$	$d_1$	$l_1$	$G_1$	
13	22.4 - 45	85 m6	160	310	
	50 - 63	60 m6	135		
	71 - 90	50 m6	110		
14	28 - 56	85 m6	160	310	
	63 - 80	60 m6	135		
	90 - 112	50 m6	110		
15	22.4 - 45	100 m6	200	350	
	50 - 63	75 m6	140		
	71 - 90	60 m6	140		
16	25 - 50	100 m6	200	350	
	56 - 71	75 m6	140		
	80 - 100	60 m6	140		

Gear unit size	Dimensions in mm																
	a	b	c	E	$e_2$	$f_2$	$f_3^{1)}$	h	$h_2^{2)}$	$m_1$	$m_2$	$n_1$	$n_2$	$p_1^{3)}$	$p_2^{3)}$	s	B <sup>4)</sup>
13	1395	900	61 ± 2	820	405	35	170	272.5	300	1300	680	50	360	50	500	48	685
14	1535	900	61 ± 2	890	475	35	170	272.5	300	1440	680	50	430	50	500	48	685
15	1680	980	72 ± 2	987	485	42	170	310	340	1565	750	60	430	50	570	55	730
16	1770	980	72 ± 2	1033	530	42	170	310	340	1655	750	60	475	50	570	55	730

For details on the shafts, see Chapter 9.

1) Flange-mounted pump not in connection with versions G, H and I.  
2) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

3) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.  
4) Max. dimensions; details acc. to order-related documentation.

# Helical gear units vertical mounting position

## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 13 to 16

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity <sup>1)</sup> H3.V with forced lubrication	Weight <sup>1) 2)</sup> H3.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35							
Article No.: <b>2LP302</b> - - - .52-....													
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg		Solid shaft with parallel key <sup>4)</sup>					
<b>H3SV</b>	<b>13</b>	200 n6	350	335	160	2155	1 - 3 A						
	<b>14</b>	210 n6	350	335	180	2490	1 - 4 A						
	<b>15</b>	230 n6	410	380	255	3260	1 - 5 A						
	<b>16</b>	240 n6	410	380	260	3625	1 - 6 A						
Type	Size	$D_2$	$G_4$	$l$	kg			Hollow shaft with keyway					
<b>H3HV</b>	<b>13</b>	190 H7	335	160	2155	1 - 3 B							
	<b>14</b>	210 H7	335	180	2490	1 - 4 B							
	<b>15</b>	230 H7	380	255	3260	1 - 5 B							
	<b>16</b>	240 H7	380	260	3625	1 - 6 B							
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	kg		Hollow shaft for shrink disk				
<b>H3DV</b> <sup>3)</sup>	<b>13</b>	190 H7	195	335	480	160	2155	1 - 3 C					
	<b>14</b>	210 H7	215	335	480	180	2490	1 - 4 C					
	<b>15</b>	230 H7	235	380	550	255	3260	1 - 5 C					
	<b>16</b>	240 H7	245	380	550	260	3625	1 - 6 C					
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	kg		Hollow shaft with spline				
<b>H3KV</b>	<b>13</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	195	335	160	2155	1 - 3 D					
	<b>14</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	215	335	180	2490	1 - 4 D					
	<b>15</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	235	380	255	3260	1 - 5 D					
	<b>16</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	245	380	260	3625	1 - 6 D					
Type	Size	c	$d_2$	$D_3$	$k_2$	n × s	t	$G_7$	$l$	kg			Flanged shaft
<b>H3FV</b>	<b>13</b>	48	580	310 H6	500	20 × 33	14	480	160	2315	1 - 3 E		
	<b>14</b>	48	620	310 H6	540	24 × 33	14	480	180	2660	1 - 4 E		
	<b>15</b>	55	710	360 H6	630	28 × 33	17	550	255	3500	1 - 5 E		
	<b>16</b>	55	740	360 H6	660	30 × 33	17	550	260	3880	1 - 6 E		

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Shaft version with reinforced bearing, see page 9/7.

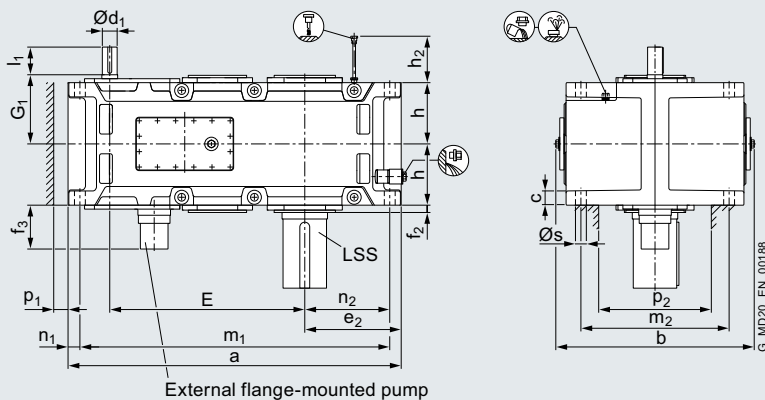
# Helical gear units vertical mounting position

Type H3

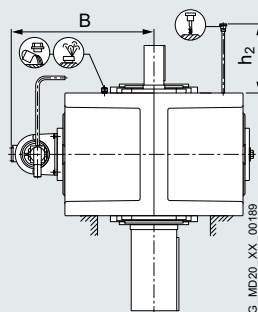
Gear unit dimensions, three-stage, gear unit sizes 17 to 20

## Selection and ordering data

**H3.V**  
Forced lubrication by  
external flange-  
mounted pump  
2LP302-...52-....



**H3.V**  
Forced lubrication  
by motor pump  
2LP302-...52-....



Gear unit size		Dimensions in mm			
		High speed shaft (HSS)			
	$l_N$	$d_1$	$l_1$	$G_1$	
17	22.4 - 45	100 m6	200	380	
	50 - 63	75 m6	140		
	71 - 90	60 m6	140		
18	25 - 50	100 m6	200	380	
	56 - 71	75 m6	140		
	80 - 100	60 m6	140		
19	22.4 - 45	100 m6	200	430	
	50 - 63	90 m6	165		
	71 - 90	75 m6	140		
20	25 - 50	100 m6	200	430	
	56 - 71	90 m6	165		
	80 - 100	75 m6	140		

Gear unit size	Dimensions in mm																
	a	b	c	E	$e_2$	$f_2$	$f_3^{1)}$	h	$h_2^{2)}$	$m_1$	$m_2$	$n_1$	$n_2$	$p_1^{3)}$	$p_2^{3)}$	s	B <sup>4)</sup>
17	1770	1110	81 ± 2	1035	525	42	210	340	374	1640	850	70	465	70	630	55	790
18	1890	1110	81 ± 2	1095	585	42	210	340	374	1760	850	70	525	70	630	55	790
19	2030	1222	91 ± 2	1190	590	55	O. r.	390	380	1885	950	78	520	70	700	65	On request
20	2150	1222	91 ± 2	1250	650	55	O. r.	390	380	2005	950	78	580	70	700	65	On request

For details on the shafts, see Chapter 9.

- 1) Values  $f_3$  for size 19 or larger on request; flange-mounted pump not in connection with versions G, H and I.
- 2) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

- 3) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.
- 4) Max. dimensions; details acc. to order-related documentation.



# Helical gear units vertical mounting position

## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 17 to 20

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

						Oil quantity <sup>1)</sup> H3.V with forced lubrication	Weight <sup>1) 2)</sup> H3.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35					
						Article No.: <b>2LP302</b> ■ - ■ ■ .52-....							
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	kg			Solid shaft with parallel key <sup>4)</sup>				
<b>H3SV</b>	<b>17</b>	250 n6	410	415	325	4250	1 - 7 A						
	<b>18</b>	270 n6	470	415	335	4740	1 - 8 A						
	<b>19</b>	290 n6	470	465	On request		2 - 0 A						
	<b>20</b>	300 n6	500	465		2 - 1 A							
Type	Size	D <sub>2</sub>	G <sub>4</sub>	l	kg			Hollow shaft with keyway					
<b>H3HV</b>	<b>17</b>	250 H7	415	325	4250	1 - 7 B							
	<b>18</b>	275 H7	415	335	4740	1 - 8 B							
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	kg		Hollow shaft for shrink disk				
<b>H3DV</b> <sup>3)</sup>	<b>17</b>	250 H7	260	415	600	325	4250	1 - 7 C					
	<b>18</b>	280 H7	285	415	600	335	4740	1 - 8 C					
	<b>19</b>	285 H7	295	465	670	On request		2 - 0 C					
	<b>20</b>	310 H7	315	465	670		2 - 1 C						
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	kg		Hollow shaft with spline				
<b>H3KV</b>	<b>17</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	260	415	325	4250	1 - 7 D					
	<b>18</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	285	415	335	4740	1 - 8 D					
	<b>19</b>	On request						2 - 0 D					
	<b>20</b>							2 - 1 D					
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n × s	t	G <sub>7</sub>	l	kg			Flanged shaft
<b>H3FV</b>	<b>17</b>	60	750	410 H6	660	24 × 39	18	600	325	4550	1 - 7 E		
	<b>18</b>	60	800	410 H6	710	26 × 39	18	600	335	5090	1 - 8 E		
	<b>19</b>	65	860	460 H6	770	30 × 39	18	670	On request		2 - 0 E		
	<b>20</b>	65	930	460 H6	830	32 × 39	18	670		2 - 1 E			

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Shaft version with reinforced bearing (up to size 18), see page 9/7.

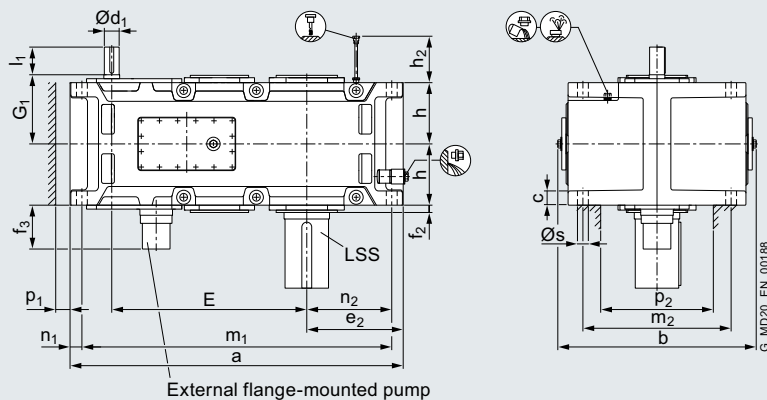
# Helical gear units vertical mounting position

Type H3

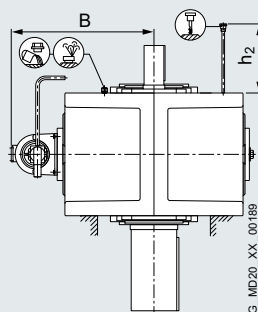
Gear unit dimensions, three-stage, gear unit sizes 21 to 24

## Selection and ordering data

**H3.V**  
Forced lubrication by  
external flange-  
mounted pump  
2LP302-...52-....



**H3.V**  
Forced lubrication  
by motor pump  
2LP302-...52-....



Gear unit size		Dimensions in mm			
		High speed shaft (HSS)			
	$l_N$	$d_1$	$l_1$	$G_1$	
21	22.4 - 45	130 n6	240	470	
	50 - 63	110 n6	205		
	71 - 90	90 m6	170		
22	25 - 50	130 n6	240	470	
	56 - 71	110 n6	205		
	80 - 100	90 m6	170		
23	22.4 - 40	130 n6	255	515	
	45 - 56	110 n6	220		
	63 - 90	90 m6	185		
24	25 - 45	130 n6	255	515	
	50 - 63	110 n6	220		
	71 - 100	90 m6	185		

Gear unit size	Dimensions in mm																
	a	b	c	E	$e_2$	$f_2$	$f_3^{1)}$	h	$h_2^{2)}$	$m_1$	$m_2$	$n_1$	$n_2$	$p_1^{3)}$	$p_2^{3)}$	s	B
21	2340	1378	100 ± 2	1387	655	60	O. r.	410	390	2200	1040	90	585	70	720	75	On request
22	2450	1378	100 ± 2	1442	710	60	O. r.	410	390	2295	1040	90	640	70	720	75	
23	On request																
24	On request																

For details on the shafts, see Chapter 9.

1) Values  $f_3$  for size 19 or larger on request; flange-mounted pump not in connection with versions G, H and I.

2) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

3) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

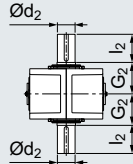
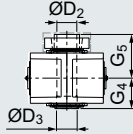
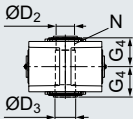
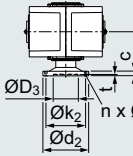
# Helical gear units vertical mounting position

## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 21 to 24

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

					Oil quantity H3.V with forced lubrication	Weight H3.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35							
					Article No.:	2LP302	■ - ■ ■	.52-....						
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg	Solid shaft with parallel key							
<b>H3SV</b>	<b>21</b>	320 n6	500	490	On request		2 - 2 A							
	<b>22</b>	340 n6	550	490			2 - 3 A							
	<b>23</b>	360 n6	590	540			2 - 4 A							
	<b>24</b>	380 n6	590	540			2 - 5 A							
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	kg	Hollow shaft for shrink disk						
<b>H3DV</b> 1)	<b>21</b>	330 H7	335	490	715	On request		2 - 2 C						
	<b>22</b>	340 H7	345	490	725			2 - 3 C						
	<b>23</b>	370 H7	375	540	800			2 - 4 C						
	<b>24</b>	390 H7	395	540	825			2 - 5 C						
Type	Size	N/DIN 5480 $D_2$	$D_3$	$G_4$	$l$	kg	Hollow shaft with spline							
<b>H3KV</b>	<b>21</b>	On request						2 - 2 D						
	<b>22</b>							2 - 3 D						
Type	Size	$c$	$d_2$	$D_3$	$k_2$	$n \times s$	$t$	$G_7$	$l$	kg	Flanged shaft			
<b>H3FV</b>	<b>21</b>	75	950	520 H6	850	28 × 45	20	710	On request		2 - 2 E			
	<b>22</b>	75	1040	520 H6	940	28 × 45	20	710					2 - 3 E	

Shaft seals, [see pages 10/2 onwards](#).

For details on the shafts, [see Chapter 9](#).

Cooling options, [see page 10/11 onwards](#).

<sup>1)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

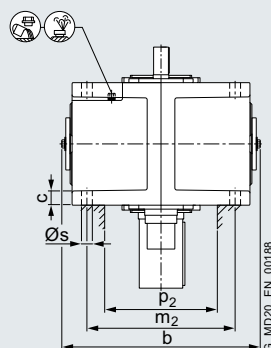
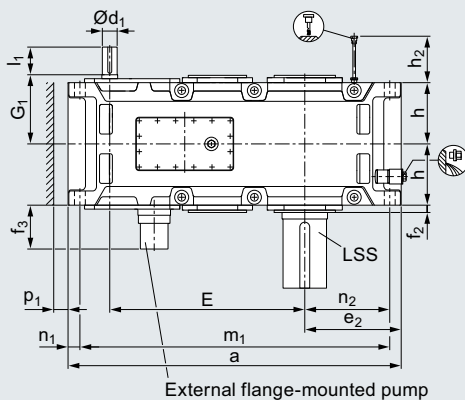
# Helical gear units vertical mounting position

Type H3

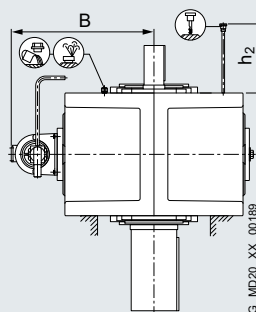
Gear unit dimensions, three-stage, gear unit sizes 25 and 26

## Selection and ordering data

**H3.V**  
Forced lubrication by external flange-mounted pump  
2LP302-...52-....



**H3.V**  
Forced lubrication by motor pump  
2LP302-...52-....



Gear unit size		Dimensions in mm		
		High speed shaft (HSS)		
	$l_N$	$d_1$	$l_1$	$G_1$
<b>25</b>	22.4 - 40	150 n6	255	580
	45 - 56	130 n6	255	
	63 - 90	100 m6	220	
<b>26</b>	25 - 45	150 n6	255	580
	50 - 63	130 n6	255	
	71 - 100	100 m6	220	

Gear unit size	Dimensions in mm																
	a	b	c	E	$e_2$	$f_2$	$f_3$	h	$h_2$	$m_1$	$m_2$	$n_1$	$n_2$	$p_1$	$p_2$	s	B
<b>25</b>	On request																
<b>26</b>	On request																

# Helical gear units vertical mounting position

## Type H3

### Gear unit dimensions, three-stage, gear unit sizes 25 and 26

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

					Oil quantity H3.V with forced lubrication	Weight H3.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35	
					Article No.: <b>2LP302</b> ■ - ■ ■ .52-....			
Type	Size	$d_2$	$l_2$	$G_2$	l	kg	Solid shaft with parallel key	
<b>H3SV</b>	<b>25</b>	400 n6	650	605	On request		<b>2 - 6 A</b>	
	<b>26</b>	420 n6	650	605				
	<b>27</b>	440 n6	690	680				
	<b>28</b>	460 n6	750	680				
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	l	kg	Hollow shaft for shrink disk
<b>H3DV</b> 1)	<b>25</b>	410 H7	415	610	895	On request		
	<b>26</b>	430 H7	435	610	925			

Shaft seals, [see pages 10/2 onwards](#).

For details on the shafts, [see Chapter 9](#).

Cooling options, [see page 10/11 onwards](#).

<sup>1)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

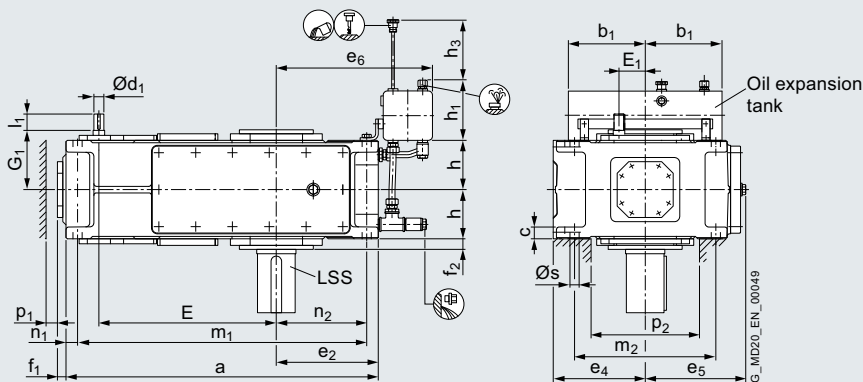
# Helical gear units vertical mounting position

Type H4

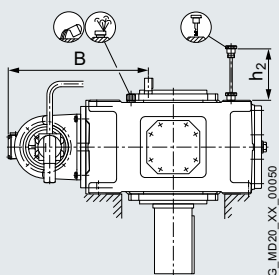
Gear unit dimensions, four-stage, gear unit sizes 7 to 12

## Selection and ordering data

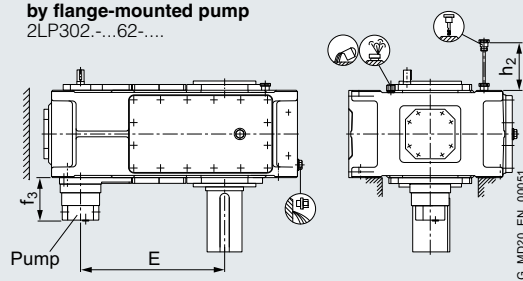
**H4.V**  
Dip lubrication  
2LP302-...62-....



**H4.V**  
Forced lubrication  
by motor pump  
2LP302-...62-....



**H4.V**  
Forced lubrication  
by flange-mounted pump  
2LP302-...62-....



Gear unit size	Dimensions in mm			
	$l_N$	$d_1$	$l_1$	$G_1$
7	100 - 180	30 m6	50	180
	200 - 355	24 k6	40	
8	125 - 224	30 m6	50	180
	250 - 450	24 k6	40	
9	100 - 180	35 m6	60	215
	200 - 355	28 m6	50	
10	125 - 224	35 m6	60	215
	250 - 450	28 m6	50	
11	100 - 180	45 m6	100	250
	200 - 355	32 m6	80	
12	125 - 224	45 m6	100	250
	250 - 450	32 m6	80	

Gear unit size	Dimensions in mm																							
	a	$b_1$	c	E	$E_1$	$e_2$	$e_4$	$e_5$	$e_6$	$f_1$	$f_2$	$f_{3(1)}$	h	$h_1$	$h_{2(2)}$	$h_3$	$m_1$	$m_2$	$n_1$	$n_2$	$p_{1(3)}$	$p_{2(3)}$	s	$B^{(4)}$
7	845	240	36 ± 1	495	80	250	280	292	425	37	30	160	150	205	165	250	775	430	35	215	35	330	28 H9	540
8	950	240	36 ± 1	540	80	310	280	302	485	37	32	160	150	205	165	250	880	430	35	275	35	330	28 H9	540
9	1000	330	45 ± 1.5	580	90	300	320	342	560	43	32	170	185	275	205	330	920	490	40	260	40	370	36 H9	580
10	1100	330	45 ± 1.5	630	90	350	320	342	610	43	32	170	185	275	205	330	1020	490	40	310	40	370	36 H9	580
11	1200	330	54 ± 1.5	705	110	345	380	402	595	47	35	170	215	275	240	340	1100	600	50	295	50	440	40 H9	640
12	1355	330	54 ± 1.5	775	110	430	380	410	680	47	35	170	215	275	240	340	1255	600	50	380	50	440	40 H9	640

For details on the shafts, see Chapter 9.

- 1) Flange-mounted pump not in connection with versions G, H and I; free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.
- 2) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring. Details acc. to order-related documentation.
- 3) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.
- 4) Max. dimensions; details acc. to order-related documentation.

# Helical gear units vertical mounting position

## Type H4

### Gear unit dimensions, four-stage, gear unit sizes 7 to 12

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity 1)	Oil quantity 1)	Weight 1) 2)			10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35				
				H4.V with dip lubrication	H4.V with forced lubrication	H4.V							
				Article No.:		2LP302	- .62-....						
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg			Solid shaft with parallel key 4)			
H4SV	7	120 n6	210	195	60	44	550	0 - 6 A					
	8	130 n6	250	195	65	48	645	0 - 7 A					
	9	140 n6	250	235	105	78	875	0 - 8 A					
	10	160 n6	300	235	110	81	1010	1 - 0 A					
	11	170 n6	300	270	175	113	1460	1 - 1 A					
	12	180 n6	300	270	200	129	1725	1 - 2 A					
Type	Size	$D_2$	$G_4$	$l$	$l$	kg			Hollow shaft with keyway				
H4HV	7	115 H7	195	60	44	550	0 - 6 B						
	8	125 H7	195	65	48	645	0 - 7 B						
	9	135 H7	235	105	78	875	0 - 8 B						
	10	150 H7	235	110	81	1010	1 - 0 B						
	11	165 H7	270	175	113	1460	1 - 1 B						
	12	180 H7	270	200	129	1725	1 - 2 B						
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg	Hollow shaft for shrink disk				
H4DV 3)	7	120 H7	120	195	280	60	44	550	0 - 6 C				
	8	130 H7	130	195	285	65	48	645	0 - 7 C				
	9	140 H7	145	235	330	105	78	875	0 - 8 C				
	10	150 H7	155	235	350	110	81	1010	1 - 0 C				
	11	165 H7	170	270	400	175	113	1460	1 - 1 C				
	12	180 H7	185	270	405	200	129	1725	1 - 2 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg	Hollow shaft with spline				
H4KV	7	N120 × 3 × 30 × 38 × 9H	114 H11	120	195	60	44	550	0 - 6 D				
	8	N120 × 3 × 30 × 38 × 9H	114 H11	130	195	65	48	645	0 - 7 D				
	9	N140 × 3 × 30 × 45 × 9H	134 H11	145	235	105	78	875	0 - 8 D				
	10	N140 × 3 × 30 × 45 × 9H	134 H11	155	235	110	81	1010	1 - 0 D				
	11	N170 × 5 × 30 × 32 × 9H	160 H11	170	270	175	113	1460	1 - 1 D				
	12	N170 × 5 × 30 × 32 × 9H	160 H11	185	270	200	129	1725	1 - 2 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	n × s	t	$G_7$	$l$	$l$	kg	Flanged shaft	
H4FV	7	30	370	180 H6	320	16 × 26	10	300	60	44	600	0 - 6 E	
	8	30	390	190 H6	340	18 × 26	10	300	65	48	700	0 - 7 E	
	9	38	430	220 H6	380	20 × 26	12	350	105	78	960	0 - 8 E	
	10	38	470	240 H6	420	22 × 26	12	350	110	81	1100	1 - 0 E	
	11	42	510	260 H6	450	18 × 33	12	400	175	113	1590	1 - 1 E	
	12	42	540	280 H6	480	22 × 33	12	400	200	129	1865	1 - 2 E	

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

3) Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

4) Shaft version with reinforced bearing, see page 9/7.

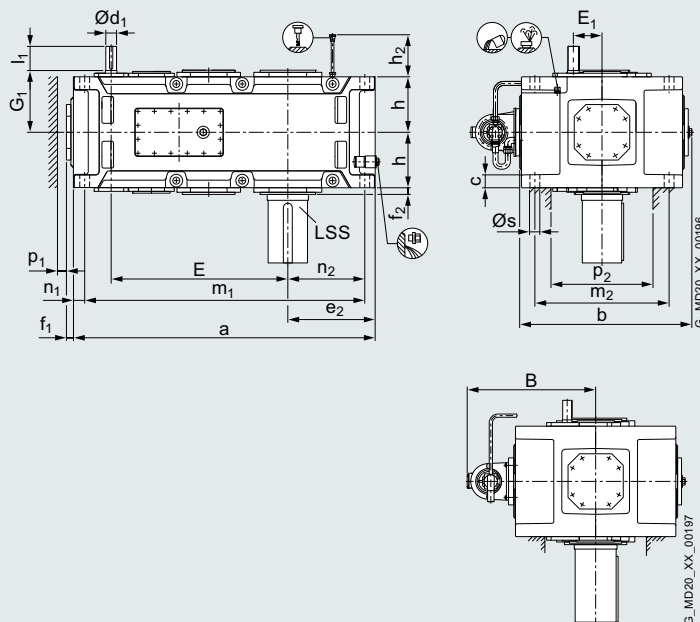
# Helical gear units vertical mounting position

Type H4

Gear unit dimensions, four-stage, gear unit sizes 13 to 18

## Selection and ordering data

**H4.V**  
Forced lubrication  
by motor pump  
2LP302-...62-...



Gear unit size		Dimensions in mm		
		High speed shaft (HSS)		
	$l_N$	$d_1$	$l_1$	$G_1$
13	100 - 180	50 m6	100	305
	200 - 355	38 m6	80	
14	125 - 224	50 m6	100	305
	250 - 450	38 m6	80	
15	100 - 180	60 m6	135	345
	200 - 235	50 m6	110	
16	112 - 200	60 m6	135	345
	224 - 400	50 m6	110	
17	100 - 180	60 m6	105	380
	200 - 355	50 m6	80	
18	112 - 200	60 m6	105	380
	224 - 400	50 m6	80	

Gear unit size	a	b	c	E	$E_1$	$e_2$	$f_1$	$f_2$	h	$h_{21)$	$m_1$	$m_2$	$n_1$	$n_2$	$p_1^{2)}$	$p_2^{2)}$	s	$B^{3)}$
13	1395	900	61 ± 2	820	130	405	47	35	272.5	300	1300	680	50	360	50	500	48	690
14	1535	900	61 ± 2	890	130	475	47	35	272.5	300	1440	680	50	430	50	500	48	690
15	1680	980	72 ± 2	987	160	485	56	42	310	340	1565	750	60	430	60	570	55	730
16	1770	980	72 ± 2	1033	160	530	56	42	310	340	1655	750	60	475	60	570	55	730
17	1770	1110	81 ± 2	1035	160	525	53	42	340	374	1640	850	70	465	70	630	55	790
18	1890	1110	81 ± 2	1095	160	585	53	42	340	374	1760	850	70	525	70	630	55	790

For details on the shafts, see Chapter 9.

1) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring. Details acc. to order-related documentation.

2) Free space for cover; please contact us for exact dimensions, if applicable.

3) Max. dimensions; details acc. to order-related documentation.



# Helical gear units vertical mounting position

## Type H4

### Gear unit dimensions, four-stage, gear unit sizes 13 to 18

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

										Oil quantity <sup>1)</sup> H4.V with forced lubrication	Weight <sup>1) 2)</sup> H4.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35			
										Article No.:	2LP302	-	-	-	.62-....
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	kg			Solid shaft with parallel key <sup>4)</sup>						
<b>H4SV</b>	<b>13</b>	200 n6	350	335	140	2270	1	-	3	A					
	<b>14</b>	210 n6	350	335	160	2600	1	-	4	A					
	<b>15</b>	230 n6	410	380	220	3440	1	-	5	A					
	<b>16</b>	240 n6	410	380	230	3740	1	-	6	A					
	<b>17</b>	250 n6	410	415	280	4445	1	-	7	A					
	<b>18</b>	270 n6	470	415	300	4915	1	-	8	A					
Type	Size	D <sub>2</sub>	G <sub>4</sub>	l	kg			Hollow shaft with keyway							
<b>H4HV</b>	<b>13</b>	190 H7	335	140	2270	1	-	3	B						
	<b>14</b>	210 H7	335	160	2600	1	-	4	B						
	<b>15</b>	230 H7	380	220	3440	1	-	5	B						
	<b>16</b>	240 H7	380	230	3740	1	-	6	B						
	<b>17</b>	250 H7	415	280	4445	1	-	7	B						
	<b>18</b>	275 H7	415	300	4915	1	-	8	B						
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	kg			Hollow shaft for shrink disk					
<b>H4DV</b> <sup>3)</sup>	<b>13</b>	190 H7	195	335	480	140	2270	1	-	3	C				
	<b>14</b>	210 H7	215	335	480	160	2600	1	-	4	C				
	<b>15</b>	230 H7	235	380	550	220	3440	1	-	5	C				
	<b>16</b>	240 H7	245	380	550	230	3740	1	-	6	C				
	<b>17</b>	250 H7	260	415	600	280	4445	1	-	7	C				
	<b>18</b>	280 H7	285	415	600	300	4915	1	-	8	C				
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	kg			Hollow shaft with spline					
<b>H4KV</b>	<b>13</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	195	335	140	2270	1	-	3	D				
	<b>14</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	215	335	160	2600	1	-	4	D				
	<b>15</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	235	380	220	3440	1	-	5	D				
	<b>16</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	245	380	230	3740	1	-	6	D				
	<b>17</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	260	415	280	4445	1	-	7	D				
	<b>18</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	285	415	300	4915	1	-	8	D				
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n × s	t	G <sub>7</sub>	l	kg	Flanged shaft				
<b>H4FV</b>	<b>13</b>	48	580	310 H6	500	20 × 33	14	480	140	2430	1	-	3	E	
	<b>14</b>	48	620	310 H6	540	24 × 33	14	480	160	2770	1	-	4	E	
	<b>15</b>	55	710	360 H6	630	28 × 33	17	550	220	3680	1	-	5	E	
	<b>16</b>	55	740	360 H6	660	30 × 33	17	550	230	3995	1	-	6	E	
	<b>17</b>	60	750	410 H6	660	24 × 39	18	600	280	4745	1	-	7	E	
	<b>18</b>	60	800	410 H6	710	26 × 39	18	600	300	5265	1	-	8	E	

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Shaft version with reinforced bearing, see page 9/7.

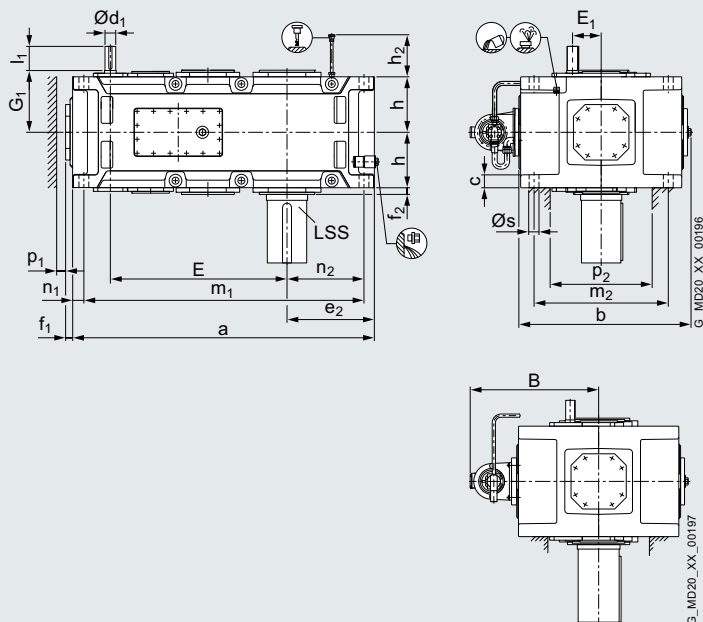
# Helical gear units vertical mounting position

Type H4

## Gear unit dimensions, four-stage, gear unit sizes 19 to 22

### Selection and ordering data

**H4.V**  
Forced lubrication  
by motor pump  
2LP302-...62-....



Gear unit size		Dimensions in mm			
Gear unit size		High speed shaft (HSS)			
	$l_N$	$d_1$	$l_1$	$G_1$	
<b>19</b>	100 - 180	75 m6	105	440	
	200 - 355	60 m6	105		
<b>20</b>	112 - 200	75 m6	105	440	
	224 - 400	60 m6	105		
<b>21</b>	100 - 180	90 m6	165	460	
	200 - 355	70 m6	140		
<b>22</b>	112 - 200	90 m6	165	460	
	224 - 400	70 m6	140		

Gear unit size	a	b	c	E	$E_1$	$e_2$	$f_1$	$f_2$	h	$h_2^{1)}$	$m_1$	$m_2$	$n_1$	$n_2$	$p_1^{2)}$	$p_2^{2)}$	s	B
<b>19</b>	2030	1222	91 ±2	1190	185	590	53	55	390	380	1885	950	78	520	70	700	65	On request
<b>20</b>	2150	1222	91 ±2	1250	185	650	53	55	390	380	2005	950	78	580	70	700	65	
<b>21</b>	2340	1378	100 ±2	1387	225	655	62	60	410	390	2185	1040	90	585	70	720	75	
<b>22</b>	2450	1378	100 ±2	1442	225	710	62	60	410	390	2295	1040	90	640	70	720	75	

For details on the shafts, see Chapter 9.

<sup>1)</sup> For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring. Details acc. to order-related documentation.

<sup>2)</sup> Free space for cover; please contact us for exact dimensions, if applicable.

# Helical gear units vertical mounting position Type H4

## Gear unit dimensions, four-stage, gear unit sizes 19 to 22

### Selection and ordering data (continued)

#### Low speed shaft (LSS)

					Oil quantity H4.V with forced lubrication	Weight H4.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35					
Article No.: <b>2LP302</b> ■ - ■ ■ .62-....												
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	kg	Solid shaft with parallel key					
<b>H4SV</b>	<b>19</b>	290 n6	470	465	On request		2 - 0 A					
	<b>20</b>	300 n6	500	465			2 - 1 A					
	<b>21</b>	320 n6	500	490			2 - 2 A					
	<b>22</b>	340 n6	550	490			2 - 3 A					
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	kg	Hollow shaft for shrink disk				
<b>H4DV</b> 1)	<b>19</b>	285 H7	295	465	670	On request		2 - 0 C				
	<b>20</b>	310 H7	315	465	670			2 - 1 C				
	<b>21</b>	330 H7	335	490	715			2 - 2 C				
	<b>22</b>	340 H7	345	490	725			2 - 3 C				
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	kg	Hollow shaft with spline				
<b>H4KV</b>	<b>19</b>	On request						2 - 0 D				
	<b>20</b>							2 - 1 D				
	<b>21</b>							2 - 2 D				
	<b>22</b>							2 - 3 D				
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n x s	t	G <sub>7</sub>	l	kg	Flanged shaft	
<b>H4FV</b>	<b>19</b>	65	860	460 H6	770	30 x 39	18	670	On request		2 - 0 E	
	<b>20</b>	65	930	460 H6	830	32 x 39	18	670			2 - 1 E	
	<b>21</b>	75	950	520 H6	850	28 x 45	20	710			2 - 2 E	
	<b>22</b>	75	1040	520 H6	940	28 x 45	20	710			2 - 3 E	

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.



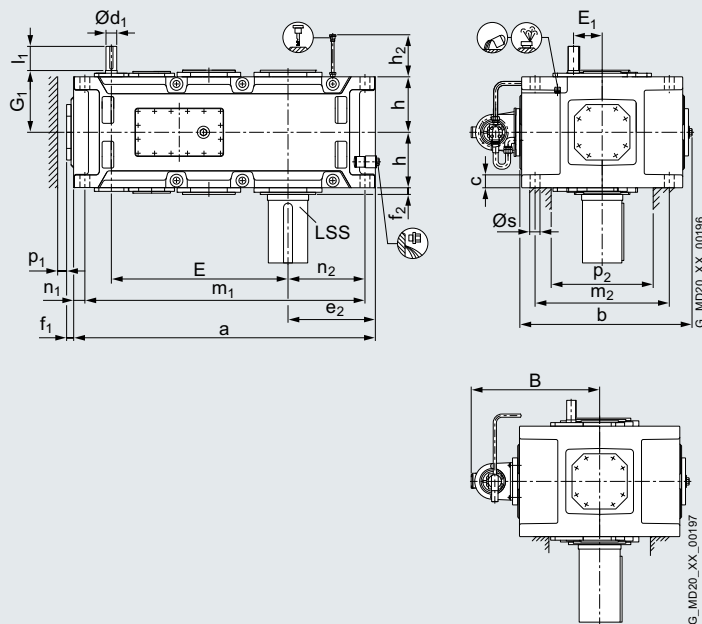
# Helical gear units vertical mounting position

Type H4

Gear unit dimensions, four-stage, gear unit sizes 23 to 26

## Selection and ordering data

**H4.V**  
Forced lubrication  
by motor pump  
2LP302-...62-....



Gear unit size	Dimensions in mm			
	$l_N$	$d_1$	$l_1$	$G_1$
<b>23</b>	100 - 160	90 m6	165	515
	180 - 355	70 m6	140	
<b>24</b>	112 - 180	90 m6	165	515
	200 - 400	70 m6	140	
<b>25</b>	100 - 160	100 m6	205	575
	180 - 355	85 m6	170	
<b>26</b>	112 - 180	100 m6	205	575
	200 - 400	85 m6	170	

Gear unit size	Dimensions in mm																
	a	b	c	E	$E_1$	$e_2$	$f_1$	$f_2$	h	$h_2$	$m_1$	$m_2$	$n_1$	$n_2$	$p_1$	$p_2$	s
<b>23</b>	On request																
<b>24</b>	On request																
<b>25</b>	On request																
<b>26</b>	On request																

For details on the shafts, see Chapter 9.

# Helical gear units vertical mounting position

Type H4 / Types H2, H3 and H4

## Gear unit dimensions, four-stage, gear unit sizes 23 to 26

### Selection and ordering data (continued)

#### Low speed shaft (LSS)

					Oil quantity H4.V with forced lubrication	Weight H4.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 5/31 to 5/35				
					Article No.:	2LP302	-	-	-	.62-....	
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	kg	Solid shaft with parallel key				
H4SV	23	360 n6	590	540	On request		2 - 4	A			
	24	380 n6	590	540			2 - 5	A			
	25	400 n6	650	605			2 - 6	A			
	26	420 n6	650	605			2 - 7	A			
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	kg	Hollow shaft for shrink disk			
H4DV <sup>1)</sup>	23	370 H7	375	540	800	On request		2 - 4	C		
	24	390 H7	395	540	825			2 - 5	C		
	25	410 H7	415	610	895			2 - 6	C		
	26	430 H7	435	610	925			2 - 7	C		

### Article No. overview

#### Article No., 10th to 12th position

				Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code	
				Article No.	2LP302	.	-	.	.	.	.	.	.	.	.	-Z	
Ratio																	
Type	H2.V	H3.V	H4.V														
i <sub>N</sub>	6.3	22.4	100														
i <sub>N</sub>	7.1	25	112														
i <sub>N</sub>	8	28	125														
i <sub>N</sub>	9	31.5	140														
i <sub>N</sub>	10	35.5	160														
i <sub>N</sub>	11.2	40	180														
i <sub>N</sub>	12.5	45	200														
i <sub>N</sub>	14	50	224														
i <sub>N</sub>	16	56	250														
i <sub>N</sub>	18	63	280														
i <sub>N</sub>	20	71	315														
i <sub>N</sub>	22.4	80	355														
i <sub>N</sub>	25	90	400														
i <sub>N</sub>	28	100	450														
i <sub>N</sub>	-	112	-														
Type designation																	
Type H2											4						
Type H3											5						
Type H4											6						
Mounting position																	
Mounting position V											2						

Shaft seals, see pages 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.



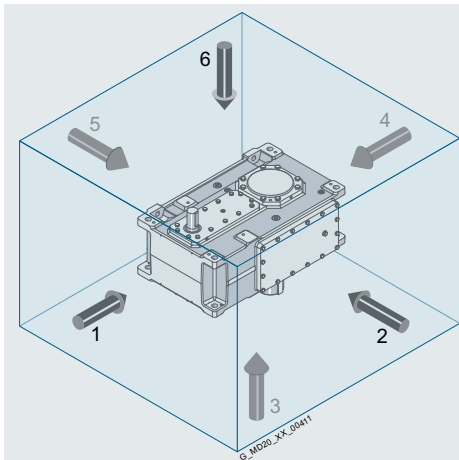
# Helical gear units vertical mounting position

Types H2, H3 and H4

## Article No. overview

### Selection and ordering data (continued)

#### Article No., 13th position



Data position of the Article No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.	2LP302 . . . . .																Z . . . .

#### Variants/shaft arrangement (looking at side 2)

Type			
H2.V	H3.V	H4.V	

<b>A</b>	 G_MD20_XX_00203	 G_MD20_XX_00204	 G_MD20_XX_00205	0 1 2 3
<b>B</b>	 G_MD20_XX_00206	 G_MD20_XX_00207	 G_MD20_XX_00208	
<b>C</b>	 G_MD20_XX_00209	 G_MD20_XX_00210	 G_MD20_XX_00211	
<b>D</b>	 G_MD20_XX_00212	 G_MD20_XX_00213	 G_MD20_XX_00214	

- Expansion tank
- Flange-mounted pump

# Helical gear units vertical mounting position

Types H2, H3 and H4

Article No. overview

## Selection and ordering data (continued)

				Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code	
				Article No.	2LP302 . . . . .												Z . . . .
Variants/shaft arrangement (looking at side 2)																	
Type	H1.V	H2.V	H3.V	H4.V													
E -																	4
F																	5
G																	6
H																	7
I																	8

The versions E and F with slow speed shaft at both ends are only relevant for the shaft variants

- "S" (solid shaft with parallel key acc. to DIN 6885/1)
- "V" (reinforced solid shaft with parallel key acc. to DIN 6885/1)
- "C" (solid shaft for zero-backlash taper clamping connection)

- Expansion tank
- Flange-mounted pump

The solid shaft extension shown represents the driven machine shaft insertion side for hollow shafts.

The slow speed hollow shaft "H" (hollow shaft with keyway according to DIN 6885/1) is generally suitable for fitting on both ends.

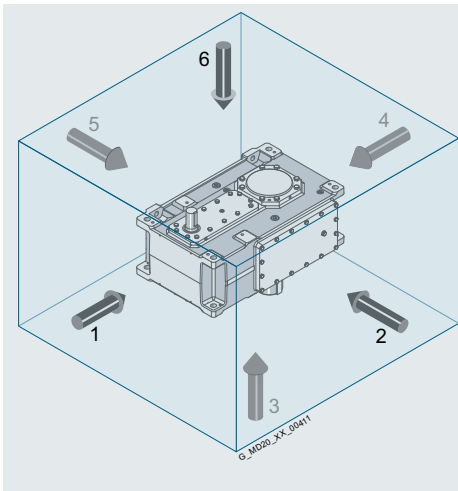


# Helical gear units vertical mounting position

Types H2, H3 and H4

## Article No. overview

### Selection and ordering data (continued)



### Article No. supplement, 14th position

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.	<b>2LP302</b>	.	-	.	.	.	.	.	.	■	.	.	-Z ■ ■ ■
<b>Sealing single-side high speed shaft (HSS)</b>													
Radial shaft seal													A
Taconite E													E
Radial shaft seal with dry-running protection													K
<b>Sealing double-extended high speed shaft (HSS)</b>													
Side 3: Radial shaft seal/Side 6: Radial shaft seal										Z			P 0 A
Side 3: Dual radial shaft seal/Side 6: Dual radial shaft seal										Z			P 0 B
Side 3: Taconite E/Side 6: Taconite E										Z			P 0 E
Side 3: Radial shaft seal/Side 6: Taconite E										Z			P 1 A
Side 3: Taconite E/Side 6: Radial shaft seal										Z			P 1 B
Side 3: Radial shaft seal/ Side 6: Radial shaft seal with dry-running protection										Z			P 1 D
Side 3: Taconite E/Side 6: Radial shaft seal with dry-running protection										Z			P 1 E

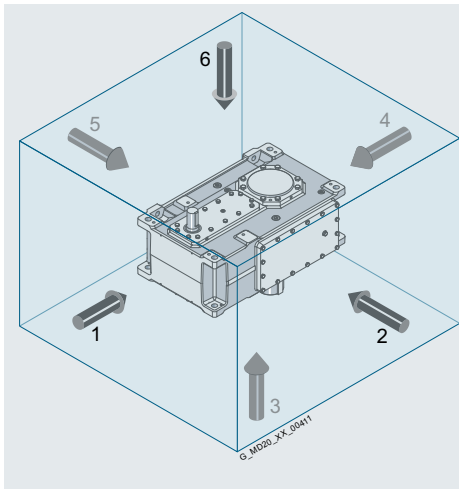


# Helical gear units vertical mounting position

Types H2, H3 and H4

Article No. overview

## Selection and ordering data (continued)



### Article No. supplement, 15th and 16th position

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.		<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z</b>
<b>Sealing low speed shaft (LSS)</b>													
Radial shaft seal													<b>A</b>
Dual radial shaft seal													<b>B</b>
Taconite F													<b>E</b>
Taconite F-F													<b>F</b>
Taconite F-H													<b>G</b>
Taconite F-K													<b>H</b>
Radial shaft seal with dry-running protection													<b>K</b>
<b>Sealing double-extended low speed shaft (LSS)</b>													
Side 3: Radial shaft seal/Side 6: Radial shaft seal													<b>Z</b> <b>Q 0 A</b>
Side 3: Dual radial shaft seal/Side 6: Dual radial shaft seal													<b>Z</b> <b>Q 0 B</b>
Side 3: Taconite F/Side 6: Taconite F													<b>Z</b> <b>Q 0 E</b>
Side 3: Radial shaft seal/Side 6: Taconite F													<b>Z</b> <b>Q 1 A</b>
Side 3: Taconite F/Side 6: Radial shaft seal													<b>Z</b> <b>Q 1 B</b>
Side 3: Radial shaft seal/ Side 6: Radial shaft seal with dry-running protection													<b>Z</b> <b>Q 1 D</b>
<b>Shaft version</b>													
High speed shaft (HSS) version: Catalog version, low speed shaft (LSS) version: Catalog version													<b>0</b>
High speed shaft (HSS) version: Reinforced version, low speed shaft (LSS) version: Catalog version													<b>1</b>

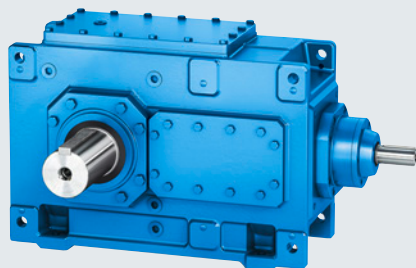


## Helical gear units vertical mounting position

### Notes

5

## Bevel helical gear units Horizontal mounting position



<b>6/2</b>	<b>Type B2</b> <u>Gear unit dimensions</u> Two-stage, gear unit sizes 4 to 8
6/2	Two-stage, gear unit sizes 9 to 12
6/4	Two-stage, gear unit sizes 13 to 18
6/6	Two-stage, gear unit sizes 13 to 18
<b>6/8</b>	<b>Type B3</b> <u>Gear unit dimensions</u> Three-stage, gear unit sizes 4 to 8
6/8	Three-stage, gear unit sizes 9 to 12
6/10	Three-stage, gear unit sizes 9 to 12
6/12	Three-stage, gear unit sizes 13 to 18
6/14	Three-stage, gear unit sizes 19 to 24
6/16	Three-stage, gear unit sizes 25 to 28
<b>6/18</b>	<b>Type B4</b> <u>Gear unit dimensions</u> Four-stage, gear unit sizes 5 to 8
6/18	Four-stage, gear unit sizes 5 to 8
6/20	Four-stage, gear unit sizes 9 to 12
6/22	Four-stage, gear unit sizes 13 to 18
6/24	Four-stage, gear unit sizes 19 to 24
6/26	Four-stage, gear unit sizes 25 to 28
<b>6/27</b>	<b>Types B2, B3 and B4</b> <u>Article No. overview</u> Article No., 10th to 12th position
6/27	Article No., 10th to 12th position
6/28	Article No., 13th position
6/30	Article No. supplement, 14th position
6/30	Article No. supplement, 15th and 16th position

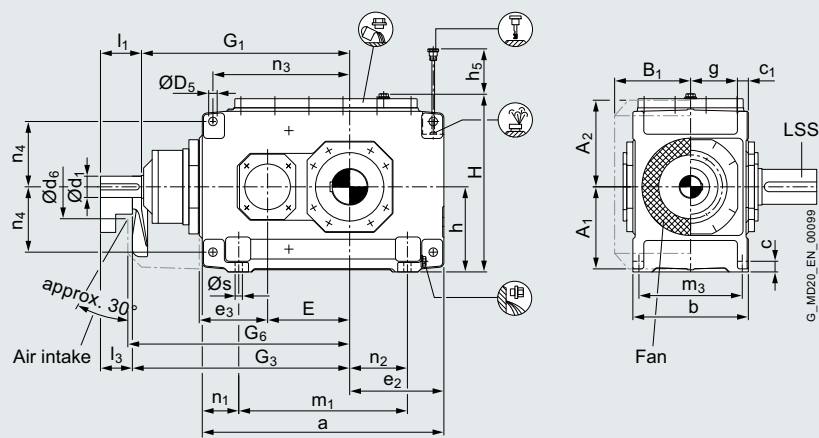
# Bevel helical gear units horizontal mounting position

## Type B2

### Gear unit dimensions, two-stage, gear unit sizes 4 to 8

#### Selection and ordering data

**B2.H**  
2LP302-...00-....



Gear unit size	Dimensions in mm														
	High speed shaft (HSS)									Fan					
	$i_N$	$d_1$	$l_1$	$l_3$	Reinforced shaft					$G_1$	$G_3$	$A_1$	$A_2$	$B_1$	$d_6$
4	5 - 11.2	45 m6	100	80	8 - 12.5	50 m6	110	90	465	485	195	200	188	150	495
	12.5 - 18	35 m6	80	60	14 - 16	40 m6	90	70							
5	5 - 11.2	55 m6	110	80	8 - 12.5	60 m6	120	90	535	565	220	235	215	160	575
	12.5 - 18	40 m6	100	70	14 - 16	50 m6	110	80							
6	6.3 - 14	55 m6	110	80	10 - 16	60 m6	120	90	570	600	220	235	215	160	610
	16 - 22.4	40 m6	100	70	18 - 20	50 m6	110	80							
7	5 - 11.2	70 m6	135	105	12.5	70 m6	135	105	640	670	270	285	250	210	685
	12.5 - 18	50 m6	110	80	14 - 16	60 m6	135	105							
8	6.3 - 14	70 m6	135	105	16	70 m6	135	105	685	715	310	285	250	210	730
	16 - 22.4	50 m6	110	80	18 - 20	60 m6	135	105							

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	$e_3$	H	g	$h^{1)}$	$h_5$	$m_1$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
4	505	270	28	$30 \pm 1$	24 H9	160	190	160	415	105	200	80	295	235	105	85	285	150	19
5	565	320	28	$30 \pm 1$	24 H9	185	205	185	482	130	230	150	355	285	105	100	330	180	19
6	645	320	28	$30 \pm 1$	24 H9	220	250	185	482	130	230	150	435	285	105	145	365	180	19
7	690	380	35	$36 \pm 1$	28 H9	225	250	225	582	154	280	180	450	340	120	130	405	215	24
8	795	380	35	$36 \pm 1$	28 H9	270	310	225	582	154	280	190	555	340	120	190	450	215	24

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

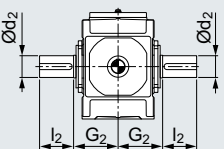
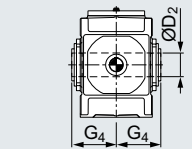
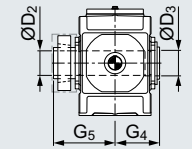
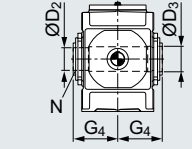
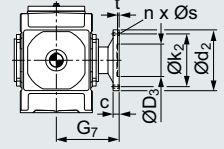
# Bevel helical gear units horizontal mounting position

## Type B2

### Gear unit dimensions, two-stage, gear unit sizes 4 to 8

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity 1)	Weight 1) 2)			10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30					
				B2.H	B2.H								
				Article No.: <b>2LP302</b>		■ - ■ ■ .00-....							
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg			Solid shaft with parallel key <sup>3)</sup>				
<b>B2SH</b>	4	80 m6	170	170	10	235	0 - 3	A					
	5	100 m6	210	200	16	360	0 - 4	A					
	6	110 n6	210	200	19	410	0 - 5	A					
	7	120 n6	210	235	31	615	0 - 6	A					
8	130 n6	250	235	34	700	0 - 7	A						
Type	Size	$D_2$	$G_4$	$l$	kg			Hollow shaft with keyway					
<b>B2HH</b>	4	80 H7	170	10	235	0 - 3	B						
	5	100 H7	200	16	360	0 - 4	B						
	6	110 H7	200	19	410	0 - 5	B						
	7	120 H7	235	31	615	0 - 6	B						
8	130 H7	235	34	700	0 - 7	B							
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	kg		Hollow shaft for shrink disk				
<b>B2DH</b>	4	85	85	170	235	10	235	0 - 3	C				
	5	100	100	200	275	16	360	0 - 4	C				
	6	110	110	200	275	19	410	0 - 5	C				
	7	120	120	235	320	31	615	0 - 6	C				
8	130	130	235	325	34	700	0 - 7	C					
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	kg		Hollow shaft with spline				
<b>B2KH</b>	5	N 95 × 3 × 30 × 30 × 9H	89 H11	100	200	16	360	0 - 4	D				
	6	N 95 × 3 × 30 × 30 × 9H	89 H11	110	200	19	410	0 - 5	D				
	7	N 120 × 3 × 30 × 38 × 9H	114 H11	120	235	31	615	0 - 6	D				
	8	N 120 × 3 × 30 × 38 × 9H	114 H11	130	235	34	700	0 - 7	D				
Type	Size	c	$d_2$	$D_3$	$k_2$	n × s	t	$G_7$	$l$	kg		Flanged shaft	
<b>B2FH</b>	5	25	300	150	260	16 × 22	10	290	16	400	0 - 4	E	
	6	25	320	160	280	18 × 22	10	290	19	455	0 - 5	E	
	7	30	370	180	320	16 × 26	10	340	31	670	0 - 6	E	
	8	30	390	190	340	18 × 26	10	340	34	760	0 - 7	E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

3) Shaft version with reinforced bearing, see page 9/7.

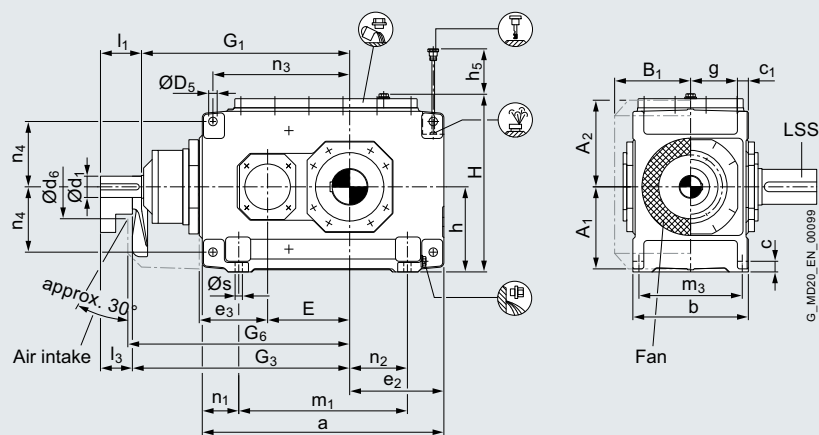
# Bevel helical gear units horizontal mounting position

## Type B2

### Gear unit dimensions, two-stage, gear unit sizes 9 to 12

#### Selection and ordering data

**B2.H**  
2LP302-...00-....



Gear unit size	Dimensions in mm										Fan					
	High speed shaft (HSS)					Reinforced shaft										
	$i_N$	$d_1$	$l_1$	$l_3$	$i_N$	$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$B_1$	$d_6$	$G_6$	
<b>9</b>	5 - 11.2	80 m6	165	130	12.5	80 m6	165	130	755	790	370	325	270	195	805	
	12.5 - 18	60 m6	140	105	14 - 16	70 m6	140	105								
<b>10</b>	6.3 - 14	80 m6	165	130	16	80 m6	165	130	805	840	370	325	270	195	855	
	16 - 22.4	60 m6	140	105	18 - 20	70 m6	140	105								
<b>11</b>	5 - 11.2	90 m6	165	130	-	-	-	-	925	960	540	385	328	210	980	
	12.5 - 18	70 m6	140	105	-	-	-	-								
<b>12</b>	6.3 - 14	90 m6	165	130	-	-	-	-	995	1030	540	385	328	210	1050	
	16 - 22.4	70 m6	140	105	-	-	-	-								

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	$e_3$	H	g	$h^{1)}$	$h_5$	$m_1$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
<b>9</b>	820	440	40	$48 \pm 1.5$	36 H9	265	300	265	662	172	320	205	530	390	145	155	480	245	28
<b>10</b>	920	440	40	$48 \pm 1.5$	36 H9	315	350	265	662	172	320	215	630	390	145	205	530	245	28
<b>11</b>	975	530	50	$54 \pm 1.5$	40 H9	320	345	320	790	211	380	240	645	470	165	180	580	300	35
<b>12</b>	1130	530	50	$54 \pm 1.5$	40 H9	390	430	320	790	211	380	250	800	470	165	265	650	300	35

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

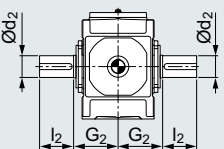
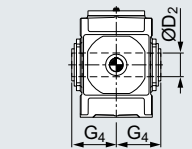
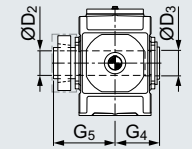
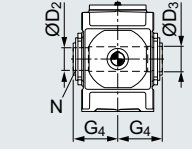
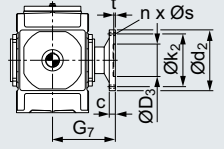
For details on the shafts, see Chapter 9.

# Bevel helical gear units horizontal mounting position Type B2

## Gear unit dimensions, two-stage, gear unit sizes 9 to 12

### Selection and ordering data (continued)

#### Low speed shaft (LSS)

				Oil quantity 1)	Weight 1) 2)			10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30					
				B2.H	B2.H								
				Article No.: <b>2LP302</b>		■ - ■ ■ .00-....							
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	kg			Solid shaft with parallel key <sup>3)</sup>				
<b>B2SH</b>	<b>9</b>	140 n6	250	270	48	1000	0 - 8 A						
	<b>10</b>	160 n6	300	270	50	1155	1 - 0 A						
	<b>11</b>	170 n6	300	320	80	1640	1 - 1 A						
	<b>12</b>	180 n6	300	320	95	1910	1 - 2 A						
Type	Size	D <sub>2</sub>	G <sub>4</sub>		l	kg			Hollow shaft with keyway				
<b>B2HH</b>	<b>9</b>	140 H7	270		48	1000	0 - 8 B						
	<b>10</b>	160 H7	270		50	1155	1 - 0 B						
	<b>11</b>	170 H7	320		80	1640	1 - 1 B						
	<b>12</b>	180 H7	320		95	1910	1 - 2 B						
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	kg		Hollow shaft for shrink disk				
<b>B2DH</b>	<b>9</b>	140	145	270	365	48	1000	0 - 8 C					
	<b>10</b>	150	155	270	385	50	1155	1 - 0 C					
	<b>11</b>	165	170	320	450	80	1640	1 - 1 C					
	<b>12</b>	180	185	320	455	95	1910	1 - 2 C					
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	kg		Hollow shaft with spline				
<b>B2KH</b>	<b>9</b>	N 140 x 3 x 30 x 45 x 9H	134 H11	145	270	48	1000	0 - 8 D					
	<b>10</b>	N 140 x 3 x 30 x 45 x 9H	134 H11	155	270	50	1155	1 - 0 D					
	<b>11</b>	N 170 x 5 x 30 x 32 x 9H	160 H11	170	320	80	1640	1 - 1 D					
	<b>12</b>	N 170 x 5 x 30 x 32 x 9H	160 H11	185	320	95	1910	1 - 2 D					
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n x s	t	G <sub>7</sub>	l	kg			Flanged shaft
<b>B2FH</b>	<b>9</b>	38	430	220	380	20 x 26	12	385	48	1090	0 - 8 E		
	<b>10</b>	38	470	240	420	22 x 26	12	385	50	1250	1 - 0 E		
	<b>11</b>	42	510	260	450	18 x 33	12	450	80	1775	1 - 1 E		
	<b>12</b>	42	540	280	480	22 x 33	12	450	95	2060	1 - 2 E		

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

3) Shaft version with reinforced bearing, see page 9/7.

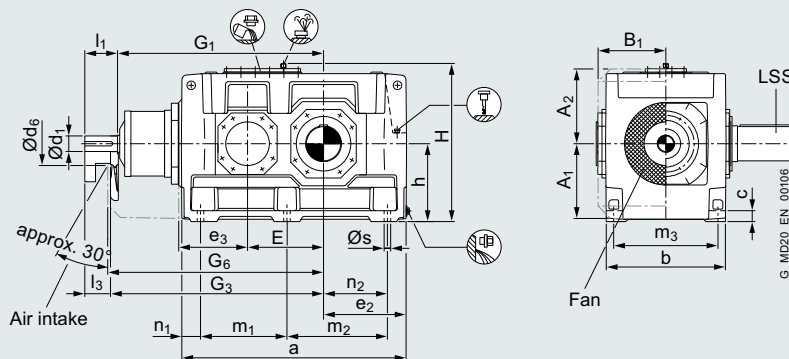
# Bevel helical gear units horizontal mounting position

Type B2

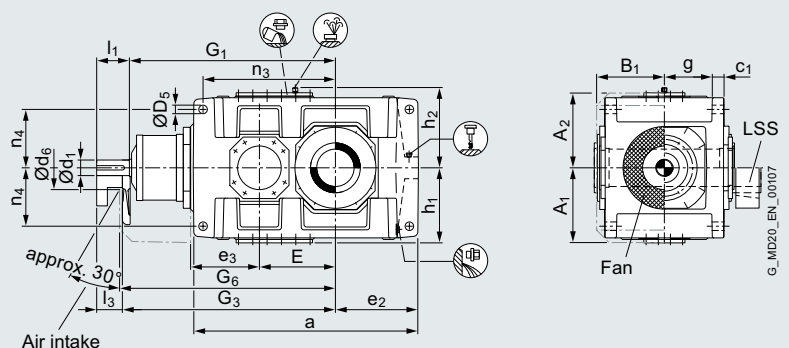
Gear unit dimensions, two-stage, gear unit sizes 13 to 18

## Selection and ordering data

**B2.H**  
2LP302-...00-....



**B2.M**  
2LP302-...01-....



Gear unit size	Dimensions in mm										
	High speed shaft (HSS)						Fan				
	$i_N$	$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$B_1$	$d_6$	$G_6$
13	5 - 11.2	110 n6	205	165	1070	1110	435	425	385	245	1130
	12.5 - 18	80 m6	170	130							
14	6.3 - 14	110 n6	205	165	1070	1110	435	425	385	245	1200
	16 - 22.4	80 m6	170	130							
15	5 - 11.2	130 n6	245	200	1277	1322	480	480	435	280	1340
	12.5 - 18	100 m6	210	165							
16	5.6 - 12.5	130 n6	245	200	1323	1368	480	480	435	280	1385
	14 - 20	100 m6	210	165							
17	5.6 - 11.2	150 n6	245	200	1435	1480	535	535	505	380	1500
	12.5 - 18	110 n6	210	165							
18	7.1 - 12.5	150 n6	245	200	1495	1540	535	535	505	380	1560
	14 - 20	110 n6	210	165							

Gear unit size	Dimensions in mm																				
	a	b	c	$c_1$	$D_5$	E	$e_2$	$e_3$	H	g	$h^{1)}$	$h_1$	$h_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
13	1130	655	60	61 ± 2	48 H9	370	405	370	900	264	460	450	460	465	465	580	100	305	675	340	35
14	1270	655	60	61 ± 2	48 H9	440	475	370	900	264	460	450	460	465	605	580	100	375	745	340	35
15	1350	765	70	72 ± 2	55 H9	442	485	442	1000	308	500	490	500	555	555	670	120	365	805	375	42
16	1440	765	70	72 ± 2	55 H9	488	530	442	1000	308	500	490	500	555	645	670	120	410	850	375	42
17	1490	885	80	81 ± 2	65 H9	490	525	490	1110	356	560	555	560	610	610	780	135	390	895	420	48
18	1610	885	80	81 ± 2	65 H9	550	585	490	1110	356	560	555	560	610	730	780	135	450	955	420	48

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.



## Bevel helical gear units horizontal mounting position Type B2

### Gear unit dimensions, two-stage, gear unit sizes 13 to 18

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> B2.H	Oil quantity <sup>1)</sup> B2.M	Weight <sup>1)2)</sup> B2.H	Weight <sup>1)2)</sup> B2.M	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30											
		Article No.:		<b>2LP302</b>		.0-....											
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	kg					<b>Solid shaft with parallel key<sup>3)</sup></b>				
<b>B2SH</b>	<b>13</b>	200 n6	350	390	140	-	2450	-	1	-	3	A					
	<b>14</b>	210 n6	350	390	155	-	2825	-	1	-	4	A					
	<b>15</b>	230 n6	410	460	220	-	3990	-	1	-	5	A					
	<b>16</b>	240 n6	410	460	230	-	4345	-	1	-	6	A					
	<b>17</b>	250 n6	410	540	320	-	5620	-	1	-	7	A					
	<b>18</b>	270 n6	470	540	335	-	6150	-	1	-	8	A					
Type	Size	D <sub>2</sub>	G <sub>4</sub>		l	l	kg	kg					<b>Hollow shaft with keyway</b>				
<b>B2HH/ B2HM</b>	<b>14</b>	210 H7	390		155	130	2825	2725	1	-	4	B					
	<b>16</b>	240 H7	450		230	190	4345	4160	1	-	6	B					
	<b>18</b>	275 H7	510		335	275	6150	5860	1	-	8	B					
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	l	kg	kg				<b>Hollow shaft for shrink disk</b>				
<b>B2DH/ B2DM</b>	<b>14</b>	210	215	390	535	155	130	2825	2725	1	-	4	C				
	<b>16</b>	240	245	450	620	230	190	4345	4160	1	-	6	C				
	<b>18</b>	280	285	510	700	335	275	6150	5860	1	-	8	C				
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	l	kg	kg				<b>Hollow shaft with spline</b>				
<b>B2KH/ B2KM</b>	<b>14</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	215	390	155	130	2825	2725	1	-	4	D				
	<b>16</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	245	450	230	190	4345	4160	1	-	6	D				
	<b>18</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	285	510	335	275	6150	5860	1	-	8	D				
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n × s	t	G <sub>7</sub>	l	l	kg	kg		<b>Flanged shaft</b>			
<b>B2FH/ B2FM</b>	<b>13</b>	48	580	310	500	20 × 33	14	525	140	120	2620	2520	1	-	3	E	
	<b>14</b>	48	620	310	540	24 × 33	14	525	155	130	3005	2905	1	-	4	E	
	<b>15</b>	55	710	360	630	28 × 33	17	625	220	180	4245	4050	1	-	5	E	
	<b>16</b>	55	740	360	660	30 × 33	17	625	230	190	4615	4430	1	-	6	E	
	<b>17</b>	60	750	410	660	24 × 39	18	695	320	260	5940	5640	1	-	7	E	
	<b>18</b>	60	800	410	710	26 × 39	18	695	335	275	6520	6230	1	-	8	E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, see page 9/7.

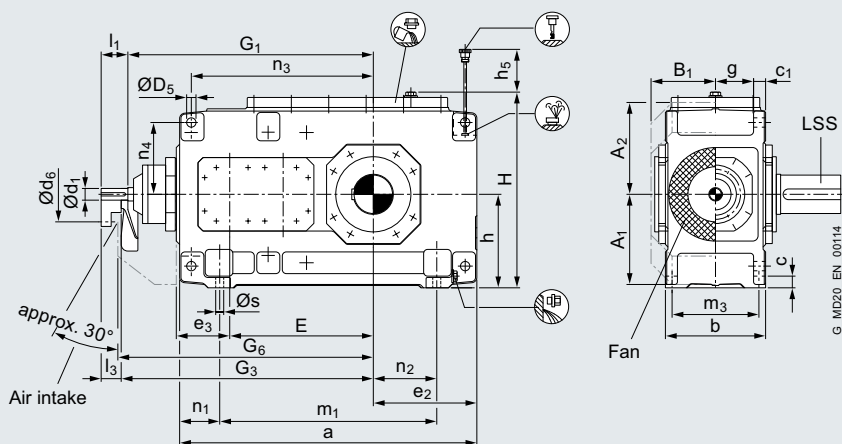
# Bevel helical gear units horizontal mounting position

## Type B3

### Gear unit dimensions, three-stage, gear unit sizes 4 to 8

#### Selection and ordering data

**B3.H**  
2LP302-...10-....



Gear unit size	Dimensions in mm														
	High speed shaft (HSS)									Fan					
	$i_N$	$d_1$	$l_1$	$l_3$	Reinforced shaft				$G_1$	$G_3$	$A_1$	$A_2$	$B_1$	$d_6$	$G_6$
4	12.5 - 45	30 m6	70	50	40 - 50	35 m6	80	50	500	520	195	200	143	110	530
	50 - 71	25 m6	60	40	56 - 63	32 m6	70	50							
5	12.5 - 45	35 m6	80	60	31.5 - 50	40 m6	90	70	575	595	220	235	168	130	605
	50 - 71	28 m6	60	40	56 - 63	35 m6	80	60							
6	16 - 56	35 m6	80	60	40 - 63	40 m6	90	70	610	630	220	235	168	130	640
	63 - 90	28 m6	60	40	71 - 80	35 m6	80	60							
7	12.5 - 45	45 m6	100	80	31.5 - 50	50 m6	110	90	690	710	275	275	193	165	720
	50 - 71	35 m6	80	60	56 - 63	40 m6	90	70							
8	16 - 56	45 m6	100	80	40 - 63	50 m6	110	90	735	755	275	275	193	165	765
	63 - 90	35 m6	80	60	71 - 80	40 m6	90	70							

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	$e_3$	H	g	$h^{1)}$	$h_5$	$m_1$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
4	565	215	28	$30 \pm 1$	24 H9	270	190	110	415	77.5	200	100	355	180	105	85	345	150	19
5	640	255	28	$30 \pm 1$	24 H9	315	205	130	482	97.5	230	130	430	220	105	100	405	180	19
6	720	255	28	$30 \pm 1$	24 H9	350	250	130	482	97.5	230	130	510	220	105	145	440	180	19
7	785	300	35	$36 \pm 1$	28 H9	385	250	160	572	114	280	170	545	260	120	130	500	215	24
8	890	300	35	$36 \pm 1$	28 H9	430	310	160	582	114	280	160	650	260	120	190	545	215	24

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

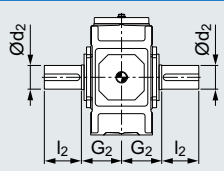
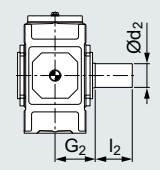
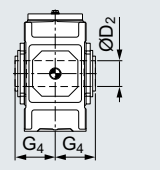
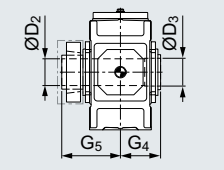
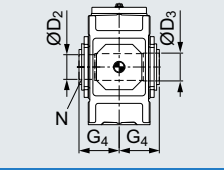
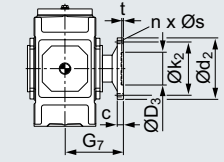
# Bevel helical gear units horizontal mounting position

## Type B3

### Gear unit dimensions, three-stage, gear unit sizes 4 to 8

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity 1)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30						
				B3.H	B3.H							
				Article No.: <b>2LP302</b> ■ - ■ ■ .10-....								
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg		Solid shaft with parallel key <sup>3)</sup>				
<b>B3SH</b>	4	80 m6	170	140	9	210	0 - 3 A					
	5	100 m6	210	165	15	325	0 - 4 A					
	6	110 n6	210	165	16	380	0 - 5 A					
	7	120 n6	210	195	27	550	0 - 6 A					
	8	130 n6	250	195	30	635	0 - 7 A					
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg		Solid shaft without parallel key				
<b>B3CH</b>	4	95 h8	125	140	9	210	0 - 3 F					
	5	115 h8	125	165	15	325	0 - 4 F					
	6	115 h8	125	165	16	380	0 - 5 F					
	7	140 h8	155	195	27	550	0 - 6 F					
	8	140 h8	155	195	30	635	0 - 7 F					
Type	Size	$D_2$	$G_4$		$l$	kg		Hollow shaft with keyway				
<b>B3HH</b>	4	80 H7	140		9	210	0 - 3 B					
	5	95 H7	165		15	325	0 - 4 B					
	6	105 H7	165		16	380	0 - 5 B					
	7	115 H7	195		27	550	0 - 6 B					
	8	125 H7	195		30	635	0 - 7 B					
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	kg	Hollow shaft for shrink disk				
<b>B3DH</b>	4	85 H7	85	140	205	9	210	0 - 3 C				
	5	100 H7	100	165	240	15	325	0 - 4 C				
	6	110 H7	110	165	240	16	380	0 - 5 C				
	7	120 H7	120	195	280	27	550	0 - 6 C				
	8	130 H7	130	195	285	30	635	0 - 7 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	kg	Hollow shaft with spline				
<b>B3KH</b>	5	N 95 × 3 × 30 × 30 × 9H	89 H11	100	165	15	325	0 - 4 D				
	6	N 95 × 3 × 30 × 30 × 9H	89 H11	110	165	16	380	0 - 5 D				
	7	N 120 × 3 × 30 × 38 × 9H	114 H11	120	195	27	550	0 - 6 D				
	8	N 120 × 3 × 30 × 38 × 9H	114 H11	130	195	30	635	0 - 7 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	kg		Flanged shaft
<b>B3FH</b>	5	25	300	150	260	16 × 22	10	255	15	360	0 - 4 E	
	6	25	320	160	280	18 × 22	10	255	16	420	0 - 5 E	
	7	30	370	180	320	16 × 26	10	300	27	600	0 - 6 E	
	8	30	390	190	340	18 × 26	10	300	30	690	0 - 7 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

3) Shaft version with reinforced bearing, see page 9/7.

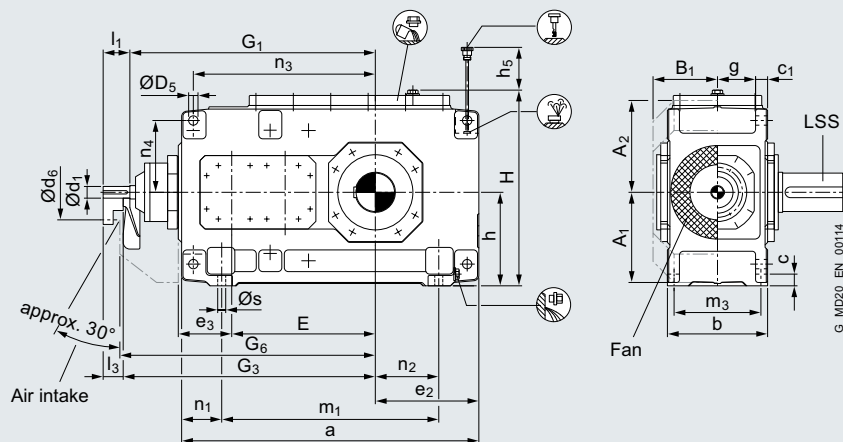
# Bevel helical gear units horizontal mounting position

## Type B3

### Gear unit dimensions, three-stage, gear unit sizes 9 to 12

#### Selection and ordering data

**B3.H**  
2LP302-...10-....



Gear unit size	Dimensions in mm										Fan								
	High speed shaft (HSS)					Reinforced shaft													
$i_N$	$d_1$	$l_1$	$l_3$	$i_N$	$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$B_1$	$d_6$	$G_6$					
<b>9</b>	12.5 - 45	55 m6	110	80	40 - 50	60	120	90	800	830	315	325	231	175	845				
	50 - 71	40 m6	100	70	56 - 63	50	110	80											
<b>10</b>	16 - 56	55 m6	110	80	40 - 63	60	120	90	850	880	315	325	231	175	895				
	63 - 90	40 m6	100	70	71 - 80	50	110	80											
<b>11</b>	12.5 - 45	70 m6	135	105	50	70	135	105	960	990	370	385	263	190	1010				
	50 - 71	50 m6	110	80	56 - 63	60	135	105											
<b>12</b>	16 - 56	70 m6	135	105	63	70	135	105	1030	1060	370	385	263	190	1080				
	63 - 90	50 m6	110	80	71 - 80	60	135	105											

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	$e_3$	H	g	$h^{1)}$	$h_5$	$m_1$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
<b>9</b>	925	370	40	$45 \pm 1.5$	36 H9	450	300	185	662	140	320	175	635	320	145	155	585	245	28
<b>10</b>	1025	370	40	$45 \pm 1.5$	36 H9	500	350	185	662	140	320	175	735	320	145	205	635	245	28
<b>11</b>	1105	430	50	$54 \pm 1.5$	40 H9	545	345	225	782	161	380	220	775	370	165	180	710	300	35
<b>12</b>	1260	430	50	$54 \pm 1.5$	40 H9	615	430	225	790	161	380	210	930	370	165	265	780	300	35

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

# Bevel helical gear units horizontal mounting position

## Type B3

### Gear unit dimensions, three-stage, gear unit sizes 9 to 12

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

				Oil quantity 1) 2)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30						
				B3.H	B3.H							
				Article No.: <b>2LP302</b> ■ - ■ ■ .10-....								
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg		Solid shaft with parallel key <sup>3)</sup>				
<b>B3SH</b>	<b>9</b>	140 n6	250	235	42	890	0 - 8 A					
	<b>10</b>	160 n6	300	235	45	1020	1 - 0 A					
	<b>11</b>	170 n6	300	270	71	1455	1 - 1 A					
	<b>12</b>	180 n6	300	270	76	1730	1 - 2 A					
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg		Solid shaft without parallel key				
<b>B3CH</b>	<b>9</b>	140 h8	155	235	42	890	0 - 8 F					
	<b>10</b>	170 h8	155	235	45	1020	1 - 0 F					
	<b>11</b>	170 h8	155	270	71	1455	1 - 1 F					
	<b>12</b>	210 h8	170	270	76	1730	1 - 2 F					
Type	Size	$D_2$	$G_4$		$l$	kg		Hollow shaft with keyway				
<b>B3HH</b>	<b>9</b>	135 H7	235		42	890	0 - 8 B					
	<b>10</b>	150 H7	235		45	1020	1 - 0 B					
	<b>11</b>	165 H7	270		71	1455	1 - 1 B					
	<b>12</b>	180 H7	270		76	1730	1 - 2 B					
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	kg	Hollow shaft for shrink disk				
<b>B3DH</b>	<b>9</b>	140 H7	145	235	330	42	890	0 - 8 C				
	<b>10</b>	150 H7	155	235	350	45	1020	1 - 0 C				
	<b>11</b>	165 H7	170	270	400	71	1455	1 - 1 C				
	<b>12</b>	180 H7	185	270	405	76	1730	1 - 2 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	kg	Hollow shaft with spline				
<b>B3KH</b>	<b>9</b>	N 140 x 3 x 30 x 45 x 9H	134 H11	145	235	42	890	0 - 8 D				
	<b>10</b>	N 140 x 3 x 30 x 45 x 9H	134 H11	155	235	45	1020	1 - 0 D				
	<b>11</b>	N 170 x 5 x 30 x 32 x 9H	160 H11	170	270	71	1455	1 - 1 D				
	<b>12</b>	N 170 x 5 x 30 x 32 x 9H	160 H11	185	270	76	1730	1 - 2 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	kg		Flanged shaft
<b>B3FH</b>	<b>9</b>	38	430	220	380	20 x 26	12	350	42	975	0 - 8 E	
	<b>10</b>	38	470	240	420	22 x 26	12	350	45	1110	1 - 0 E	
	<b>11</b>	42	510	260	450	18 x 33	12	400	71	1585	1 - 1 E	
	<b>12</b>	42	540	280	480	22 x 33	12	400	76	1870	1 - 2 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

3) Shaft version with reinforced bearing, see page 9/7.

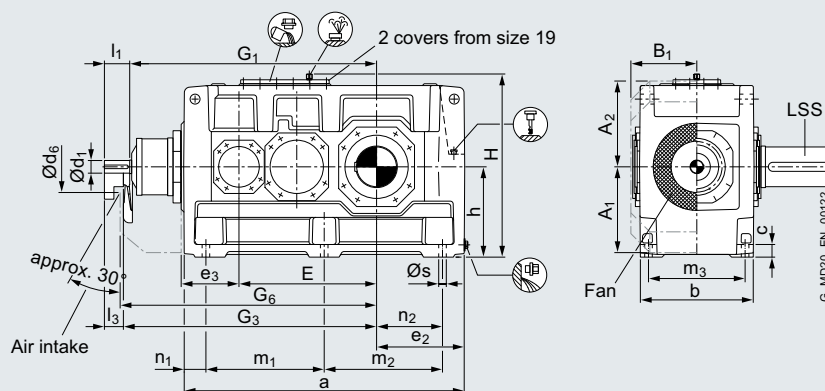
# Bevel helical gear units horizontal mounting position

Type B3

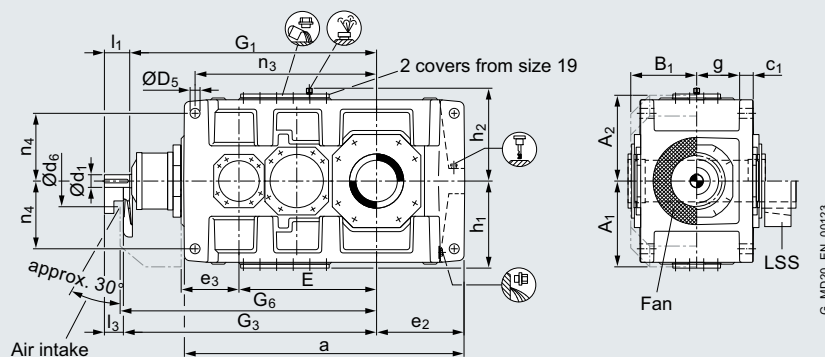
## Gear unit dimensions, three-stage, gear unit sizes 13 to 18

### Selection and ordering data

**B3.H**  
2LP302-...10-....



**B3.M**  
2LP302-...11-....



Gear unit size	Dimensions in mm																
	High speed shaft (HSS)									Fan							
	Reinforced shaft																
$i_N$	$d_1$	$l_1$	$l_3$	$i_N$	$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$B_1$	$d_6$	$G_6$			
13	12.5 - 45	80 m6	165	130	50	80 m6	165	130	1125	1160	425	435	325	210	1080		
	50 - 71	60 m6	140	105	56 - 63	70 m6	140	105									
14	16 - 56	80 m6	165	130	63	80 m6	165	130	1195	1230	425	435	325	210	1250		
	63 - 90	60 m6	140	105	71 - 80	70 m6	140	105									
15	12.5 - 45	90 m6	165	130	-	-	-	-	1367	1402	475	475	365	210	1420		
	50 - 71	70 m6	140	105	-	-	-	-									
16	14 - 50	90 m6	165	130	-	-	-	-	1413	1448	475	475	365	210	1470		
	56 - 80	70 m6	140	105	-	-	-	-									
17	12.5 - 45	110 n6	205	165	-	-	-	-	1560	1600	535	535	395	230	1620		
	50 - 71	80 m6	170	130	-	-	-	-									
18	14 - 50	110 n6	205	165	-	-	-	-	1620	1660	535	535	395	230	1680		
	56 - 80	80 m6	170	130	-	-	-	-									

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	$e_3$	H	g	$h^{1)}$	$h_1$	$h_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
13	1290	550	60	61 ± 2	48 H9	635	405	265	900	211.5	440	450	460	545	545	475	100	305	835	340	35
14	1430	550	60	61 ± 2	48 H9	705	475	265	900	211.5	440	450	460	545	685	475	100	375	905	340	35
15	1550	625	70	72 ± 2	55 H9	762	485	320	1000	238	500	490	500	655	655	535	120	365	1005	375	42
16	1640	625	70	72 ± 2	55 H9	808	530	320	1000	238	500	490	500	655	745	535	120	410	1050	375	42
17	1740	690	80	81 ± 2	55 H9	860	525	370	1110	259	550	555	560	735	735	600	135	390	1145	425	42
18	1860	690	80	81 ± 2	55 H9	920	585	370	1110	259	550	555	560	735	855	600	135	450	1205	425	42

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

# Bevel helical gear units horizontal mounting position

## Type B3

### Gear unit dimensions, three-stage, gear unit sizes 13 to 18

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> B3.H	Oil quantity <sup>1)</sup> B3.M	Weight <sup>1)2)</sup> B3.H	Weight <sup>1)2)</sup> B3.M	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30									
		Article No.: <b>2LP302</b>				■ - ■ ■ .1-....									
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	kg			Solid shaft with parallel key <sup>3)</sup>				
<b>B3SH</b>	<b>13</b>	200 n6	350	335	130	-	2380	-	1 - 3	A					
	<b>14</b>	210 n6	350	335	140	-	2750	-	1 - 4	A					
	<b>15</b>	230 n6	410	380	210	-	3730	-	1 - 5	A					
	<b>16</b>	240 n6	410	380	220	-	3955	-	1 - 6	A					
	<b>17</b>	250 n6	410	415	290	-	4990	-	1 - 7	A					
	<b>18</b>	270 n6	470	415	300	-	5495	-	1 - 8	A					
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	kg			Solid shaft without parallel key				
<b>B3CH/ B3CM</b>	<b>13</b>	210 h8	170	335	130	110	2380	2265	1 - 3	F					
	<b>14</b>	210 h8	170	335	140	115	2750	2620	1 - 4	F					
	<b>15</b>	250 h8	190	380	210	160	3730	3535	1 - 5	F					
	<b>16</b>	250 h8	190	380	220	165	3955	3735	1 - 6	F					
Type	Size	D <sub>2</sub>	G <sub>4</sub>	l	l	kg	kg			Hollow shaft with keyway					
<b>B3HH/ B3HM</b>	<b>13</b>	190 H7	335	130	110	2380	2260	1 - 3	B						
	<b>14</b>	210 H7	335	140	115	2750	2615	1 - 4	B						
	<b>15</b>	230 H7	380	210	160	3730	3540	1 - 5	B						
	<b>16</b>	240 H7	380	220	165	3955	3765	1 - 6	B						
	<b>17</b>	250 H7	415	290	230	4990	4760	1 - 7	B						
	<b>18</b>	275 H7	415	300	235	5495	5240	1 - 8	B						
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	l	kg	kg		Hollow shaft for shrink disk				
<b>B3DH/ B3DM</b>	<b>13</b>	190 H7	195	335	480	130	110	2380	2260	1 - 3	C				
	<b>14</b>	210 H7	215	335	480	140	115	2750	2615	1 - 4	C				
	<b>15</b>	230 H7	235	380	550	210	160	3730	3540	1 - 5	C				
	<b>16</b>	240 H7	245	380	550	220	165	3955	3765	1 - 6	C				
	<b>17</b>	250 H7	260	415	600	290	230	4990	4760	1 - 7	C				
	<b>18</b>	280 H7	285	415	600	300	235	5495	5240	1 - 8	C				
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	l	kg	kg		Hollow shaft with spline				
<b>B3KH/ B3KM</b>	<b>13</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	195	335	130	110	2380	2260	1 - 3	D				
	<b>14</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	215	335	140	115	2750	2615	1 - 4	D				
	<b>15</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	235	380	210	160	3730	3540	1 - 5	D				
	<b>16</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	245	380	220	165	3955	3765	1 - 6	D				
	<b>17</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	260	415	290	230	4990	4760	1 - 7	D				
	<b>18</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	285	415	300	235	5495	5240	1 - 8	D				
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n × s	t	G <sub>7</sub>	l	l	kg	kg		Flanged shaft	
<b>B3FH/ B3FM</b>	<b>13</b>	48	580	310	500	20 × 33	14	480	130	110	2540	2420	1 - 3	E	
	<b>14</b>	48	620	310	540	24 × 33	14	480	140	115	2920	2785	1 - 4	E	
	<b>15</b>	55	710	360	630	28 × 33	17	550	210	160	3970	3780	1 - 5	E	
	<b>16</b>	55	740	360	660	30 × 33	17	550	220	165	4250	4020	1 - 6	E	
	<b>17</b>	60	750	410	660	24 × 39	18	600	290	230	5290	5060	1 - 7	E	
	<b>18</b>	60	800	410	710	26 × 39	18	600	300	235	6045	5590	1 - 8	E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, see page 9/7.

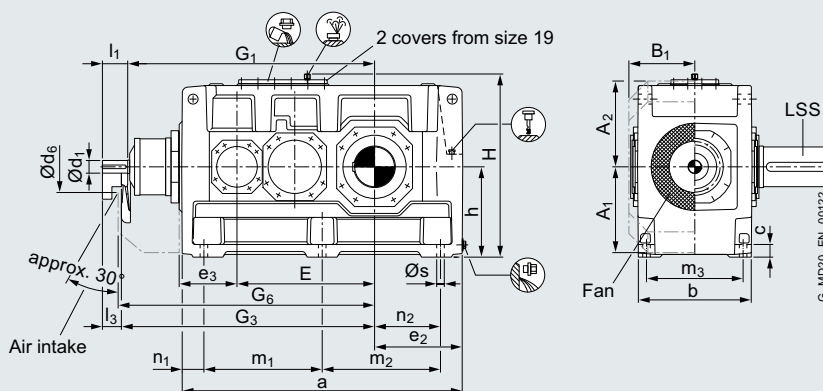
# Bevel helical gear units horizontal mounting position

Type B3

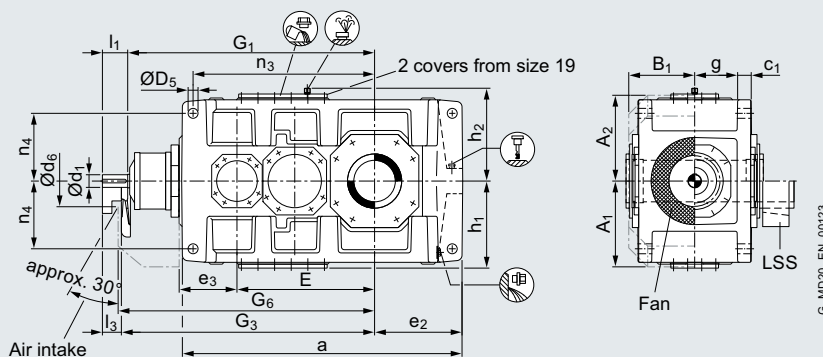
## Gear unit dimensions, three-stage, gear unit sizes 19 to 24

### Selection and ordering data

**B3.H**  
2LP302-...10-....



**B3.M**  
2LP302-...11-....



Gear unit size	Dimensions in mm						Fan				
	High speed shaft (HSS)						A <sub>1</sub>	A <sub>2</sub>	B <sub>1</sub>	d <sub>6</sub>	G <sub>6</sub>
	i <sub>N</sub>	d <sub>1</sub>	l <sub>1</sub>	l <sub>3</sub>	G <sub>1</sub>	G <sub>3</sub>					
19	12.5 - 45	130 n6	245	200	1832	1877	610	630	448	245	1900
	50 - 71	100 m6	210	165							
20	14 - 50	130 n6	245	200	1892	1937	610	630	448	245	1960
	56 - 80	100 m6	210	165							
21	12.5 - 45	130 n6	245	200	1902	1947	690	690	473	280	1970
	50 - 71	100 m6	210	165							
22	14 - 50	130 n6	245	200	1957	2002	690	690	473	280	2025
	56 - 80	100 m6	210	165							
23	20 - 45	150 n6	245	200	2130	2175	720	720	515	382	2208
	50 - 71	110 n6	210	165							
24	22.4 - 50	150 n6	245	200	2195	2240	720	720	515	382	2273
	56 - 80	110 n6	210	165							

Gear unit size	a	b	c	c <sub>1</sub>	D <sub>5</sub>	E	e <sub>2</sub>	e <sub>3</sub>	H	g	h <sup>1)</sup>	h <sub>1</sub>	h <sub>2</sub>	m <sub>1</sub>	m <sub>2</sub>	m <sub>3</sub>	n <sub>1</sub>	n <sub>2</sub>	n <sub>3</sub>	n <sub>4</sub>	s
19	2010	790	90	91 ±2	65 H9	997	590	420	1240	299	620	615	620	850	850	690	155	435	1345	475	48
20	2130	790	90	91 ±2	65 H9	1057	650	420	1240	299	620	615	620	850	970	690	155	495	1405	475	48
21	2140	830	100	100 ±2	75 H9	1067	655	450	1390	310	700	685	690	900	900	720	170	485	1400	520	56
22	2250	830	100	100 ±2	75 H9	1122	710	450	1390	310	700	685	690	900	1010	720	170	540	1455	520	56
23	2380	930	115	120 ±2	80 H9	1185	730	490	1565	342	780	765	785	1010	1010	810	180	550	1560	580	56
24	2510	930	115	120 ±2	80 H9	1250	795	490	1565	342	780	765	785	1010	1140	810	180	615	1625	580	56

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.



# Bevel helical gear units horizontal mounting position

## Type B3

### Gear unit dimensions, three-stage, gear unit sizes 19 to 24

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity 1)	Oil quantity 1)	Weight 1) 2)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30									
		B3.H	B3.M	B3.H	B3.M										
		Article No.:		2LP302		.1-....									
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg	kg							
<b>B3SH</b>	19	290 n6	470	465	380	–	7000	–	2 - 0 A						
	20	300 n6	500	465	440	–	8100	–	2 - 1 A						
	21	320 n6	500	490	370	–	9200	–	2 - 2 A						
	22	340 n6	550	490	430	–	9900	–	2 - 3 A						
	23	360 n6	590	540	520	–	12000	–	2 - 4 A						
	24	380 n6	590	540	600	–	13400	–	2 - 5 A						
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg	kg						
<b>B3DH/ B3DM</b>	19	285 H7	295	465	670	380	360	7000	6500	2 - 0 C					
	20	310 H7	315	465	670	440	420	8100	7600	2 - 1 C					
	21	330 H7	335	490	715	370	420	9200	8600	2 - 2 C					
	22	340 H7	345	490	725	430	490	9900	9400	2 - 3 C					
	23	370 H7	375	540	800	520	560	12000	11400	2 - 4 C					
	24	390 H7	395	540	820	600	650	13400	12700	2 - 5 C					
Type	Size	$c$	$d_2$	$D_3$	$k_2$	$n \times s$	$t$	$G_7$	$l$	$l$	kg	kg			
<b>B3FH/ B3FM</b>	19	65	860	460	770	30 × 39	18	670	380	360	On request		2 - 0 E		
	20	65	930	460	830	32 × 39	18	670	440	420			2 - 1 E		
	21	75	950	520	850	28 × 45	20	710	370	420			2 - 2 E		
	22	75	1040	520	940	28 × 45	20	710	430	490			2 - 3 E		
	23	On request													
	24	On request													

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

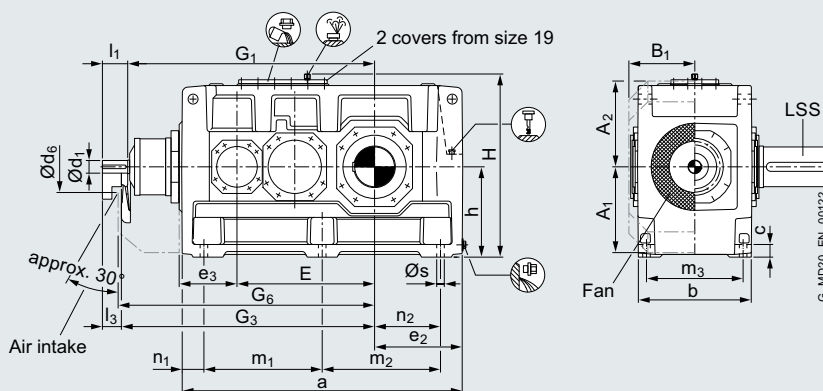
# Bevel helical gear units horizontal mounting position

Type B3

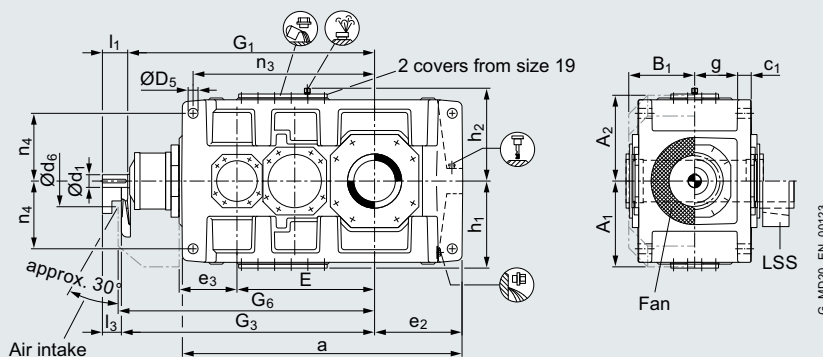
## Gear unit dimensions, three-stage, gear unit sizes 25 to 28

### Selection and ordering data

**B3.H**  
2LP302-...10-....



**B3.M**  
2LP302-...11-....



Gear unit size	Dimensions in mm										
	High speed shaft (HSS)						Fan				
	$l_N$	$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$A_2$	$B_1$	$d_6$	$G_6$
25	20 - 40	160 n6	295	240	2375	2430	790	790	575	414	2435
	45 - 71	120 n6	220	165							
26	22.4 - 45	160 n6	295	240	2465	2520	790	790	575	414	2525
	50 - 80	120 n6	220	165							
27	20 - 40	180 n6	295	240	2625	2680	870	870	640	446	2688
	45 - 71	130 n6	255	200							
28	22.4 - 45	180 n6	295	240	2720	2775	870	870	640	446	2783
	50 - 80	130 n6	255	200							

Gear unit size																					
	a	b	c	$c_1$	$D_5$	E	$e_2$	$e_3$	H	g	$h^{1)}$	$n_1$	$n_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
25	2645	1045	130	120 ± 2	90 H9	1325	790	555	1740	400	860	860	880	1155	1090	910	200	590	1750	660	66
26	2825	1045	130	120 ± 2	90 H9	1415	880	555	1740	400	860	860	880	1155	1270	910	200	680	1840	660	66
27	2960	1170	150	145 ± 2	100 H9	1485	880	625	1900	440	950	930	950	1260	1260	1030	220	660	2000	720	74
28	3150	1170	150	145 ± 2	100 H9	1580	975	625	1900	440	950	930	950	1260	1450	1030	220	755	2095	720	74

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

# Bevel helical gear units horizontal mounting position

## Type B3

### Gear unit dimensions, three-stage, gear unit sizes 25 to 28

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity 1)	Oil quantity 1)	Weight 1) 2)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30														
		B3.H	B3.M	B3.H	B3.M															
		Article No.:		2LP302		.1-....														
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg	kg												
<b>B3SH</b>	<b>25</b>	400 n6	650	605	760	–	16100	–	2	–	6	A								
	<b>26</b>	420 n6	650	605	880	–	18000	–	2	–	7	A								
	<b>27</b>	440 n6	690	680	1050	–	22700	–	2	–	8	A								
	<b>28</b>	460 n6	750	680	1220	–	25700	–	3	–	0	A								
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg	kg											
<b>B3DH/ B3DM</b>	<b>25</b>	410 H7	415	610	895	760	830	16100	15300	2	–	6	C							
	<b>26</b>	430 H7	435	610	925	880	960	18000	17000	2	–	7	C							
	<b>27</b>	460 H7	465	680	1000	1050	1150	22700	21700	2	–	8	C							
	<b>28</b>	470 H7	475	680	1020	1220	1340	25700	24400	3	–	0	C							
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	$l$	kg	kg								
<b>B3FH/ B3FM</b>	<b>25</b>	On request											2	–	6	E				
	<b>26</b>												2	–	7	E				
	<b>27</b>												2	–	8	E				
	<b>28</b>												3	–	0	E				

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

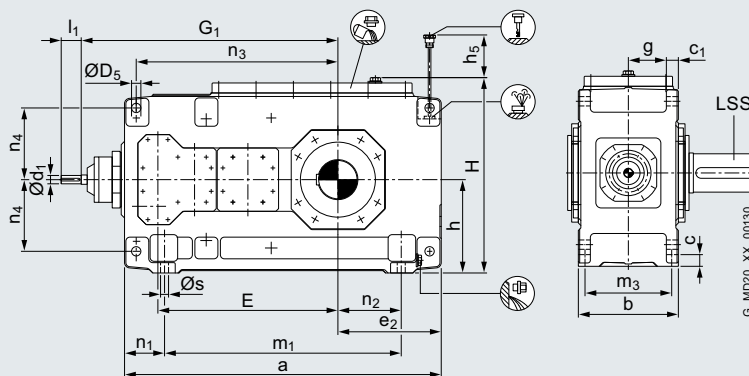
# Bevel helical gear units horizontal mounting position

## Type B4

### Gear unit dimensions, four-stage, gear unit sizes 5 to 8

#### Selection and ordering data

**B4.H**  
2LP302-...20-....



Gear unit size	Dimensions in mm						
	High speed shaft (HSS)			Reinforced shaft			
	$i_N$	$d_1$	$l_1$	$i_N$	$d_1$	$l_1$	$G_1$
5	80 - 180	28 m6	55	–	–	–	615
	200 - 315	20 k6	50	–	–	–	
6	100 - 224	28 m6	55	–	–	–	650
	250 - 400	20 k6	50	–	–	–	
7	80 - 180	30 m6	70	160 - 200	35 m6	80	725
	200 - 315	25 k6	60	224 - 250	32 m6	70	
8	100 - 224	30 m6	70	200 - 250	35 m6	80	770
	250 - 400	25 k6	60	280 - 315	32 m6	70	

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_5$	$m_1$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
5	690	255	28	$30 \pm 1$	24 H9	405	205	97.5	482	230	100	480	220	105	100	455	180	19
6	770	255	28	$30 \pm 1$	24 H9	440	250	97.5	482	230	100	560	220	105	145	490	180	19
7	845	300	35	$36 \pm 1$	28 H9	495	250	114	572	280	140	605	260	120	130	560	215	24
8	950	300	35	$36 \pm 1$	28 H9	540	310	114	582	280	130	710	260	120	190	605	215	24

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

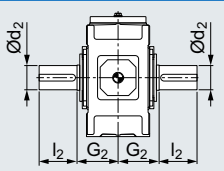
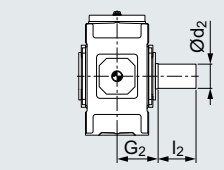
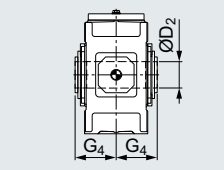
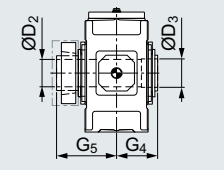
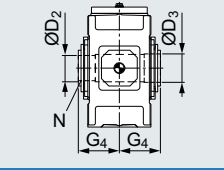
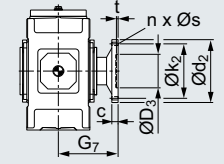
# Bevel helical gear units horizontal mounting position

## Type B4

### Gear unit dimensions, four-stage, gear unit sizes 5 to 8

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

				Oil quantity 1)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30						
				B4.H	B4.H							
				Article No.: <b>2LP302</b> ■ - ■ ■ .20-....								
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	kg		Solid shaft with parallel key <sup>3)</sup>				
<b>B4SH</b>	5	100 m6	210	165	16	335	0 - 4 A					
	6	110 n6	210	165	18	385	0 - 5 A					
	7	120 n6	210	195	30	555	0 - 6 A					
	8	130 n6	250	195	33	655	0 - 7 A					
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	kg		Solid shaft without parallel key				
<b>B4CH</b>	5	115 h8	125	165	16	335	0 - 4 F					
	6	115 h8	125	165	18	385	0 - 5 F					
	7	140 h8	155	195	30	555	0 - 6 F					
	8	140 h8	155	195	33	655	0 - 7 F					
Type	Size	D <sub>2</sub>	G <sub>4</sub>	l	kg			Hollow shaft with keyway				
<b>B4HH</b>	5	95 H7	165	16	335	0 - 4 B						
	6	105 H7	165	18	385	0 - 5 B						
	7	115 H7	195	30	555	0 - 6 B						
	8	125 H7	195	33	655	0 - 7 B						
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	kg		Hollow shaft for shrink disk			
<b>B4DH</b>	5	100 H7	100	165	240	16	335	0 - 4 C				
	6	110 H7	110	165	240	18	385	0 - 5 C				
	7	120 H7	120	195	280	30	555	0 - 6 C				
	8	130 H7	130	195	285	33	655	0 - 7 C				
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	kg		Hollow shaft with spline			
<b>B4KH</b>	5	N 95 × 3 × 30 × 30 × 9H	89 H11	100	165	16	335	0 - 4 D				
	6	N 95 × 3 × 30 × 30 × 9H	89 H11	110	165	18	385	0 - 5 D				
	7	N 120 × 3 × 30 × 38 × 9H	114 H11	120	195	30	555	0 - 6 D				
	8	N 120 × 3 × 30 × 38 × 9H	114 H11	130	195	33	655	0 - 7 D				
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n × s	t	G <sub>7</sub>	l	kg		Flanged shaft
<b>B4FH</b>	5	25	300	150	260	16 × 22	10	255	16	370	0 - 4 E	
	6	25	320	160	280	18 × 22	10	255	18	425	0 - 5 E	
	7	30	370	180	320	16 × 26	10	300	30	605	0 - 6 E	
	8	30	390	190	340	18 × 26	10	300	33	710	0 - 7 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

3) Shaft version with reinforced bearing, see page 9/7.

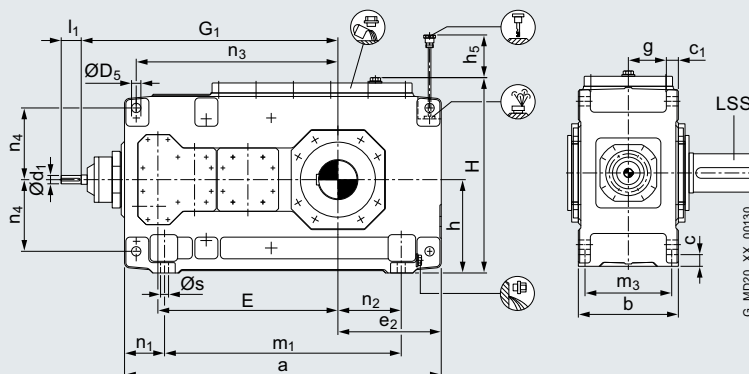
# Bevel helical gear units horizontal mounting position

## Type B4

### Gear unit dimensions, four-stage, gear unit sizes 9 to 12

#### Selection and ordering data

**B4.H**  
2LP302-...20-....



Gear unit size	Dimensions in mm						
	High speed shaft (HSS)			Reinforced shaft			
	$i_N$	$d_1$	$l_1$	$i_N$	$d_1$	$l_1$	$G_1$
<b>9</b>	80 - 180	35 m6	80	125 - 200	40 m6	90	840
	200 - 315	28 m6	60	224 - 250	35 m6	80	
<b>10</b>	100 - 224	35 m6	80	160 - 250	40 m6	90	890
	250 - 400	28 m6	60	280 - 315	35 m6	80	
<b>11</b>	80 - 180	45 m6	100	125 - 200	50 m6	110	1010
	200 - 315	35 m6	80	224 - 250	40 m6	90	
<b>12</b>	100 - 224	45 m6	100	160 - 250	50 m6	110	1080
	250 - 400	35 m6	80	280 - 315	40 m6	90	

Gear unit size	Dimensions in mm																	
	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_5$	$m_1$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
<b>9</b>	1000	370	40	$45 \pm 1.5$	36 H9	580	300	140	662	320	135	710	320	145	155	660	245	28
<b>10</b>	1100	370	40	$45 \pm 1.5$	36 H9	630	350	140	662	320	135	810	320	145	205	710	245	28
<b>11</b>	1200	430	50	$54 \pm 1.5$	40 H9	705	345	161	782	380	170	870	370	165	180	805	300	35
<b>12</b>	1355	430	50	$54 \pm 1.5$	40 H9	775	430	161	790	380	160	1025	370	165	265	875	300	35

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

# Bevel helical gear units horizontal mounting position

## Type B4

### Gear unit dimensions, four-stage, gear unit sizes 9 to 12

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

				Oil quantity 1)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30						
				B4.H	B4.H							
				Article No.: <b>2LP302</b> ■ - ■ ■ .20-....								
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg		Solid shaft with parallel key <sup>3)</sup>				
<b>B4SH</b>	<b>9</b>	140 n6	250	235	48	890	0 - 8 A					
	<b>10</b>	160 n6	300	235	50	1025	1 - 0 A					
	<b>11</b>	170 n6	300	270	80	1485	1 - 1 A					
	<b>12</b>	180 n6	300	270	90	1750	1 - 2 A					
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg		Solid shaft without parallel key				
<b>B4CH</b>	<b>9</b>	140 h8	155	235	48	890	0 - 8 F					
	<b>10</b>	170 h8	155	235	50	1025	1 - 0 F					
	<b>11</b>	170 h8	155	270	80	1485	1 - 1 F					
	<b>12</b>	210 h8	170	270	90	1750	1 - 2 F					
Type	Size	$D_2$	$G_4$		$l$	kg		Hollow shaft with keyway				
<b>B4HH</b>	<b>9</b>	135 H7	235		48	890	0 - 8 B					
	<b>10</b>	150 H7	235		50	1025	1 - 0 B					
	<b>11</b>	165 H7	270		80	1485	1 - 1 B					
	<b>12</b>	180 H7	270		90	1750	1 - 2 B					
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	kg	Hollow shaft for shrink disk				
<b>B4DH</b>	<b>9</b>	140 H7	145	235	330	48	890	0 - 8 C				
	<b>10</b>	150 H7	155	235	350	50	1025	1 - 0 C				
	<b>11</b>	165 H7	170	270	400	80	1485	1 - 1 C				
	<b>12</b>	180 H7	185	270	405	90	1750	1 - 2 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	kg	Hollow shaft with spline				
<b>B4KH</b>	<b>9</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	145	235	48	890	0 - 8 D				
	<b>10</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	155	235	50	1025	1 - 0 D				
	<b>11</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	170	270	80	1485	1 - 1 D				
	<b>12</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	185	270	90	1750	1 - 2 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	kg		Flanged shaft
<b>B4FH</b>	<b>9</b>	38	430	220	380	20 × 26	12	350	48	975	0 - 8 E	
	<b>10</b>	38	470	240	420	22 × 26	12	350	50	1115	1 - 0 E	
	<b>11</b>	42	510	260	450	18 × 33	12	400	80	1615	1 - 1 E	
	<b>12</b>	42	540	280	480	22 × 33	12	400	90	1890	1 - 2 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

3) Shaft version with reinforced bearing, see page 9/7.

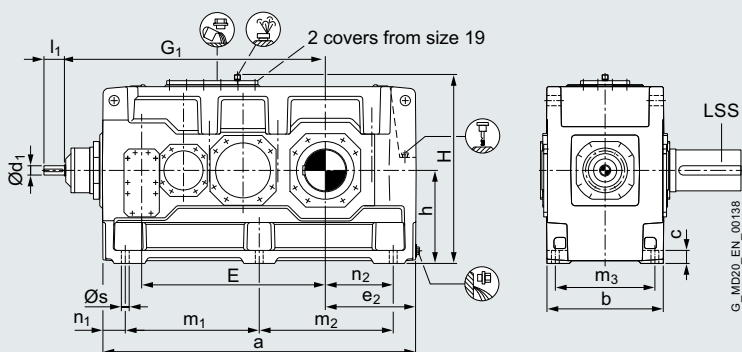
# Bevel helical gear units horizontal mounting position

Type B4

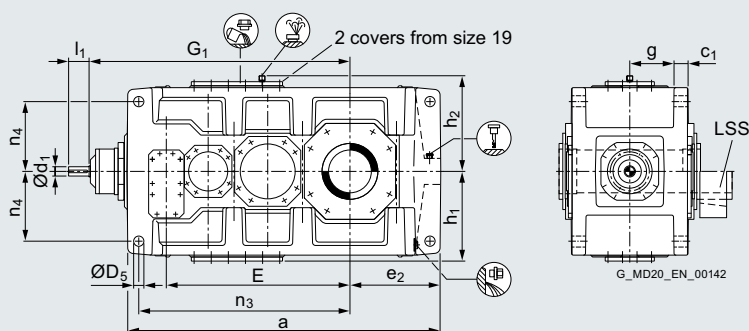
Gear unit dimensions, four-stage, gear unit sizes 13 to 18

## Selection and ordering data

**B4.H**  
2LP302-...20-....



**B4.M**  
2LP302-...21-....



Gear unit size	Dimensions in mm						
	High speed shaft (HSS)			Reinforced shaft			
	$i_N$	$d_1$	$l_1$	$i_N$	$d_1$	$l_1$	$G_1$
13	80 - 180	55 m6	110	125 - 200	60	120	1170
	200 - 315	40 m6	100	224 - 250	50	110	
14	100 - 224	55 m6	110	160 - 250	60	120	1240
	250 - 400	40 m6	100	280 - 315	50	110	
15	80 - 180	70 m6	135	200	70	135	1402
	200 - 315	50 m6	110	224 - 250	60	135	
16	90 - 200	70 m6	135	224	70	135	1448
	224 - 355	50 m6	110	250 - 280	60	135	
17	80 - 180	70 m6	135	200	70	135	1450
	200 - 315	50 m6	110	224 - 250	60	135	
18	90 - 200	70 m6	135	224	70	135	1510
	224 - 355	50 m6	110	250 - 280	60	135	

Gear unit size	Dimensions in mm																			
	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_1$	$h_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
13	1395	550	60	$61 \pm 2$	48 H9	820	405	212	900	450	450	460	597.5	597.5	475	100	305	940	340	35
14	1535	550	60	$61 \pm 2$	48 H9	890	475	212	900	450	450	460	597.5	737.5	475	100	375	1010	340	35
15	1680	625	70	$72 \pm 2$	55 H9	987	485	238	1000	490	490	500	720	720	535	120	365	1135	375	42
16	1770	625	70	$72 \pm 2$	55 H9	1033	530	238	1000	490	490	500	720	810	535	120	410	1180	375	42
17	1770	690	80	$81 \pm 2$	55 H9	1035	525	259	1110	555	555	560	750	750	600	135	390	1175	425	42
18	1890	690	80	$81 \pm 2$	55 H9	1095	585	259	1110	555	555	560	750	870	600	135	450	1235	425	42

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.



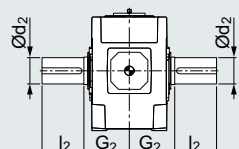
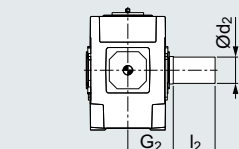
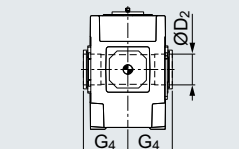
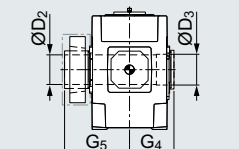
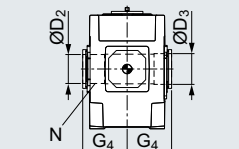
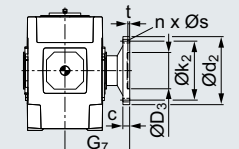
# Bevel helical gear units horizontal mounting position

## Type B4

### Gear unit dimensions, four-stage, gear unit sizes 13 to 18

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

		Oil quantity <sup>1)</sup> B4.H	Oil quantity <sup>1)</sup> B4.M	Weight <sup>1)2)</sup> B4.H	Weight <sup>1)2)</sup> B4.M	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30									
		Article No.:		2LP302		.2-....									
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	kg							
<b>Solid shaft with parallel key<sup>3)</sup></b>															
B4SH	13	200 n6	350	335	145	-	2395	-	1 - 3	A					
	14	210 n6	350	335	150	-	2735	-	1 - 4	A					
	15	230 n6	410	380	230	-	3630	-	1 - 5	A					
	16	240 n6	410	380	235	-	3985	-	1 - 6	A					
	17	250 n6	410	415	295	-	4695	-	1 - 7	A					
	18	270 n6	470	415	305	-	5200	-	1 - 8	A					
<b>Solid shaft without parallel key</b>															
B4CH/ B4CM	13	210 h8	170	335	145	120	2395	2280	1 - 3	F					
	14	210 h8	170	335	150	125	2735	2605	1 - 4	F					
	15	250 h8	190	380	230	170	3630	3435	1 - 5	F					
	16	250 h8	190	380	235	175	3985	3765	1 - 6	F					
<b>Hollow shaft with keyway</b>															
B4HH/ B4HM	13	190 H7		335	145	120	2395	2280	1 - 3	B					
	14	210 H7		335	150	125	2735	2605	1 - 4	B					
	15	230 H7		380	230	170	3630	3435	1 - 5	B					
	16	240 H7		380	235	175	3985	3765	1 - 6	B					
	17	250 H7		415	295	230	4695	4460	1 - 7	B					
	18	275 H7		415	305	235	5200	4930	1 - 8	B					
<b>Hollow shaft for shrink disk</b>															
B4DH/ B4DM	13	190 H7	195	335	480	145	120	2395	2280	1 - 3	C				
	14	210 H7	215	335	480	150	125	2735	2605	1 - 4	C				
	15	230 H7	235	380	550	230	170	3630	3435	1 - 5	C				
	16	240 H7	245	380	550	235	175	3985	3765	1 - 6	C				
	17	250 H7	260	415	600	295	230	4695	4460	1 - 7	C				
	18	280 H7	285	415	600	305	235	5200	4930	1 - 8	C				
<b>Hollow shaft with spline</b>															
B4KH/ B4KM	13	N 190 x 5 x 30 x 36 x 9H	180 H11	195	335	145	120	2395	2280	1 - 3	D				
	14	N 190 x 5 x 30 x 36 x 9H	180 H11	215	335	150	125	2735	2605	1 - 4	D				
	15	N 220 x 5 x 30 x 42 x 9H	210 H11	235	380	230	170	3630	3435	1 - 5	D				
	16	N 220 x 5 x 30 x 42 x 9H	210 H11	245	380	235	175	3985	3765	1 - 6	D				
	17	N 250 x 5 x 30 x 48 x 9H	240 H11	260	415	295	230	4695	4460	1 - 7	D				
	18	N 250 x 5 x 30 x 48 x 9H	240 H11	285	415	305	235	5200	4930	1 - 8	D				
<b>Flanged shaft</b>															
B4FH/ B4FM	13	48	580	310	500	20 x 33	14	480	145	120	2555	2440	1 - 3	E	
	14	48	620	310	540	24 x 33	14	480	150	125	2905	2775	1 - 4	E	
	15	55	710	360	630	28 x 33	17	550	230	170	3870	3675	1 - 5	E	
	16	55	740	360	660	30 x 33	17	550	235	175	4240	4020	1 - 6	E	
	17	60	750	410	660	24 x 39	18	600	295	230	4995	4760	1 - 7	E	
	18	60	800	410	710	26 x 39	18	600	305	235	5550	5280	1 - 8	E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft version with reinforced bearing, see page 9/7.

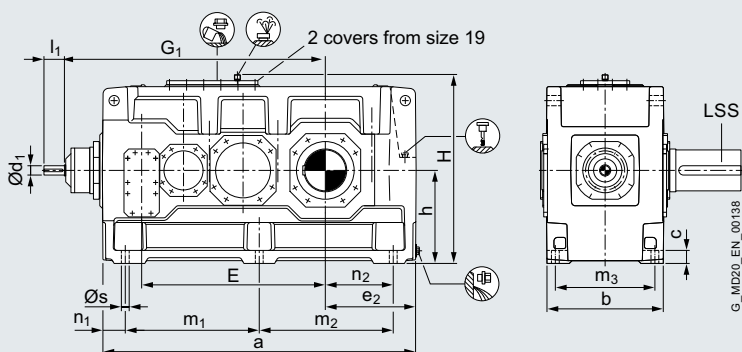
# Bevel helical gear units horizontal mounting position

Type B4

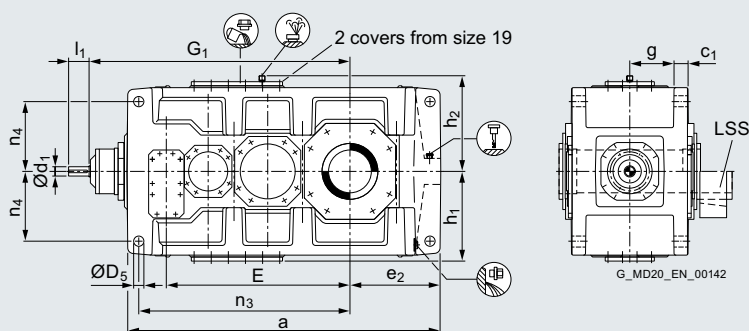
Gear unit dimensions, four-stage, gear unit sizes 19 to 24

## Selection and ordering data

**B4.H**  
2LP302-...20-....



**B4.M**  
2LP302-...21-....



Gear unit size	Dimensions in mm						
	High speed shaft (HSS)			Reinforced shaft			
	$i_N$	$d_1$	$l_1$	$i_N$	$d_1$	$l_1$	$G_1$
19	80 - 180	80 m6	165	200	80 m6	165	1680
	200 - 315	60 m6	140	224 - 250	70 m6	140	
20	90 - 200	80 m6	165	224	80 m6	165	1740
	224 - 355	60 m6	140	250 - 280	70 m6	140	
21	80 - 180	90 m6	165	-	-	-	1992
	200 - 315	70 m6	140	-	-	-	
22	90 - 200	90 m6	165	-	-	-	2047
	224 - 355	70 m6	140	-	-	-	
23	80 - 160	90 m6	165	-	-	-	2110
	180 - 315	70 m6	140	-	-	-	
24	90 - 180	90 m6	165	-	-	-	2175
	200 - 355	70 m6	140	-	-	-	

Gear unit size	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_1$	$h_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
19	2030	790	90	91 ± 2	65 H9	1190	590	299	1240	615	615	620	860	860	690	155	435	1365	475	48
	2150	790	90	91 ± 2	65 H9	1250	650	299	1240	615	615	620	860	980	690	155	495	1425	475	48
21	2340	830	100	100 ± 2	75 H9	1387	655	310	1390	685	685	690	1000	1000	720	170	485	1600	520	56
22	2450	830	100	100 ± 2	75 H9	1442	710	310	1390	685	685	690	1000	1110	720	170	540	1655	520	56
23	2530	930	115	120 ± 2	80 H9	1505	730	342	1565	780	765	785	1085	1085	810	180	550	1725	580	56
24	2660	930	115	120 ± 2	80 H9	1570	795	342	1565	780	765	785	1085	1215	810	180	615	1790	580	56

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

# Bevel helical gear units horizontal mounting position

## Type B4

### Gear unit dimensions, four-stage, gear unit sizes 19 to 24

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity 1)	Oil quantity 1)	Weight 1) 2)	Weight 1) 2)	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30									
		B4.H	B4.M	B4.H	B4.M										
		Article No.:		2LP302		.2-....									
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg	kg	Solid shaft with parallel key						
<b>B4SH</b>	<b>19</b>	290 n6	470	465	480	–	6800	–	2 - 0 A						
	<b>20</b>	300 n6	500	465	550	–	8200	–	2 - 1 A						
	<b>21</b>	320 n6	500	490	540	–	9200	–	2 - 2 A						
	<b>22</b>	340 n6	550	490	620	–	9900	–	2 - 3 A						
	<b>23</b>	360 n6	590	540	710	–	12000	–	2 - 4 A						
	<b>24</b>	380 n6	590	540	810	–	13500	–	2 - 5 A						
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg	kg	Hollow shaft for shrink disk					
<b>B4DH/ B4DM</b>	<b>19</b>	285 H7	295	465	670	480	440	6800	6300	2 - 0 C					
	<b>20</b>	310 H7	315	465	670	550	510	8200	7700	2 - 1 C					
	<b>21</b>	330 H7	335	490	715	540	590	9200	8600	2 - 2 C					
	<b>22</b>	340 H7	345	490	725	620	680	9900	9400	2 - 3 C					
	<b>23</b>	370 H7	375	540	800	710	790	12000	11400	2 - 4 C					
	<b>24</b>	390 H7	395	540	820	810	910	13500	12800	2 - 5 C					
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	$l$	kg	kg	Flanged shaft		
<b>B4FH/ B4FM</b>	<b>19</b>	65	860	460	770	30 × 39	18	670	480	440	On request		2 - 0 E		
	<b>20</b>	65	930	460	830	32 × 39	18	670	550	510	On request		2 - 1 E		
	<b>21</b>	75	950	520	850	28 × 45	20	710	540	590	On request		2 - 2 E		
	<b>22</b>	75	1040	520	940	28 × 45	20	710	620	680	On request		2 - 3 E		
	<b>23</b>	On request													
	<b>24</b>	On request													

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

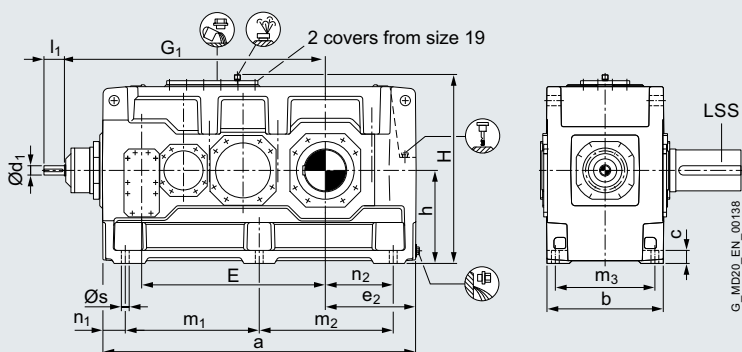
# Bevel helical gear units horizontal mounting position

Type B4

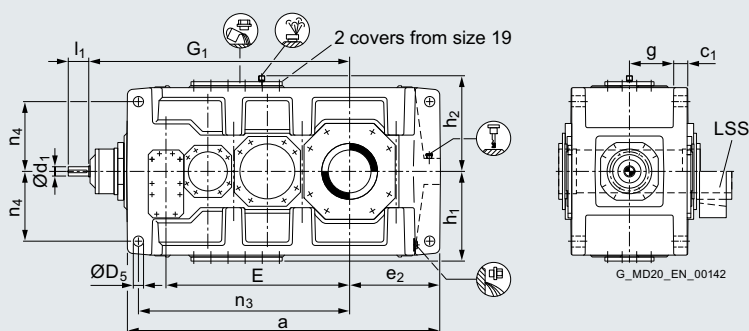
Gear unit dimensions, four-stage, gear unit sizes 25 to 28

## Selection and ordering data

**B4.H**  
2LP302-...20-....



**B4.M**  
2LP302-...21-....



Gear unit size	Dimensions in mm				
	$l_N$	$d_1$	$l_1$	$G_1$	
<b>25</b>	80 - 160	110 n6	205	2395	
	180 - 315	80 m6	170		
<b>26</b>	90 - 180	110 n6	205	2485	
	200 - 355	80 m6	170		
<b>27</b>	80 - 160	130 n6	245	2762	
	180 - 315	100 m6	210		
<b>28</b>	90 - 180	130 n6	245	2857	
	200 - 355	100 m6	210		

Gear unit size																				
	a	b	c	$c_1$	$D_5$	E	$e_2$	g	H	$h^{1)}$	$h_1$	$h_2$	$m_1$	$m_2$	$m_3$	$n_1$	$n_2$	$n_3$	$n_4$	s
<b>25</b>	2830	1045	130	120 ±2	90 H9	1695	790	400	1740	860	860	880	1215	1215	910	200	590	1965	660	66
<b>26</b>	3010	1045	130	120 ±2	90 H9	1785	880	400	1740	860	860	880	1215	1395	910	200	680	2055	660	66
<b>27</b>	3220	1170	150	145 ±2	100 H9	1927	880	440	1900	950	930	950	1390	1390	1030	220	660	2260	720	74
<b>28</b>	3410	1170	150	145 ±2	100 H9	2022	975	440	1900	950	930	950	1390	1580	1030	220	755	2355	720	74

Shaft seals, see page 10/2 onwards.

<sup>1)</sup> Permissible tolerance: -1 mm.

For details on the shafts, see Chapter 9.

## Bevel helical gear units horizontal mounting position

### Type B4 / Types B2, B3 and B4

#### Gear unit dimensions, four-stage, gear unit sizes 25 to 28

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity 1)	Oil quantity 1)	Weight 1) 2)	Weight 1) 2)					10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 6/27 to 6/30					
		B4.H	B4.M	B4.H	B4.M										
		Article No.:				<b>2LP302</b>		■ - ■ ■ ■		<b>.2-....</b>					
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	kg							
<b>B4SH</b>	<b>25</b>	400 n6	650	605	1000	-	16300	-	<b>2 - 6 A</b>						
	<b>26</b>	420 n6	650	605	1150	-	18000	-	<b>2 - 7 A</b>						
	<b>27</b>	440 n6	690	680	1430	-	23000	-	<b>2 - 8 A</b>						
	<b>28</b>	460 n6	750	680	1580	-	26200	-	<b>3 - 0 A</b>						
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	l	kg	kg						
<b>B4DH/ B4DM</b>	<b>25</b>	410 H7	415	610	895	1000	1110	16300	15500	<b>2 - 6 C</b>					
	<b>26</b>	430 H7	435	610	925	1150	1280	18000	17100	<b>2 - 7 C</b>					
	<b>27</b>	460 H7	465	680	1000	1430	1590	23000	22000	<b>2 - 8 C</b>					
	<b>28</b>	470 H7	475	680	1020	1580	1750	26200	25000	<b>3 - 0 C</b>					
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n x s	t	G <sub>7</sub>	l	l	kg	kg			
<b>B4FH/ B4FM</b>	<b>25</b>	On request												<b>2 - 6 E</b>	
	<b>26</b>													<b>2 - 7 E</b>	
	<b>27</b>													<b>2 - 8 E</b>	
	<b>28</b>													<b>3 - 0 E</b>	

#### Article No. overview

##### Article No., 10th to 12th position

				Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
				Article No.	<b>2LP302</b>				■ - ■ ■ ■		■ - ■ ■ ■		■ - ■ ■ ■		<b>-Z . . . .</b>	
<b>Ratio</b>																
Type	B2.H	B3.H	B4.H													
<b>i<sub>N</sub></b>	5	12.5	80													
<b>i<sub>N</sub></b>	5.6	14	90													
<b>i<sub>N</sub></b>	6.3	16	100													
<b>i<sub>N</sub></b>	7.1	18	112													
<b>i<sub>N</sub></b>	8	20	125													
<b>i<sub>N</sub></b>	9	22.4	140													
<b>i<sub>N</sub></b>	10	25	160													
<b>i<sub>N</sub></b>	11.2	28	180													
<b>i<sub>N</sub></b>	12.5	31.5	200													
<b>i<sub>N</sub></b>	14	35.5	224													
<b>i<sub>N</sub></b>	16	40	250													
<b>i<sub>N</sub></b>	18	45	280													
<b>i<sub>N</sub></b>	20	50	315													
<b>i<sub>N</sub></b>	22.4	56	355													
<b>i<sub>N</sub></b>	-	63	400													
<b>i<sub>N</sub></b>	-	71	-													
<b>i<sub>N</sub></b>	-	80	-													
<b>i<sub>N</sub></b>	-	90	-													
<b>Type designation</b>																
Type B2											<b>0</b>					
Type B3											<b>1</b>					
Type B4											<b>2</b>					
<b>Mounting position</b>																
Mounting position H											<b>0</b>					
Mounting position M											<b>1</b>					

Shaft seal see page 10/2 onwards.  
 For details on the shafts, see Chapter 9.  
 Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.  
 2) Without oil filling.



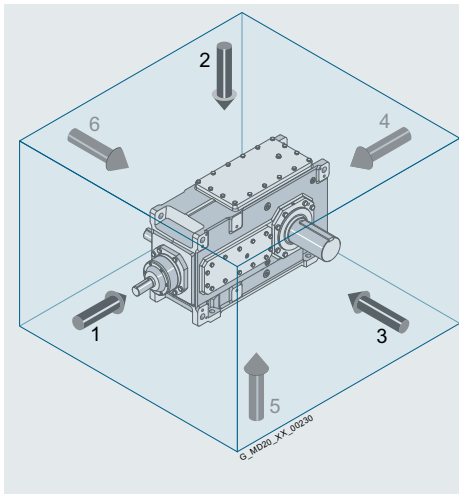
# Bevel helical gear units horizontal mounting position

Types B2, B3 and B4

## Article No. overview

### Selection and ordering data (continued)

#### Article No., 13th position



Irrespective of the mounting position of the gear unit, the face designations "right" and "left" always refer to the horizontal mounting position with the view on side 1.

Side 2 is on top.

Mounting cover on top (2),

looking at drive front face (1):

Side 3 = right

Side 6 = left

Data position of the Article No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.	2LP302 . . . . .																Z . . . . .

#### Variants/shaft arrangement (looking at side 2)

Type	B2.H	B3.H	B4.H	
A				0
B				1
C				2
D				3

For details on the backstops and dimension  $G_8$ , see page 10/23 onwards.

□/■ Backstop

- ③ Backstop Sz. 4–14
- ④ Backstop Sz. 15–18
- ⑤ Backstop Sz. 4–18

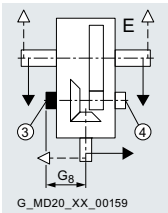
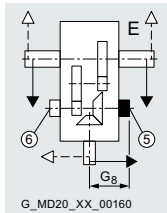
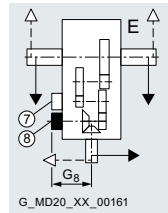
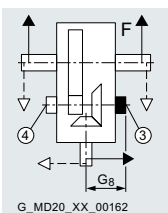
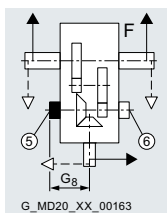
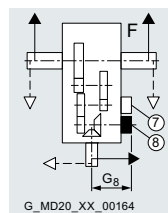
- ⑥ Backstop Sz. 19–22
- ⑦ Backstop Sz. 5–10
- ⑧ Backstop Sz. 11–22

# Bevel helical gear units horizontal mounting position

## Types B2, B3 and B4

Article No. overview

### Selection and ordering data (continued)

			Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code	
			Article No.	2LP302 . . . . .												Z . . . .
Variants/shaft arrangement (looking at side 2)																
Type	B2.H	B3.H	B4.H													
E																4
F																5



The versions E and F with slow speed shaft at both ends are only relevant for the shaft variants

- "S" (solid shaft with parallel key acc. to DIN 6885/1)
- "V" (reinforced solid shaft with parallel key acc. to DIN 6885/1)
- "C" (solid shaft for zero-backlash taper clamping connection)

The solid shaft extension shown represents the driven machine shaft insertion side for hollow shafts.

The slow speed hollow shaft "H" (hollow shaft with keyway according to DIN 6885/1) is generally suitable for fitting on both ends.

For details on the seals, [see page 10/2 onwards](#).

For details on the backstops and dimension  $G_8$ , [see page 10/23 onwards](#).

□/■ Backstop

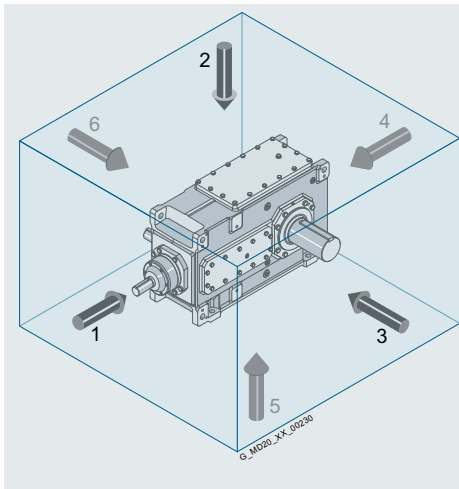
- |                        |                        |
|------------------------|------------------------|
| ③ Backstop Sz. 4 – 14  | ⑥ Backstop Sz. 19 – 22 |
| ④ Backstop Sz. 15 – 18 | ⑦ Backstop Sz. 5 – 10  |
| ⑤ Backstop Sz. 4 – 18  | ⑧ Backstop Sz. 11 – 22 |

# Bevel helical gear units horizontal mounting position

Types B2, B3 and B4

## Article No. overview

### Selection and ordering data (continued)



Irrespective of the mounting position of the gear unit, the face designations "right" and "left" always refer to the horizontal mounting position with the view on side 1.

Side 2 is on top.

Mounting cover on top (2),

looking at drive front face (1):

Side 3 = right

Side 6 = left

### Article No. supplement, 14th position

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.		2LP302	.	.	.	.	.	.	.	■	.	.	-Z . . .
<b>Sealing single-side high speed shaft (HSS)</b>													
Radial shaft seal													A
Taconite E													E

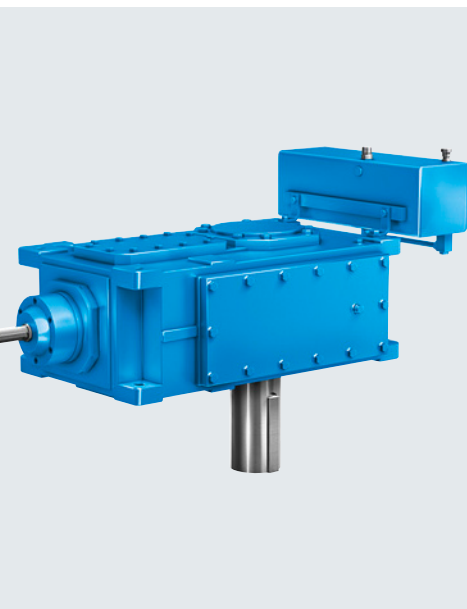
### Article No. supplement, 15th and 16th position

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.		2LP302	.	.	.	.	.	.	.	.	■	■	-Z ■ ■ ■
<b>Sealing low speed shaft (LSS)</b>													
Radial shaft seal													A
Dual radial shaft seal													B
Taconite F													E
Taconite F-F													F
Taconite F-H													G
Taconite F-K													H
<b>Sealing double-extended low speed shaft (LSS)</b>													
Side 3: Radial shaft seal/Side 6: Radial shaft seal													Z Q 0 A
Side 3: Dual radial shaft seal/Side 6: Dual radial shaft seal													Z Q 0 B
Side 3: Taconite F/Side 6: Taconite F													Z Q 0 E
Side 3: Radial shaft seal/Side 6: Taconite F													Z Q 1 A
Side 3: Taconite F/Side 6: Radial shaft seal													Z Q 1 B
<b>Shaft version</b>													
High speed shaft (HSS) version: Catalog version, low speed shaft (LSS) version: Catalog version													0
High speed shaft (HSS) version: Reinforced version, low speed shaft (LSS) version: Catalog version													1



## Bevel helical gear units Vertical mounting position

7



<b>7/2</b>	<b>Type B2</b> <u>Gear unit dimensions</u> Two-stage, gear unit sizes 4 to 8
7/2	Two-stage, gear unit sizes 9 to 12
7/4	Two-stage, gear unit sizes 13 to 18
7/6	Two-stage, gear unit sizes 13 to 18
<b>7/8</b>	<b>Type B3</b> <u>Gear unit dimensions</u> Three-stage, gear unit sizes 4 to 8
7/8	Three-stage, gear unit sizes 9 to 12
7/10	Three-stage, gear unit sizes 9 to 12
7/12	Three-stage, gear unit sizes 13 to 18
7/14	Three-stage, gear unit sizes 19 to 24
7/16	Three-stage, gear unit sizes 25 and 26
<b>7/18</b>	<b>Type B4</b> <u>Gear unit dimensions</u> Four-stage, gear unit sizes 5 to 8
7/18	Four-stage, gear unit sizes 5 to 8
7/20	Four-stage, gear unit sizes 9 to 12
7/22	Four-stage, gear unit sizes 13 to 18
7/24	Four-stage, gear unit sizes 19 to 24
7/26	Four-stage, gear unit sizes 25 and 26
<b>7/27</b>	<b>Type B4 / Types B2, B3 and B4</b> <u>Article No. overview</u> Article No., 10th to 12th position
7/27	Article No., 10th to 12th position
7/28	Article No., 13th position
7/30	Article No. supplement, 14th position
7/30	Article No. supplement, 15th and 16th position

7

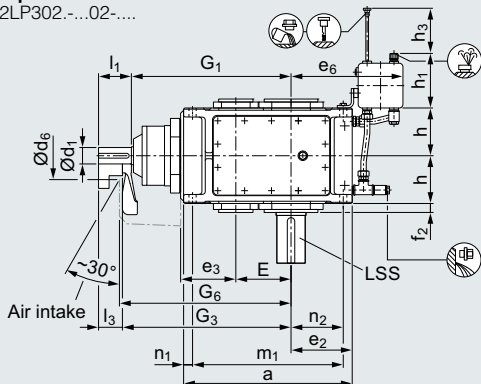
# Bevel helical gear units vertical mounting position

Type B2

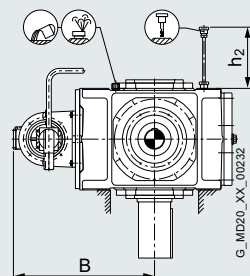
## Gear unit dimensions, two-stage, gear unit sizes 4 to 8

### Selection and ordering data

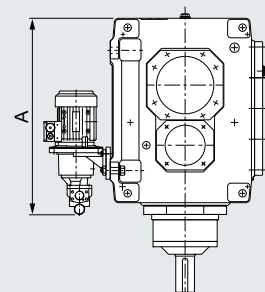
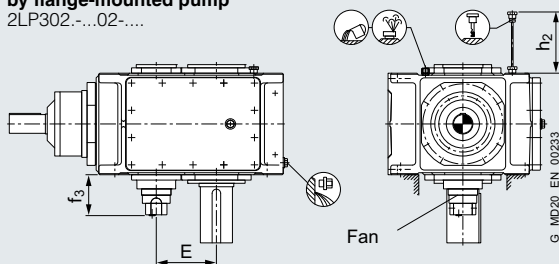
**B2.V**  
Dip lubrication  
2LP302-...02-....



**B2.V**  
Forced lubrication  
by motor pump  
2LP302-...02-....



**B2.V**  
Forced lubrication  
by flange-mounted pump  
2LP302-...02-....



Gear unit size	Dimensions in mm													
	High speed shaft (HSS)										Fan			
	Reinforced shaft					Standard shaft					A <sub>1</sub>	B <sub>1</sub>	d <sub>6</sub>	G <sub>6</sub>
i <sub>N</sub>	d <sub>1</sub>	l <sub>1</sub>	l <sub>3</sub>	i <sub>N</sub>	d <sub>1</sub>	l <sub>1</sub>	l <sub>3</sub>	G <sub>1</sub>	G <sub>3</sub>					
4	5 - 11.2	45 m6	100	80	8 - 12.5	50 m6	110	90	465	485	188	200	150	495
	12.5 - 18	35 m6	80	60	14 - 16	40 m6	90	70						
5	5 - 11.2	55 m6	110	80	8 - 12.5	60 m6	120	90	535	565	215	235	160	575
	12.5 - 18	40 m6	100	70	14 - 16	50 m6	110	80						
6	6.3 - 14	55 m6	110	80	10 - 16	60 m6	120	90	570	600	215	235	160	610
	16 - 22.4	40 m6	100	70	18 - 20	50 m6	110	80						
7	5 - 11.2	70 m6	135	105	12.5	70 m6	135	105	640	670	250	285	210	685
	12.5 - 18	50 m6	110	80	14 - 16	60 m6	135	105						
8	6.3 - 14	70 m6	135	105	16	70 m6	135	105	685	715	250	285	210	730
	16 - 22.4	50 m6	110	80	18 - 20	60 m6	135	105						

Gear unit size	Dimensions in mm																						
	a	b <sub>1</sub>	c	E	e <sub>2</sub>	e <sub>3</sub>	e <sub>4</sub>	e <sub>5</sub>	e <sub>6</sub>	f <sub>2</sub>	f <sub>3</sub>	h	h <sub>1</sub>	h <sub>2</sub> <sup>1)</sup>	h <sub>3</sub>	m <sub>1</sub>	m <sub>2</sub>	n <sub>1</sub>	n <sub>2</sub>	p <sub>2</sub> <sup>2)</sup>	s	A <sup>3)</sup>	B <sup>3)</sup>
4	505	150	30 ± 1	160	190	100	200	215	320	26	-	135	165	-	180	445	300	30	160	220	24 H9	-	-
5	565	240	30 ± 1	185	205	185	230	252	385	30	190	160	205	245	240	505	360	30	175	270	24 H9	565	480
6	645	240	30 ± 1	220	250	185	230	252	425	30	190	160	205	245	240	585	360	30	220	270	24 H9	650	480
7	690	240	36 ± 1	225	250	225	280	302	425	32	200	190	205	220	250	620	430	35	215	330	28 H9	740	530
8	795	240	36 ± 1	270	310	225	280	302	485	32	200	190	205	220	250	725	430	35	275	330	28 H9	845	530

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

<sup>1)</sup> For forced lubrication, approximately h<sub>2</sub> can be assumed as required space for piping and monitoring; details according to order-related documentation.

<sup>2)</sup> Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

<sup>3)</sup> Max. dimensions; details acc. to order-related documentation.

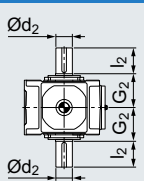
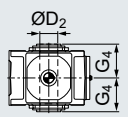
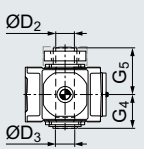
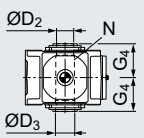
# Bevel helical gear units vertical mounting position

## Type B2

### Gear unit dimensions, two-stage, gear unit sizes 4 to 8

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity 1)	Oil quantity 1)	Weight 1)2)				10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30					
		B2.V Dip lubrication	B2.V Forced lubrication	B2.V									
		Article No.:			2LP302			.02-....					
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg				Solid shaft with parallel key <sup>4)</sup>		
<b>B2SV</b>	4	80 m6	170	170	23.5	–	235	0 - 3	A				
	5	100 m6	210	200	38	19	360	0 - 4	A				
	6	110 n6	210	200	46	23	410	0 - 5	A				
	7	120 n6	210	235	74	37	615	0 - 6	A				
	8	130 n6	250	235	81	40	700	0 - 7	A				
Type	Size	$D_2$	$G_4$		$l$	$l$	kg				Hollow shaft with keyway		
<b>B2HV</b>	4	80 H7	170		23.5	–	235	0 - 3	B				
	5	100 H7	200		38	19	360	0 - 4	B				
	6	110 H7	200		46	23	410	0 - 5	B				
	7	120 H7	235		74	37	615	0 - 6	B				
	8	130 H7	235		81	40	700	0 - 7	B				
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg			Hollow shaft for shrink disk		
<b>B2DV</b> <sup>3)</sup>	4	85 H7	85	170	235	23.5	–	235	0 - 3	C			
	5	100 H7	100	200	275	38	19	360	0 - 4	C			
	6	110 H7	110	200	275	46	23	410	0 - 5	C			
	7	120 H7	120	235	320	74	37	615	0 - 6	C			
	8	130 H7	130	235	325	81	40	700	0 - 7	C			
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg			Hollow shaft with spline		
<b>B2KV</b>	5	N 95 x 3 x 30 x 30 x 9H	89 H11	100	200	38	19	360	0 - 4	D			
	6	N 95 x 3 x 30 x 30 x 9H	89 H11	110	200	46	23	410	0 - 5	D			
	7	N 120 x 3 x 30 x 38 x 9H	114 H11	120	235	74	37	615	0 - 6	D			
	8	N 120 x 3 x 30 x 38 x 9H	114 H11	130	235	81	40	700	0 - 7	D			
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	$l$	kg	Flanged shaft	
<b>B2FV</b>	5	25	300	150	260	16 x 22	10	290	38	19	400	0 - 4	E
	6	25	320	160	280	18 x 22	10	290	46	23	455	0 - 5	E
	7	30	370	180	320	16 x 26	10	340	74	37	670	0 - 6	E
	8	30	390	190	340	18 x 26	10	340	81	40	760	0 - 7	E

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

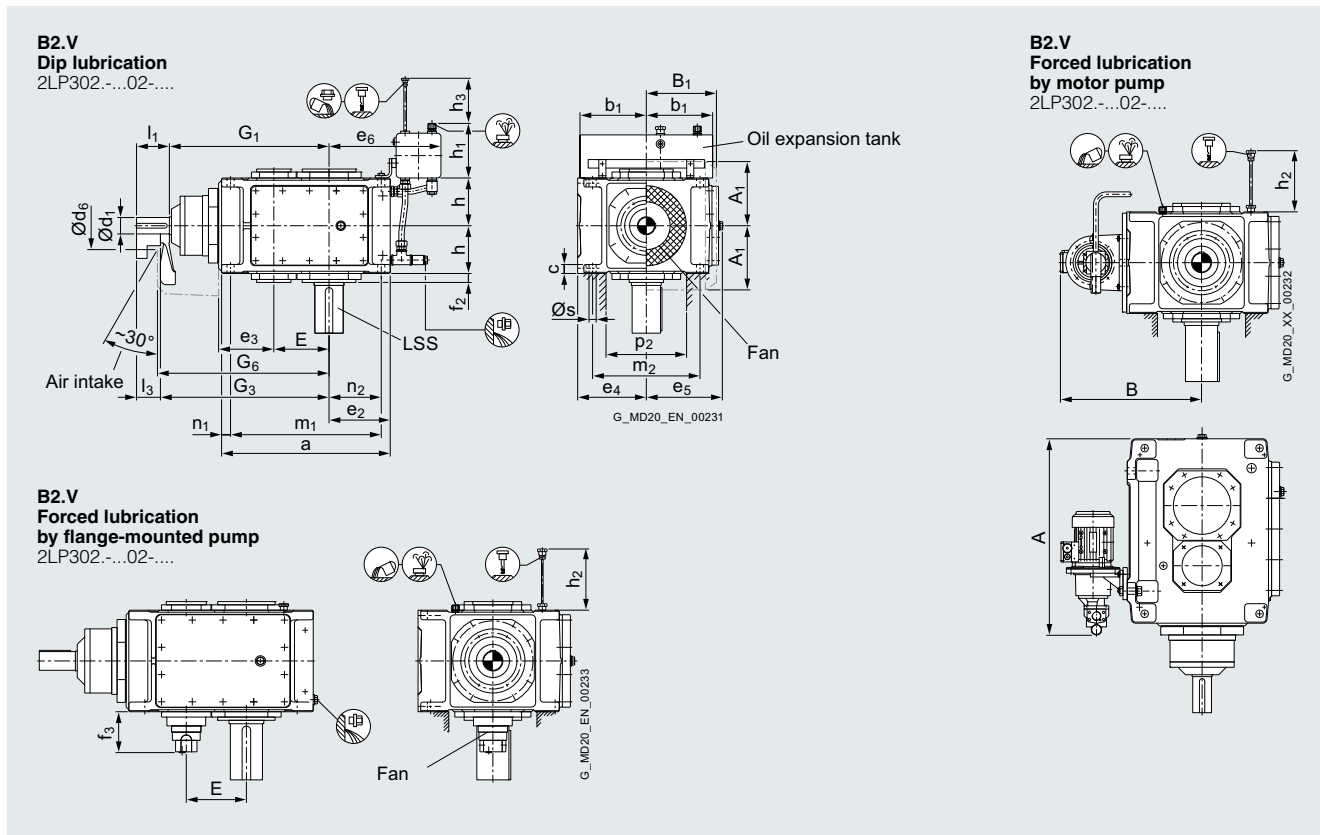
<sup>4)</sup> Shaft version with reinforced bearing, see page 9/7.

# Bevel helical gear units vertical mounting position

Type B2

## Gear unit dimensions, two-stage, gear unit sizes 9 to 12

### Selection and ordering data



Gear unit size	Dimensions in mm															
	High speed shaft (HSS)										Fan					
	Reinforced shaft															
$i_N$	$d_1$	$l_1$	$l_3$	$i_N$	$d_1$	$l_1$	$l_2$	$G_1$	$G_3$	$A_1$	$B_1$	$d_6$	$G_6$			
9	5 - 11.2	80 m6	165	130	12.5	80 m6	165	130	755	790	270	325	195	805		
	12.5 - 18	60 m6	140	105	14 - 16	70 m6	140	105								
10	6.3 - 14	80 m6	165	130	16	80 m6	165	130	805	840	270	325	195	855		
	16 - 22.4	60 m6	140	105	18 - 20	70 m6	140	105								
11	5 - 11.2	90 m6	165	130	-	-	-	-	925	960	328	385	210	980		
	12.5 - 18	70 m6	140	105	-	-	-	-								
12	6.3 - 14	90 m6	165	130	-	-	-	-	995	1030	328	385	210	1050		
	16 - 22.4	70 m6	140	105	-	-	-	-								

Gear unit size	Dimensions in mm																											
	a	$b_1$	c	E	$e_2$	$e_3$	$e_4$	$e_5$	$e_6$	$f_2$	$f_3$	h	$h_1$	$h_2^{1)}$	$h_3$	$m_1$	$m_2$	$n_1$	$n_2$	$p_2^{2)}$	s	A <sup>3)</sup>	B <sup>3)</sup>					
9	820	330	48 ± 1.5	265	300	265	320	342	560	45	200	220	275	250	330	740	490	40	260	370	36 H9	795	570					
10	920	330	48 ± 1.5	315	350	265	320	342	610	45	200	220	275	250	330	840	490	40	310	370	36 H9	895	570					
11	975	330	54 ± 1.5	320	345	320	380	410	595	47	200	265	275	300	340	875	600	50	295	440	40 H9	979	630					
12	1130	330	54 ± 1.5	390	430	320	380	410	680	47	200	265	275	300	340	1030	600	50	380	440	40 H9	1135	630					

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

1) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

2) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

3) Max. dimensions; details acc. to order-related documentation.

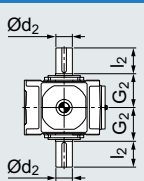
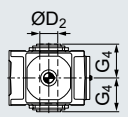
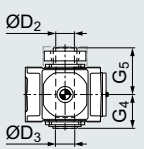
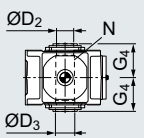
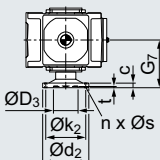
# Bevel helical gear units vertical mounting position

## Type B2

### Gear unit dimensions, two-stage, gear unit sizes 9 to 12

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

		Oil quantity 1)	Oil quantity 1)	Weight 1) 2)					10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30				
		B2.V Dip lubrication	B2.V Forced lubrication	B2.V									
		Article No.:		2LP302	-		.02-....						
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg		Solid shaft with parallel key <sup>4)</sup>				
<b>B2SV</b>	<b>9</b>	140 n6	250	270	115	57	1000	0 - 8 A					
	<b>10</b>	160 n6	300	270	120	60	1155	1 - 0 A					
	<b>11</b>	170 n6	300	320	190	95	1640	1 - 1 A					
	<b>12</b>	180 n6	300	320	225	114	1910	1 - 2 A					
Type	Size	D <sub>2</sub>	G <sub>4</sub>		l	l	kg		Hollow shaft with keyway				
<b>B2HV</b>	<b>9</b>	140 H7	270		115	57	1000	0 - 8 B					
	<b>10</b>	160 H7	270		120	60	1155	1 - 0 B					
	<b>11</b>	170 H7	320		190	95	1640	1 - 1 B					
	<b>12</b>	180 H7	320		225	114	1910	1 - 2 B					
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	l	kg		Hollow shaft for shrink disk			
<b>B2DV</b> <sup>3)</sup>	<b>9</b>	140 H7	145	270	365	115	57	1000	0 - 8 C				
	<b>10</b>	150 H7	155	270	385	120	60	1155	1 - 0 C				
	<b>11</b>	165 H7	170	320	450	190	95	1640	1 - 1 C				
	<b>12</b>	180 H7	185	320	455	225	114	1910	1 - 2 C				
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	l	kg		Hollow shaft with spline			
<b>B2KV</b>	<b>9</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	145	270	115	57	1000	0 - 8 D				
	<b>10</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	155	270	120	60	1155	1 - 0 D				
	<b>11</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	170	320	190	95	1640	1 - 1 D				
	<b>12</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	185	320	225	114	1910	1 - 2 D				
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n × s	t	G <sub>7</sub>	l	l	kg		Flanged shaft
<b>B2FV</b>	<b>9</b>	38	430	220	380	20 × 26	12	385	115	57	1090	0 - 8 E	
	<b>10</b>	38	470	240	420	22 × 26	12	385	120	60	1250	1 - 0 E	
	<b>11</b>	42	510	260	450	18 × 33	12	450	190	95	1775	1 - 1 E	
	<b>12</b>	42	540	280	480	22 × 33	12	450	225	114	2060	1 - 2 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

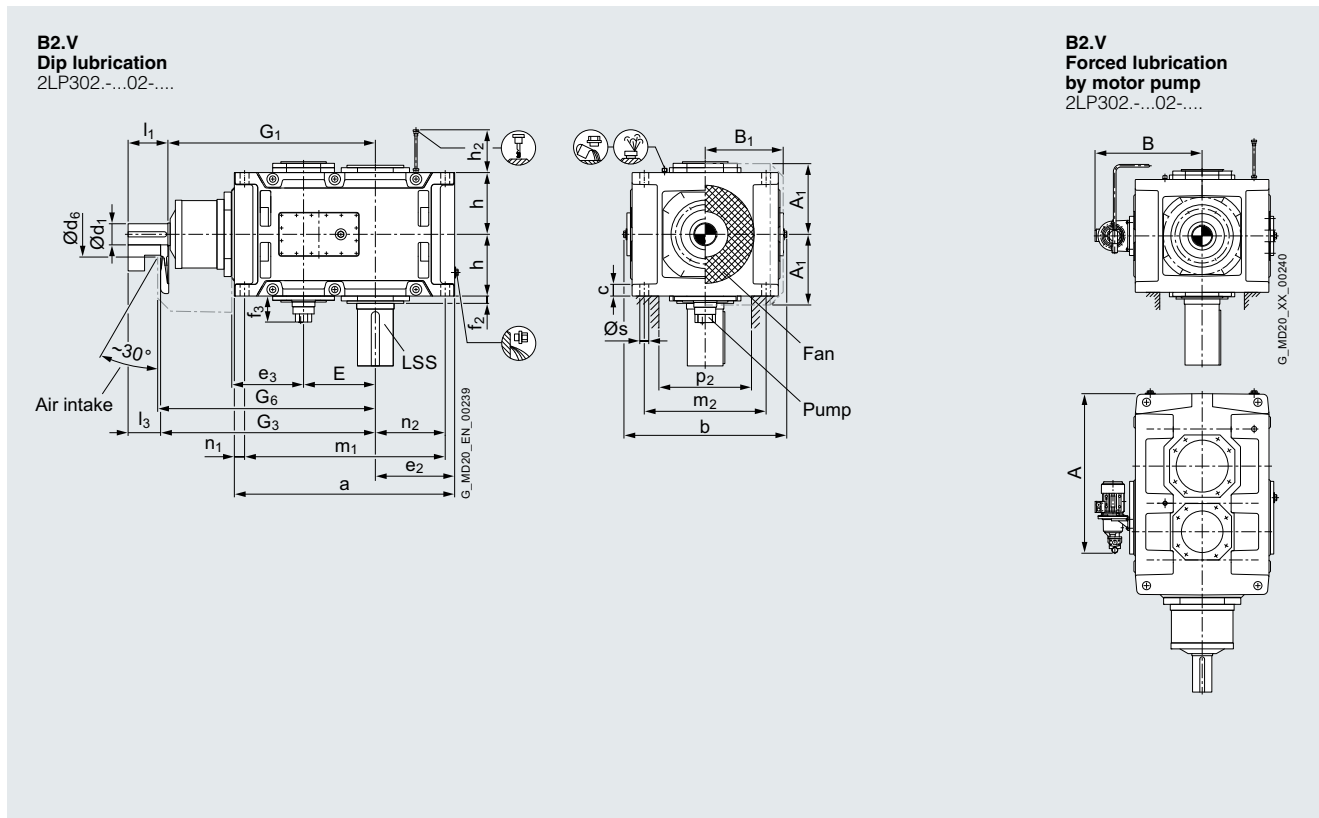
<sup>4)</sup> Shaft version with reinforced bearing, see page 9/7.

# Bevel helical gear units vertical mounting position

## Type B2

### Gear unit dimensions, two-stage, gear unit sizes 13 to 18

#### Selection and ordering data



Gear unit size	Dimensions in mm									
	High speed shaft (HSS)						Fan			
	$l_N$	$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$B_1$	$d_6$	$G_6$
13	5 - 11.2	110 n6	205	165	1070	1110	375	450	245	1130
	12.5 - 18	80 m6	170	130						
14	6.3 - 14	110 n6	205	165	1070	1110	375	450	245	1200
	16 - 22.4	80 m6	170	130						
15	5 - 11.2	130 n6	245	200	1277	1322	435	495	280	1340
	12.5 - 18	100 m6	210	165						
16	5.6 - 12.5	130 n6	245	200	1323	1368	435	495	280	1385
	14 - 20	100 m6	210	165						
17	5.6 - 11.2	150 n6	245	200	1435	1480	505	555	380	1500
	12.5 - 18	110 n6	210	165						
18	7.1 - 12.5	150 n6	245	200	1495	1540	505	555	380	1560
	14 - 20	110 n6	210	165						

Gear unit size	Dimensions in mm																	
	a	b	c	E	$e_2$	$e_3$	$f_2$	$f_3$	h	$h_2^{1)}$	$m_1$	$m_2$	$n_1$	$n_2$	$p_2^{2)}$	s	A <sup>3)</sup>	B <sup>3)</sup>
13	1130	900	61 ± 2	370	405	370	38	200	325	350	1035	680	50	360	500	48	785	680
14	1270	900	61 ± 2	370	475	370	45	200	325	350	1175	680	50	430	500	48	925	680
15	1350	980	72 ± 2	442	485	442	75	200	380	430	1235	750	60	430	570	55	975	730
16	1440	980	72 ± 2	442	530	442	75	200	380	430	1325	750	60	475	570	55	1065	730
17	1490	1110	81 ± 2	490	525	490	98	200	437.5	480	1360	840	70	465	630	65	995	780
18	1610	1110	81 ± 2	490	585	490	98	200	437.5	480	1480	840	70	525	630	65	1115	780

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

<sup>1)</sup> For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

<sup>2)</sup> Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

<sup>3)</sup> Max. dimensions; details acc. to order-related documentation.

# Bevel helical gear units vertical mounting position

## Type B2

### Gear unit dimensions, two-stage, gear unit sizes 13 to 18

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

						Oil quantity 1) 2) B2.V Forced lubrication	Weight 1) 2) B2.V			10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30				
						Article No.: <b>2LP302</b>		- - - <b>.02-....</b>						
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg				Solid shaft with parallel key <sup>4)</sup>				
<b>B2SV</b>	<b>13</b>	200 n6	350	390	125	2450	1	-	3 A					
	<b>14</b>	210 n6	350	390	140	2825	1	-	4 A					
	<b>15</b>	230 n6	410	460	190	3990	1	-	5 A					
	<b>16</b>	240 n6	410	460	200	4345	1	-	6 A					
	<b>17</b>	250 n6	410	540	270	5620	1	-	7 A					
	<b>18</b>	270 n6	470	540	295	6150	1	-	8 A					
Type	Size	$D_2$	$G_4$	$l$	kg					Hollow shaft with keyway				
<b>B2HV</b>	<b>13</b>	-	-	125	2450	1	-	3 B						
	<b>14</b>	210 H7	390	140	2825	1	-	4 B						
	<b>15</b>	-	-	190	3990	1	-	5 B						
	<b>16</b>	240 H7	450	200	4345	1	-	6 B						
	<b>17</b>	-	-	270	5620	1	-	7 B						
	<b>18</b>	275 H7	510	295	6150	1	-	8 B						
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	kg			Hollow shaft for shrink disk				
<b>B2DV</b> <sup>3)</sup>	<b>13</b>	-	-	-	-	125	2450	1	-	3 C				
	<b>14</b>	210 H7	215	390	535	140	2825	1	-	4 C				
	<b>15</b>	-	-	-	-	190	3990	1	-	5 C				
	<b>16</b>	240 H7	245	450	620	200	4345	1	-	6 C				
	<b>17</b>	-	-	-	-	270	5620	1	-	7 C				
	<b>18</b>	280 H7	285	510	700	295	6150	1	-	8 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	kg			Hollow shaft with spline				
<b>B2KV</b>	<b>13</b>	-	-	-	-	125	2450	1	-	3 D				
	<b>14</b>	N 190 x 5 x 30 x 36 x 9H	180 H11	215	390	140	2825	1	-	4 D				
	<b>15</b>	-	-	-	-	190	3990	1	-	5 D				
	<b>16</b>	N 220 x 5 x 30 x 42 x 9H	210 H11	245	450	200	4345	1	-	6 D				
	<b>17</b>	-	-	-	-	270	5620	1	-	7 D				
	<b>18</b>	N 250 x 5 x 30 x 48 x 9H	240 H11	285	510	295	6150	1	-	8 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	kg			Flanged shaft	
<b>B2FV</b>	<b>13</b>	48	580	310	500	20 x 33	14	525	125	2620	1	-	3 E	
	<b>14</b>	48	620	310	540	24 x 33	14	525	140	3005	1	-	4 E	
	<b>15</b>	55	710	360	630	28 x 33	17	625	190	4245	1	-	5 E	
	<b>16</b>	55	740	360	660	30 x 33	17	625	200	4615	1	-	6 E	
	<b>17</b>	60	750	410	660	24 x 39	18	695	270	5940	1	-	7 E	
	<b>18</b>	60	800	410	710	26 x 39	18	695	295	6520	1	-	8 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

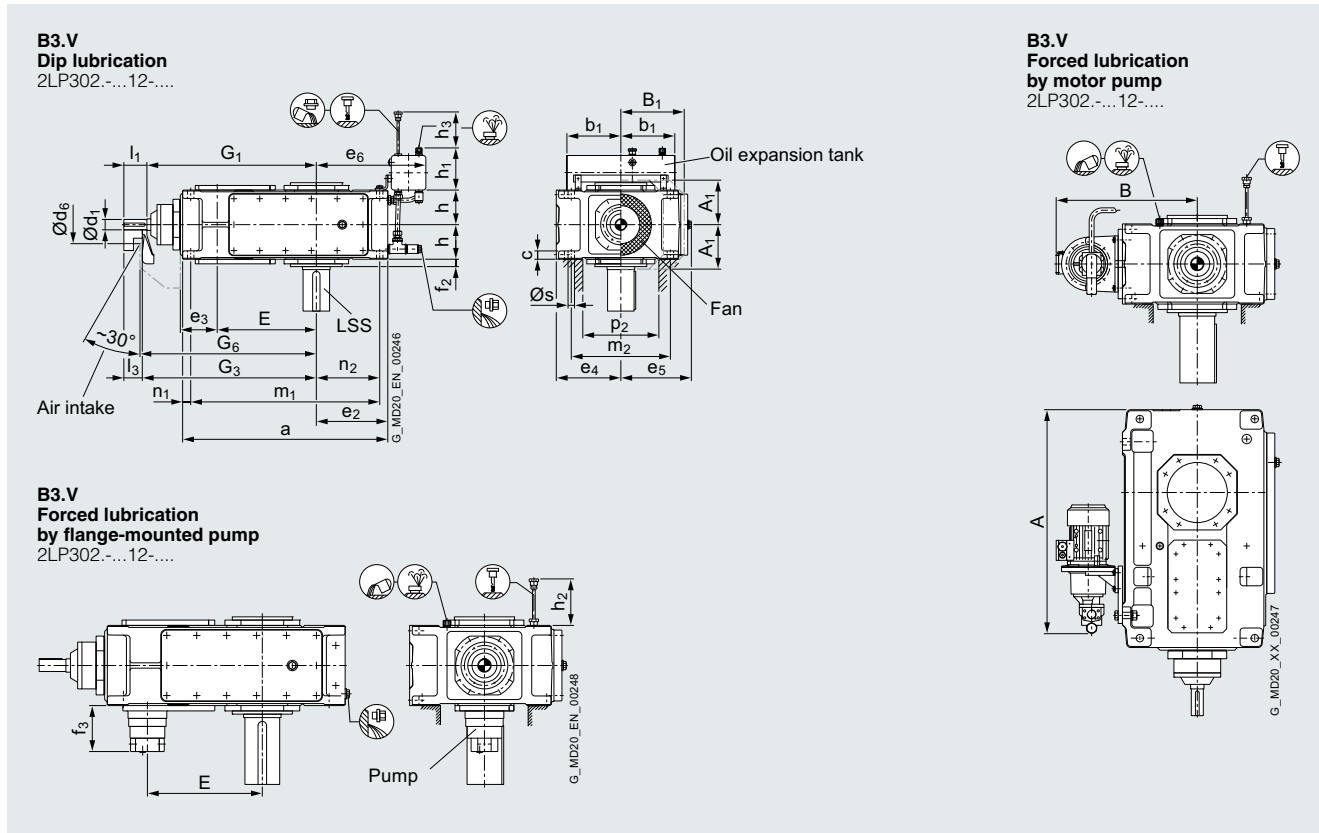
<sup>4)</sup> Shaft version with reinforced bearing, see page 9/7.

# Bevel helical gear units vertical mounting position

Type B3

Gear unit dimensions, three-stage, gear unit sizes 4 to 8

## Selection and ordering data



Gear unit size	Dimensions in mm													
	High speed shaft (HSS)										Fan			
	Reinforced shaft										A <sub>1</sub>	B <sub>1</sub>	d <sub>6</sub>	G <sub>6</sub>
	i <sub>N</sub>	d <sub>1</sub>	l <sub>1</sub>	l <sub>3</sub>	i <sub>N</sub>	d <sub>1</sub>	l <sub>1</sub>	l <sub>3</sub>	G <sub>1</sub>	G <sub>3</sub>	A <sub>1</sub>	B <sub>1</sub>	d <sub>6</sub>	G <sub>6</sub>
4	12.5 - 45	30 m6	70	50	40 - 50	35 m6	80	60	500	520	143	200	110	530
	50 - 71	25 k6	60	40	56 - 63	32 m6	70	50						
5	12.5 - 45	35 m6	80	60	31.5 - 50	40 m6	90	70	575	595	168	235	130	605
	50 - 71	28 m6	60	40	56 - 63	35 m6	80	60						
6	16 - 56	35 m6	80	60	40 - 63	40 m6	90	70	610	630	168	235	130	640
	63 - 90	28 m6	60	40	71 - 80	35 m6	80	60						
7	12.5 - 45	45 m6	100	80	31.5 - 50	50 m6	110	90	690	710	193	275	165	720
	50 - 71	35 m6	80	60	56 - 63	40 m6	90	70						
8	16 - 56	45 m6	100	80	40 - 63	50 m6	110	90	735	755	193	275	165	765
	63 - 90	35 m6	80	60	71 - 80	40 m6	90	70						

Gear unit size	a	b <sub>1</sub>	c	E	e <sub>2</sub>	e <sub>3</sub>	e <sub>4</sub>	e <sub>5</sub>	e <sub>6</sub>	f <sub>2</sub>	f <sub>3</sub>	h	h <sub>1</sub>	h <sub>2</sub> <sup>1)</sup>	h <sub>3</sub>	m <sub>1</sub>	n <sub>1</sub>	n <sub>2</sub>	p <sub>2</sub> <sup>2)</sup>	s	A <sup>3)</sup>	B <sup>3)</sup>
4	565	150	30 ± 1	270	190	110	200	215	320	22	-	107.5	165	-	180	505	30	160	220	24 H9	-	-
5	640	240	30 ± 1	315	205	130	230	252	385	28	190	127.5	205	180	240	580	30	175	270	24 H9	610	480
6	720	240	30 ± 1	350	250	130	230	252	425	28	190	127.5	205	180	240	660	30	220	270	24 H9	690	480
7	785	240	36 ± 1	385	250	160	280	292	425	30	190	150	205	165	250	715	35	215	330	28 H9	740	530
8	890	240	36 ± 1	430	310	160	280	302	485	32	190	150	205	165	250	820	35	275	330	28 H9	845	530

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

<sup>1)</sup> For forced lubrication, approximately h<sub>2</sub> can be assumed as required space for piping and monitoring; details according to order-related documentation.

<sup>2)</sup> Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

<sup>3)</sup> Max. dimensions; details acc. to order-related documentation.



# Bevel helical gear units vertical mounting position

## Type B3

### Gear unit dimensions, three-stage, gear unit sizes 4 to 8

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

				Oil quantity 1)	Oil quantity 1)	Weight 1)2)			10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30					
				B3.V Dip lubrication	B3.V Forced lubrication	B3.V								
				Article No.:		2LP302	- .12-....							
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg			Solid shaft with parallel key <sup>4)</sup>				
<b>B3SV</b>	4	80 m6	170	140	20	–	210	0	- 3 A					
	5	100 m6	210	165	34	17	325	0	- 4 A					
	6	110 n6	210	165	36	18	380	0	- 5 A					
	7	120 n6	210	195	60	30	550	0	- 6 A					
	8	130 n6	250	195	68	34	635	0	- 7 A					
Type	Size	$D_2$	$G_4$		$l$	$l$	kg			Hollow shaft with keyway				
<b>B3HV</b>	4	80 H7	140		20	–	210	0	- 3 B					
	5	95 H7	165		34	17	325	0	- 4 B					
	6	105 H7	165		36	18	380	0	- 5 B					
	7	115 H7	195		60	30	550	0	- 6 B					
	8	125 H7	195		68	34	635	0	- 7 B					
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg			Hollow shaft for shrink disk			
<b>B3DV</b> <sup>3)</sup>	4	85 H7	85	140	205	20	–	210	0	- 3 C				
	5	100 H7	100	165	240	34	17	325	0	- 4 C				
	6	110 H7	110	165	240	36	18	380	0	- 5 C				
	7	120 H7	120	195	280	60	30	550	0	- 6 C				
	8	130 H7	130	195	285	68	34	635	0	- 7 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg			Hollow shaft with spline			
<b>B3KV</b>	5	N 95 × 3 × 30 × 30 × 9H	89 H11	100	165	34	17	325	0	- 4 D				
	6	N 95 × 3 × 30 × 30 × 9H	89 H11	110	165	36	18	380	0	- 5 D				
	7	N 120 × 3 × 30 × 38 × 9H	114 H11	120	195	60	30	550	0	- 6 D				
	8	N 120 × 3 × 30 × 38 × 9H	114 H11	130	195	68	34	635	0	- 7 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	$l$	kg			Flanged shaft
<b>B3FV</b>	5	25	300	150	260	16 × 22	10	255	34	17	360	0	- 4 E	
	6	25	320	160	280	18 × 22	10	255	36	18	420	0	- 5 E	
	7	30	370	180	320	16 × 26	10	300	60	30	600	0	- 6 E	
	8	30	390	190	340	18 × 26	10	300	68	34	690	0	- 7 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Shaft version with reinforced bearing, see page 9/7.

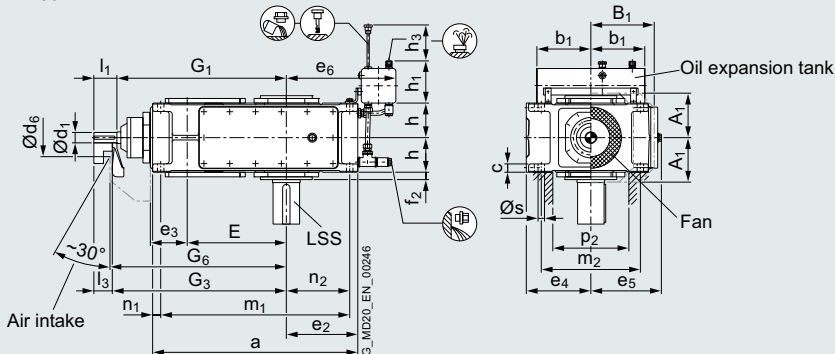
# Bevel helical gear units vertical mounting position

Type B3

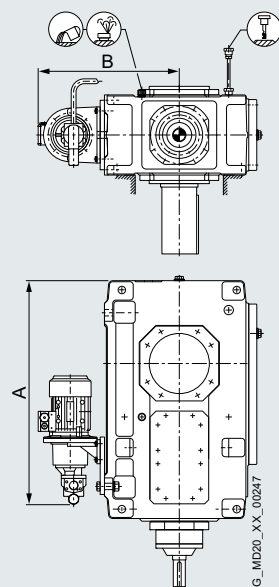
Gear unit dimensions, three-stage, gear unit sizes 9 to 12

## Selection and ordering data

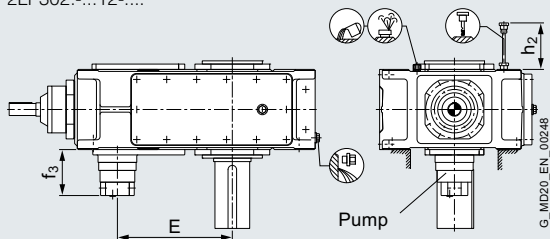
**B3.V**  
Dip lubrication  
2LP302-...12-....



**B3.V**  
Forced lubrication  
by motor pump  
2LP302-...12-....



**B3.V**  
Forced lubrication  
by flange-mounted pump  
2LP302-...12-....



Gear unit size	Dimensions in mm														
	High speed shaft (HSS)										Fan				
	Reinforced shaft														
	$l_N$	$d_1$	$l_1$	$l_3$	$l_N$	$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$B_1$	$d_6$	$G_6$	
<b>9</b>	12.5 - 45	55 m6	110	80	40 - 50	60 m6	120	90	800	830	231	325	175	845	
	50 - 71	40 m6	100	70	56 - 63	50 m6	110	80							
<b>10</b>	16 - 56	55 m6	110	80	40 - 63	60 m6	120	90	850	880	231	325	175	895	
	63 - 90	40 m6	100	70	71 - 80	50 m6	110	80							
<b>11</b>	12.5 - 45	70 m6	135	105	50	70 m6	135	105	960	990	263	385	190	1010	
	50 - 71	50 m6	110	80	56 - 63	60 m6	135	105							
<b>12</b>	16 - 56	70 m6	135	105	63	70 m6	135	105	1030	1060	263	385	190	1080	
	63 - 90	50 m6	110	80	70 - 80	60 m6	135	105							

Gear unit size																						
	a	$b_1$	c	E	$e_2$	$e_3$	$e_4$	$e_5$	$e_6$	$f_2$	$f_3$	h	$h_1$	$h_2^{1)}$	$h_3$	$m_1$	$n_1$	$n_2$	$p_2^{2)}$	s	A <sup>3)</sup>	B <sup>3)</sup>
<b>9</b>	925	330	45 ± 1.5	450	300	185	320	342	560	32	180	185	275	205	330	845	40	260	370	36 H9	710	570
<b>10</b>	1025	330	45 ± 1.5	500	350	185	320	342	610	32	180	185	275	205	330	945	40	310	370	36 H9	810	570
<b>11</b>	1105	330	54 ± 1.5	545	345	225	380	402	595	35	180	215	275	240	340	1005	50	295	440	40 H9	820	630
<b>12</b>	1260	330	54 ± 1.5	615	430	225	380	410	680	35	180	215	275	240	340	1160	50	380	440	40 H9	975	630

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

1) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

2) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

3) Max. dimensions; details acc. to order-related documentation.

# Bevel helical gear units vertical mounting position

## Type B3

### Gear unit dimensions, three-stage, gear unit sizes 9 to 12

#### Selection and ordering data (continued)

#### Low speed shaft (LSS)

		Oil quantity 1)	Oil quantity 1)	Weight 1)2)				10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30							
		B3.V Dip lubrication	B3.V Forced lubrication	B3.V											
		Article No.:			2LP302			.12-....							
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg				Solid shaft with parallel key 4)				
<b>B3SV</b>	<b>9</b>	140 n6	250	235	96	48	890	0	-	8 A					
	<b>10</b>	160 n6	300	235	105	52	1020	1	-	0 A					
	<b>11</b>	170 n6	300	270	155	77	1455	1	-	1 A					
	<b>12</b>	180 n6	300	270	175	87	1730	1	-	2 A					
Type	Size	$D_2$	$G_4$		$l$	$l$	kg				Hollow shaft with keyway				
<b>B3HV</b>	<b>9</b>	135 H7	235		96	48	890	0	-	8 B					
	<b>10</b>	150 H7	235		105	52	1020	1	-	0 B					
	<b>11</b>	165 H7	270		155	77	1455	1	-	1 B					
	<b>12</b>	180 H7	270		175	87	1730	1	-	2 B					
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg			Hollow shaft for shrink disk				
<b>B3DV</b> 3)	<b>9</b>	140 H7	145	235	330	96	48	890	0	-	8 C				
	<b>10</b>	150 H7	155	235	350	105	52	1020	1	-	0 C				
	<b>11</b>	165 H7	170	270	400	155	77	1455	1	-	1 C				
	<b>12</b>	180 H7	185	270	405	175	87	1730	1	-	2 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg			Hollow shaft with spline				
<b>B3KV</b>	<b>9</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	145	235	96	48	890	0	-	8 D				
	<b>10</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	155	235	105	52	1020	1	-	0 D				
	<b>11</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	170	270	155	77	1455	1	-	1 D				
	<b>12</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	185	270	175	87	1730	1	-	2 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	n × s	t	$G_7$	$l$	$l$	kg	Flanged shaft			
<b>B3FV</b>	<b>9</b>	38	430	220	380	20 × 26	12	350	96	48	975	0	-	8 E	
	<b>10</b>	38	470	240	420	22 × 26	12	350	105	52	1110	1	-	0 E	
	<b>11</b>	42	510	260	450	18 × 33	12	400	155	77	1585	1	-	1 E	
	<b>12</b>	42	540	280	480	22 × 33	12	400	175	87	1870	1	-	2 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

3) Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

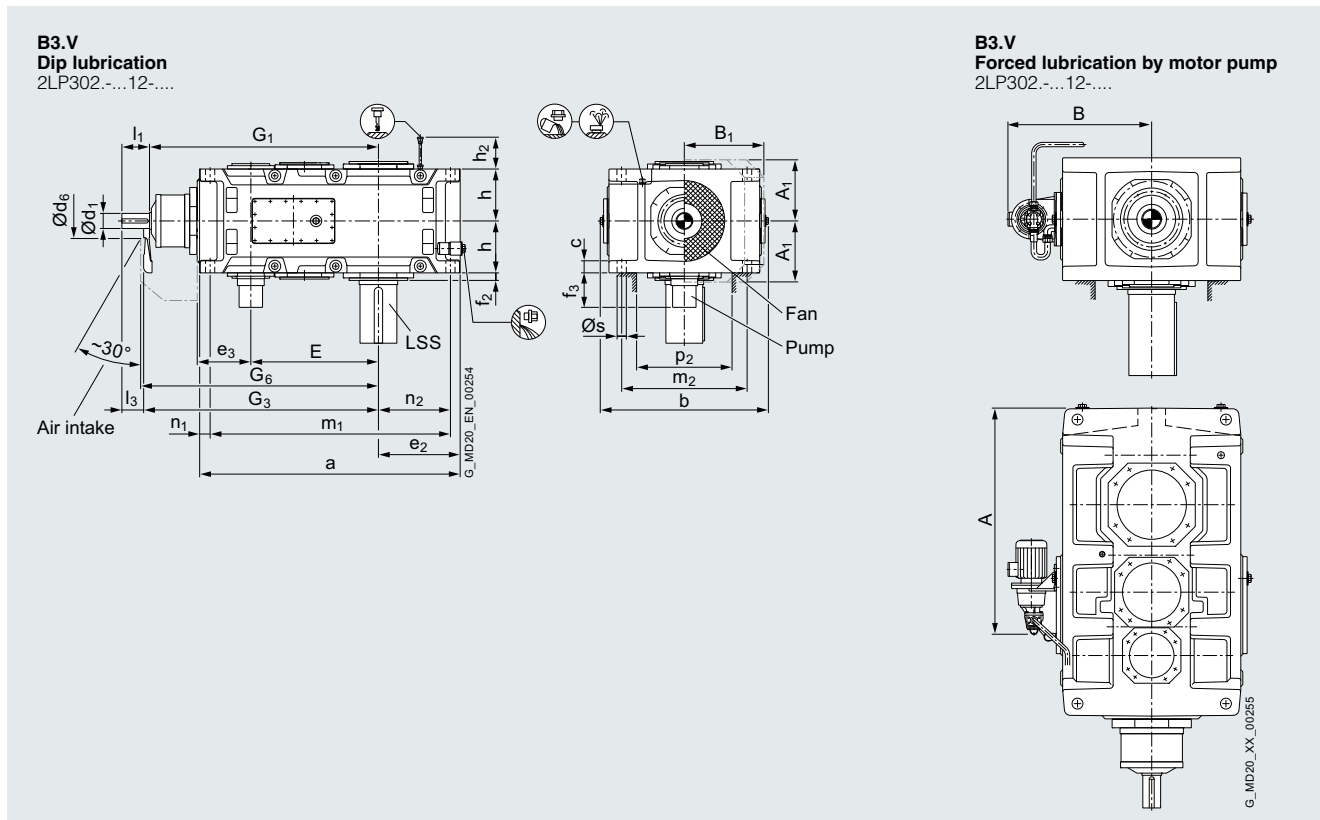
4) Shaft version with reinforced bearing, see page 9/7.

# Bevel helical gear units vertical mounting position

Type B3

Gear unit dimensions, three-stage, gear unit sizes 13 to 18

## Selection and ordering data



Gear unit size	Dimensions in mm													
	High speed shaft (HSS)									Fan				
	$i_N$	$d_1$	$l_1$	$l_3$	Reinforced shaft				$G_1$	$G_3$	$A_1$	$B_1$	$d_6$	$G_6$
					$i_N$	$d_1$	$l_1$	$l_3$						
13	12.5 - 45	80 m6	165	130	50	80 m6	165	130	1125	1160	325	475	210	1080
	50 - 71	60 m6	140	105	56 - 63	70 m6	140	105						
14	16 - 56	80 m6	165	130	63	80 m6	165	130	1195	1230	325	475	210	1250
	63 - 90	60 m6	140	105	70 - 80	70 m6	140	105						
15	12.5 - 45	90 m6	165	130	-	-	-	-	1367	1402	365	520	210	1420
	50 - 71	70 m6	140	105	-	-	-	-						
16	14 - 50	90 m6	165	130	-	-	-	-	1413	1448	365	520	210	1470
	56 - 80	70 m6	140	105	-	-	-	-						
17	12.5 - 45	110 n6	205	165	-	-	-	-	1560	1600	395	570	230	1620
	50 - 71	80 m6	170	130	-	-	-	-						
18	14 - 50	110 n6	205	165	-	-	-	-	1620	1660	395	570	230	1680
	56 - 80	80 m6	170	130	-	-	-	-						

Gear unit size	Dimensions in mm																	
	a	b	c	E	$e_2$	$e_3$	$f_2$	$f_3$	h	$h_2^{1)}$	$m_1$	$m_2$	$n_1$	$n_2$	$p_2^{2)}$	s	A <sup>3)</sup>	B <sup>3)</sup>
13	1290	900	61 ± 2	635	405	265	35	170	272.5	300	1195	680	50	360	500	48	990	690
14	1430	900	61 ± 2	705	475	265	35	170	272.5	300	1335	680	50	430	500	48	1130	690
15	1550	980	72 ± 2	762	485	320	42	170	310	340	1435	750	60	430	570	55	1175	730
16	1640	980	72 ± 2	808	530	320	42	170	310	340	1525	750	60	475	570	55	1270	730
17	1740	1110	81 ± 2	860	525	370	42	170	340	380	1610	850	70	465	630	55	1265	790
18	1860	1110	81 ± 2	920	585	370	42	170	340	380	1730	850	70	525	630	55	1385	790

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

1) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

2) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

3) Max. dimensions; details acc. to order-related documentation.

# Bevel helical gear units vertical mounting position

## Type B3

### Gear unit dimensions, three-stage, gear unit sizes 13 to 18

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

						Oil quantity 1) 2) B3.V Forced lubrication	Weight 1) 2) B3.V			10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30				
						Article No.: <b>2LP302</b>		■ - ■ ■ ■ .12-....						
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg				Solid shaft with parallel key <sup>4)</sup>				
<b>B3SV</b>	<b>13</b>	200 n6	350	335	115	2260	1	-	3 A					
	<b>14</b>	210 n6	350	335	130	2615	1	-	4 A					
	<b>15</b>	230 n6	410	380	180	3540	1	-	5 A					
	<b>16</b>	240 n6	410	380	190	3765	1	-	6 A					
	<b>17</b>	250 n6	410	415	260	4760	1	-	7 A					
	<b>18</b>	270 n6	470	415	275	5240	1	-	8 A					
Type	Size	$D_2$	$G_4$	$l$	kg					Hollow shaft with keyway				
<b>B3HV</b>	<b>13</b>	190 H7	335	115	2260	1	-	3 B						
	<b>14</b>	210 H7	335	130	2615	1	-	4 B						
	<b>15</b>	230 H7	380	180	3540	1	-	5 B						
	<b>16</b>	240 H7	380	190	3765	1	-	6 B						
	<b>17</b>	250 H7	415	260	4760	1	-	7 B						
	<b>18</b>	275 H7	415	275	5240	1	-	8 B						
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	kg			Hollow shaft for shrink disk				
<b>B3DV</b> <sup>3)</sup>	<b>13</b>	190 H7	195	335	480	115	2260	1	-	3 C				
	<b>14</b>	210 H7	215	335	480	130	2615	1	-	4 C				
	<b>15</b>	230 H7	235	380	550	180	3540	1	-	5 C				
	<b>16</b>	240 H7	245	380	550	190	3765	1	-	6 C				
	<b>17</b>	250 H7	260	415	600	260	4760	1	-	7 C				
	<b>18</b>	280 H7	285	415	600	275	5240	1	-	8 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	kg			Hollow shaft with spline				
<b>B3KV</b>	<b>13</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	195	335	115	2260	1	-	3 D				
	<b>14</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	215	335	130	2615	1	-	4 D				
	<b>15</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	235	380	180	3540	1	-	5 D				
	<b>16</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	245	380	190	3765	1	-	6 D				
	<b>17</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	260	415	260	4760	1	-	7 D				
	<b>18</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	285	415	275	5240	1	-	8 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	kg			Flanged shaft	
<b>B3FV</b>	<b>13</b>	48	580	310	500	20 × 33	14	480	115	2420	1	-	3 E	
	<b>14</b>	48	620	310	540	24 × 33	14	480	130	2785	1	-	4 E	
	<b>15</b>	55	710	360	630	28 × 33	17	550	180	3780	1	-	5 E	
	<b>16</b>	55	740	360	660	30 × 33	17	550	190	4020	1	-	6 E	
	<b>17</b>	60	750	410	660	24 × 39	18	600	260	5060	1	-	7 E	
	<b>18</b>	60	800	410	710	26 × 39	18	600	275	5590	1	-	8 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Shaft version with reinforced bearing, see page 9/7.

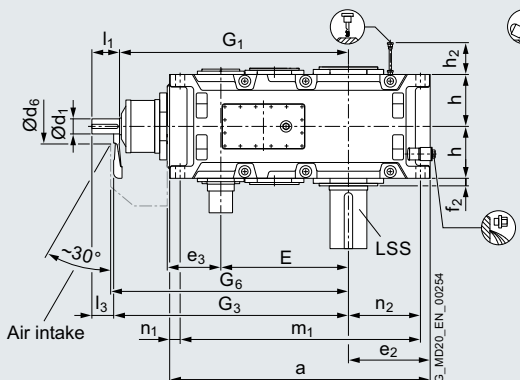
# Bevel helical gear units vertical mounting position

Type B3

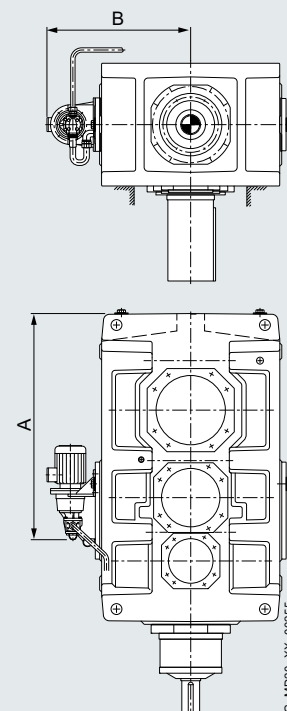
Gear unit dimensions, three-stage, gear unit sizes 19 to 24

## Selection and ordering data

**B3.V**  
Dip lubrication  
2LP302-...12-....



**B3.V**  
Forced lubrication by motor pump  
2LP302-...12-....



Gear unit size	Dimensions in mm						Fan			
	High speed shaft (HSS)						A <sub>1</sub>	B <sub>1</sub>	d <sub>6</sub>	G <sub>6</sub>
	i <sub>N</sub>	d <sub>1</sub>	l <sub>1</sub>	l <sub>3</sub>	G <sub>1</sub>	G <sub>3</sub>				
19	12.5 - 45	130 n6	245	200	1832	1877	On request			
	50 - 71	100 m6	210	165						
20	14 - 50	130 n6	245	200	1892	1937				
	56 - 80	100 m6	210	165						
21	12.5 - 45	130 n6	245	200	1902	1947				
	50 - 71	100 m6	210	165						
22	14 - 50	130 n6	245	200	1957	2002				
	56 - 80	100 m6	210	165						
23	20 - 45	150 n6	245	200	2130	2175				
	50 - 71	110 n6	210	165						
24	22.4 - 50	150 n6	245	200	2195	2240				
	56 - 80	110 n6	210	165						

Gear unit size	Dimensions in mm																	
	a	b	c	E	e <sub>2</sub>	e <sub>3</sub>	f <sub>2</sub>	f <sub>3</sub>	h	h <sub>2</sub> <sup>1)</sup>	m <sub>1</sub>	m <sub>2</sub>	n <sub>1</sub>	n <sub>2</sub>	p <sub>2</sub> <sup>1)</sup>	s	A	B
19	2010	1222	91 ± 2	997	590	420	55	On request	390	380	1865	950	On request	520	700	65	On request	
20	2130	1222	91 ± 2	1057	650	420	55		390	380	1985	950		580	700	65		
21	2140	1378	100 ± 2	1067	655	450	60		410	390	1985	1040		585	720	75		
22	2250	1378	100 ± 2	1122	710	450	60		410	390	2095	1040		640	720	75		
23	On request																	
24																		

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

<sup>1)</sup> Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

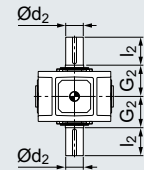
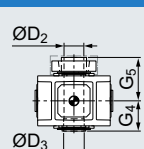
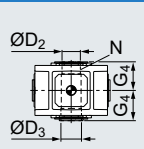
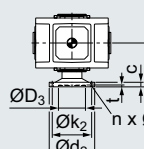


## Bevel helical gear units vertical mounting position Type B3

### Gear unit dimensions, three-stage, gear unit sizes 19 to 24

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity B3.V Dip lubrication	Oil quantity B3.V Forced lubrication	Weight B3.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30					
		Article No.:				<b>2LP302</b>	-	<b>.12-....</b>				
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg					
<b>B3SV</b>	19	On request						2 - 0 A				
	20							2 - 1 A				
	21							2 - 2 A				
	22							2 - 3 A				
	23							2 - 4 A				
	24							2 - 5 A				
												
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	l	kg				
<b>B3DV</b> 1)	19	285 H7	295	465	670	On request		2 - 0 C				
	20	310 H7	315	465	670			2 - 1 C				
	21	330 H7	335	490	715			2 - 2 C				
	22	340 H7	345	490	725			2 - 3 C				
	23	370 H7	375	540	800			2 - 4 C				
	24	390 H7	395	540	820			2 - 5 C				
												
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	l	kg				
<b>B3KV</b>	19	On request						2 - 0 D				
	20							2 - 1 D				
	21							2 - 2 D				
	22							2 - 3 D				
												
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n x s	t	G <sub>7</sub>	l	l	kg	
<b>B3FV</b>	19	On request										2 - 0 E
	20											2 - 1 E
	21											2 - 2 E
	22											2 - 3 E
												

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

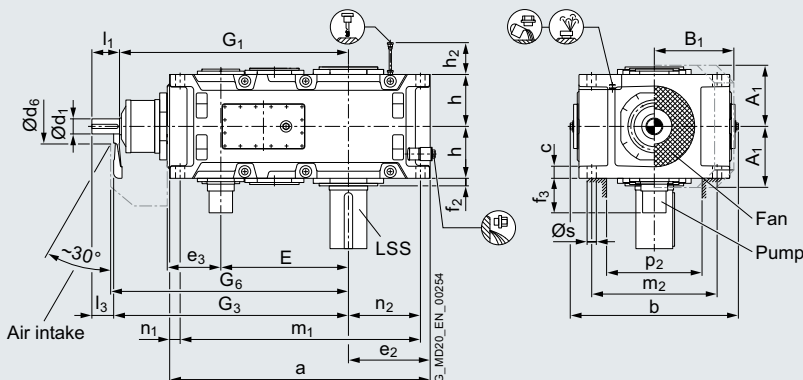
# Bevel helical gear units vertical mounting position

Type B3

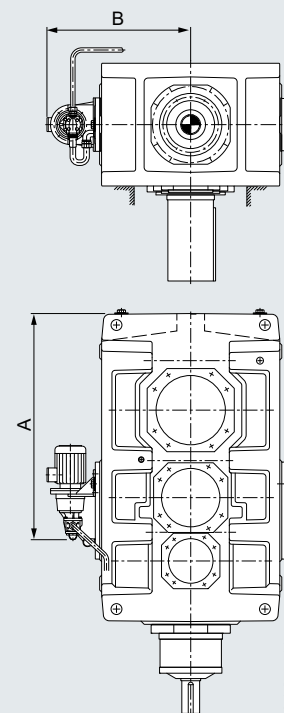
Gear unit dimensions, three-stage, gear unit sizes 25 and 26

## Selection and ordering data

**B3.V**  
Dip lubrication  
2LP302-...12-...



**B3.V**  
Forced lubrication by motor pump  
2LP302-...12-...



Gear unit size	Dimensions in mm						Fan							
	$i_N$	$d_1$	$l_1$	$l_3$	$G_1$	$G_3$	$A_1$	$B_1$	$d_6$	$G_6$				
25	20 - 40	160 n6	295	240	2375	2430	On request							
	45 - 71	120 n6	220	165										
26	22.4 - 45	160 n6	295	240	2465	2520					On request			
	50 - 80	120 n6	220	165										

Gear unit size	a	b	c	E	$e_2$	$e_3$	$f_2$	h	$h_2$	$m_1$	$m_2$	$n_2$	$p_2$	s	A	B
25	On request															
26	On request															

Shaft seals, [see page 10/2 onwards](#).

For details on the shafts, [see Chapter 9](#).



## Bevel helical gear units vertical mounting position Type B3

### Gear unit dimensions, three-stage, gear unit sizes 25 and 26

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity B3.V Dip lubrication	Oil quantity B3.V Forced lubrication	Weight B3.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30			
						Article No.:	<b>2LP302</b> ■ - ■ ■ .12-....			
Type	Size	$d_2$	$l_2$	$G_2$		kg	Solid shaft with parallel key			
<b>B3SV</b>	<b>25</b>	On request					2 - 6 A			
	<b>26</b>						2 - 7 A			
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	kg	Hollow shaft for shrink disk			
<b>B3DV</b> 1)	<b>25</b>	410 H7	415	610	895	On request	2 - 6 C			
	<b>26</b>	430 H7	435	610	925		2 - 7 C			

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

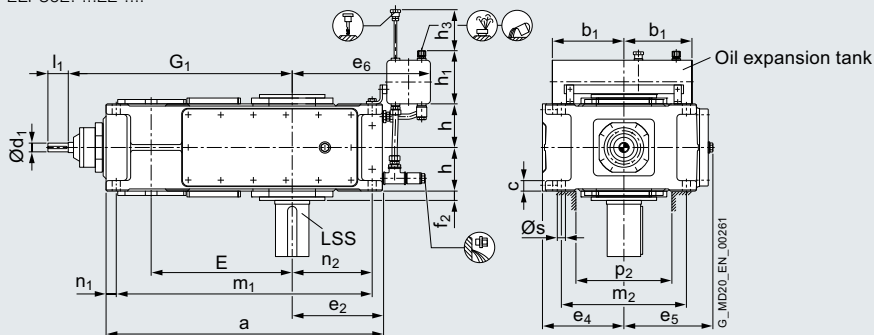
# Bevel helical gear units vertical mounting position

Type B4

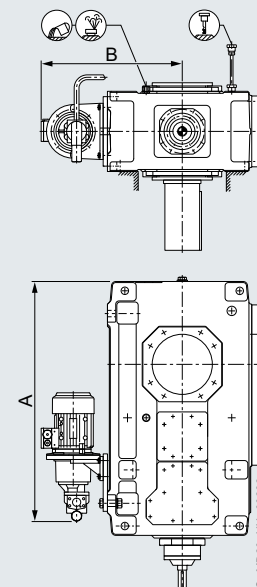
Gear unit dimensions, four-stage, gear unit sizes 5 to 8

## Selection and ordering data

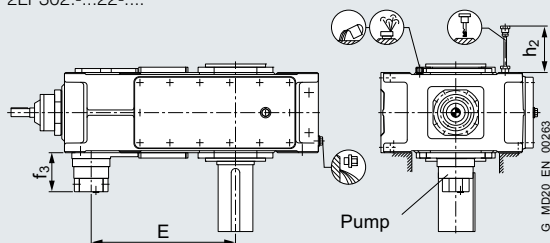
**B4.V**  
Dip lubrication  
2LP302-...22-....



**B4.V**  
Forced lubrication  
by motor pump  
2LP302-...22-....



**B4.V**  
Forced lubrication  
by flange-mounted pump  
2LP302-...22-....



Gear unit size	Dimensions in mm						
	High speed shaft (HSS)			Reinforced shaft			
	$i_N$	$d_1$	$l_1$	$i_N$	$d_1$	$l_1$	$G_1$
5	80 - 180	28 m6	55	-	-	-	615
	200 - 315	20 k6	50	-	-	-	
6	100 - 224	28 m6	55	-	-	-	650
	250 - 400	20 k6	50	-	-	-	
7	80 - 180	30 m6	70	160 - 200	35 m6	80	725
	200 - 315	25 k6	60	224 - 250	32 m6	70	
8	100 - 224	30 m6	70	200 - 250	35 m6	80	770
	250 - 400	25 k6	60	280 - 315	32 m6	70	

Gear unit size	Dimensions in mm																					
	a	$b_1$	c	E	$e_2$	$e_4$	$e_5$	$e_6$	$f_2$	$f_3$	h	$h_1$	$h_2^{1)}$	$h_3$	$m_1$	$m_2$	$n_1$	$n_2$	$p_2^{2)}$	s	A <sup>3)</sup>	B <sup>3)</sup>
5	690	240	30 ± 1	405	205	230	252	385	28	200	127.5	205	190	240	630	360	30	175	270	24 H9	660	480
6	770	240	30 ± 1	440	250	230	252	425	28	200	127.5	205	190	240	710	360	30	220	270	24 H9	740	480
7	845	240	36 ± 1	495	250	280	292	425	30	120	150	205	165	250	775	430	35	215	330	28 H9	800	530
8	950	240	36 ± 1	540	310	280	302	485	32	120	150	205	165	250	880	430	35	275	330	28 H9	905	530

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

1) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

2) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

3) Max. dimensions; details acc. to order-related documentation.

# Bevel helical gear units vertical mounting position

## Type B4

### Gear unit dimensions, four-stage, gear unit sizes 5 to 8

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity 1)	Oil quantity 1)	Weight 1)2)				10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30							
		B4.V Dip lubrication	B4.V Forced lubrication	B4.V											
		Article No.:			2LP302			.22-....							
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg				Solid shaft with parallel key <sup>4)</sup>				
<b>B4SV</b>	5	100 m6	210	165	36	18	335	0	-	4 A					
	6	110 n6	210	165	40	20	385	0	-	5 A					
	7	120 n6	210	195	65	32	555	0	-	6 A					
	8	130 n6	250	195	73	36	655	0	-	7 A					
Type	Size	$D_2$	$G_4$		$l$	$l$	kg				Hollow shaft with keyway				
<b>B4HV</b>	5	95 H7	165		36	18	335	0	-	4 B					
	6	105 H7	165		40	20	385	0	-	5 B					
	7	115 H7	195		65	32	555	0	-	6 B					
	8	125 H7	195		73	36	655	0	-	7 B					
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg			Hollow shaft for shrink disk				
<b>B4DV</b> <sup>3)</sup>	5	100 H7	100	165	240	36	18	335	0	-	4 C				
	6	110 H7	110	165	240	40	20	385	0	-	5 C				
	7	120 H7	120	195	280	65	32	555	0	-	6 C				
	8	130 H7	130	195	285	73	36	655	0	-	7 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg			Hollow shaft with spline				
<b>B4KV</b>	5	N 95 × 3 × 30 × 30 × 9H	89 H11	100	165	36	18	335	0	-	4 D				
	6	N 95 × 3 × 30 × 30 × 9H	89 H11	110	165	40	20	385	0	-	5 D				
	7	N 120 × 3 × 30 × 38 × 9H	114 H11	120	195	65	32	555	0	-	6 D				
	8	N 120 × 3 × 30 × 38 × 9H	114 H11	130	195	73	36	655	0	-	7 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	$l$	kg	Flanged shaft			
<b>B4FV</b>	5	25	300	150	260	16 × 22	10	255	36	18	335	0	-	4 E	
	6	25	320	160	280	18 × 22	10	255	40	20	385	0	-	5 E	
	7	30	370	180	320	16 × 26	10	300	65	32	555	0	-	6 E	
	8	30	390	190	340	18 × 26	10	300	73	36	655	0	-	7 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Shaft version with reinforced bearing, see page 9/7.

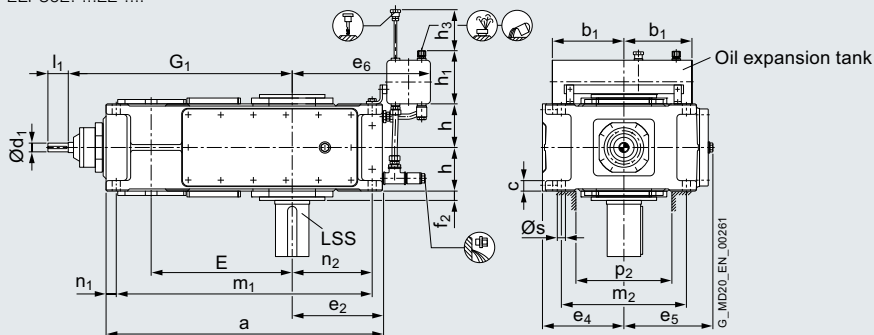
# Bevel helical gear units vertical mounting position

Type B4

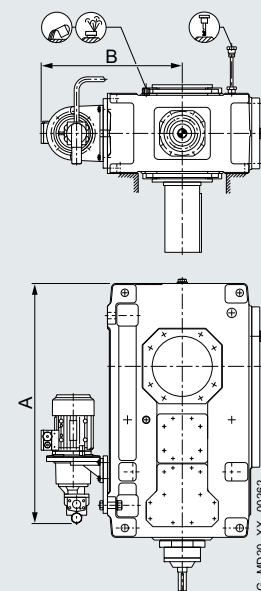
## Gear unit dimensions, four-stage, gear unit sizes 9 to 12

### Selection and ordering data

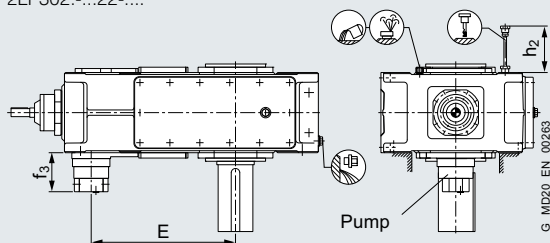
**B4.V**  
Dip lubrication  
2LP302-...22-....



**B4.V**  
Forced lubrication  
by motor pump  
2LP302-...22-....



**B4.V**  
Forced lubrication  
by flange-mounted pump  
2LP302-...22-....



Gear unit size	Dimensions in mm							
	High speed shaft (HSS)				Reinforced shaft			
	$i_N$	$d_1$	$l_1$	$i_N$	$d_1$	$l_1$	$G_1$	
9	80 - 180	35 m6	80	125 - 200	40 m6	90	840	
	200 - 315	28 m6	60	224 - 250	35 m6	80		
10	100 - 224	35 m6	80	160 - 250	40 m6	90	890	
	250 - 400	28 m6	60	280 - 315	35 m6	80		
11	80 - 180	45 m6	100	125 - 200	50 m6	110	1010	
	200 - 315	35 m6	80	224 - 250	40 m6	90		
12	100 - 224	45 m6	100	160 - 250	50 m6	110	1080	
	250 - 400	35 m6	80	280 - 315	40 m6	90		

Gear unit size	Dimensions in mm																					
	a	$b_1$	c	E	$e_2$	$e_4$	$e_5$	$e_6$	$f_2$	$f_3$	h	$h_1$	$h_2^{1)}$	$h_3$	$m_1$	$m_2$	$n_1$	$n_2$	$p_2^{2)}$	s	A <sup>3)</sup>	B <sup>3)</sup>
9	1000	330	45 ± 1.5	580	300	320	342	560	32	120	185	275	205	330	920	490	40	260	370	36 H9	785	570
10	1100	330	45 ± 1.5	630	350	320	342	610	32	120	185	275	205	330	1020	490	40	310	370	36 H9	885	570
11	1200	330	54 ± 1.5	705	345	380	402	595	35	130	215	275	240	340	1100	600	50	295	440	40 H9	915	630
12	1355	330	54 ± 1.5	775	430	380	410	680	35	130	215	275	240	340	1255	600	50	380	440	40 H9	1070	630

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

1) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

2) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

3) Max. dimensions; details acc. to order-related documentation.

# Bevel helical gear units vertical mounting position

## Type B4

### Gear unit dimensions, four-stage, gear unit sizes 9 to 12

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

		Oil quantity 1)	Oil quantity 1)	Weight 1)2)				10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30							
		B4.V Dip lubrication	B4.V Forced lubrication	B4.V											
		Article No.:			2LP302			.22-....							
Type	Size	$d_2$	$l_2$	$G_2$	$l$	$l$	kg				Solid shaft with parallel key <sup>4)</sup>				
<b>B4SV</b>	<b>9</b>	140 n6	250	235	105	52	890	0	-	8 A					
	<b>10</b>	160 n6	300	235	110	55	1025	1	-	0 A					
	<b>11</b>	170 n6	300	270	175	87	1485	1	-	1 A					
	<b>12</b>	180 n6	300	270	200	100	1750	1	-	2 A					
Type	Size	$D_2$	$G_4$		$l$	$l$	kg				Hollow shaft with keyway				
<b>B4HV</b>	<b>9</b>	135 H7	235		105	52	890	0	-	8 B					
	<b>10</b>	150 H7	235		110	55	1025	1	-	0 B					
	<b>11</b>	165 H7	270		175	87	1485	1	-	1 B					
	<b>12</b>	180 H7	270		200	100	1750	1	-	2 B					
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	$l$	kg			Hollow shaft for shrink disk				
<b>B4DV</b> <sup>3)</sup>	<b>9</b>	140 H7	145	235	330	105	52	890	0	-	8 C				
	<b>10</b>	150 H7	155	235	350	110	55	1025	1	-	0 C				
	<b>11</b>	165 H7	170	270	400	175	87	1485	1	-	1 C				
	<b>12</b>	180 H7	185	270	405	200	100	1750	1	-	2 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	$l$	kg			Hollow shaft with spline				
<b>B4KV</b>	<b>9</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	145	235	105	52	890	0	-	8 D				
	<b>10</b>	N 140 × 3 × 30 × 45 × 9H	134 H11	155	235	110	55	1025	1	-	0 D				
	<b>11</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	170	270	175	87	1485	1	-	1 D				
	<b>12</b>	N 170 × 5 × 30 × 32 × 9H	160 H11	185	270	200	100	1750	1	-	2 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	$l$	kg	Flanged shaft			
<b>B4FV</b>	<b>9</b>	38	430	220	380	20 × 26	12	350	105	52	890	0	-	8 E	
	<b>10</b>	38	470	240	420	22 × 26	12	350	110	55	1025	1	-	0 E	
	<b>11</b>	42	510	260	450	18 × 33	12	400	175	87	1485	1	-	1 E	
	<b>12</b>	42	540	280	480	22 × 33	12	400	200	100	1750	1	-	2 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Approximate values; exact data acc. to order-related documentation.

<sup>2)</sup> Without oil filling.

<sup>3)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

<sup>4)</sup> Shaft version with reinforced bearing, see page 9/7.

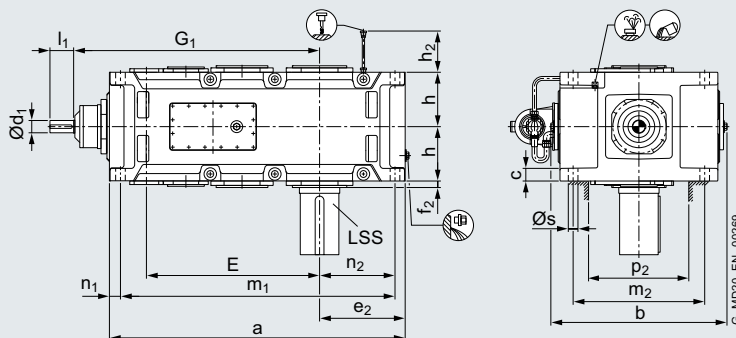
# Bevel helical gear units vertical mounting position

Type B4

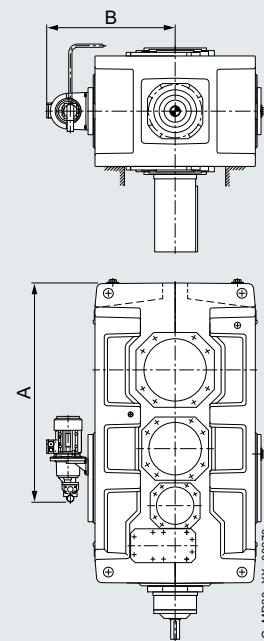
Gear unit dimensions, four-stage, gear unit sizes 13 to 18

## Selection and ordering data

**B4.V**  
Dip lubrication  
2LP302-...22-....



**B4.V**  
Forced lubrication  
by motor pump  
2LP302-...22-....



Gear unit size	Dimensions in mm						
	High speed shaft (HSS)			Reinforced shaft			
	$i_N$	$d_1$	$l_1$	$i_N$	$d_1$	$l_1$	$G_1$
13	80 - 180	55 m6	110	125 - 200	60 m6	120	1170
	200 - 315	40 m6	100	224 - 250	50 m6	110	
14	100 - 224	55 m6	110	160 - 250	60 m6	120	1240
	250 - 400	40 m6	100	280 - 315	50 m6	110	
15	80 - 180	70 m6	135	200	70 m6	135	1402
	200 - 315	50 m6	110	224 - 250	60 m6	135	
16	90 - 200	70 m6	135	224	70 m6	135	1448
	224 - 355	50 m6	110	250 - 280	60 m6	135	
17	80 - 180	70 m6	135	200	70 m6	135	1450
	200 - 315	50 m6	110	224 - 250	60 m6	135	
18	90 - 200	70 m6	135	224	70 m6	135	1510
	224 - 355	50 m6	110	250 - 280	60 m6	135	

Gear unit size	Dimensions in mm															
	a	b	c	E	$e_2$	$f_2$	h	$h_2^{1)}$	$m_1$	$m_2$	$n_1$	$n_2$	$p_2^{2)}$	s	A <sup>3)</sup>	B <sup>3)</sup>
13	1395	900	61 ± 2	820	405	35	272.5	300	1300	680	50	360	500	48	1055	690
14	1535	900	61 ± 2	890	475	35	272.5	300	1440	680	50	430	500	48	1195	690
15	1680	980	72 ± 2	987	485	42	310	340	1565	750	60	430	570	55	1275	730
16	1770	980	72 ± 2	1033	530	42	310	340	1655	750	60	475	570	55	1370	730
17	1770	1110	81 ± 2	1035	525	42	340	374	1640	850	70	465	630	55	1295	790
18	1890	1110	81 ± 2	1095	585	42	340	374	1760	850	70	525	630	55	1415	790

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

1) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

2) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.

3) Max. dimensions; details acc. to order-related documentation.

# Bevel helical gear units vertical mounting position

## Type B4

### Gear unit dimensions, four-stage, gear unit sizes 13 to 18

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

						Oil quantity 1) 2) B4.V Forced lubrication	Weight 1) 2) B4.V			10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30				
						Article No.: <b>2LP302</b>		■ - ■ ■ ■ .22-....						
Type	Size	$d_2$	$l_2$	$G_2$	$l$	kg				Solid shaft with parallel key 4)				
<b>B4SV</b>	<b>13</b>	200 n6	350	335	135	2280	1	-	3 A					
	<b>14</b>	210 n6	350	335	150	2605	1	-	4 A					
	<b>15</b>	230 n6	410	380	210	3435	1	-	5 A					
	<b>16</b>	240 n6	410	380	220	3765	1	-	6 A					
	<b>17</b>	250 n6	410	415	270	4460	1	-	7 A					
	<b>18</b>	270 n6	470	415	285	4930	1	-	8 A					
Type	Size	$D_2$	$G_4$	$l$	kg					Hollow shaft with keyway				
<b>B4HV</b>	<b>13</b>	190 H7	335	135	2280	1	-	3 B						
	<b>14</b>	210 H7	335	150	2605	1	-	4 B						
	<b>15</b>	230 H7	380	210	3435	1	-	5 B						
	<b>16</b>	240 H7	380	220	3765	1	-	6 B						
	<b>17</b>	250 H7	415	270	4460	1	-	7 B						
	<b>18</b>	275 H7	415	285	4930	1	-	8 B						
Type	Size	$D_2$	$D_3$	$G_4$	$G_5$	$l$	kg			Hollow shaft for shrink disk				
<b>B4DV</b> 3)	<b>13</b>	190 H7	195	335	480	135	2280	1	-	3 C				
	<b>14</b>	210 H7	215	335	480	150	2605	1	-	4 C				
	<b>15</b>	230 H7	235	380	550	210	3435	1	-	5 C				
	<b>16</b>	240 H7	245	380	550	220	3765	1	-	6 C				
	<b>17</b>	250 H7	260	415	600	270	4460	1	-	7 C				
	<b>18</b>	280 H7	285	415	600	285	4930	1	-	8 C				
Type	Size	N/DIN 5480	$D_2$	$D_3$	$G_4$	$l$	kg			Hollow shaft with spline				
<b>B4KV</b>	<b>13</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	195	335	135	2280	1	-	3 D				
	<b>14</b>	N 190 × 5 × 30 × 36 × 9H	180 H11	215	335	150	2605	1	-	4 D				
	<b>15</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	235	380	210	3435	1	-	5 D				
	<b>16</b>	N 220 × 5 × 30 × 42 × 9H	210 H11	245	380	220	3765	1	-	6 D				
	<b>17</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	260	415	270	4460	1	-	7 D				
	<b>18</b>	N 250 × 5 × 30 × 48 × 9H	240 H11	285	415	285	4930	1	-	8 D				
Type	Size	c	$d_2$	$D_3$	$k_2$	$n \times s$	t	$G_7$	$l$	kg	Flanged shaft			
<b>B4FV</b>	<b>13</b>	48	580	310	500	20 × 33	14	480	135	2440	1	-	3 E	
	<b>14</b>	48	620	310	540	24 × 33	14	480	150	2775	1	-	4 E	
	<b>15</b>	55	710	360	630	28 × 33	17	550	210	3675	1	-	5 E	
	<b>16</b>	55	740	360	660	30 × 33	17	550	220	4020	1	-	6 E	
	<b>17</b>	60	750	410	660	24 × 39	18	600	270	4760	1	-	7 E	
	<b>18</b>	60	800	410	710	26 × 39	18	600	285	5280	1	-	8 E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Approximate values; exact data acc. to order-related documentation.

2) Without oil filling.

3) Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

4) Shaft version with reinforced bearing, see page 9/7.

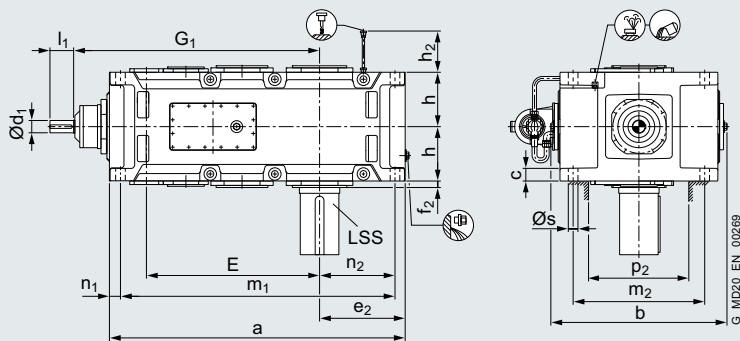
# Bevel helical gear units vertical mounting position

Type B4

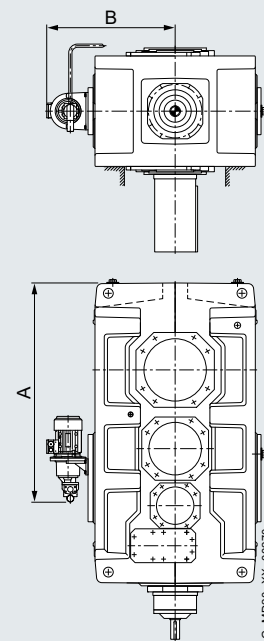
Gear unit dimensions, four-stage, gear unit sizes 19 to 24

## Selection and ordering data

**B4.V**  
Dip lubrication  
2LP302-...22-....



**B4.V**  
Forced lubrication  
by motor pump  
2LP302-...22-....



Gear unit size	Dimensions in mm						
	High speed shaft (HSS)			Reinforced shaft			
	$i_N$	$d_1$	$l_1$	$i_N$	$d_1$	$l_1$	$G_1$
19	80 - 180	80 m6	165	200	80 m6	165	1680
	200 - 315	60 m6	140	224 - 250	70 m6	140	
20	90 - 200	80 m6	165	224	80 m6	165	1740
	224 - 355	60 m6	140	250 - 280	70 m6	140	
21	80 - 180	90 m6	165	-	-	-	1992
	200 - 315	70 m6	140	-	-	-	
22	90 - 200	90 m6	165	-	-	-	2047
	224 - 355	70 m6	140	-	-	-	
23	80 - 160	90 m6	165	-	-	-	2110
	180 - 315	70 m6	140	-	-	-	
24	90 - 180	90 m6	165	-	-	-	2175
	200 - 355	70 m6	140	-	-	-	

Gear unit size	Dimensions in mm															
	a	b	c	E	$e_2$	$f_2$	h	$h_2^{1)}$	$m_1$	$m_2$	$n_1$	$n_2$	$p_2^{2)}$	s	A	B
19	2030	1222	91 ± 2	1190	590	55	390	380	1885	950	78	520	700	65	On request	
20	2150	1222	91 ± 2	1250	650	55	390	380	2005	950	78	580	700	65	On request	
21	2340	1378	100 ± 2	1387	655	60	410	390	2185	1040	90	585	720	75	On request	
	2450	1378	100 ± 2	1442	710	60	410	390	2295	1040	90	640	720	75	On request	
23	On request															
24	On request															

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

1) For forced lubrication, approximately  $h_2$  can be assumed as required space for piping and monitoring; details according to order-related documentation.

2) Free space for pump, pipes and cover; please contact us for exact dimensions, if applicable.



## Bevel helical gear units vertical mounting position Type B4

### Gear unit dimensions, four-stage, gear unit sizes 19 to 24

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

				Oil quantity B4.V Dip lubrication	Oil quantity B4.V Forced lubrication	Weight B4.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30							
Article No.: <b>2LP302</b> - <b>.22-....</b>														
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg			Solid shaft with parallel key				
<b>B4SV</b>	<b>19</b>	290 n6	470	465	On request			2 - 0	A					
	<b>20</b>	300 n6	500	465				2 - 1	A					
	<b>21</b>	320 n6	500	490				2 - 2	A					
	<b>22</b>	340 n6	550	490				2 - 3	A					
	<b>23</b>	360 n6	590	540				2 - 4	A					
	<b>24</b>	380 n6	590	540				2 - 5	A					
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	l	kg			Hollow shaft for shrink disk			
<b>B4DV</b> 1)	<b>19</b>	285 H7	295	465	670	On request			2 - 0	C				
	<b>20</b>	310 H7	315	465	670				2 - 1	C				
	<b>21</b>	330 H7	335	490	715				2 - 2	C				
	<b>22</b>	340 H7	345	490	725				2 - 3	C				
	<b>23</b>	370 H7	375	540	800				2 - 4	C				
	<b>24</b>	390 H7	395	540	820				2 - 5	C				
Type	Size	N/DIN 5480	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	l	l	kg			Hollow shaft with spline			
<b>B4KV</b>	<b>19</b>	On request							2 - 0	D				
	<b>20</b>								2 - 1	D				
	<b>21</b>								2 - 2	D				
	<b>22</b>								2 - 3	D				
Type	Size	c	d <sub>2</sub>	D <sub>3</sub>	k <sub>2</sub>	n x s	t	G <sub>7</sub>	l	l	kg			Flanged shaft
<b>B4FV</b>	<b>19</b>	65	860	460	770	30 x 39	18	670	On request			2 - 0	E	
	<b>20</b>	65	930	460	830	32 x 39	18	670				2 - 1	E	
	<b>21</b>	75	950	520	850	28 x 45	20	710				2 - 2	E	
	<b>22</b>	75	1040	520	940	28 x 45	20	710				2 - 3	E	

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

1) Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

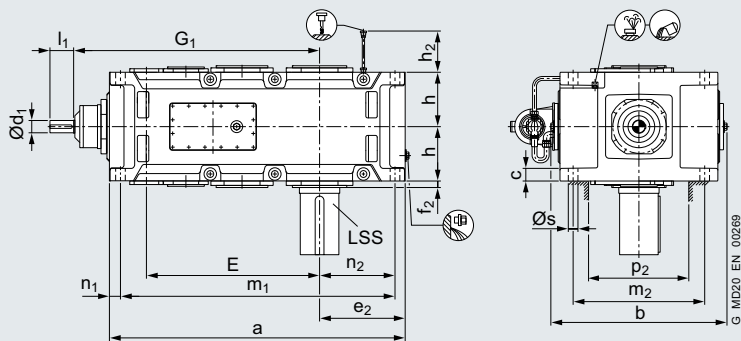
# Bevel helical gear units vertical mounting position

Type B4

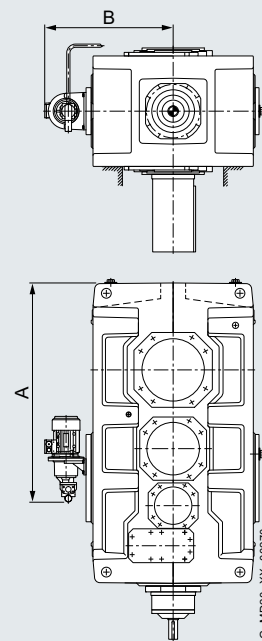
## Gear unit dimensions, four-stage, gear unit sizes 25 and 26

### Selection and ordering data

**B4.V**  
Dip lubrication  
2LP302-...22-....



**B4.V**  
Forced lubrication  
by motor pump  
2LP302-...22-....



Gear unit size	Dimensions in mm			
	$l_N$	$d_1$	$l_1$	$G_1$
<b>25</b>	80 - 160	110 n6	205	2395
	180 - 315	80 m6	170	
<b>26</b>	90 - 180	110 n6	205	2485
	200 - 355	80 m6	170	

Gear unit size	Dimensions in mm															
	a	b	c	E	$e_2$	$f_2$	h	$h_2$	$m_1$	$m_2$	$n_1$	$n_2$	$p_2$	s	A	B
<b>25</b>	On request															
<b>26</b>	On request															

Shaft seals, [see page 10/2 onwards](#).

For details on the shafts, [see Chapter 9](#).

## Bevel helical gear units vertical mounting position

Type B4 / Types B2, B3 and B4

### Gear unit dimensions, four-stage, gear unit sizes 25 and 26

#### Selection and ordering data (continued)

##### Low speed shaft (LSS)

					Oil quantity B4.V Dip lubrication	Oil quantity B4.V Forced lubrication	Weight B4.V	10th to 13th position of Article No. and Article No. supplement, for 14th to 16th position, see pages 7/27 to 7/30				
					Article No.:		<b>2LP302</b>	<b>.22-....</b>				
Type	Size	d <sub>2</sub>	l <sub>2</sub>	G <sub>2</sub>	l	l	kg	Solid shaft with parallel key				
<b>B4SV</b>	<b>25</b>	400 n6	650	605	On request			<b>2 - 6 A</b>				
	<b>26</b>	420 n6	650	605				<b>2 - 7 A</b>				
Type	Size	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	l	l	kg	Hollow shaft for shrink disk			
<b>B4DV</b> 1)	<b>25</b>	410 H7	415	610	895	On request			<b>2 - 6 C</b>			
	<b>26</b>	430 H7	435	610	925				<b>2 - 7 C</b>			

#### Article No. overview

##### Article No., 10th to 12th position

				Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
				Article No.	<b>2LP302</b>	.	.	.	■	■	■	.	.	.	.	<b>-Z</b>
Ratio																
Type B2.V	B3.V	B4.V														
<b>i<sub>N</sub></b> 5	12.5	80														<b>A</b>
<b>i<sub>N</sub></b> 5.6	14	90														<b>B</b>
<b>i<sub>N</sub></b> 6.3	16	100														<b>C</b>
<b>i<sub>N</sub></b> 7.1	18	112														<b>D</b>
<b>i<sub>N</sub></b> 8	20	125														<b>E</b>
<b>i<sub>N</sub></b> 9	22.4	140														<b>F</b>
<b>i<sub>N</sub></b> 10	25	160														<b>G</b>
<b>i<sub>N</sub></b> 11.2	28	180														<b>H</b>
<b>i<sub>N</sub></b> 12.5	31.5	200														<b>J</b>
<b>i<sub>N</sub></b> 14	35.5	224														<b>K</b>
<b>i<sub>N</sub></b> 16	40	250														<b>L</b>
<b>i<sub>N</sub></b> 18	45	280														<b>M</b>
<b>i<sub>N</sub></b> 20	50	315														<b>N</b>
<b>i<sub>N</sub></b> 22.4	56	355														<b>P</b>
<b>i<sub>N</sub></b> -	63	400														<b>Q</b>
<b>i<sub>N</sub></b> -	71	-														<b>R</b>
<b>i<sub>N</sub></b> -	80	-														<b>S</b>
<b>i<sub>N</sub></b> -	90	-														<b>T</b>
Type designation																
Type B2											<b>0</b>					
Type B3											<b>1</b>					
Type B4											<b>2</b>					
Mounting position																
Mounting position V											<b>2</b>					

Shaft seals, see page 10/2 onwards.

For details on the shafts, see Chapter 9.

Cooling options, see page 10/11 onwards.

<sup>1)</sup> Shaft variant designed to withstand axial forces (including those caused by weight of gear unit) on request.

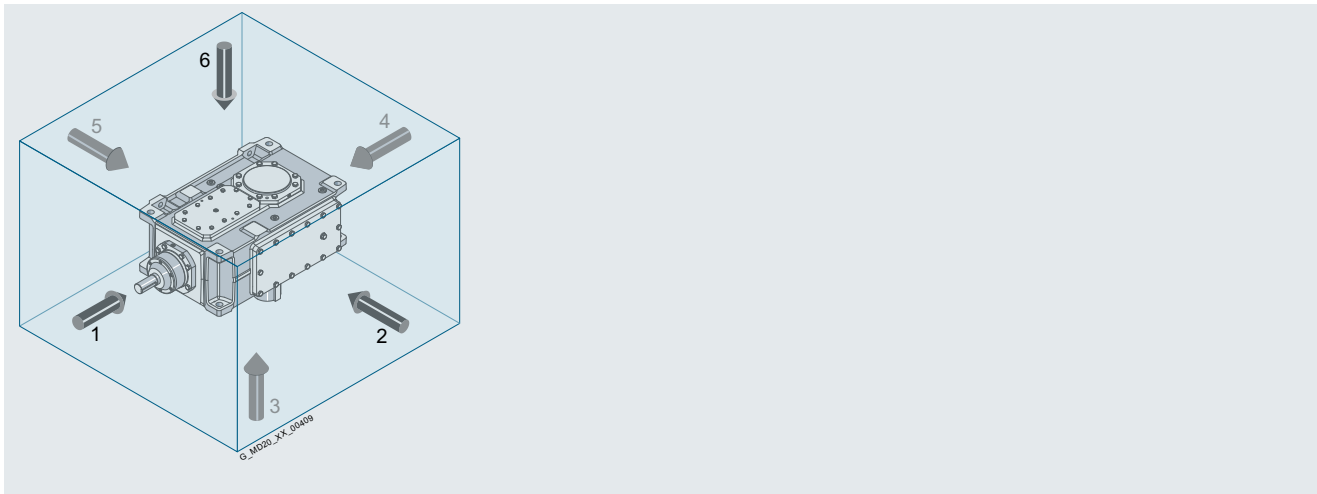
# Bevel helical gear units vertical mounting position

Types B2, B3 and B4

## Article No. overview

### Selection and ordering data (continued)

#### Article No., 13th position



Data position of the Article No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.	2LP302 . . . . .												■	. . . . - Z . . . .			

#### Variants/shaft arrangement (looking at side 2)

Type	B2.V	B3.V	B4.V	
<b>A</b>				0
<b>B</b>				1
<b>C</b>				2
<b>D</b>				3

# Bevel helical gear units vertical mounting position

Types B2, B3 and B4

Article No. overview

## Selection and ordering data (continued)

			Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code		
			Article No.	2LP302 . . . . .												Z . . . .	
Variants/shaft arrangement (looking at side 2)																	
Type																	
B2.V			B3.V			B4.V											
E																	
	G_MD20_XX_00288	G_MD20_XX_00289	G_MD20_XX_00290														
														4			
F																	
	G_MD20_XX_00291	G_MD20_XX_00292	G_MD20_XX_00293														
														5			



The versions E and F with slow speed shaft at both ends are only relevant for the shaft variants

- "S" (solid shaft with parallel key acc. to DIN 6885/1)
- "V" (reinforced solid shaft with parallel key acc. to DIN 6885/1)
- "C" (solid shaft for play-free taper clamping connection)

The solid shaft extension shown represents the driven machine shaft insertion side for hollow shafts.

The slow speed hollow shaft "H" (hollow shaft with keyway according to DIN 6885/1) is generally suitable for fitting on both ends.

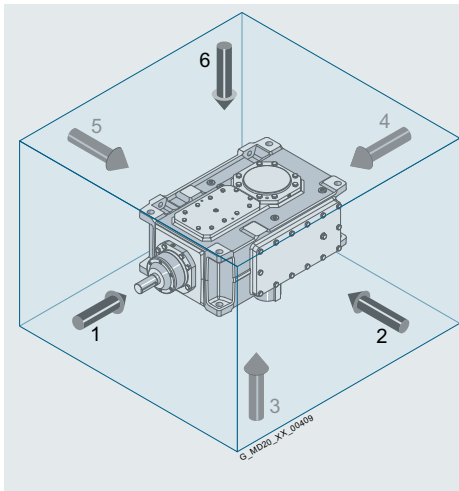
For details on the seals, [see page 10/2 onwards](#).

# Bevel helical gear units vertical mounting position

Types B2, B3 and B4

## Article No. overview

### Selection and ordering data (continued)



#### Article No. supplement, 14th position

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.		2LP302	.	-	.	.	.	.	.	.	.	.	-Z ■ ■ ■
<b>Sealing single-side high speed shaft (HSS)</b>													
Radial shaft seal													A
Dual radial shaft seal													B
Taconite E													E

#### Article No. supplement, 15th and 16th position

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code	
Article No.		2LP302	.	-	.	.	.	.	.	.	.	.	-Z ■ ■ ■	
<b>Sealing low speed shaft (LSS)</b>														
Radial shaft seal													A	
Dual radial shaft seal													B	
Taconite F													E	
Taconite F-F													F	
Taconite F-H													G	
Taconite F-K													H	
Radial shaft seal with dry-running protection													K	
<b>Sealing double-extended low speed shaft (LSS)</b>														
Side 3: Radial shaft seal/Side 6: Radial shaft seal													Z	Q 0 A
Side 3: Dual radial shaft seal/Side 6: Dual radial shaft seal													Z	Q 0 B
Side 3: Taconite F/Side 6: Taconite F													Z	Q 0 E
Side 3: Radial shaft seal/Side 6: Taconite F													Z	Q 1 A
Side 3: Taconite F/Side 6: Radial shaft seal													Z	Q 1 B
Side 3: Radial shaft seal/ Side 6: Radial shaft seal with dry-running protection													Z	Q 1 D
<b>Shaft version</b>														
High speed shaft (HSS) version: Catalog version, low speed shaft (LSS) version: Catalog version														0
High speed shaft (HSS) version: Reinforced version, low speed shaft (LSS) version: Catalog version														1

## Special mounting positions



8/2

**Upright installation,  
gear unit sizes 4 – 18**

8/4

**Water screw (pump) gear units**

8/6

Water screw generator drives

## Special mounting positions

### Upright installation, gear unit sizes 4 – 18

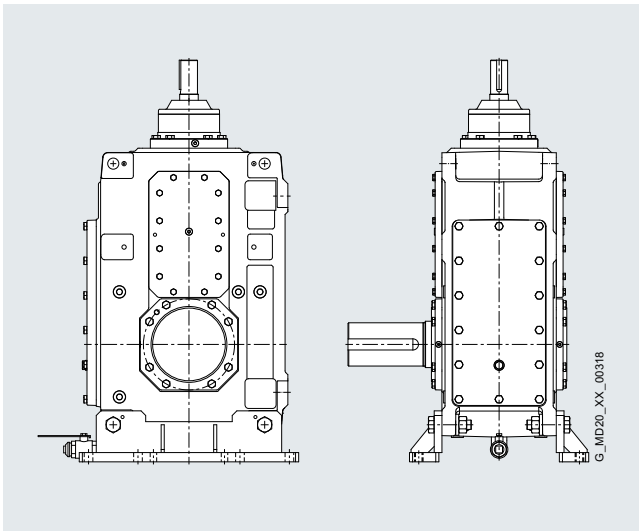
#### Overview

Flender gear units of the types H2, H3, H4, B2, B3 and B4 are also available for an upright mounting position with low speed shaft (LSS) at the top or at the bottom.

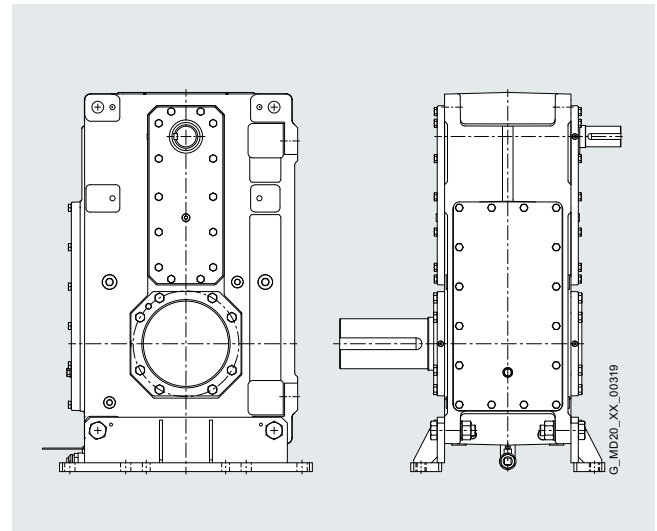
The setup can be implemented, for example, as a slip-on gear unit with torque reaction arm (not shown) or using rails/feet.

For oil supply, see Table 2.

#### Mounting position: low speed shaft at bottom

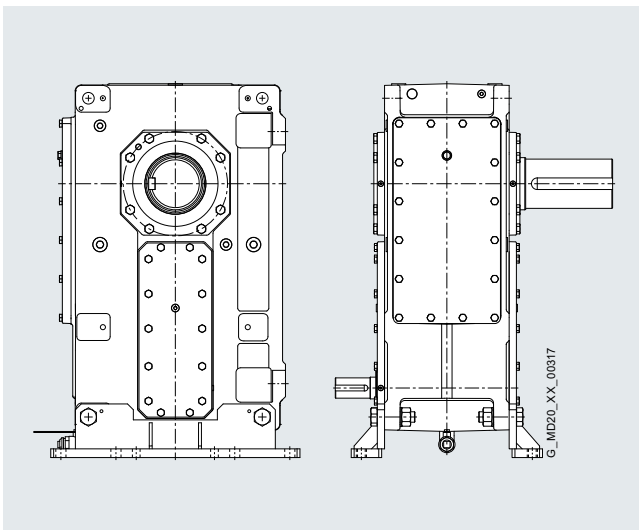


Type B3



Type H3

#### Mounting position: low speed shaft at top



Type H3



## Overview (continued)

## Dimensions

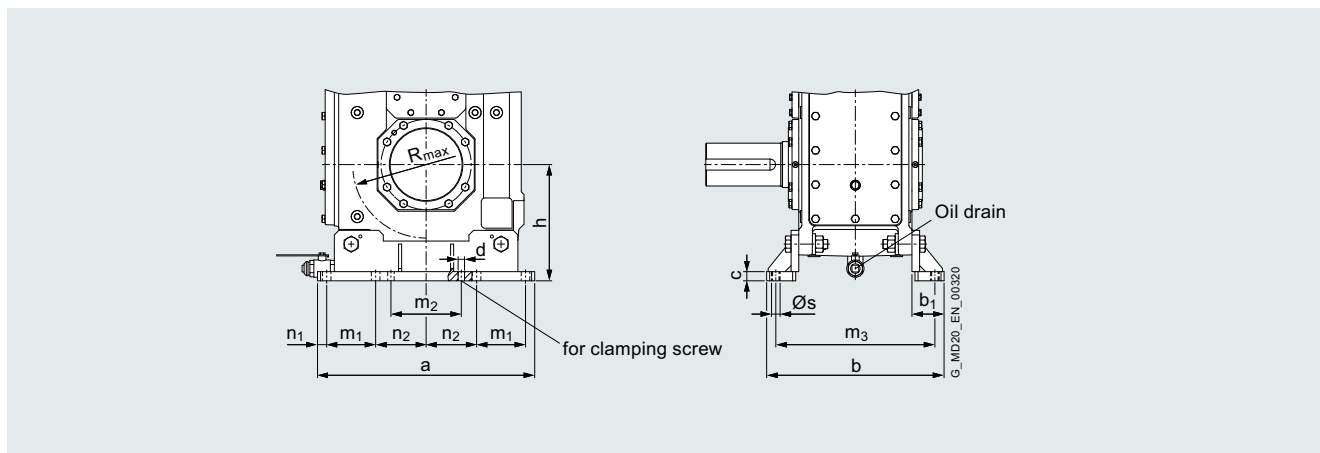


Table 1

Gear unit size	Dimensions in mm												H2, H3, H4, B3, B4		B2	
	a	b <sub>1</sub>	c	4 × d	h <sup>1)</sup>	m <sub>1</sub>	m <sub>2</sub>	n <sub>1</sub>	n <sub>2</sub>	8 × Ø s	R <sub>max</sub> <sup>1)</sup>	b	m <sub>3</sub>	b	m <sub>3</sub>	
4	450	68	20	M 16	255	110	300	20	95	19	120	351	315	406	370	
5	510	68	20	M 16	270	110	360	20	125	19	130	391	355	456	420	
6					315						180					
7	610	85	30	M 20	325	130	200	25	150	24	170	470	420	550	500	
8					385						230					
9	710	105	30	M 24	380	160	230	30	165	28	240	580	520	650	590	
10					430						290					
11	860	115	30	M 30	435	190	270	35	205	35	240	660	590	760	690	
12					520						330					
13	965	100	60	M 36	430	260	230	37.5	185	35	360	750	670	855	775	
14					500						430					
15	1060	110	70	M 36	505	300	190	45	185	42	430	845	755	985	895	
16					550						470					
17	1210	125	80	M 42	550	340	250	55	210	48	460	940	830	1135	1025	
18					610						520					

Table 2

Gear unit size	Types					
	H2	H3	H4	B2	B3	B4
4 – 12	Dip lubrication	Dip lubrication with oil expansion tank	Dip lubrication with oil expansion tank	Dip lubrication with oil expansion tank, also in motor lantern	Dip lubrication with oil expansion tank, also in motor lantern	Dip lubrication with oil expansion tank, also in motor lantern
13 – 18	Forced lubrication with flange pump	Forced lubrication with flange pump	Forced lubrication with motor pump	Forced lubrication with flange pump or motor pump	Forced lubrication with flange pump or motor pump	Forced lubrication with flange pump or motor pump

Sizes 19 to 28 on request.

Observe free space for elements of the oil supply (pump, pipes, etc.)! Dimensions on request

<sup>1)</sup> Applies for low speed shaft at bottom. Values for low speed shaft at top on request.

## Special mounting positions

### Water screw (pump) gear units

#### Overview

Water screws are used to lift water.

The screw operates according to the "Archimedean principle". The slow speed shaft is tilted downwards between 30 and 38°. Water screw pumps are also suitable for pumping heavily contaminated liquids, even those containing small solid particles. The delivery head is normally only a few meters and the flow rate relatively high.

The output shaft of the gear unit, whose mounting position corresponds to the inclination angle of the screw, does not absorb any additional loads and transmits the torque to the screw shaft by means of a flexible coupling.

Flender gear units are specially designed to operate in these conditions. Here, a gear unit with adapted oil level, a corresponding shaft seal, an oil drain, and a special breather is required.

Each gear unit is fitted with a backstop to prevent the screw from accelerating backwards by the water that is forced back when the motor is switched off.

#### Advantages

- Low-noise
- Low-vibration
- High efficiency

#### Complete solution

- Set up on base frame
- Backstop
- Coupling protection through protective cover
- Condition monitoring possible

#### Application areas

- Municipal sewage treatment plants
- Drainage
- Irrigation systems
- Pumping of water from a low level to a higher level



Water screw (pump) gear units

#### Technical specifications

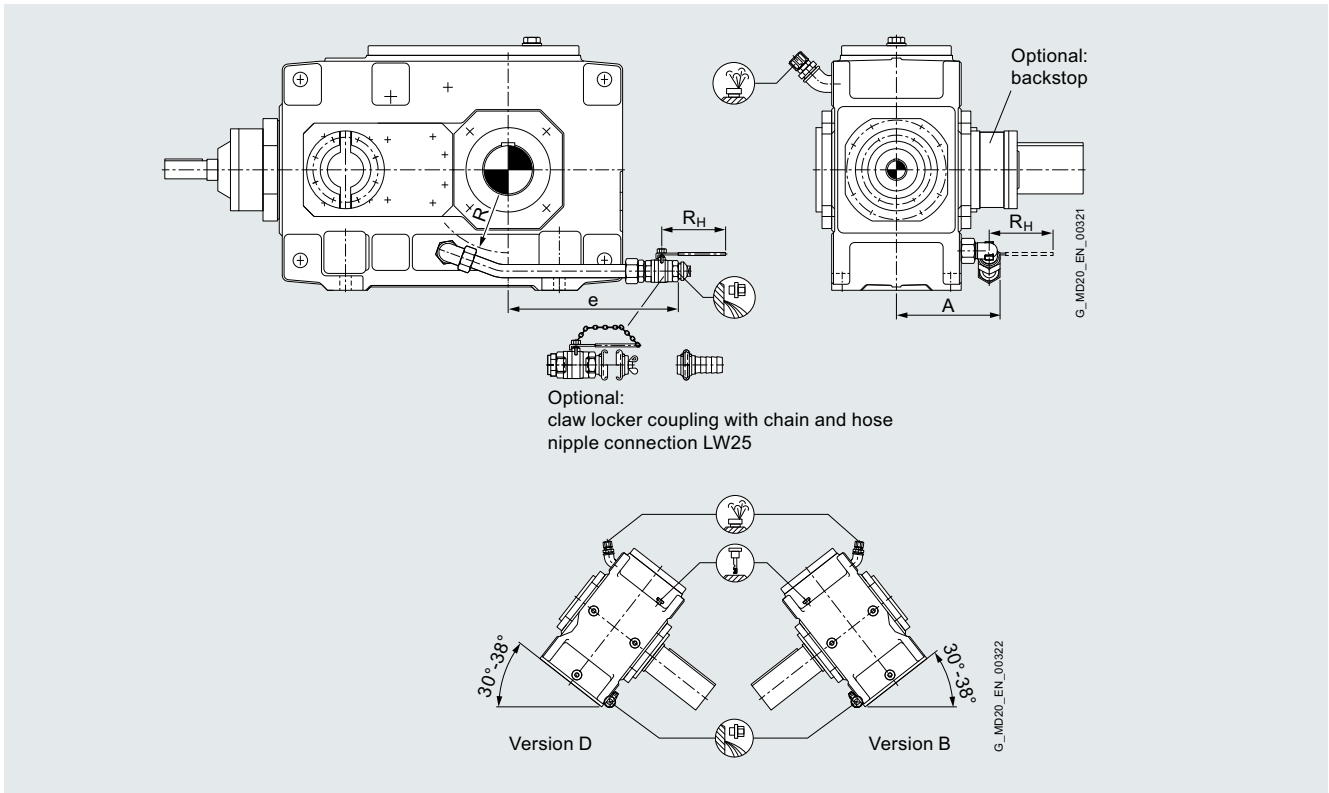
<b>Types</b>	Helical and bevel helical gear units
<b>Sizes</b>	4 ... 18
<b>Number of stages</b>	3-stage
<b>Ratios</b>	$i = 12 \dots 80$
<b>Nominal output torques</b>	5 800 ... 240 000 Nm
<b>Mounting positions</b>	Inclined position, slow speed shaft Tilted downwards 30 to 38°

Please contact Flender regarding different versions.

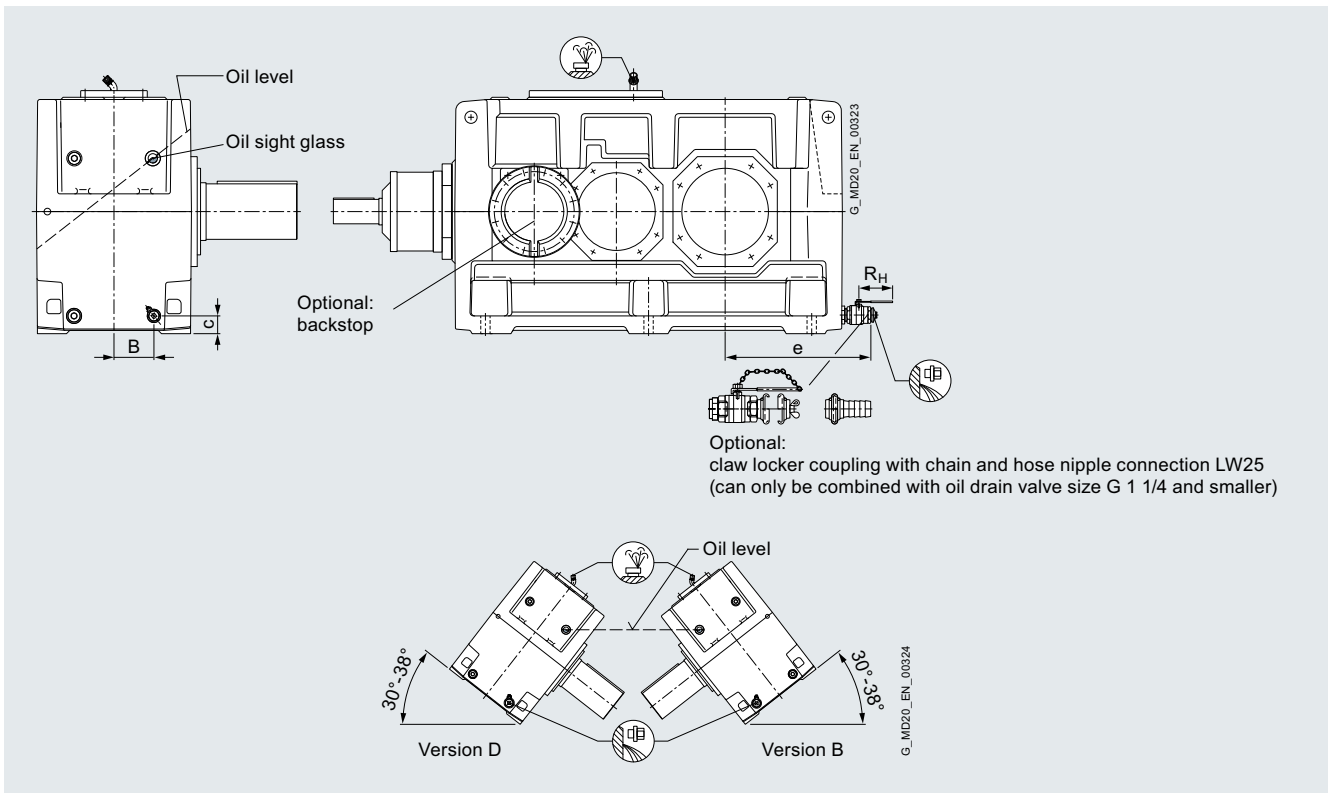
Position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>											<b>-Z</b>
<b>Water screw design</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water screw	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>K 2 5</b>
Oil drain valve in water screw design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>K 3 2</b>
Standard air filter for water screw gear unit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>K 7 5</b>

Dimension drawings

Water screw bevel helical gear unit, type B3



Water screw design up to gear size 12



Water screw design from gear size 13

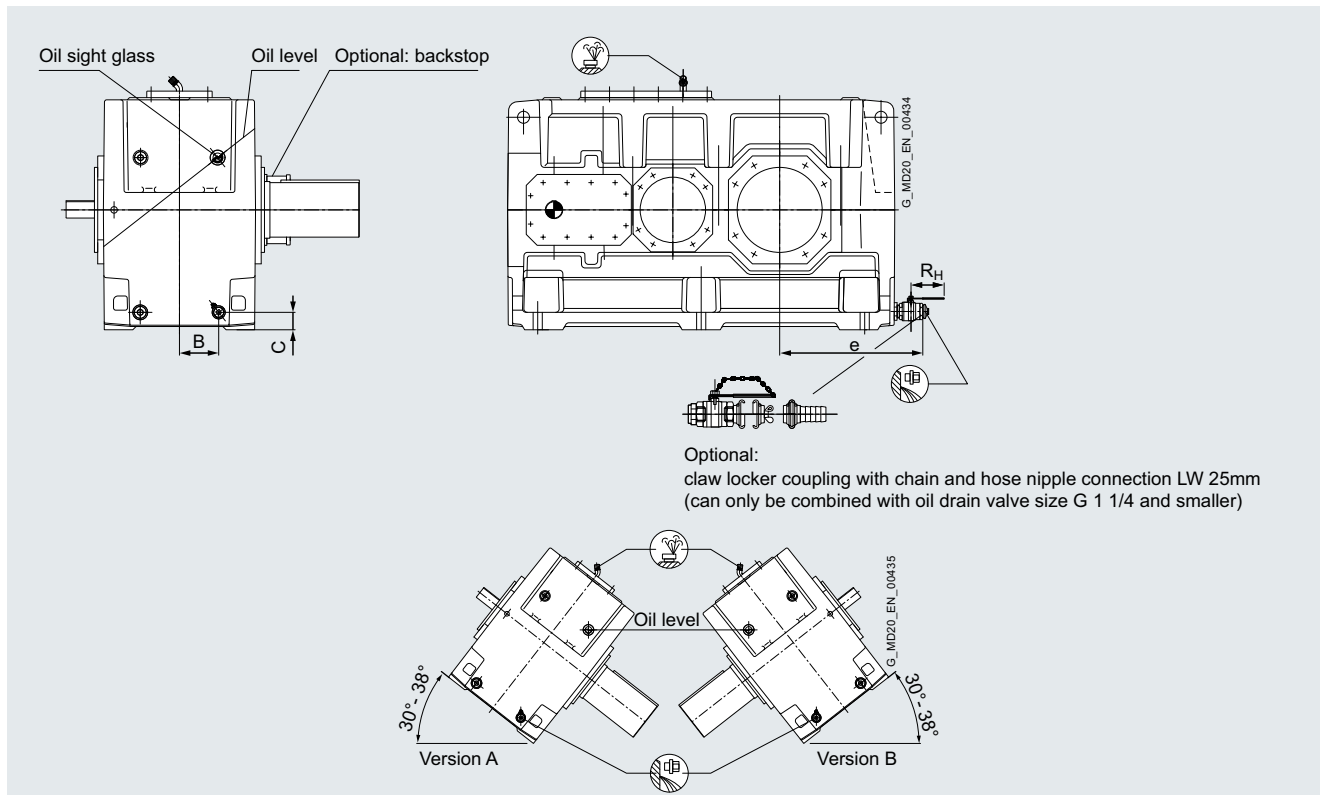


## Special mounting positions

### Water screw (pump) gear units, water screw generator drives

#### Dimensional drawings (continued)

#### Water screw helical gear unit, type H3SH (size 5 or larger)



#### Water screw bevel helical gear unit, type B3 and H3

Water screw design / oil drain valves

Type	Size	Dimensions in mm						Assigned oil drain valve	
		A	e	R	B	C	R	Threaded connection "	R <sub>H</sub> mm
<b>B3SH and H3SH (from size 5)</b>	4	180	285	125	–	–	125	G3/4	102
	5	195	305	–	–	–	–		
	6	195	345	–	–	–	–		
	7	225	360	–	–	–	–		
	8	225	420	–	–	–	–		
	9	235	410	–	–	–	–	G1 1/4	121
	10	235	460	–	–	–	–		
	11	300	465	–	–	–	–		
	12	300	550	–	–	–	–	G2	158
	13	–	500	–	135	67	–		
14	–	570	–	135	67	–			
15	–	610	–	150	80	–			
16	–	655	–	150	80	–			
17	–	650	–	180	85	–			
18	–	710	–	180	85	–			

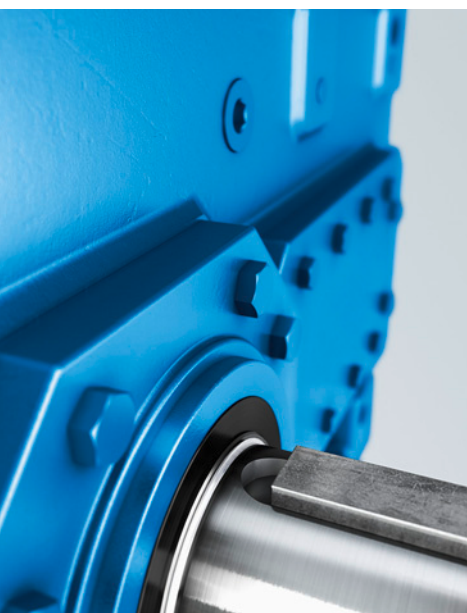
#### Water screw generator drives

The technology described under "Water screw (pump) gear units" (page 8/4 onwards) is also used for the conversion of hydropower into electrical energy.

Here, the drive on the gear unit is performed via the slow speed shaft and the speed is converted to "high speed".

The dimensions and the further setup are comparable to those of the water screw pump.

## Connection dimensions



9/2	<b>Cylindrical shaft extensions</b>
9/2	Central holes, form DS
9/3	in shaft extensions DIN 332/1
9/3	Selection of fit
9/4	<b>Parallel keys, keyways and hollow shafts with keyway</b>
9/5	<b>Protective cover for second shaft extension for shaft extension at both ends</b>
9/5	Types H2S., H3S., H4S., B2S., B3S., B4S., H2C., H3C., H4C., B3C., B4C.
9/6	<b>Solid shaft with parallel key</b>
9/6	Types H1S., H2S., H3S., H4S., B2S., B3S. and B4S., sizes 4 to 28
9/7	<b>Solid shaft with parallel key and reinforced bearing</b>
9/7	Types H2V., H3V., H4V., B2V., B3V. and B4V., sizes 7 to 18
9/8	<b>Permissible additional radial forces at low speed shaft (LSS)</b>
9/8	Types H1 to H4, B2 to B4
9/10	<b>Solid shaft without parallel key</b>
9/10	Types H2C., H3C., H4C., B3C., B4C.
9/11	Flange coupling with zero-backlash dual taper clamping connection (RFK)
9/12	<b>Hollow shaft with shrink disk</b>
9/12	Types H2D., H3D., H4D., B3D. and B4D.
9/14	Type B2D.
9/15	<b>Hollow shaft with spline according to DIN 5480</b>
9/15	Types H2K., H3K., H4K., B3K. and B4K.
9/16	Type B2K.
9/17	<b>Hollow shaft with keyway according to DIN 6885/1</b>
9/17	Types H2H., H3H., H4H., B3H. and B4H.
9/18	Type B2H.
9/19	<b>Counter flanges for flanged shaft</b>
9/19	Types H2F., H3F., H4F., B2F., B3F. and B4F.

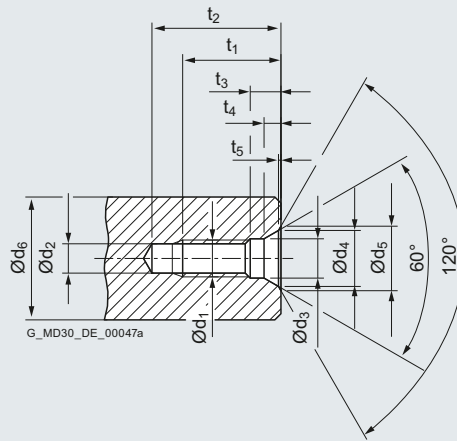
## Connection dimensions

### Cylindrical shaft extensions

#### Central holes, form DS in shaft extensions DIN 332/1

#### Dimensional drawings

##### Form DS with thread, straight running surface and protective counterbore



Recommended diameter ranges $d_6^{1)}$		Form DS Central hole DS	$d_1$	$d_2^{2)}$	$d_3$	$d_4$	$d_5$	$t_1$	$t_2$		$t_3$	$t_4$	$t_5$
via	to								min.	max.			
mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
16	21	DS 6	M 6	5.0	6.4	9.6	10.5	16.0	21	23	5.0	2.8	0.4
21	24	DS 8	M 8	6.8	8.4	12.2	13.2	19.0	25	28	6.0	3.3	0.4
24	30	DS 10	M10	8.5	10.5	14.9	16.3	22.0	30	34	7.5	3.8	0.6
30	38	DS 12	M 12	10.2	13.0	18.1	19.8	28.0	37	42	9.5	4.4	0.7
38	50	DS 16	M 16	14.0	17.0	23.0	25.3	36.0	45	50	12.0	5.2	1.0
50	85	DS 20	M 20	17.5	21.0	28.4	31.3	42.0	53	59	15.0	6.4	1.3
85	130	DS 24	M 24	21.0	25.0	34.2	38.0	50.0	63	68	18.0	8.0	1.6
130	225	DS 30 <sup>3)</sup>	M 30	26.5	31.0	40.2	44.6	60.0	77	83	17.0	8.0	1.9
225	320	DS 36 <sup>3)</sup>	M 36	32.0	37.0	49.7	55.0	74.0	93	99	22.0	11.0	2.3
320	500	DS 42 <sup>3)</sup>	M 42	37.5	43.0	60.3	66.6	84.0	105	111	26.0	15.0	2.7

1) Diameter refers to the finished workpiece

2) Tap hole drill diameter acc. to DIN 336 Part 1

3) Dimensions not acc. to DIN 332

### Overview

#### Selection of fit for solid shaft studs with keyway

Selection of fit	Shaft d		Shaft tolerance	Bore tolerance
	via	to		
	mm	mm		
Shaft tolerance acc. to Flender standard		25	k6	H7
	25	100	m6	
	100		n6	

For heavy-duty operating conditions, e.g. reversing under load, it is recommended that a tighter fit and for the hub keyway width the ISO tolerance P9 is selected (special design).

In this case, the customer should provide the relevant information.

## Connection dimensions

Parallel keys, keyways and hollow shafts with keyway

### Selection of fit

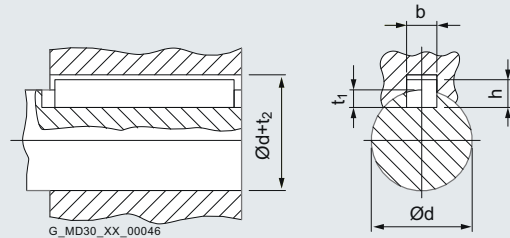
#### Dimensional drawings

##### Parallel keys and keyways

Drive type fastening without taper action

Parallel key and keyway according to DIN 6885/1

Parallel key form B



Diameter		Width	Height	Depth of keyway in shaft	Depth of keyway in hub
d via	to	b <sup>1)</sup>	h	t <sub>1</sub>	d + t <sub>2</sub> DIN 6885/1
mm	mm	mm	mm	mm	mm
17	22	6	6	3.5	d + 2.8
22	30	8	7	4	d + 3.3
30	38	10	8	5	d + 3.3
38	44	12	8	5	d + 3.3
44	50	14	9	5.5	d + 3.8
50	58	16	10	6	d + 4.3
58	65	18	11	7	d + 4.4
65	75	20	12	7.5	d + 4.9
75	85	22	14	9	d + 5.4
85	95	25	14	9	d + 5.4
95	110	28	16	10	d + 6.4
110	130	32	18	11	d + 7.4
130	150	36	20	12	d + 8.4
150	170	40	22	13	d + 9.4
170	200	45	25	15	d + 10.4
200	230	50	28	17	d + 11.4
230	260	56	32	20	d + 12.4
260	290	63	32	20	d + 12.4
290	330	70	36	22	d + 14.4
330	390	80	40	25	d + 15.4
390	440	90	45	28	d + 17.4

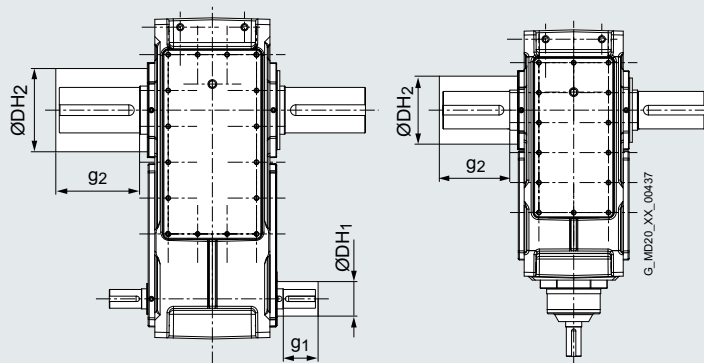
For heavy-duty operating conditions, e.g. reversing under load, it is recommended that a tighter fit and for the hub keyway width the ISO tolerance P9 is selected (special design). In this case, the customer should provide the relevant information.

<sup>1)</sup> The tolerance zone for the hub keyway width b is ISO JS9, or ISO P9 for heavy-duty operating conditions (P9 special design).



Dimensional drawings

H2S., H3S., H4S., B2S., B3S., B4S., H2C., H3C., H4C., B3C., B4C.



Gear unit size	Dimensions in mm											
	Protective cover high speed shaft (HSS)						Protective cover low speed shaft (LSS)					
	Type H2..		H3..		H4..		H2/3/4S, H2/3/4C		B3/4S, B3/4C		B2S	
	DH <sub>1</sub>	g <sub>1</sub>	DH <sub>1</sub>	g <sub>1</sub>	DH <sub>1</sub>	g <sub>1</sub>	DH <sub>2</sub>	g <sub>2</sub>	DH <sub>2</sub>	g <sub>2</sub>	DH <sub>2</sub>	g <sub>2</sub>
4	99	118.5	-	-	-	-	158	183.5	158	183.5	158	181
5	114	117.5	101	87.5	-	-	190	227.5	190	227.5	190	225
6	114	117.5	101	87.5	-	-	200	227.5	200	227.5	200	225
7	129	155	104	100	79	60	227	225	227	225	227	225
8	129	155	104	100	79	60	237	265	237	265	237	265
9	144	162	119	142	89	70	254	267	254	267	254	267
10	144	162	119	142	89	70	286	317	286	317	286	317
11	169	185	129	140	99	115	311	315	311	315	311	315
12	169	185	129	140	99	115	326	315	326	315	326	315
13	204	220	154	175	109	120	351	375	351	375	351	372.5
14	204	220	154	175	109	120	351	375	351	375	351	372.5
15	239	232.5	184	217.5	124	157.5	366	437.5	366	437.5	366	427.5
16	239	232.5	184	217.5	124	157.5	406	442.5	406	442.5	406	432.5
17	269	272	184	220	-	-	406	440	406	440	406	412.5
18	269	272	184	220	-	-	426	515	426	515	426	487.5
19-28	On request											

Selection and ordering data

Ordering information

When ordering a protective cover at the second shaft extension, the letter **-Z** and the following order codes must be added to the Article No.

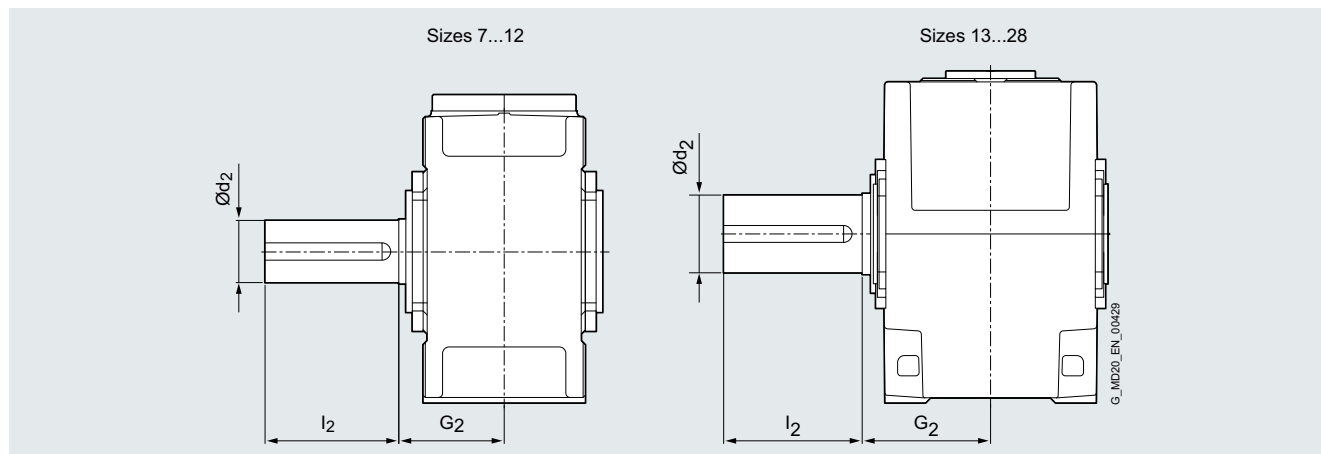
Position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.	2LP302 . . . . . -Z ■ ■ ■											
<b>Protective cover at second shaft extension for shaft extension at both ends</b>												
Protective cover at high speed shaft (HSS), mounting on gear unit side 6 (left)												G 1 0
Protective cover at high speed shaft (HSS), mounting on gear unit side 3 (right)												G 1 1
Protective cover at low speed shaft (LSS), mounting on gear unit side 6 (left)												G 2 0
Protective cover at low speed shaft (LSS), mounting on gear unit side 3 (right)												G 2 1

## Connection dimensions

Solid shaft with parallel key

Types H1S., H2S., H3S., H4S., B2S., B3S. and B4S., sizes 4 to 28

### Overview



Gear unit size	Dimensions in mm								
	Type H1S.	H2S., H3S., H4S., B3S., B4S.					B2S.		
	$d_2^{1)}$	$l_2$	$G_2$	$d_2^{1)}$	$l_2$	$G_2$	$d_2^{1)}$	$l_2$	$G_2$
3	60	125	170	-	-	-	-	-	-
4				80	170	140	80	170	170
5	85	160	210	100	210	165	100	210	200
6				110	210	165	110	210	200
7	105	200	250	120	210	195	120	210	235
8				130	250	195	130	250	235
9	125	210	270	140	250	235	140	250	270
10				160	300	235	160	300	270
11	150	240	320	170	300	270	170	300	320
12				180	300	270	180	300	320
13	180	310	360	200	350	335	200	350	390
14				210	350	335	210	350	390
15	220	350	360	230	410	380	230	410	460
16				240	410	380	240	410	460
17	240	400	400	250	410	415	250	410	540
18				270	470	415	270	470	540
19	270	450	440	290	470	465	-	-	-
20	-	-	-	300	500	465	-	-	-
21	-	-	-	320	500	490	-	-	-
22	-	-	-	340	550	490	-	-	-
23	-	-	-	360	590	540	-	-	-
24	-	-	-	380	590	540	-	-	-
25	-	-	-	400	650	605	-	-	-
26	-	-	-	420	650	605	-	-	-
27	-	-	-	440	690	680	-	-	-
28	-	-	-	460	750	680	-	-	-

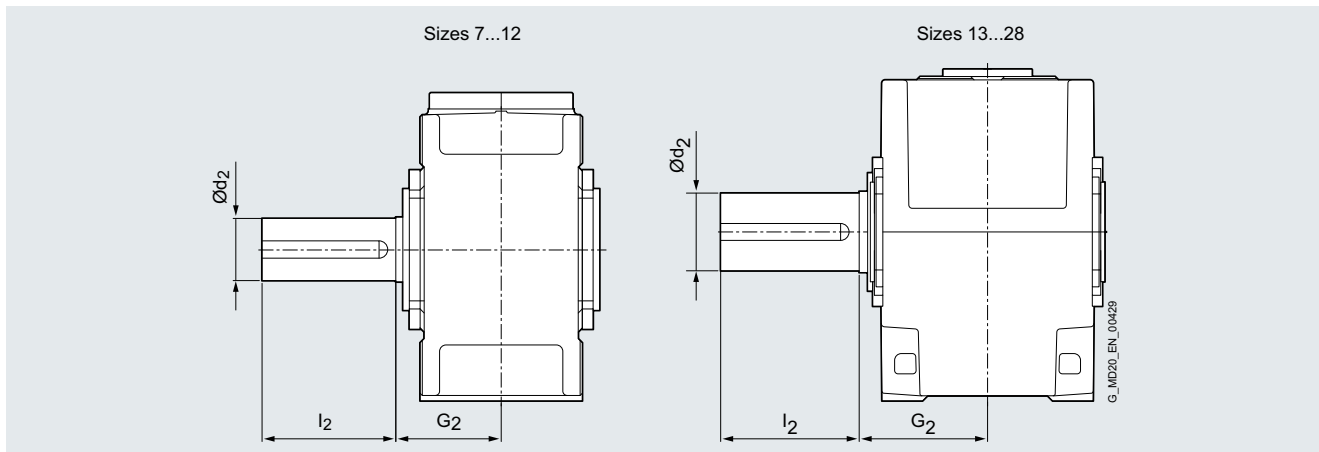
<sup>1)</sup> Selection of fit, see page 9/3.

## Connection dimensions

### Solid shaft with parallel key and reinforced bearing

Types H2V., H3V., H4V., B2V., B3V. and B4V., sizes 7 to 18

#### Overview



Gear unit size	Dimensions in mm			Add. weight in kg	Dimensions in mm			Add. weight in kg
	Type <b>H.VH, H.VV, B3VH, B3VV, B4VH, B4VV</b>				Type <b>B2VH, B2VV</b>			
	$d_2$	$l_2$	$G_2$		$d_2$	$l_2$	$G_2$	
<b>7</b>	130 n6	250	205	40	130 n6	250	245	45
<b>8</b>	130 n6	250	205	40	130 n6	250	245	45
<b>9</b>	150 n6	250	245	60	150 n6	250	280	65
<b>10</b>	170 n6	300	245	60	170 n6	300	280	65
<b>11</b>	180 n6	300	270	95	180 n6	300	320	100
<b>12</b>	180 n6	300	270	110	180 n6	300	320	120
<b>13</b>	220 n6	350	335	120	–	–	–	–
<b>14</b>	230 n6	410	335	135	230 n6	410	390	145
<b>15</b>	260 n6	410	380	170	–	–	–	–
<b>16</b>	270 n6	470	380	195	270 n6	470	460	210
<b>17</b>	290 n6	470	415	240	–	–	–	–
<b>18</b>	310 n6	470	415	360	310 n6	470	540	380

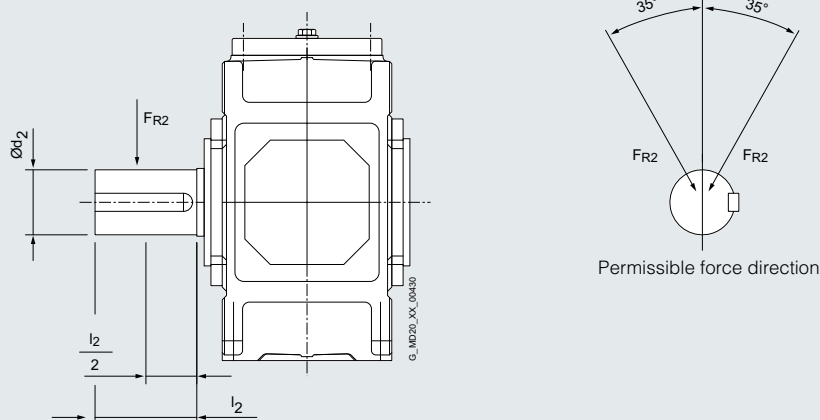
Versions E, F and I on request

## Connection dimensions

Permissible additional radial forces at low speed shaft (LSS)

### Types H1 to H4, B2 to B4

#### Overview



Permissible additional radial forces  $F_{R2}$  in kN with force application on center of shaft extension, solid shaft (S) <sup>1) 2)</sup>

Gear unit size	Type	H2S		B2S		H3S		H4S		B3S		B4S	
	Version A/B	A/B/G/H	C/D	A/C	B/D	A/B/G/H	C/D	A/B	C/D	A/C	B/D	A/C	B/D
4	–	10	10	13	12	–	–	–	–	14	9	–	–
5	<sup>3)</sup>	22	13	27	15	29	18	–	–	29	18	29	18
6	–	22	13	27	15	29	18	–	–	29	18	29	18
7	<sup>3)</sup>	30	18	37	17	40	26	26	40	40	26	40	26
8	–	30	18	37	17	40	26	26	40	40	26	40	26
9	<sup>3)</sup>	30	10	38	10	40	18	18	40	40	18	40	18
10	–	45	28	55	30	60	40	40	60	60	40	60	40
11	<sup>3)</sup>	64	35	78	35	85	50	50	85	85	50	85	50
12	–	64	35	78	38	85	50	50	85	85	50	85	50
13	<sup>3)</sup>	150	112	160	110	190	150	150	190	190	150	190	150
14	–	150	112	160	110	190	150	150	190	190	150	190	150
15	<sup>3)</sup>	140	85	150	75	185	120	120	185	185	120	185	120
16	–	205	135	210	145	265	185	185	265	265	185	265	185
17	<sup>3)</sup>	205	135	210	100	265	185	185	265	265	185	265	185
18	–	205	135	210	100	265	190	190	265	265	190	265	190

Sizes 19 to 26 on request

Permissible additional radial forces  $F_{R2}$  in kN with force application on center of shaft extension, solid shaft with reinforced bearing (V) <sup>1) 2)</sup>

Gear unit size	Type	B2VH, B2VV		H3VH, H3VV, H4VH, H4VV B3VH, B3VV, B4VH, B4VV		H3VH, H3VV, H4VH, H4VV B3VH, B3VV, B4VH, B4VV	
	Version A/B/G/H	C/D	A/C	B/D	A/B/G/H, C/D, A/C, A/C	A/B/G/H, C/D, A/C, A/C	
7	55	45	65	45	65	55	
8	55	45	65	45	65	55	
9	70	50	80	50	80	65	
10	90	65	100	65	95	75	
11	110	80	120	80	135	110	
12	110	80	120	80	135	110	
13	155	120	–	–	210	170	
14	155	120	170	115	210	170	
15	220	165	–	–	280	220	
16	220	165	230	160	280	220	
17	280	200	–	–	360	290	
18	280	210	310	200	370	300	

Sizes 19 to 26 on request

<sup>1)</sup> Table values are minimum values, they apply to  $f_1 \geq 1.2$ . By specifying the angle of application and the direction of rotation, usually significantly higher additional forces can be allowed. Consultation is required.

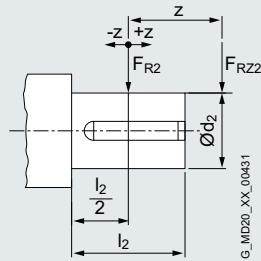
<sup>2)</sup> For force application outside of center of shaft extension, see table on next page.

<sup>3)</sup> On request.

## Connection dimensions

### Permissible additional radial forces at low speed shaft (LSS)

Types H1 to H4, B2 to B4

**Overview** (continued)**Force application outside of center of shaft extension**

$F_{RZ2}$  Permissible external radial force  
 $F_{R2}$  For permissible additional radial force, see table  
 $k$  Force application factor according to table

$$F_{RZ2} = F_{R2} \times k$$

## Force application factor k

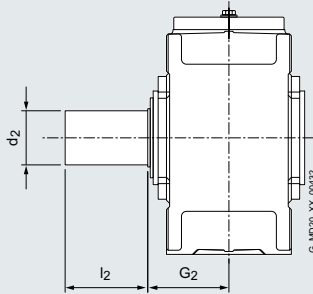
Gear unit size	Distance z in mm														
	-200	-150	-100	-75	-50	-25	0	25	50	75	100	150	200	250	300
<b>4</b>	–	–	–	–	1.17	1.08	1.00	0.86	0.76	0.68	0.62	0.52	0.44	–	–
<b>5+6</b>	–	–	–	1.22	1.14	1.06	1.00	0.88	0.79	0.72	0.66	0.56	0.49	0.43	–
<b>7+8</b>	–	–	–	1.19	1.12	1.06	1.00	0.89	0.81	0.74	0.68	0.58	0.51	0.46	0.41
<b>9+10</b>	–	–	1.22	1.15	1.10	1.05	1.00	0.90	0.82	0.76	0.70	0.61	0.54	0.48	0.44
<b>11+12</b>	–	–	1.18	1.13	1.08	1.04	1.00	0.91	0.84	0.78	0.73	0.64	0.57	0.51	0.47
<b>13+14</b>	–	1.24	1.15	1.11	1.07	1.03	1.00	0.92	0.86	0.80	0.75	0.67	0.60	0.55	0.50
<b>15+16</b>	–	1.20	1.12	1.09	1.06	1.03	1.00	0.93	0.87	0.82	0.77	0.69	0.63	0.58	0.53
<b>17+18</b>	1.25	1.17	1.11	1.08	1.05	1.03	1.00	0.94	0.88	0.84	0.79	0.72	0.66	0.60	0.56

## Connection dimensions

Solid shaft without parallel key

Types H2C., H3C., H4C., B3C., B4C.

### Overview



Gear unit size	Types H2C., H3C., H4C., B3C., B4C.			
	$d_2$	$l_2$	$G_2$	Coupling size RFK
4	95 h8	125	140	115
5	115 h8	125	165	115 <sup>*)</sup>
				140
6	115 h8	125	165	115 <sup>*)</sup>
				140
7	140 h8	155	195	140 <sup>*)</sup>
				170
8	140 h8	155	195	140 <sup>*)</sup>
				170
9	140 h8	155	235	140 <sup>*)</sup>
				170
10	170 h8	155	235	170 <sup>*)</sup>
				210
				211
11	170 h8	155	270	170 <sup>*)</sup>
				210
				211
12	210 h8	170	270	210 <sup>*)</sup>
				211
				250
13	210 h8	170	335	210 <sup>*)</sup>
				211
				250
14	210 h8	170	335	210 <sup>*)</sup>
				211
				250
15	250 h8	190	380	250 <sup>*)</sup>
				270
16	250 h8	190	380	250 <sup>*)</sup>
				270

<sup>\*)</sup> Design of the coupling to  $1.5 \times T_{2N}$  when connecting the motor via motor lantern and supporting the drive train on the gear unit housing (dimension  $n_3$  from Chapter 4). This also applies to the drive train mounted on the rocker, as long as the support distance does not fall below  $1.7 \times n_3$ . Otherwise, the coupling design applies to twice the nominal output torque  $T_{2N}$ .

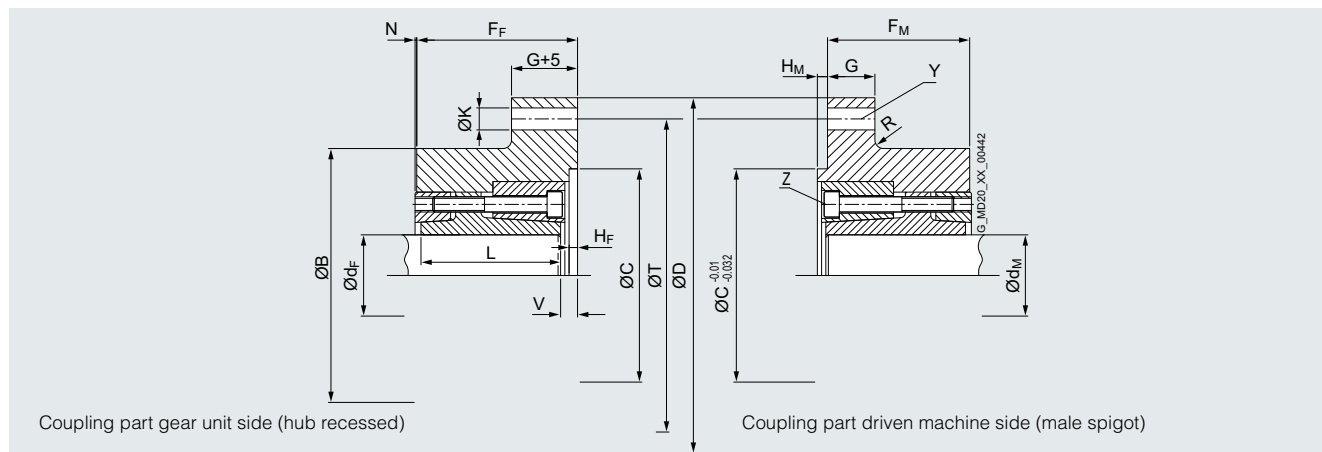
With identical flange connection dimensions, different coupling half sizes can be combined with each other. The maximum restrictions of the smaller coupling part then apply. Additionally occurring reaction forces in the coupling must be checked for admissibility in individual cases.

## Connection dimensions

### Solid shaft without parallel key

#### Flange coupling with zero-backlash dual taper clamping connection (RFK)

### Overview



Tru-Line flange coupling RFK	Shaft d <sub>p</sub> or d <sub>M</sub>	Max. transferable torque M	Dimensions in mm																Connecting screws Y <sup>1)</sup>		Clamping bolts Z		Weight
			Hub recessed	Male spigot	mm	B	C	D	F <sub>F</sub>	F <sub>M</sub>	G	H <sub>F</sub>	H <sub>M</sub>	K	L	N	R	T	V <sup>2)</sup>	V <sup>3)</sup>	Tightening torque Nm	Z	
115 F	115 M	min. 95 max. 115	28000 35500	230	300	400	115	105	30	10	6	25	100	8	40	350	17.5	16	8×M24×100	1020	7×M14	229	47 45
140 F	140 M	min. 115 max. 140	45000 56000	270	300	400	115	105	30	10	6	25	100	8	20	350	17.5	15.3	8×M24×100	1020	10×M14	229	55 51
170 F	170 M	min. 140 max. 170	90000 112000	330	300	560	145	135	35	12	8	32	128	10	30	480	20	17.9	18×M30×120	2030	11×M16	354	112 105
210 F	210 M	min. 170 max. 210	160000 200000	390	300	560	145	135	35	12	8	32	128	10	20	480	20	16.6	18×M30×120	2030	16×M16	354	137 125
211 F	211 M	min. 170 max. 210	160000 200000	430	350	630	145	135	40	12	8	32	128	10	20	550	On req.	On req.	18×M30×130	2030	16×M16	354	160 148
250 F	250 M	min. 210 max. 250	265000 315000	470	350	630	160	150	40	12	8	32	140	10	10	550	18	13.8	18×M30×130	2030	14×M20	692	199 183
270 F	270 M	min. 250 max. 270	375000 400000	510	550	710	180	170	40	12	8	32	158	10	30	630	On req.	On req.	24×M30×130	2030	16×M20	692	259 249
290 F	290 M	min. 270 max. 290	450000 490000	550	550	710	180	170	40	12	8	32	158	10	15	630	On req.	On req.	24×M30×130	2030	18×M20	692	286 275

### Ordering information

Position of the Article No.	1 to 5	6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.	2LA06 . 0 . . . . .												-Z
<b>Flange coupling with zero-backlash dual taper clamping connection (RFK)</b>													
Hub recessed (F)	3												
Male spigot (M)	4												
Both coupling parts with the same size	7												
Size 115		0	A	A	0	0	0	A	A	0			
Size 140		1	D	W	6	5	4	G	D	2			
Size 170		2	H	U	4	1	8	N	G	4			
Size 210		3	M	S	1	7	3	U	K	6			
Size 211		3	M	S	2	1	4	H	Q	2			
Size 250		4	R	P	8	3	8	B	N	8			
Size 270		5	V	M	6	0	3	H	S	1			
Size 290		7	A	K	3	5	7	P	V	3			
For use at low temperatures down to -45 °C											G	3	9
1 set of connecting screws											G	5	0
Bore diameter coupling part driven machine shaft (male spigot)											Y	4	0
Bore diameter coupling part gear unit side (hub recessed)											Y	4	1

The following coupling parts are combinable:  
 115 ↔ 140    211 ↔ 250  
 170 ↔ 210    270 ↔ 290

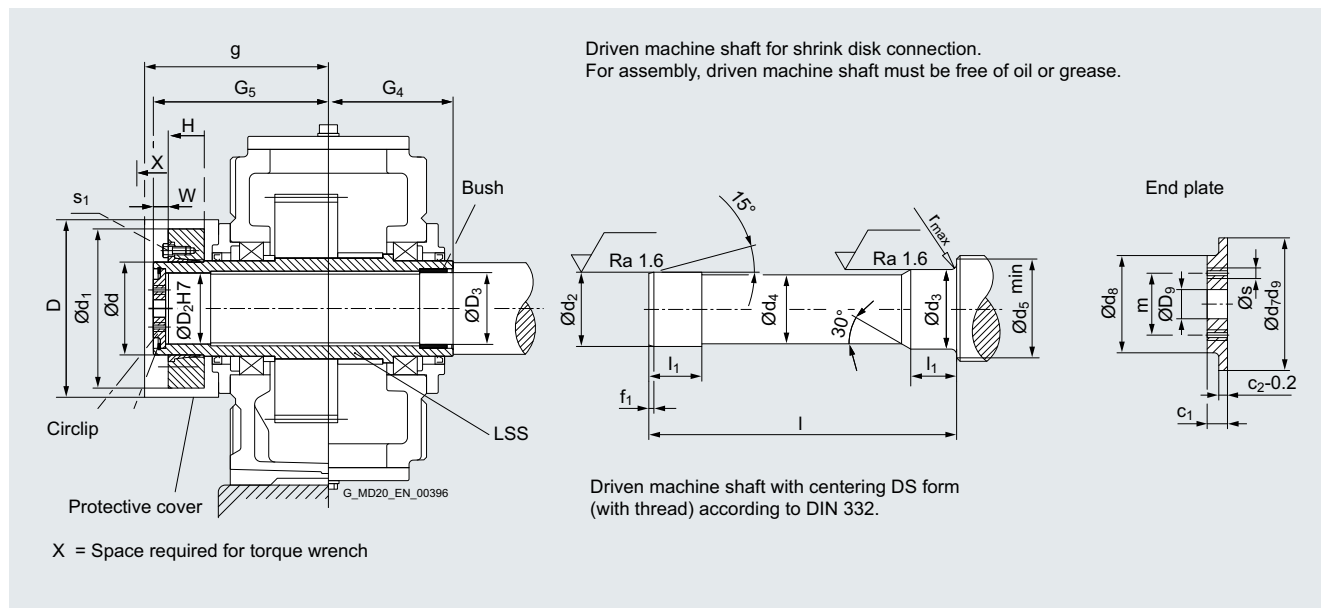
- 1) Connecting screws Y according to EN ISO 4014 strength class 10.9 or 12.9 for RFK 50 on reference diameter T.
- 2) not mounted
- 3) mounted

## Connection dimensions

Hollow shaft with shrink disk

Types H2D., H3D., H4D., B3D. and B4D.

### Overview



Gear unit size	Driven machine shaft <sup>1)</sup>															End plate			Circlip
	Dimensions in mm																		
	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>5</sub>	f <sub>1</sub>	l	l <sub>1</sub>	r	c <sub>1</sub>	c <sub>2</sub>	d <sub>7</sub>	d <sub>8</sub>	D <sub>9</sub>	m	s	Quantity	DIN 472		
4	85 g6	85 h6	84.5	95	4	326	48	2	17	7	90	70	22	50	M 8	2	90 × 3		
5	100 g6	100 h6	99.5	114	5	383	53	2	20	8	105	80	26	55	M 10	2	105 × 4		
6	110 g6	110 h6	109.5	124	5	383	58	3	20	8	115	85	26	60	M 10	2	115 × 4		
7	120 g6	120 h6	119.5	134	5	453	68	3	20	8	125	90	26	65	M 12	2	125 × 4		
8	130 g6	130 h6	129.5	145	6	458	73	3	20	8	135	100	26	70	M 12	2	135 × 4		
9	140 g6	145 m6	139.5	160	6	539	82	4	23	10	150	110	33	80	M 12	2	150 × 4		
10	150 g6	155 m6	149.5	170	6	559	92	4	23	10	160	120	33	90	M 12	2	160 × 4		
11	165 f6	170 m6	164.5	185	7	644	112	4	23	10	175	130	33	90	M 12	2	175 × 4		
12	180 f6	185 m6	179.5	200	7	649	122	4	23	10	190	140	33	100	M 16	2	190 × 4		
13	190 f6	195 m6	189.5	213	7	789	137	5	23	10	200	150	33	110	M 16	2	200 × 4		
14	210 f6	215 m6	209.5	233	8	784	147	5	28	14	220	170	33	130	M 16	2	220 × 5		
15	230 f6	235 m6	229.5	253	8	899	157	5	28	14	240	180	39	140	M 16	2	240 × 5		
16	240 f6	245 m6	239.5	263	8	899	157	5	28	14	250	190	39	150	M 20	2	250 × 5		
17	250 f6	260 m6	249.5	278	8	982	177	5	30	14	265	200	39	150	M 20	2	265 × 5		
18	280 f6	285 m6	279.5	306	9	982	177	5	30	14	290	210	39	160	M 20	2	290 × 5		
19	285 f6	295 m6	284.5	316	9	1100	187	5	32	15	300	220	39	170	M 24	2	300 × 5		
20	310 f6	315 m6	309.5	336	9	1100	187	5	32	15	320	230	39	180	M 24	2	320 × 6		
21	330 f6	335 m6	329	358	9	1160	205	5	40	20	340	250	45	190	M 24	2	340 × 6		
22	340 f6	345 m6	339	368	9	1170	215	5	40	20	350	260	45	200	M 24	2	350 × 6		
23	370 f6	375 m6	369	405	10	1294	215	6	40	20	380	280	45	210	M 30	2	380 × 6		
24	390 f6	395 m6	389	425	10	1314	235	6	40	20	400	300	45	220	M 30	2	400 × 6		
25	410 f6	415 m6	409	445	10	1455	235	6	45	20	420	320	45	240	M 30	2	420 × 7		
26	430 f6	435 m6	429	465	10	1485	260	6	45	20	440	340	45	250	M 30	2	440 × 7		
27	460 f6	465 m6	459	495	10	1630	260	6	45	20	470	360	45	260	M 30	2	470 × 7		
28	470 f6	475 m6	469	505	10	1650	270	6	45	20	480	380	45	270	M 30	2	480 × 7		

<sup>1)</sup> Material of driven machine shaft C60N or higher strength. Shrink disk on machine side on request.



## Connection dimensions

### Hollow shaft with shrink disk

Types H2D., H3D., H4D., B3D. and B4D.

#### Overview (continued)

Gear unit size	Hollow shaft				Shrink disk <sup>1)</sup>				Screw	Protective cover	
	Dimensions in mm									D	g
	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	d	d <sub>1</sub>	H	W			
4	85	85	140	205	110	185	51	20	M 12	235	225
5	100	100	165	240	125	215	55	20	M 12	275	260
6	110	110	165	240	140	230	61	20	M 14	285	255
7	120	120	195	280	155	263	64	23	M 14	330	305
8	130	130	195	285	165	290	70	23	M 16	340	305
9	140	145	235	330	175	300	71	28	M 16	360	355
10	150	155	235	350	200	340	87	28	M 16	395	365
11	165	170	270	400	220	370	103	30	M 20	435	420
12	180	185	270	405	240	405	107	30	M 20	450	420
13	190	195	335	480	260	430	119	30	M 20	500	505
14	210	215	335	480	280	460	132	30	M 20	525	505
15	230	235	380	550	300	485	140	35	M 24	575	575
16	240	245	380	550	320	520	140	35	M 24	595	575
17	250	260	415	600	340	570	155	35	M 24	615	630
18	280	285	415	600	360	590	162	35	M 24	635	625
19	285	295	465	670	380	640	166	40	M 27	685	695
20	310	315	465	670	390	650	166	40	M 27	705	695
21	330	335	490	715	420	670	186	45	M 27	760	750
22	340	345	490	725	440	720	196	45	M 27	800	760
23	370	375	540	800	460	760	200	65	M 27	820	835
24	390	395	540	820	480	800	218	65	M 30	850	855
25	410	415	610	895	500	835	218	75	M 30	870	930
26	430	435	610	925	530	865	245	76	M 30	920	960
27	460	465	680	1000	560	920	245	76	M 30	960	1035
28	470	475	680	1020	590	960	265	78	M 30	1010	1060

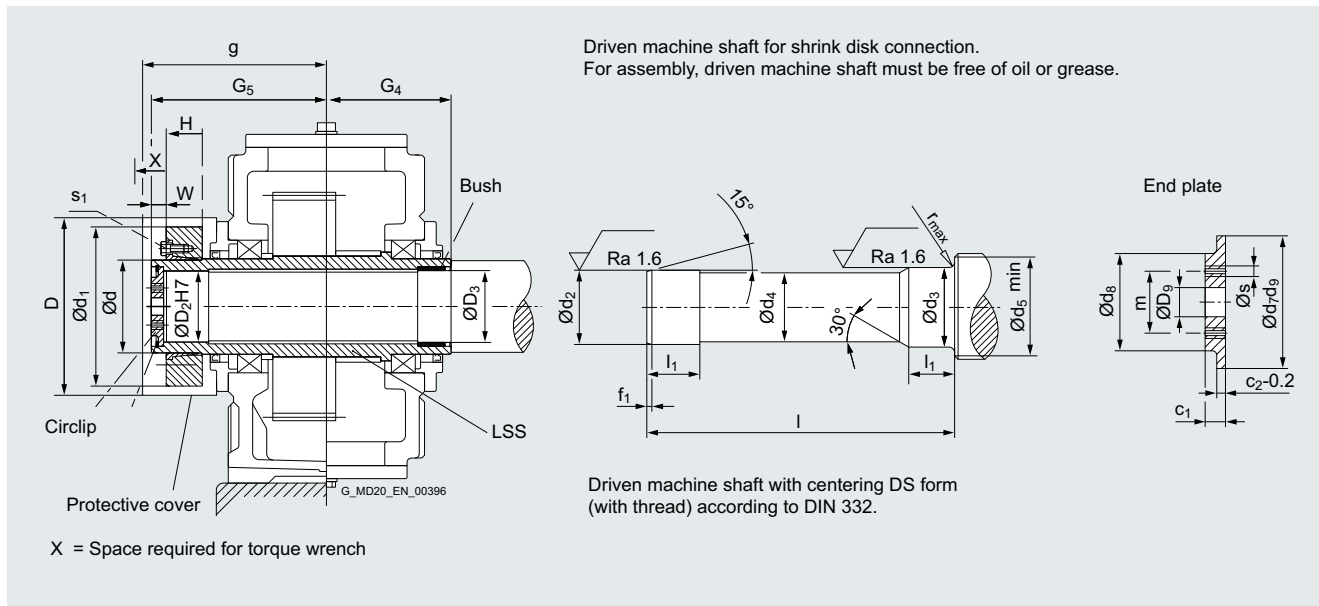
<sup>1)</sup> Shrink disk is not included in scope of supply. Please order separately, if required. In case of order, shrink disk is supplied loose.

## Connection dimensions

### Hollow shaft with shrink disk

#### Type B2D.

#### Overview



Gear unit size	Driven machine shaft <sup>1)</sup>															End plate		Circlip
	Dimensions in mm																	
	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>5</sub>	f <sub>1</sub>	l	l <sub>1</sub>	r	c <sub>1</sub>	c <sub>2</sub>	d <sub>7</sub>	d <sub>8</sub>	D <sub>9</sub>	m	s	Quantity	DIN 472	
4	85 g6	85 h6	84.5	95	4	386	48	2	17	7	90	70	22	50	M 8	2	90 × 3	
5	100 g6	100 h6	99.5	114	5	453	53	2	20	8	105	80	26	55	M 10	2	105 × 4	
6	110 g6	110 h6	109.5	124	5	453	58	3	20	8	115	85	26	60	M 10	2	115 × 4	
7	120 g6	120 h6	119.5	134	5	533	68	3	20	8	125	90	26	65	M 12	2	125 × 4	
8	130 g6	130 h6	129.5	145	6	538	73	3	20	8	135	100	26	70	M 12	2	135 × 4	
9	140 g6	145 m6	139.5	160	6	609	82	4	23	10	150	110	33	80	M 12	2	150 × 4	
10	150 g6	155 m6	149.5	170	6	629	92	4	23	10	160	120	33	90	M 12	2	160 × 4	
11	165 f6	170 m6	164.5	185	7	744	112	4	23	10	175	130	33	90	M 12	2	175 × 4	
12	180 f6	185 m6	179.5	200	7	749	122	4	23	10	190	140	33	100	M 16	2	190 × 4	
14	210 f6	215 m6	209.5	233	8	894	147	5	28	14	220	170	33	130	M 16	2	220 × 5	
16	240 f6	245 m6	239.5	263	8	1039	157	5	28	14	250	190	39	150	M 20	2	250 × 5	
18	280 f6	285 m6	279.5	306	9	1177	177	5	30	14	290	210	39	160	M 20	2	290 × 5	

Gear unit size	Hollow shaft				Shrink disk <sup>2)</sup>					Screw	Protective cover	
	Dimensions in mm											
	D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	d	d <sub>1</sub>	H	W		D	g	
4	85	85	170	235	110	185	51	20	M 12	235	255	
5	100	100	200	275	125	215	55	20	M 12	275	290	
6	110	110	200	275	140	230	61	20	M 14	285	285	
7	120	120	235	320	155	263	64	23	M 14	330	345	
8	130	130	235	325	165	290	70	23	M 16	340	345	
9	140	145	270	365	175	300	71	28	M 16	360	390	
10	150	155	270	385	200	340	87	28	M 16	395	400	
11	165	170	320	450	220	370	103	30	M 20	435	470	
12	180	185	320	455	240	405	107	30	M 20	450	470	
14	210	215	390	535	280	460	132	30	M 20	525	555	
16	240	245	450	620	320	520	140	35	M 24	595	645	
18	280	285	510	700	360	590	162	35	M 24	635	725	

<sup>1)</sup> Material of driven machine shaft C60N or higher strength. Shrink disk on machine side on request.

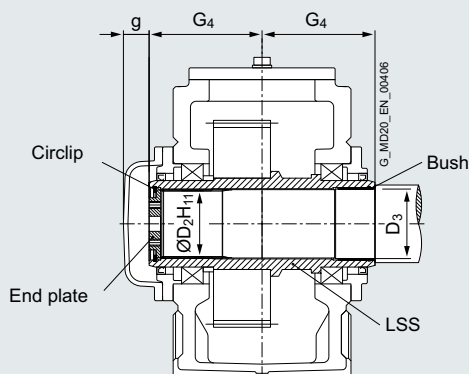
<sup>2)</sup> Shrink disk is not included in scope of supply. Please order separately, if required. In case of order, shrink disk is supplied loose.

## Connection dimensions

### Hollow shaft with spline according to DIN 5480

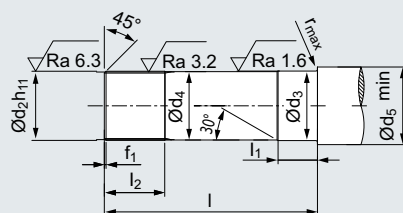
Types H2K., H3K., H4K., B3K. and B4K.

#### Overview

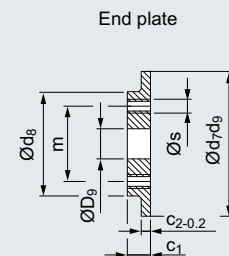


End plate and circclip are supplied by us

Driven machine shaft for connection via involute splines, to be greased on assembly



Driven machine shaft with central hole DS form (with thread) according to DIN 332



Gear unit size	External spline DIN 5480	Driven machine shaft <sup>1)</sup>								
		Dimensions in mm								
		d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>5</sub>	f <sub>1</sub>	l	l <sub>1</sub>	l <sub>2</sub>	r
5	W 95 × 3 × 30 × 8f	94.4	100 h6	93	114	3	308	53	90	2
6	W 95 × 3 × 30 × 8f	94.4	110 h6	93	124	3	308	58	90	3
7	W120 × 3 × 38 × 8f	119.4	120 h6	118	134	3	368	68	105	3
8	W120 × 3 × 38 × 8f	119.4	130 h6	118	145	3	368	73	105	3
9	W140 × 3 × 45 × 8f	139.4	145 m6	138	160	3	444	82	125	4
10	W140 × 3 × 45 × 8f	139.4	155 m6	138	170	3	444	92	125	4
11	W170 × 5 × 32 × 8f	169	170 m6	168	185	5	514	112	150	4
12	W170 × 5 × 32 × 8f	169	185 m6	168	200	5	514	122	150	4
13	W190 × 5 × 36 × 8f	189	195 m6	188	213	5	644	137	180	5
14	W190 × 5 × 36 × 8f	189	215 m6	188	233	5	644	147	180	5
15	W220 × 5 × 42 × 8f	219	235 m6	218	253	5	728	157	200	5
16	W220 × 5 × 42 × 8f	219	245 m6	218	263	5	728	157	200	5
17	W250 × 5 × 48 × 8f	249	260 m6	248	278	5	796	177	215	5
18	W250 × 5 × 48 × 8f	249	285 m6	248	306	5	796	177	215	5
19 – 22	On request									

Gear unit size	End plate								Circclip DIN 472	Hollow shaft				Screw
	Dimensions in mm									D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	g	
	c <sub>1</sub>	c <sub>2</sub>	d <sub>7</sub>	d <sub>8</sub>	D <sub>9</sub>	m	s	Quantity						
5	20	8	105	80	26	55	M10	2	105 × 4	89	100	165	40	M24
6	20	8	105	80	26	55	M10	2	105 × 4	89	110	165	40	M24
7	20	8	125	90	26	65	M12	2	125 × 4	114	120	195	40	M24
8	20	8	125	90	26	65	M12	2	125 × 4	114	130	195	40	M24
9	23	10	150	110	33	80	M12	2	150 × 4	134	145	235	45	M30
10	23	10	150	110	33	80	M12	2	150 × 4	134	155	235	45	M30
11	23	10	175	130	33	90	M12	2	175 × 4	160	170	270	45	M30
12	23	10	175	130	33	90	M12	2	175 × 4	160	185	270	45	M30
13	23	10	200	150	33	110	M16	2	200 × 4	180	195	335	45	M30
14	23	10	200	150	33	110	M16	2	200 × 4	180	215	335	45	M30
15	28	14	240	180	39	140	M16	2	240 × 5	210	235	380	60	M36
16	28	14	240	180	39	140	M16	2	240 × 5	210	245	380	60	M36
17	30	14	265	200	39	150	M20	2	265 × 5	240	260	415	60	M36
18	30	14	265	200	39	150	M20	2	265 × 5	240	285	415	60	M36
19 – 22	On request													

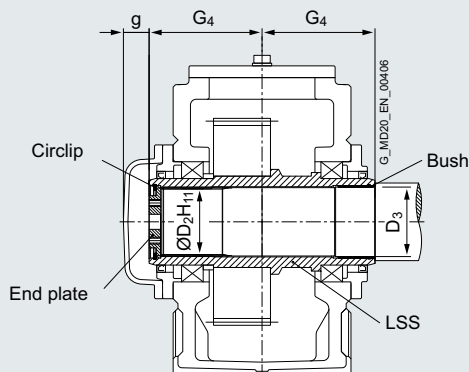
<sup>1)</sup> Material of driven machine shaft C60N or higher strength.

## Connection dimensions

Hollow shaft with spline according to DIN 5480

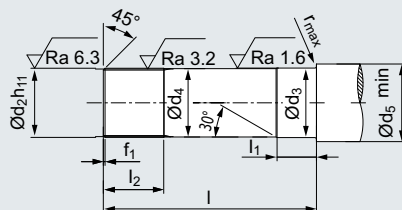
### Type B2K.

#### Overview



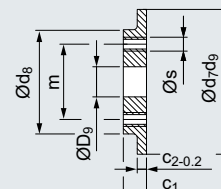
End plate and circclip are supplied by us

Driven machine shaft for connection via involute splines, to be greased on assembly



Driven machine shaft with central hole DS form (with thread) according to DIN 332

End plate



Gear unit size	External spline DIN 5480	Driven machine shaft <sup>1)</sup>								
		Dimensions in mm								
		d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>5</sub>	f <sub>1</sub>	l	l <sub>1</sub>	l <sub>2</sub>	r
5	W 95 × 3 × 30 × 8f	94.4	100 h6	93	114	3	378	53	90	2
6	W 95 × 3 × 30 × 8f	94.4	110 h6	93	124	3	378	58	90	3
7	W120 × 3 × 38 × 8f	119.4	120 h6	118	134	3	448	68	105	3
8	W120 × 3 × 38 × 8f	119.4	130 h6	118	145	3	448	73	105	3
9	W140 × 3 × 45 × 8f	139.4	145 m6	138	160	3	514	82	125	4
10	W140 × 3 × 45 × 8f	139.4	155 m6	138	170	3	514	92	125	4
11	W170 × 5 × 32 × 8f	169	170 m6	168	185	5	614	112	150	4
12	W170 × 5 × 32 × 8f	169	185 m6	168	200	5	614	122	150	4
14	W190 × 5 × 36 × 8f	189	215 m6	188	233	5	754	147	180	5
16	W220 × 5 × 42 × 8f	219	245 m6	218	263	5	868	157	200	5
18	W250 × 5 × 48 × 8f	249	285 m6	248	306	5	986	177	215	5

Gear unit size	End plate								Circclip DIN 472	Hollow shaft				Screw
	Dimensions in mm									D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	g	
	c <sub>1</sub>	c <sub>2</sub>	d <sub>7</sub>	d <sub>8</sub>	D <sub>9</sub>	m	s	Quantity						
5	20	8	105	80	26	55	M10	2	105 × 4	89	100	200	40	M24
6	20	8	105	80	26	55	M10	2	105 × 4	89	110	200	40	M24
7	20	8	125	90	26	65	M12	2	125 × 4	114	120	235	40	M24
8	20	8	125	90	26	65	M12	2	125 × 4	114	130	235	40	M24
9	23	10	150	110	33	80	M12	2	150 × 4	134	145	270	45	M30
10	23	10	150	110	33	80	M12	2	150 × 4	134	155	270	45	M30
11	23	10	175	130	33	90	M12	2	175 × 4	160	170	320	45	M30
12	23	10	175	130	33	90	M12	2	175 × 4	160	185	320	45	M30
14	23	10	200	150	33	110	M16	2	200 × 4	180	215	390	45	M30
16	28	14	240	180	39	140	M16	2	240 × 5	210	245	450	60	M36
18	30	14	265	200	39	150	M20	2	265 × 5	240	285	510	60	M36

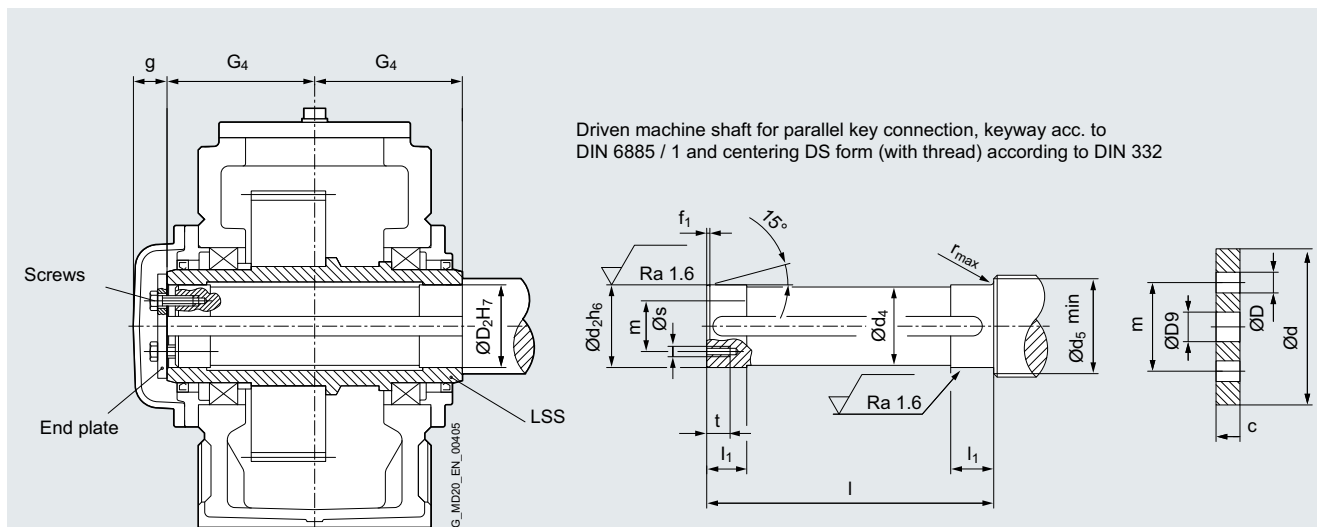
<sup>1)</sup> Material of driven machine shaft C60N or higher strength.

## Connection dimensions

Hollow shaft with keyway according to DIN 6885/1

Types H2H., H3H., H4H., B3H. and B4H.

### Overview



Gear unit size	Driven machine shaft <sup>1)</sup>									
	Dimensions in mm									
	d <sub>2</sub>	d <sub>4</sub>	d <sub>5</sub>	f <sub>1</sub>	l	l <sub>1</sub>	r	s	t	
4	80	79.5	88	4	278	35	1.2	M10	18	
5	95	94.5	105	5	328	40	1.6	M10	18	
6	105	104.5	116	5	328	45	1.6	M10	18	
7	115	114.5	126	5	388	50	2.5	M12	20	
8	125	124.5	136	6	388	55	2.5	M12	20	
9	135	134.5	147	6	467	60	2.5	M12	20	
10	150	149.5	162	6	467	65	2.5	M12	20	
11	165	164.5	177	7	537	70	2.5	M16	28	
12	180	179.5	192	7	537	75	2.5	M16	28	
13	190	189.5	206	7	667	80	3	M16	28	
14	210	209.5	226	8	667	85	3	M16	28	
15	230	229.5	248	8	756	100	3	M20	38	
16	240	239.5	258	8	756	100	3	M20	38	
17	250	249.5	270	8	826	110	4	M20	38	
18	275	274.5	295	9	826	120	4	M20	38	

Gear unit size	End plate					Screw		Hollow shaft		
	Dimensions in mm					Size	Quantity	D <sub>2</sub>	G <sub>4</sub>	g
	c	D	D <sub>9</sub>	d	m					
4	10	11	22	100	60	M10 × 25	2	80	140	35
5	10	11	26	120	70	M10 × 25	2	95	165	40
6	10	11	26	120	70	M10 × 25	2	105	165	40
7	12	13.5	26	140	80	M12 × 30	2	115	195	40
8	12	13.5	26	150	85	M12 × 30	2	125	195	40
9	12	13.5	33	160	90	M12 × 30	2	135	235	45
10	12	13.5	33	185	110	M12 × 30	2	150	235	45
11	15	17.5	33	195	120	M16 × 40	2	165	270	45
12	15	17.5	33	220	130	M16 × 40	2	180	270	45
13	18	17.5	33	230	140	M16 × 40	2	190	335	45
14	18	17.5	33	250	160	M16 × 40	2	210	335	45
15	25	22	39	270	180	M20 × 55	4	230	380	60
16	25	22	39	280	180	M20 × 55	4	240	380	60
17	25	22	39	300	190	M20 × 55	4	250	415	60
18	25	22	39	330	210	M20 × 55	4	275	415	60

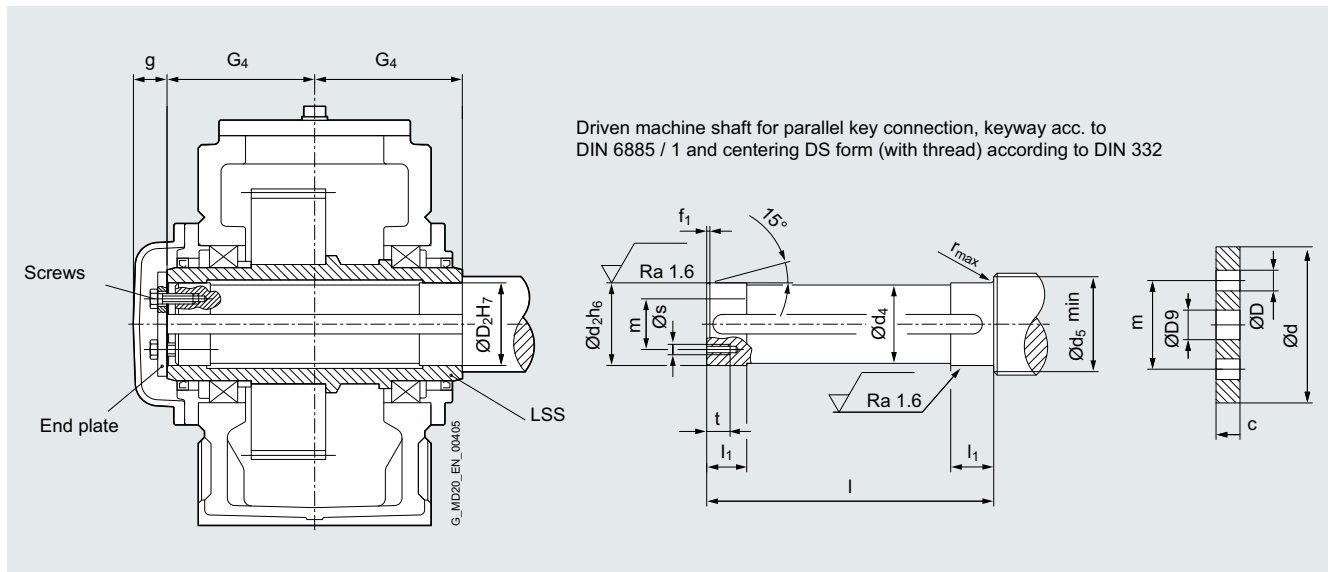
<sup>1)</sup> Material of driven machine shaft C60N or higher strength. Parallel key is not included in scope of supply. Please order separately, if required.

## Connection dimensions

Hollow shaft with keyway according to DIN 6885/1

### Type B2H.

#### Overview



Gear unit size	Driven machine shaft <sup>1)</sup>									
	Dimensions in mm									
	$d_2$	$d_4$	$d_5$	$f_1$	$l$	$l_1$	$r$	$s$	$t$	
4	80	79.5	88	4	338	35	1.2	M10	18	
5	95	94.5	105	5	398	40	1.6	M10	18	
6	105	104.5	116	5	398	45	1.6	M10	18	
7	115	114.5	126	5	468	50	1.6	M12	20	
8	125	124.5	136	6	468	55	2.5	M12	20	
9	135	134.5	147	6	537	60	2.5	M12	20	
10	150	149.5	162	6	537	65	2.5	M12	20	
11	165	164.5	177	7	637	70	2.5	M16	28	
12	180	179.5	192	7	637	75	2.5	M16	28	
14	210	209.5	226	8	777	85	3	M16	28	
16	240	239.5	258	8	896	100	3	M20	38	
18	275	274.5	295	9	1016	120	4	M20	38	

Gear unit size	End plate					Screw		Hollow shaft		
	Dimensions in mm					Size	Quantity	$D_2$	$G_4$	$g$
	$c$	$D$	$D_9$	$d$	$m$					
4	10	11	22	100	60	M10 × 25	2	80	170	35
5	10	11	26	120	70	M10 × 25	2	95	200	40
6	10	11	26	120	70	M10 × 25	2	105	200	40
7	12	13.5	26	140	80	M12 × 30	2	115	235	40
8	12	13.5	26	150	85	M12 × 30	2	125	235	40
9	12	13.5	33	160	90	M12 × 30	2	135	270	45
10	12	13.5	33	185	110	M12 × 30	2	150	270	45
11	15	17.5	33	195	120	M16 × 40	2	165	320	45
12	15	17.5	33	220	130	M16 × 40	2	180	320	45
14	18	17.5	33	250	160	M16 × 40	2	210	390	45
16	25	22	39	280	180	M20 × 55	4	240	450	60
18	25	22	39	330	210	M20 × 55	4	275	510	60

<sup>1)</sup> Material of driven machine shaft C60N or higher strength. Parallel key is not included in scope of supply. Please order separately, if required.

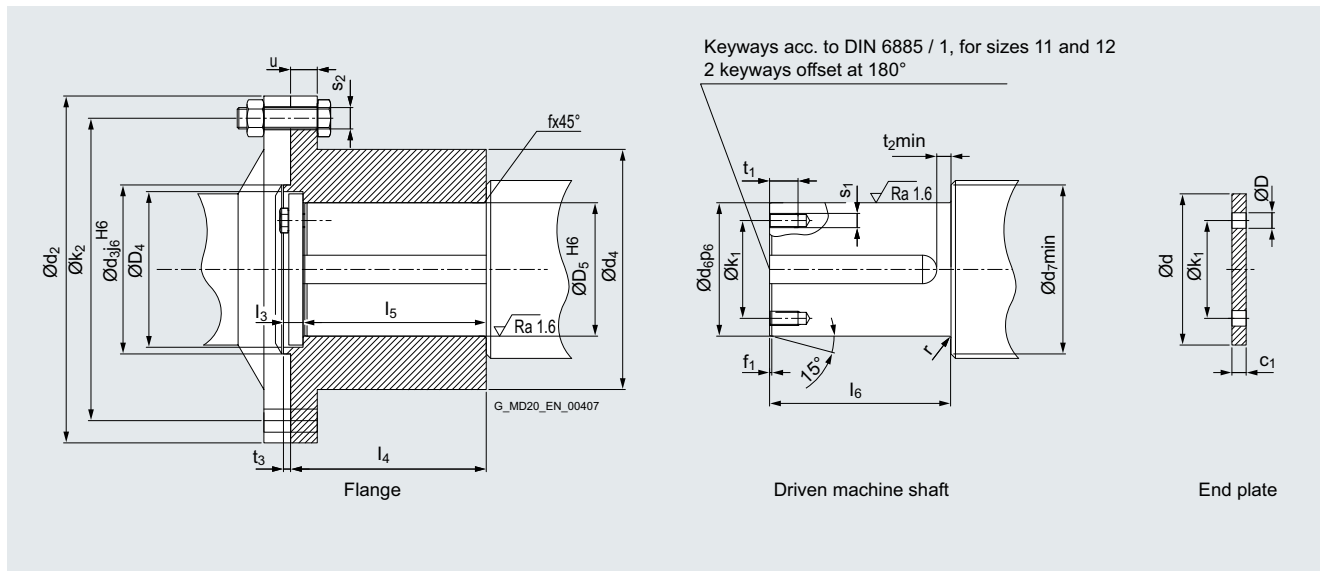
## Connection dimensions

### Counter flanges for flanged shaft

Types H2F., H3F., H4F., B2F., B3F. and B4F.

#### Overview

#### Sizes 5 to 12



Gear unit size	Flange														Screw <sup>1)</sup>		
	Dimensions in mm														Size	Quantity	Nm
	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	D <sub>4</sub>	D <sub>5</sub>	f	k <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	s <sub>2</sub>	t <sub>3</sub>	u				
5	300	150	190	135	110	2.5	260	16	175	167	M20	8	25	M20 × 70	16	610	
6	320	160	210	145	120	2.5	280	22	185	171	M20	8	25	M20 × 70	18	610	
7	370	180	230	160	135	2.5	320	21	220	207	M24	8	30	M24 × 90	16	1050	
8	390	190	270	175	150	2.5	340	22	220	206	M24	8	30	M24 × 90	18	1050	
9	430	220	290	195	160	4.0	380	22	250	238	M24	10	38	M24 × 100	20	1050	
10	470	240	210	220	180	4.0	420	22	250	238	M24	10	38	M24 × 100	22	1050	
11	510	260	340	235	200	4.0	450	22	290	278	M30	10	42	M30 × 120	18	2100	
12	540	280	360	255	210	4.0	480	22	290	278	M30	10	42	M30 × 120	22	2100	

Gear unit size	Driven machine shaft										End plate				Screw		
	Dimensions in mm										Size	Quantity	kg				
	d <sub>6</sub>	d <sub>7</sub>	f <sub>1</sub>	k <sub>1</sub>	l <sub>6</sub>	r	s <sub>1</sub>	t <sub>1</sub>	t <sub>2</sub>	c <sub>1</sub>	d	D	k <sub>1</sub>				
5	110	122	2.5	80	165	2	M12	28	7.5	10	130	13.5	80	M12 × 35	4	35	
6	120	132	2.5	95	169	2	M16	32	7.5	14	140	17.5	95	M16 × 45	4	45	
7	135	147	2.5	95	205	2	M16	32	16	14	155	17.5	95	M16 × 45	4	65	
8	150	162	2.5	110	204	2	M16	32	16	16	170	17.5	110	M16 × 45	4	85	
9	160	176	4.0	110	235	3	M16	32	16	16	190	17.5	110	M16 × 45	4	115	
10	180	196	4.0	145	235	3	M20	38	16	18	215	22	145	M20 × 55	4	130	
11	200	216	4.0	145	275	3	M20	38	16	18	230	22	145	M20 × 55	4	175	
12	210	230	4.0	160	275	3	M20	38	16	18	250	22	160	M20 × 55	4	200	

The parallel key is not included in scope of supply. Please order separately, if required.

<sup>1)</sup> Screws according to DIN 931, material 10.9; nuts according to DIN 934, material 10.

<sup>2)</sup> Tightening torque of the flange connection screw. Materials of flanges and driven machine shafts C60N or higher strength.

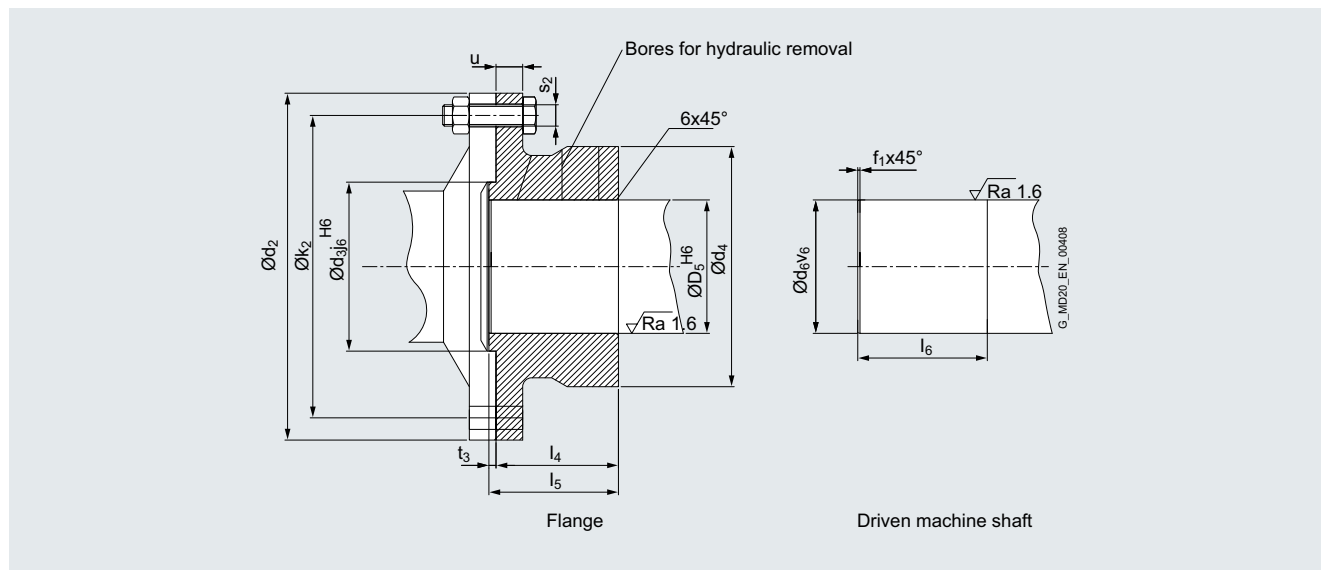
## Connection dimensions

### Counter flanges for flanged shaft

Types H2F., H3F., H4F., B2F., B3F. and B4F.

#### Overview

Sizes 13 to 22



Gear unit size	Flange										
	Dimensions in mm										
	$d_2$	$d_3$	$d_4$	$D_5^{2)}$	$k_2$	$l_4$	$l_5$	$s_2$	$t_3$	$u$	
13	580	310	390	240	500	310	322	M30	12	48	
14	620	310	425	260	540	345	357	M30	12	48	
15	710	360	460	280	630	365	380	M30	15	55	
16	740	360	480	300	660	395	410	M30	15	55	
17	750	410	520	320	660	420	436	M36	16	60	
18	800	410	520	340	710	450	466	M36	16	60	
19 – 22	On request										

Gear unit size	Screw <sup>1)</sup>			Driven machine shaft			Weight kg
	Size	Quantity	Nm TA	Dimensions in mm			
				$d_6$	$f_1$	$l_6$	
13	M30 × 130	20	2100	240	3	322	235
14	M30 × 130	24	2100	260	3	357	300
15	M30 × 140	28	2100	280	3	380	400
16	M30 × 140	30	2100	300	4	410	450
17	M36 × 160	24	3560	320	4	436	540
18	M36 × 160	26	3560	340	4	466	650
19 – 22	On request						

Flange connections with keyway on request.

Materials of flanges and driven machine shafts C60N or higher strengths.

When fitting, heat counter flange to 190 °C, driven machine shaft to 20 °C.

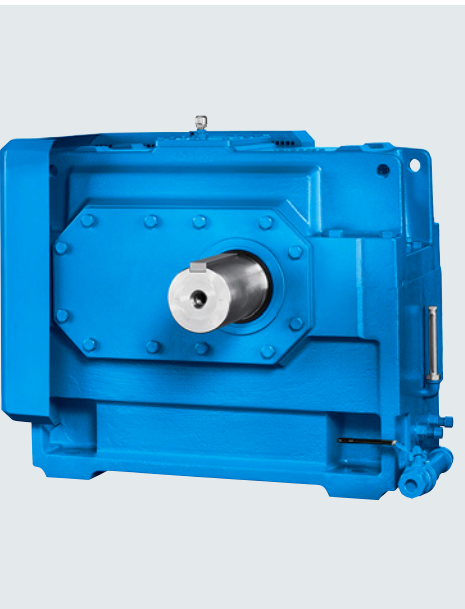
<sup>1)</sup> Screws according to DIN 931, material 10.9; nuts according to DIN 934, material 10.

<sup>2)</sup> Other diameters on request. (Smaller drilled holes D5 are possible for foot-mounted design.)

<sup>3)</sup> Dimension  $d_3 j_6$  after shrink fitting.



## Options for operation



<b>10/2</b>	<b>Shaft seals</b>
10/2	Radial shaft seal
10/2	Taconite seal
10/5	Labyrinth seal
10/5	TacoLab seal
10/5	Special seals
<b>10/8</b>	<b>Oil circulation lubrication</b>
10/8	Forced lubrication
<b>10/11</b>	<b>Cooling</b>
10/11	Fan and cooling coil
10/12	Cooling coil
10/16	Additional cooling options
<b>10/19</b>	<b>Heating</b>
10/19	Heating elements
<b>10/23</b>	<b>Backstop</b>
<b>10/26</b>	<b>Information about oil, information about installation</b>
<b>10/27</b>	<b>Oil level indicator, housing material, oil drain valve, breather</b>
<b>10/28</b>	<b>Explosion protection ATEX</b>
<b>10/30</b>	<b>Corrosion protection</b>
<b>10/31</b>	<b>Coating system</b>
<b>10/31</b>	<b>Color selection</b>
<b>10/32</b>	<b>Test reports, further information</b>
<b>10/33</b>	<b>Test run, acceptances</b>
<b>10/34</b>	<b>Devices and filters</b>

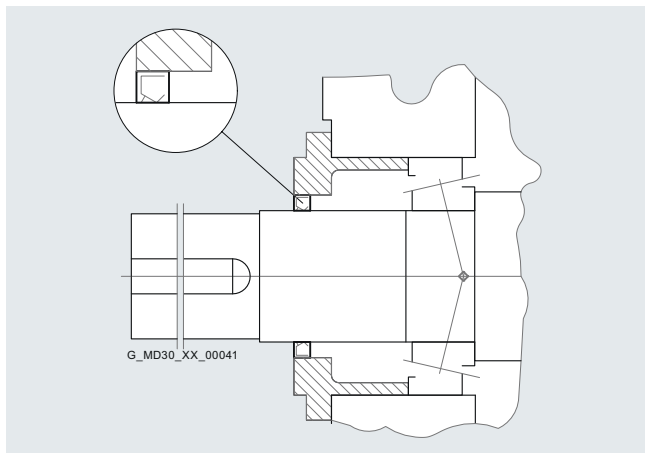
## Options for operation

### Shaft seals

#### Radial shaft seal, Taconite seal

##### Overview

##### Radial shaft seal



Radial shaft seals are suitable for low to average operating speeds. They can be used for all types and sizes.

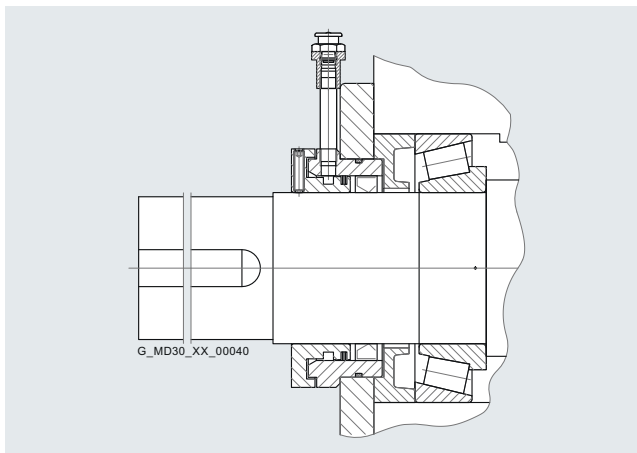
In a normal scenario, only one radial shaft seal is installed at each sealing point. At the hollow shaft sealing point on the driven machine side and on the bottom low speed shaft for a vertical mounting position, a second, back-up radial shaft seal is installed as a standard measure.

Upon request by the customer, a 2nd radial shaft seal can be installed at other sealing points.

Other features are:

- Wearing seal, however, easy to maintain
- Local heat development on sealing lip; therefore, adequate lubrication (cooling) required
- Commercially available product with the highest qualification requirements for suppliers
- Radial shaft seal material FKM - fluororubber (commercial name VITON), NBR for very low ambient temperatures
- Design with low oil level on request
- Optionally, a hardened bushing can be installed under the radial shaft seal. This can alternatively be switched to the entire shaft if run-in grooves have formed due to the radial shaft seal.
- Optionally, dry-running protection can be provided for vertically mounted gear units if shaft extensions are located at the top. For gear units that are vertically mounted in explosive atmospheres, either a Taconite seal or dry-running protection must be installed on shaft journals that are located on the top.

##### Taconite seal

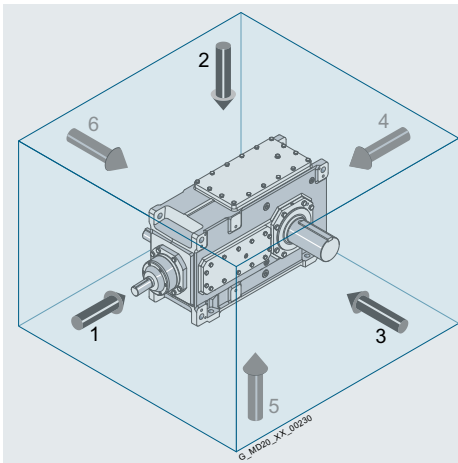


With the Taconite seal, the desired level of operational safety in dirty or dusty environments can be achieved. A labyrinth system filled with special grease protects the radial shaft seal against harmful environmental influences such as dust and solar irradiation.

The attaching of motor lanterns can be considered as quasi dust-proof. B-gear units can nevertheless be designed with an optional, additional Taconite seal on the high speed shaft. No Taconite seal is offered for H gear units with motor lanterns due to the quasi dust-proof design.

Variants of Taconite seals	Application area	Remarks
<b>E</b>	All high speed shafts, with or without fans	<ul style="list-style-type: none"> <li>• Labyrinth that can be regreased</li> <li>• Observe dimensions for H3 and H4</li> </ul>
<b>F</b>	Low speed shaft Type S: Solid shaft Type V: Reinforced solid shaft Type F: Flanged shaft Type C: Solid shaft without keyway	<ul style="list-style-type: none"> <li>• Labyrinth that can be regreased</li> </ul> <p>For flanged shaft only size 8 or larger</p>
<b>F-F</b>	Low speed shaft Type H: Hollow shaft with keyway Type K: Hollow shaft with spline according to DIN 5480 Type D: Hollow shaft for shrink disk	<ul style="list-style-type: none"> <li>• Labyrinth that can be regreased on both sides, including protective cover as touch protection on non-drive end of gear unit</li> </ul>
<b>F-H</b>	Low speed shaft Type H: Hollow shaft with keyway Type K: Hollow shaft with spline according to DIN 5480	<ul style="list-style-type: none"> <li>• Labyrinth that can be regreased on drive end, dust-proof protective cover on opposite side</li> </ul>
<b>F-K</b>	Low speed shaft Type D: Hollow shaft for shrink disk	<ul style="list-style-type: none"> <li>• Labyrinth that can be regreased on drive end, dust-proof protective cover on opposite side</li> </ul>

**Selection and ordering data**



Irrespective of the mounting position of the gear unit, the face designations "right" and "left" always refer to the horizontal mounting position with the view on side 1.  
Side 2 is on top.  
Mounting cover on top (2),  
looking at drive front face (1):  
Side 3 = right  
Side 6 = left

**Article No. supplement, 14th position**

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.	<b>2LP302</b>	.	.	.	.	.	.	.	.	■	.	.	-Z ■ ■ ■
<b>Sealing single-side high speed shaft (HSS)</b>													
Radial shaft seal													A
Dual radial shaft seal													B
Taconite E													E
Radial shaft seal on hardened bushing													J
Radial shaft seal with dry-running protection													K
<b>Sealing double-extended high speed shaft (HSS)</b>													
Side 3: Radial shaft seal/Side 6: Radial shaft seal													Z P 0 A
Side 3: Dual radial shaft seal/Side 6: Dual radial shaft seal													Z P 0 B
Side 3: Taconite E/Side 6: Taconite E													Z P 0 E
Side 3: Radial shaft seal/Side 6: Taconite E													Z P 1 A
Side 3: Taconite E/Side 6: Radial shaft seal													Z P 1 B
Side 3: Radial shaft seal on hardened bushing/ Side 6: Radial shaft seal with dry-running protection													Z P 1 C
Side 3: Radial shaft seal/Side 6: Radial shaft seal with dry-running protection													Z P 1 D
Side 3: Taconite E/Side 6: Radial shaft seal with dry-running protection													Z P 1 E
Side 3: Radial shaft seal on hardened bearing bushing/Side 6: Taconite E													Z P 1 F
Side 3: Special seal, order via order code "Y99"/Side 6: Radial shaft seal													Z P 8 B
Side 3: Radial shaft seal/Side 6: Special seal, order via order code "Y99"													Z P 8 C
Side 3: Special seal, order via order code "Y99"/Side 6: Dual radial shaft seal													Z P 8 D
Side 3: Dual radial shaft seal/Side 6: Special seal, order via order code "Y99"													Z P 8 E
Side 3: Special seal, order via order code "Y99"/Side 6: Taconite E													Z P 8 F
Side 3: Taconite E/Side 6: Special seal, order via order code "Y99"													Z P 8 G
Side 3: Special seal, order via order code "Y99"/ Side 6: Radial shaft seal with dry-running protection													Z P 8 H
Side 3: Radial shaft seal on hardened bushing/ Side 6: Special seal, order via order code "Y99"													Z P 8 J
Side 3: Special seal, order via order code "Y99"/ Side 6: Special seal, order via order code "Y99"													Z P 8 K

## Options for operation

## Shaft seals

## Radial shaft seal, Taconite seal

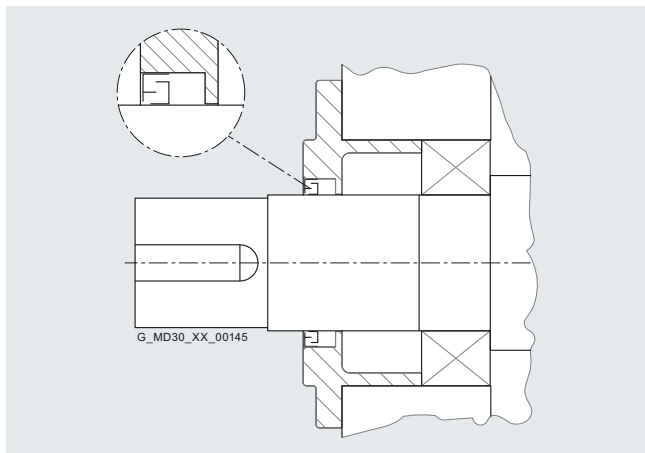
## Selection and ordering data

## Article No. supplement, 15th and 16th position

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code	
	Article No.	2LP302	.	.	.	.	.	.	.	.	.	.	-Z ■ ■ ■ ■	
<b>Sealing low speed shaft (LSS)</b>														
Radial shaft seal													A	
Dual radial shaft seal													B	
Taconite F													E	
Taconite F-F													F	
Taconite F-H													G	
Taconite F-K													H	
Radial shaft seal on hardened bushing													J	
Radial shaft seal with dry-running protection													K	
<b>Sealing double-extended low speed shaft (LSS)</b>														
Side 3: Radial shaft seal/Side 6: Radial shaft seal													Z	Q 0 A
Side 3: Dual radial shaft seal/Side 6: Dual radial shaft seal													Z	Q 0 B
Side 3: Labyrinth/Side 6: Labyrinth													Z	Q 0 C
Side 3: Labyrinth with V-seal/Side 6: Labyrinth with V-seal													Z	Q 0 D
Side 3: Taconite F/Side 6: Taconite F													Z	Q 0 E
Side 3: Radial shaft seal/Side 6: Taconite F													Z	Q 1 A
Side 3: Taconite F/Side 6: Radial shaft seal													Z	Q 1 B
Side 3: Radial shaft seal on hardened bushing/ Side 6: Radial shaft seal with dry-running protection													Z	Q 1 C
Side 3: Radial shaft seal/Side 6: Radial shaft seal with dry-running protection													Z	Q 1 D
Side 3: Special seal, order via order code "Y99"/Side 6: Radial shaft seal													Z	Q 8 B
Side 3: Radial shaft seal/Side 6: Special seal, order via order code "Y99"													Z	Q 8 C
Side 3: Special seal, order via order code "Y99"/Side 6: Dual radial shaft seal													Z	Q 8 D
Side 3: Dual radial shaft seal/Side 6: Special seal, order via order code "Y99"													Z	Q 8 E
Side 3: Special seal, order via order code "Y99"/Side 6: Taconite F													Z	Q 8 F
Side 3: Taconite F/Side 6: Special seal, order via order code "Y99"													Z	Q 8 G
Side 3: Special seal, order via order code "Y99"/ Side 6: Radial shaft seal with dry-running protection													Z	Q 8 H
Side 3: Radial shaft seal on hardened bushing/ Side 6: Special seal, order via order code "Y99"													Z	Q 8 J
Side 3: Special seal, order via order code "Y99"/ Side 6: Special seal, order via order code "Y99"													Z	Q 8 K

Overview

**Labyrinth seal**



Labyrinth seals are especially suitable for higher operating speeds. They can only be used with gear units of type H1SH and H2SH.

For special protection when the gear unit does not run, the labyrinth seal can be combined with a V-ring seal.

Other features are:

- Contact-free and therefore wear-free
- No heat generated locally, so maintenance-free
- Small installation space

The following criteria must be taken into account when selecting labyrinth seals:

- For use with stationary drives only (e.g. not for traveling gears)
- With dip lubrication or oil circulation lubrication only (other lubrication variants available on request)
- Extremely dusty installation locations or those subject to polluted water hazards must be avoided
- Shaft planes must be horizontal
- Refer to table for minimum input speed  $n_1$  required for dip lubrication see table, page 10/6. If the input speed is lower than the minimum input speed  $n_1$ , it may be possible to use the labyrinth seal in combination with oil circulation lubrication. Radial shaft seals must otherwise be provided.
- To achieve a preservation life in excess of 6 months, the combination of labyrinth seal with additional V-ring seal must be used.
- Use of the combination of labyrinth seal with additional V-ring seal is recommended for applications with frequent down-times.

**TacoLab seal**

The combination seal made up of an oil and dust labyrinth is a combination of Taconite and labyrinth seals. A labyrinth seal is installed in place of the radial shaft seal ring of the Taconite seal.

The advantages of the labyrinth seal are supplemented here by usability in very dusty environments.

**Oil retaining tube**

The oil retaining tube is a seal which keeps the shaft outlet of the low speed shaft (LSS) absolutely free of oil. Forced lubrication is absolutely required for this seal. There are further limitations regarding ratios and design. The low speed shaft (LSS) for the

oil retaining tube that is vertically brought out downward is designed with an internal, contact-free and wear-free shaft seal. A radial shaft seal makes up the outside end of the seal.

Ordering information:

When ordering forced lubrication with an oil retaining tube, the Article No. must be supplemented with **-Z**.

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z</b> ■ ■ ■

<b>Oil supply</b>												
Forced lubrication, with oil retaining tube												<b>H 2 9</b>

**Special seals (please contact Flender)**

In addition to the sealing solutions shown in the tables, other solutions are offered in the selection tool for direct selection. Many other types of seals are possible upon request, e.g. Taconite seal on a hardened bushing, sliding ring seals, radial shaft seals for increased internal gear unit pressure (e.g. during inerting). "Special seal" must be selected for this and the seal must be described with "Z" at the 14th or 15th position of the Article No. with the corresponding order code "P8A" or "Q8A" and order code "Y99" with plain text.

Double-extended shafts can also be implemented with different seals on the respective shaft journals. The selection of seals can be defined in the configurator.

**Shaft seals H1 - H4, B2 - B4**

Type	Size	Radial shaft seal		Labyrinth seal <sup>3)</sup>		Taconite seal	
		HSS	LSS	HSS <sup>2)</sup>	LSS	HSS	LSS
<b>H1SH</b>	3 - 17	H	H	H	H	H <sup>2)</sup>	H
<b>H2..</b>	4 - 18	H / V	H / V	H	-	H / V <sup>2)</sup>	H / V
<b>H3..</b>	5 - 18	H / V	H / V	-	-	H / V <sup>1)2)</sup>	H / V
<b>H4..</b>	7 - 18	H / V	H / V	-	-	H / V <sup>1)2)</sup>	H / V
<b>B2..</b>	4 - 18	H / V	H / V	-	-	H / V	H / V
<b>B3..</b>	4 - 18	H / V	H / V	-	-	H / V	H / V
<b>B4..</b>	5 - 18	H / V	H / V	-	-	H / V	H / V
<b>All</b>	19 - 28	On request					

H = Horizontal  
V = Vertical  
HSS = High speed shaft  
LSS = Low speed shaft

1) Observe changed dimensions, see Chapter 4.  
2) Not in combination with motor lantern.  
3) Optionally with V-ring seal.

## Options for operation

## Shaft seals

## Labyrinth seal/TacoLab seal/Special seals

## Overview (continued)

## Minimum speeds for labyrinth seals

$i_N$	Gear unit size																	Type	
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19 - 28		
	Input speeds $n_1$ in rpm																		
1.25	x	-	x	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	H1
1.4	x	-	x	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	
1.6	740	-	515	-	425	-	370	-	305	-	260	-	-	-	-	-	-	-	
1.8	810	-	570	-	460	-	395	-	325	-	285	-	-	-	-	-	-	-	
2	860	-	610	-	490	-	420	-	350	-	305	-	255	-	-	-	-	-	
2.24	920	-	660	-	550	-	455	-	375	-	330	-	275	-	-	-	-	-	
2.5	1020	-	710	-	595	-	495	-	405	-	355	-	295	-	-	-	-	-	
2.8	1100	-	775	-	635	-	530	-	445	-	390	-	320	-	290	-	-	-	
3.15	1190	-	850	-	690	-	600	-	480	-	430	-	350	-	315	-	-	-	
3.55	1300	-	935	-	755	-	650	-	530	-	470	-	380	-	345	-	O. r.	-	
4	1430	-	1025	-	835	-	720	-	580	-	515	-	420	-	380	-	O. r.	-	
4.5	1575	-	1145	-	905	-	770	-	640	-	575	-	475	-	425	-	O. r.	-	
5	1730	-	1205	-	990	-	850	-	730	-	605	-	525	-	455	-	O. r.	-	
5.6	1910	-	1340	-	1095	-	955	-	765	-	670	-	580	-	505	-	O. r.	-	
6.3	-	x	x	-	x	-	515	-	x	-	370	-	305	-	260	-	O. r.	-	
7.1	-	x	810	-	660	-	570	-	460	-	395	-	325	305	385	260	O. r.	-	
8	-	1020	860	x	705	x	610	x	490	x	420	370	350	325	305	385	O. r.	-	
9	-	1080	920	x	760	660	660	x	550	x	455	395	375	350	330	305	O. r.	-	
10	-	1190	1020	860	820	705	710	610	595	x	495	420	405	375	355	330	O. r.	-	
11.2	-	1280	1100	920	885	760	775	660	635	550	530	455	445	405	390	355	O. r.	-	
12.5	-	1435	1190	1020	955	820	850	710	690	595	600	495	480	445	430	390	O. r.	-	
14	-	1560	1300	1100	1090	885	935	775	755	635	650	530	530	480	470	430	O. r.	-	
16	-	1715	1430	1190	1200	955	1025	850	835	690	720	600	580	530	515	470	O. r.	-	
18	-	1890	1575	1300	1320	1090	1145	935	905	755	770	650	640	580	575	515	O. r.	-	
20	-	-	1730	1430	1450	1200	1205	1025	990	835	850	720	730	640	605	575	O. r.	-	
22.4	-	-	1910	1575	1530	1320	1340	1145	1095	905	-	770	-	730	-	605	O. r.	-	
25	-	-	-	1730	-	1450	-	1205	-	990	-	850	-	-	-	-	O. r.	-	
28	-	-	-	1910	-	1530	-	1340	-	1095	-	-	-	-	-	-	O. r.	-	

x Labyrinths not possible

O. r. On request

When the minimum input speed  $n_1$  is undershot, radial shaft seals must be provided.

## Selection and ordering data

## Article No. supplement, 14th position

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
	Article No.	2LP302	.	.	.	.	.	.	.	.	.	.	-Z ■ ■ ■
<b>Sealing single-side high speed shaft (HSS)</b>													
Labyrinth													C
Labyrinth with V-seal													D
Special seal, order via order code "Y99"													Z P 8 A
<b>Sealing double-extended high speed shaft (HSS)</b>													
Side 3: Labyrinth/Side 6: Labyrinth													Z P 0 C
Side 3: Labyrinth with V-seal/Side 6: Labyrinth with V-seal													Z P 0 D
Side 3: Special seal, order via order code "Y99"/Side 6: Radial shaft seal													Z P 8 B
Side 3: Radial shaft seal/Side 6: Special seal, order via order code "Y99"													Z P 8 C
Side 3: Special seal, order via order code "Y99"/Side 6: Dual radial shaft seal													Z P 8 D
Side 3: Dual radial shaft seal/Side 6: Special seal, order via order code "Y99"													Z P 8 E
Side 3: Special seal, order via order code "Y99"/Side 6: Taconite E													Z P 8 F
Side 3: Taconite E/Side 6: Special seal, order via order code "Y99"													Z P 8 G
Side 3: Special seal, order via order code "Y99"/ Side 6: Radial shaft seal with dry-running protection													Z P 8 H
Side 3: Radial shaft seal on hardened bushing/ Side 6: Special seal, order via order code "Y99"													Z P 8 J
Side 3: Special seal, order via order code "Y99"/ Side 6: Special seal, order via order code "Y99"													Z P 8 K

## Article No. supplement, 15th and 16th position

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
	Article No.	2LP302	.	.	.	.	.	.	.	.	.	.	-Z ■ ■ ■
<b>Sealing low speed shaft (LSS)</b>													
Labyrinth													C
Labyrinth with V-seal													D
Special seal, order via order code "Y99"													Z Q 8 A
<b>Sealing double-extended low speed shaft (LSS)</b>													
Side 3: Labyrinth/Side 6: Labyrinth													Z Q 0 C
Side 3: Labyrinth with V-seal/Side 6: Labyrinth with V-seal													Z Q 0 D
Side 3: Special seal, order via order code "Y99"/Side 6: Radial shaft seal													Z Q 8 B
Side 3: Radial shaft seal/Side 6: Special seal, order via order code "Y99"													Z Q 8 C
Side 3: Special seal, order via order code "Y99"/Side 6: Dual radial shaft seal													Z Q 8 D
Side 3: Dual radial shaft seal/Side 6: Special seal, order via order code "Y99"													Z Q 8 E
Side 3: Special seal, order via order code "Y99"/Side 6: Taconite F													Z Q 8 F
Side 3: Taconite F/Side 6: Special seal, order via order code "Y99"													Z Q 8 G
Side 3: Special seal, order via order code "Y99"/ Side 6: Radial shaft seal with dry-running protection													Z Q 8 H
Side 3: Radial shaft seal on hardened bushing/ Side 6: Special seal, order via order code "Y99"													Z Q 8 J
Side 3: Special seal, order via order code "Y99"/ Side 6: Special seal, order via order code "Y99"													Z Q 8 K

## Options for operation

### Oil circulation lubrication

#### Forced lubrication

##### Overview

In the case of higher speeds, forced lubrications may be required to ensure the oil supply.

The oil can be filtered during this. Various filters and filter meshes are available. The filter can positively influence the purity of the oil and thus the suitability of the oil for lubrication and heat dissipation.

Forced lubrication is implemented for monitoring and ensuring the function with a pressure monitor, which outputs a signal when the minimum oil pressure in the pipe system is undershot, so that the drive can be shut down for safety reasons.

Pressure monitor e.g. 0.5 bar falling

Option: double changeover filter (standard from size 13)

Option: double changeover filter (standard from size 13)

Coarse filter

Pump

The foundation must be horizontal and level. Inclined on request. For technical specifications about filters and devices, see page 10/34 onwards. Double changeover filter: Standard from gear unit size 13, for details see page 10/46<sup>3)</sup>.

Forced lubrication  
Type H1.H, gear unit size 5 to 17

Gear unit size	5	7	9	11	13	15	17
Pump <sup>1)</sup> KSW	1	2	2	2	3	3	3
E	283	337	400	430	474	479	525

Coarse filter

Pressure monitor e.g. 0.5 bar falling

Option: double changeover filter (standard from size 13)

Option: double changeover filter (standard from size 13)

Pump

The foundation must be horizontal and level. Inclined on request. For technical specifications about filters and devices, see page 10/34 onwards. Double changeover filter: Standard from gear unit size 13, for details see page 10/46<sup>3)</sup>.

Forced lubrication  
Type H2.H, gear unit size 5 to 18

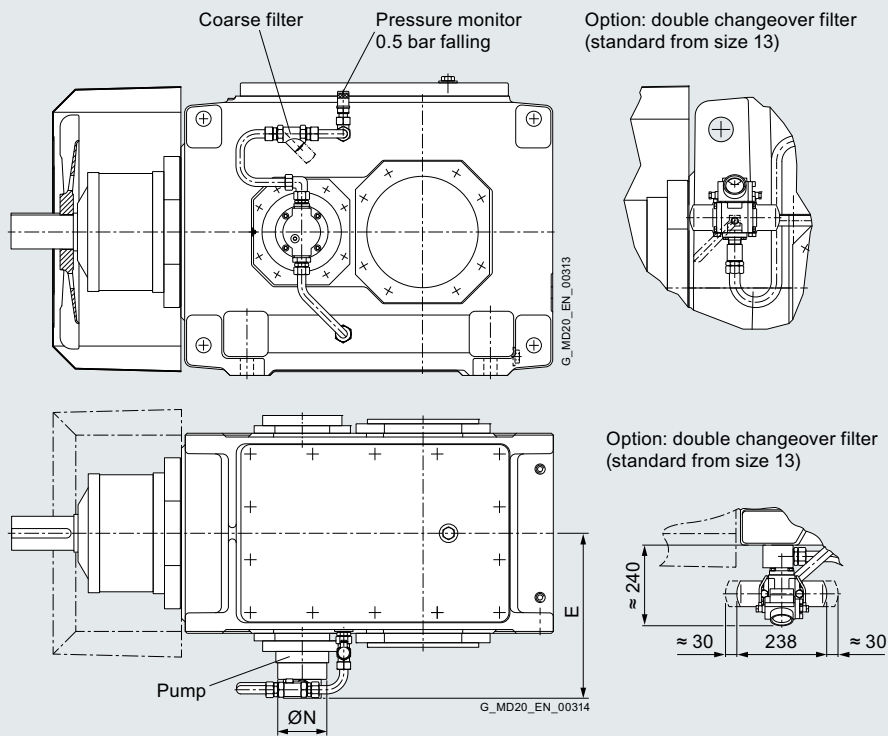
Gear unit size	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Pump <sup>2)</sup> KSW	1								2					
E	264		285		308		344		440		475		500	

<sup>1)</sup> Applies to speeds  $n \geq 900$  to 1800 rpm  
<sup>2)</sup> Applies to speeds  $n \geq 1500$  to 1800 rpm

<sup>3)</sup> Line filter alternatively possible, see page 10/10 and 10/45.



**Overview (continued)**



The foundation must be horizontal and level.  
Inclined on request.  
For technical specifications about filters and devices, [see page 10/34 onwards](#).  
Double changeover filter: Standard from gear unit size 13, for details [see page 10/46<sup>2\)</sup>](#).

Forced lubrication  
Type B2.H, gear unit size 5 to 18

Gear unit size	5/6			7/8			9/10			11/12			13/14		15/16		17/18	
Pump <sup>1)</sup> KSW	1	2	3	1	2	3	1	2	3	1	2	3	2	3	2	3	2	3
Ø N	110	110	140	110	110	140	110	110	140	110	110	140	110	140	110	140	110	140
E	342	342	342	372	372	372	401	401	401	442	442	442	489	489	545	545	606	606

<sup>1)</sup> Valid for the following speeds  
 Sizes 1 and 2  $n_1 \geq 1500$  to 1800 rpm  
 Sizes 3  $n_1 \geq 1200$  to 1800 rpm

<sup>2)</sup> Line filter alternatively possible, [see page 10/10 and 10/45](#).

## Options for operation

### Oil circulation lubrication

#### Forced lubrication

##### Overview (continued)

##### Line filter option (for details see page 10/45)

The standard design of the forced lubrication for gear units up to size 12 is provided with a coarse filter.

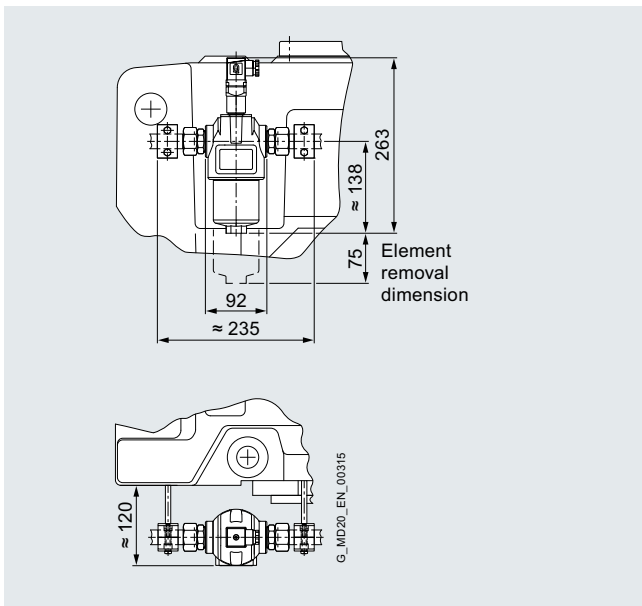
Upon request, the design can have a filter with a filter chamber (line filter) or also with 2 filter chambers (dual changeover filter). These two filters have an electronic contamination indicator.

With a dual changeover filter, the operator can "switch over" from a dirty filter element to a clean one during operation, which makes the gear unit 100% available. In contrast to this, the gear

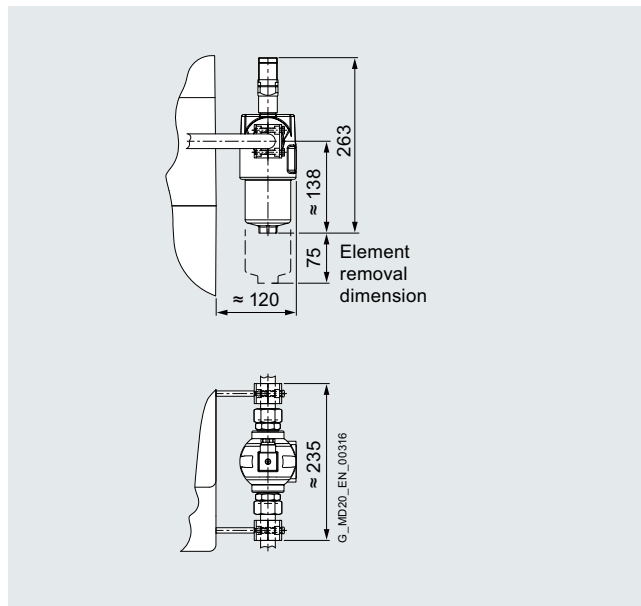
unit must be taken out of operation to clean the coarse filter or line filter.

With size 13 or larger, dual changeover filters are provided as the standard because they can be "manually" switched during operation when they become dirty.

If the availability does not play a role, a single line filter can also be provided here.



Line filter for types H2 and B2



Line filter for type H1

**Overview**

**Fan and cooling coil**

Fans and/or cooling coils can be used for auxiliary cooling.

Fan:

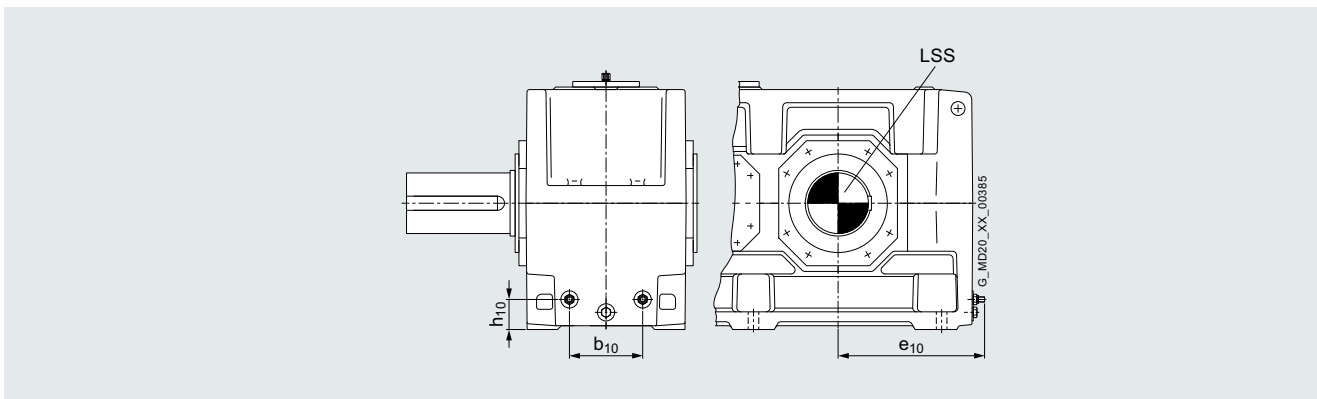
- The standard fan is designed as a radial fan and is mounted on the high speed shaft (HSS). On designs with shaft extensions at both ends (designs **G, H, I**), the fan is mounted either at gear unit side 3 (right) or gear unit side 6 (left).
- An adapted air guide cover ensures optimized air flow on the gear unit and therefore high-performance cooling
- It is possible to attach a fan later  
Please note: For types H3 and H4, the corresponding dimensions for the high speed shaft (HSS) with fan must be specified in advance according to Chapter 4!
- The connection dimensions at the input shaft are changed if a fan is mounted

Cooling coil:

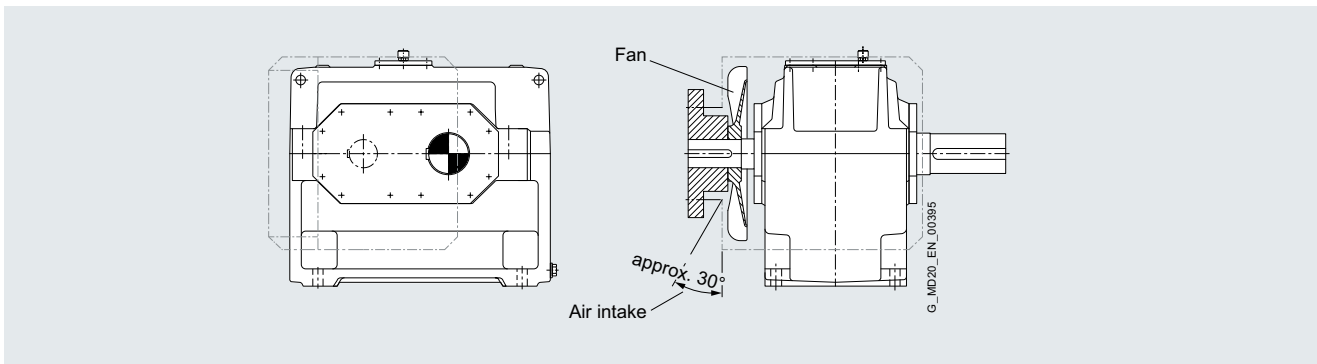
- The cooling coil is connected on gear unit side 4 (front side of low speed shaft (LSS))
- The cooling coil is suitable for freshwater, seawater and brackish water
- See table for connection dimensions
- Water connection: G 1/2"

Parameters for attainment of the specified thermal capacities:

- Volumetric flow of the cooling water in l/min, see tables on page 10/13 on the right. The flow rate can exceed the specified values, but this might result in elevated noise levels.
- Max. permissible cooling water pressure: 8 bar
- See tables on page 10/13.



Cooling coil, connection gear unit side 4 (front side, low speed shaft (LSS))



Fan

Ordering information:

Article No.:	2LP302.-.....-0.A	-Z	Order code
<b>Auxiliary cooling</b>			
Oil cooling: Radial fan, standard version, side 1			<b>H 6 0</b>
Oil cooling: Radial fan, standard version, side 3			<b>H 6 1</b>
Oil cooling: Radial fan, standard version, side 6			<b>H 6 2</b>
Oil cooling: Radial fan, ATEX design, side 1			<b>H 6 3</b>
Oil cooling: Radial fan, ATEX design, side 3			<b>H 6 4</b>
Oil cooling: Radial fan, ATEX design, side 6			<b>H 6 5</b>
Oil cooling: Cooling coil, catalog version, side 4			<b>H 6 6</b>

Article No.:	2LP302.-.....-0.A	-Z	Order code
<b>Auxiliary cooling</b>			
Radial fan, standard version, with dual-side high speed shaft (HSS) opposite drive, side 3			<b>H 6 7</b>
Radial fan, standard version, with dual-side high speed shaft (HSS) opposite drive, side 6			<b>H 6 8</b>
Radial fan, ATEX design, with dual-side high speed shaft (HSS) opposite drive, side 3			<b>H 6 9</b>
Radial fan, ATEX design, with dual-side high speed shaft (HSS) opposite drive, side 6			<b>H 7 0</b>

## Options for operation

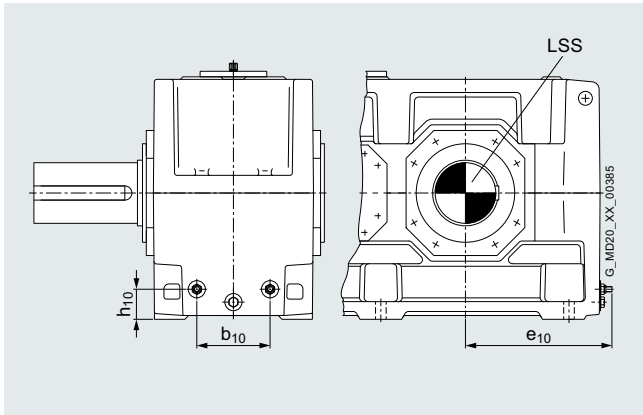
### Cooling

#### Cooling coil

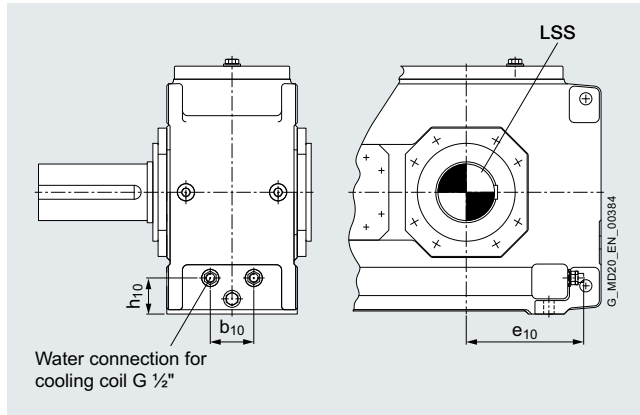
#### Overview

#### Cooling coil suitable for fresh water, seawater and brackish water

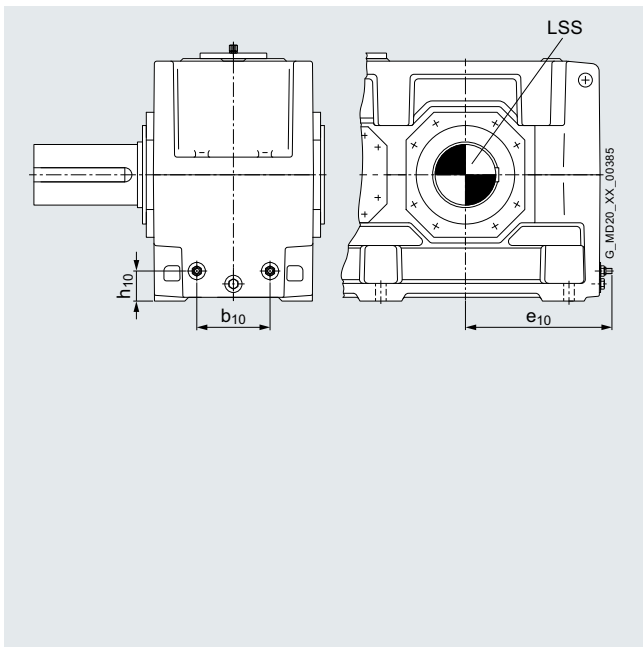
#### Cooling coil for horizontal types



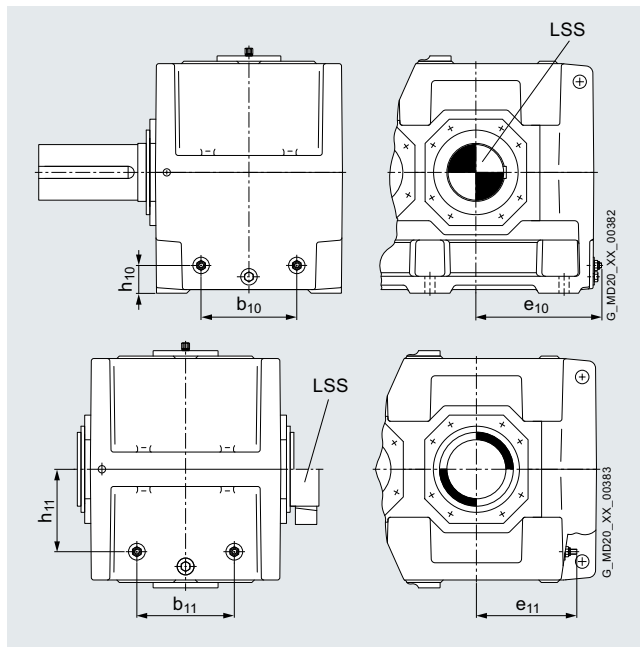
Cooling coil for type H1



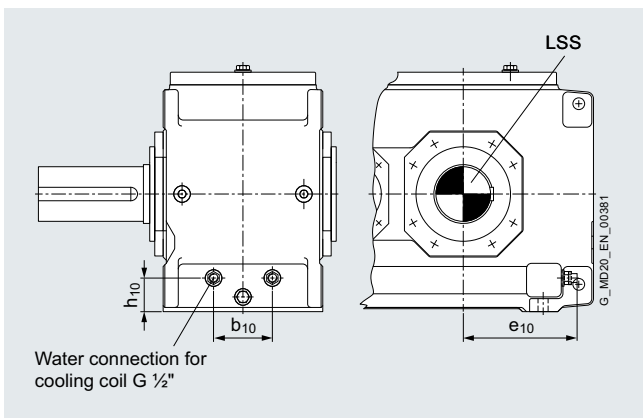
Cooling coil for types H2.H, H3.H, B3.H up to gear unit size 12



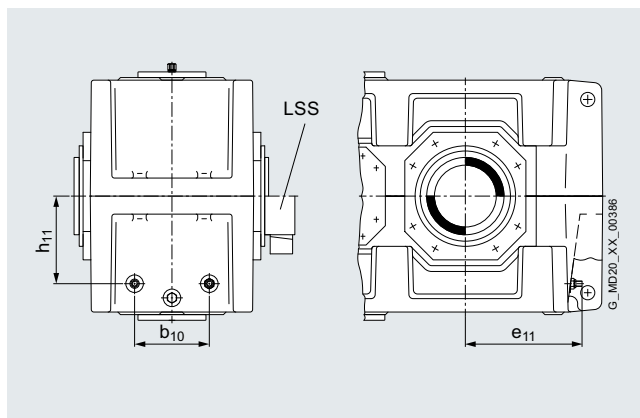
Cooling coil for type H2.H, H3.H, B3.H from gear unit size 13



Cooling coil for type B2 from gear unit size 13 (top B2.H, bottom B2.M)



Cooling coil for type B2 up to gear unit size 12



Cooling coil for type H2.M, H3.M, H4.M from gear unit size 13

## Overview (continued)

## Type H1.H

Size	b <sub>10</sub>	e <sub>10</sub>	h <sub>10</sub>	l/min <sup>1)</sup>
3	48	205	74	4
5	88	270	90	4
7	124	310	135	4
9	116	365	110	8
11	146	425	130	8
13	152	480	150	8
15	172	560	130	8
17	202	600	145	8
19	On request			

## Type H2.H, H2.M

Size	b <sub>10</sub>	e <sub>10</sub>	e <sub>11</sub>	h <sub>10</sub>	h <sub>11</sub>	l/min <sup>1)</sup>
4	34	155	–	60	–	4
5	68	170	–	64	–	4
6	70	215	–	68	–	4
7	100	210	–	83	–	4
8	100	270	–	83	–	4
9	140	245	–	110	–	8
10	100	295	–	95	–	8
11	110	275	–	95	–	8
12	200	360	–	109	–	8
13	252	455	335	116	300	8
14	252	525	405	116	300	8
15	290	535	395	119	335	8
16	290	580	440	119	335	8
17	340	575	425	134	380	8
18	340	635	485	134	380	8
from 19	On request					

## Type H3.H, H3.M

Size	b <sub>10</sub>	e <sub>10</sub>	e <sub>11</sub>	h <sub>10</sub>	h <sub>11</sub>	l/min <sup>1)</sup>
5	70	175	–	60	–	4
6	70	220	–	69	–	4
7	80	210	–	83	–	4
8	80	270	–	83	–	4
9	150	245	–	107	–	4
10	90	295	–	95	–	4
11	200	275	–	115	–	8
12	200	360	–	115	–	8
13	252	460	335	116	300	8
14	252	530	405	116	300	8
15	290	540	395	119	335	8
16	290	585	440	119	335	8
17	300	580	425	134	380	8
18	300	640	485	134	380	8
from 19	On request					

## Type B2.H, B2.M

Size	b <sub>10</sub>	b <sub>11</sub>	e <sub>10</sub>	e <sub>11</sub>	h <sub>10</sub>	h <sub>11</sub>	l/min <sup>1)</sup>
4	74	–	160	–	54	–	4
5	130	–	175	–	62	–	8
6	120	–	220	–	68	–	4
7	140	–	210	–	80	–	8
8	140	–	270	–	80	–	4
9	232	–	245	–	110	–	8
10	150	–	295	–	90	–	8
11	312	–	275	–	115	–	8
12	300	–	360	–	115	–	8
13	324	324	460	335	116	300	8
14	324	324	530	405	116	300	8
15	396	396	540	395	119	335	8
16	396	396	585	440	119	335	8
17	468	324	580	425	134	380	8
18	468	324	640	485	134	380	8

## Type B3.H, B3.M

Size	b <sub>10</sub>	e <sub>10</sub>	e <sub>11</sub>	h <sub>10</sub>	h <sub>11</sub>	l/min <sup>1)</sup>
4	34	155	–	60	–	4
5	68	170	–	64	–	4
6	70	215	–	69	–	4
7	100	210	–	83	–	4
8	100	270	–	83	–	4
9	140	245	–	110	–	8
10	100	295	–	95	–	8
11	110	275	–	95	–	8
12	200	360	–	109	–	8
13	252	455	335	116	300	8
14	252	525	405	116	300	8
15	290	535	395	119	335	8
16	290	580	440	119	335	8
17	340	575	425	134	380	8
18	340	635	485	134	380	8
from 19	On request					

LSS: Low speed shaft

1) Required volume of cooling water, maximum cooling water pressure 8 bar.

## Options for operation

### Cooling

#### Cooling coil

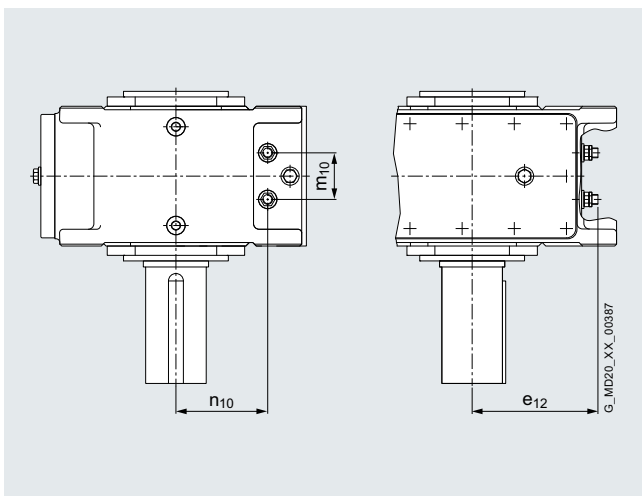
##### Overview (continued)

##### Cooling coil for vertical types

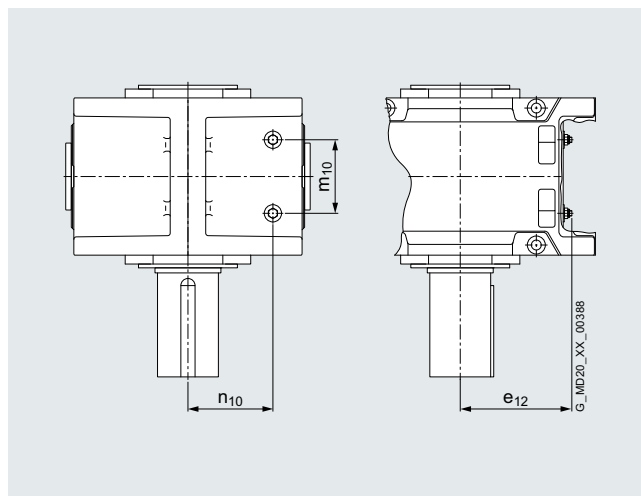
If possible, the cooling coil should be combined with dip lubrication when being installed in a vertically set up gear unit. The following measures should be carried out when using cooling coils in vertically installed gear units in combination with forced lubrication:

- Flow of cool water must be interrupted when gear unit is stopped
- Wet air filter must be used

For constant start and stop operation, cooling coils are only permitted in vertically installed gear units with dip lubrication.



Cooling coil for types H..V, B..V  
up to gear unit size 12



Cooling coil for types H..V, B..V  
from gear unit size 13

## Overview (continued)

## Type H2.V

Size	m <sub>10</sub>	n <sub>10</sub>	e <sub>12</sub>	l/min <sup>1)</sup>
4	34	140	155	4
5	68	166	170	4
6	70	162	215	4
7	100	197	210	4
8	100	197	270	4
9	140	210	245	8
10	100	225	295	8
11	110	285	275	8
12	200	271	360	8
13	252	300	335	8
14	252	300	405	8
15	290	335	395	8
16	290	335	440	8
17	340	380	425	8
18	340	380	485	8
from 19	On request			

## Type H3.V

Size	m <sub>10</sub>	n <sub>10</sub>	e <sub>12</sub>	l/min <sup>1)</sup>
5	70	170	175	4
6	70	161	220	4
7	80	197	210	4
8	80	197	270	4
9	150	213	245	4
10	90	225	295	4
11	200	265	275	8
12	200	265	360	8
13	252	300	335	8
14	252	300	405	8
15	290	340	395	8
16	290	340	440	8
17	300	380	425	8
18	300	380	485	8
from 19	On request			

## Type B2.V

Size	m <sub>10</sub>	n <sub>10</sub>	e <sub>12</sub>	l/min <sup>1)</sup>
4	74	146	160	4
5	130	168	175	8
6	120	162	220	4
7	140	200	210	8
8	140	200	270	4
9	232	210	245	8
10	150	230	295	8
11	312	265	275	8
12	300	265	360	8
13	324	300	335	8
14	324	300	405	8
15	396	345	390	8
16	396	345	435	8
17	324	395	425	8
18	324	395	485	8

## Type B3.V

Size	m <sub>10</sub>	n <sub>10</sub>	e <sub>12</sub>	l/min <sup>1)</sup>
4	34	140	155	4
5	68	166	170	4
6	70	162	215	4
7	100	197	210	4
8	100	197	270	4
9	140	210	245	8
10	100	225	295	8
11	110	285	275	8
12	200	271	360	8
13	252	300	335	8
14	252	300	405	8
15	290	335	395	8
16	290	335	440	8
17	340	380	425	8
18	340	380	485	8
from 19	On request			

## Ordering information:

Article No.:	Order code
	2LP302.-.....-Z ■ ■ ■
<b>Cooling coil</b>	
Oil cooling: Cooling coil, catalog version, side 4	H 6 6

For optimal cooling using cooling water, cooling water flow regulators can be supplied. The valves operate without a supply of auxiliary energy and do not have to be supplied with power.

The volumetric flow is adapted at any time to the current need. The volumetric flow of the cooling water is regulated depending on the sensor temperature.

The cooling water volume regulators are already set to the required setpoint range at the factory.

Cooling water connection when using on a standard cooling coil: G $\frac{1}{2}$ "

Cooling water connection for use on the oil-water cooler in the oil circuit (see page 10/16): G $\frac{3}{4}$ "

<sup>1)</sup> Required volume of cooling water, maximum cooling water pressure 8 bar.

## Options for operation

### Cooling

#### Additional cooling options

##### Overview

Further cooling options can be implemented – the selection is made via the configurator using the "Other cooling" option, order code **Y37** – the desired cooling option can then be defined in plain text.

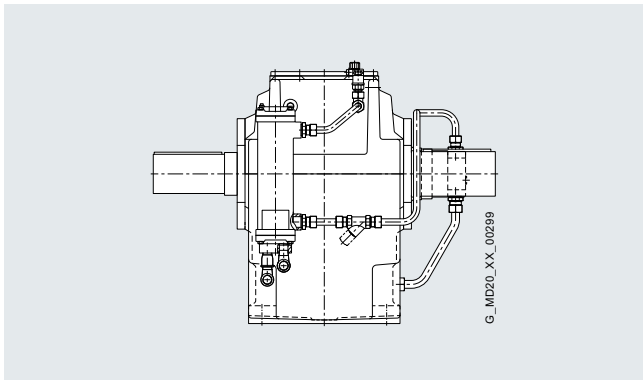
##### **Oil-to-water cooler**

This option allows the precise dimensioning of the cooling, even for dissipating heat quantities that are bigger than can be accomplished using the cooling coil. To this end, the gear unit is equipped with a motor-driven or flange-mounted pump and the oil is directed through the cooler during operation. This option does not require forced lubrication in every case, pure circulation cooling is also possible. To ensure the functionality, a pressure sensor can be installed in the oil line and/or a temperature sensor can be installed in the oil sump. A filter can be installed to improve the oil quality and thus to improve the service life. Refer to the Filter chapter (from page 10/44).

The cooling coil can be designed in the bidding phase by specifying the technical requirements and boundary conditions. The pump assignment and the attaching of the oil-water heat exchanger is standardized.

##### a) Bundled tube heat exchanger

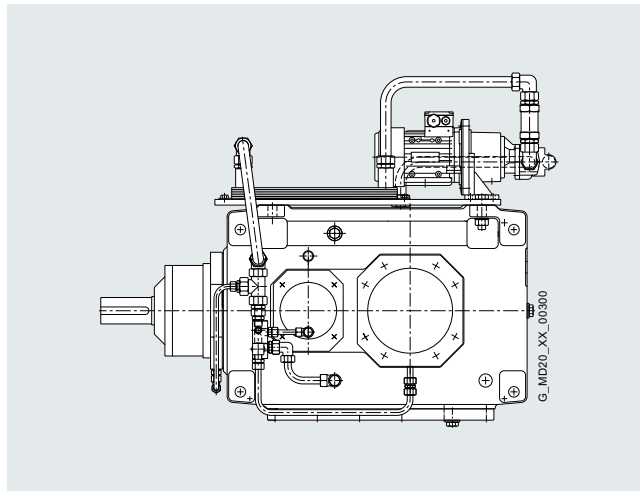
A bundled tube heat exchanger can be used for cooling (suitable for fresh water and sea water).



Example: H1SH09 with flange-mounted pump and oil-water cooler

##### b) Plate heat exchanger

A plate heat exchanger can be used for cooling (not suitable for sea water).



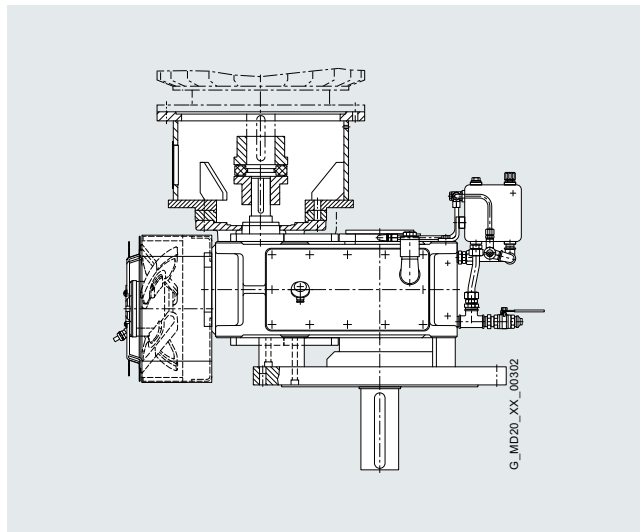
Example: B2SV08 with forced lubrication, motor pump and plate cooler (solution for variable speeds)

##### **Electrically driven fan**

An electrically driven fan can be installed. Cooling can take place with this, regardless of the operating state of the gear unit (e.g. not at low ambient temperatures, when an oil temperature limit is exceeded or in the event of variable speeds). To optimally utilize the advantages of this cooling option, control via temperature monitoring is required. The heat dissipation is at least equal to the standard fan.

The advantage of this cooling variant is that the cooling only takes place when it is really required.

Please contact Flender.

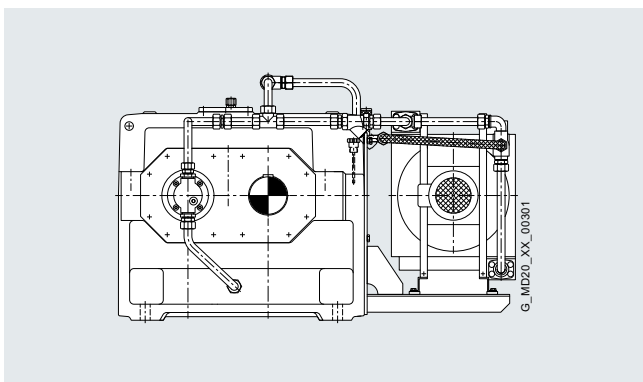


Example: H2SV05 with expansion tank, motor lantern, electrically driven fan, and optional resistance thermometer



**Overview** (continued)**Oil-air cooler / OLCC (oil-air cooler, incl. bypass for cold oil and temperature regulating valve)**

An oil-air cooler can be used for cooling for which no additional cooling medium is needed. To this end, the gear unit is equipped with a motor-driven or flange-mounted pump and the oil is directed through the cooler during operation. This can be installed next to the gear unit or, depending on the job and installation situation, on the sides or top. Environmental conditions that are highly prone to contamination degrade the effectiveness of the cooling system if it is not serviced or cleaned. The pump assignment and the attaching of the maximum possible cooler is standardized.



Example: H1SH07 with oil-air cooler, flange-mounted pump and pressure monitor

**Oil supply system that can be connected to the gear unit**

An oil supply system can be installed for cooling. We offer oil-air cooling systems (OL..) and oil-water cooling systems (OW..). The cooling is laid out in the bidding phase based on the technical boundary conditions. Usually, the suction and pressure lines of the oil supply systems are designed as flexible pipes to compensate vibrations from the main motor, cooler motor and pump motor. On request, the oil supply system/gear unit connection can also be designed with rigid pipes.

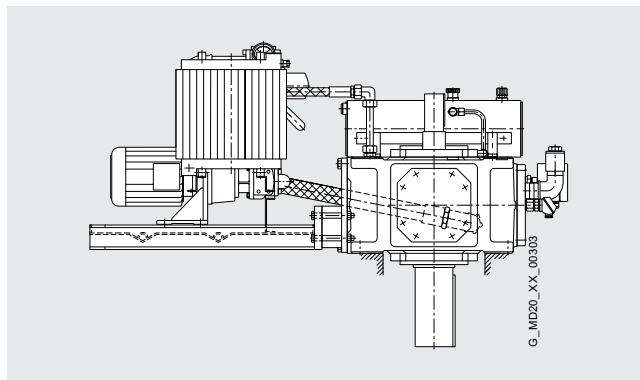
The systems consist of a motor-driven pump, oil heat exchanger, optional oil filter, visual or electronic monitoring devices (e.g. pressure gauges, dial thermometers, pressure monitors, temperature monitors, volumetric flow monitors), 2nd motor pump group, oil tank, cooling water flow regulator, vibration damper, etc.

For applications with maximum plant availability, the minimum options of a double changeover filter, 2nd motor pump and electronic monitoring are recommended.

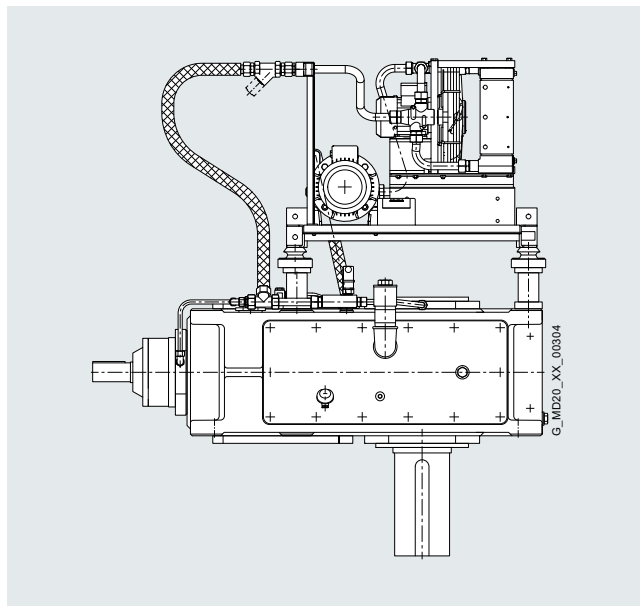
This can be installed next to the gear unit or, depending on the job and installation situation, on the sides or top.

The cooling and lubrication systems can be designed for the required, cooling capacity to be dissipated.

[Please contact Flender.](#)



Example: H2SV05 with OLGE 1, side-mounted



Example: B3SV10 with OLGE 1, top-mounted

## Options for operation

### Cooling

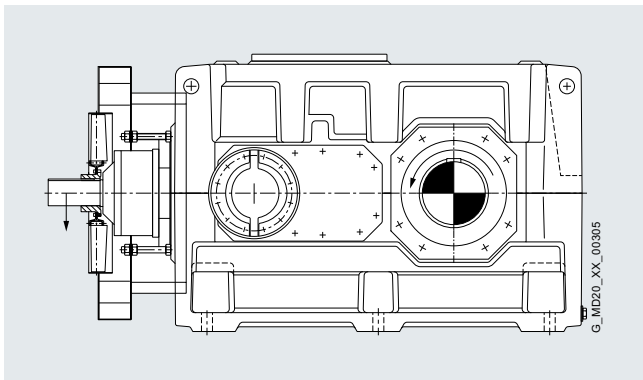
#### Additional cooling options

##### Overview (continued)

##### Fan attachment options (please contact Flender)

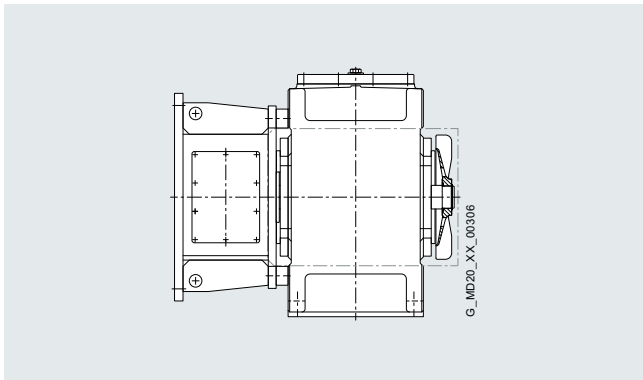
- Axial fan (dependent on direction of rotation, changed fan guard contour), exclusively for bevel helical gear units for increased cooling output compared to the standard radial fan

With bevel helical gear units, it is possible to attach a fan on the extended, first intermediate shaft.



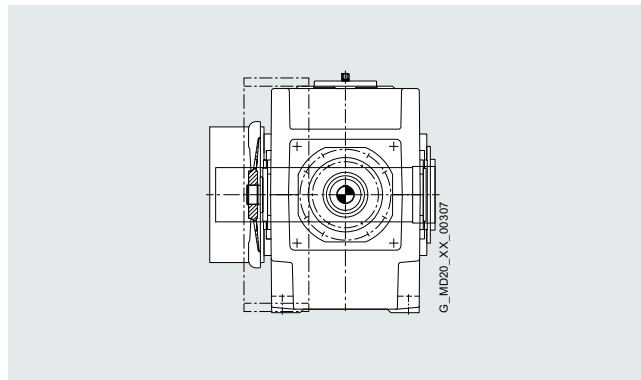
Example: B3SH13 with backstop and axial fan

Alternatively, other attachment options are possible for the standard radial fan:

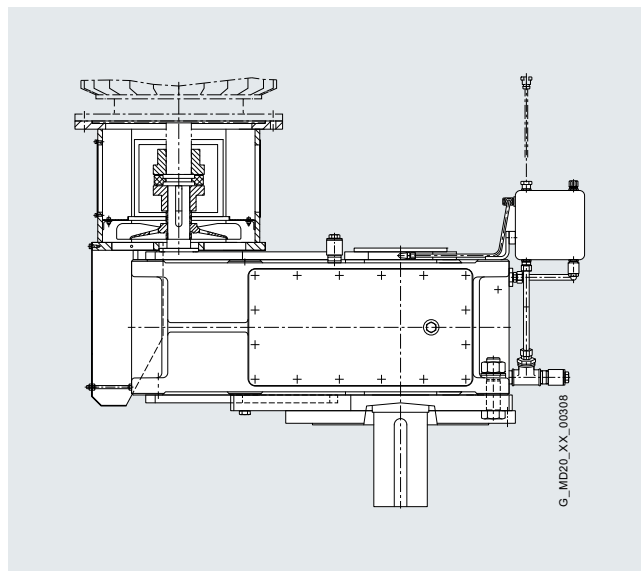


Example: H3SH11 with fan opposite of drive spigots

If it is not possible to attach the fan on the high speed shaft, the fan can also be attached on the opposite side.



Example: B3DH15 with fan on brought out intermediate shaft



Example: H3SV11 – Lantern with integrated fan

It is possible to attach the fan on the high speed shaft in the motor lantern.

The cooling performance may be somewhat less compared to a standard fan.

## Overview

The materials used in a gear unit, comprised of a wide variety of components and lubricants, require defined boundary conditions to ensure proper usage.

Heating elements must be used when the temperature limit for the relevant lubrication variant is undershot.

The selection criteria for oil, lubrication and heating are shown below. Heating for vertical gear units on request.  
Horizontal mounting position, sizes 3, 5, 7, 9, 11, 13, 14, 15, 16, 17, 18

Lubrication	Base oil	Viscosity ISO-VG at 40 °C in mm <sup>2</sup> /s (cSt)	Oil temperature													
			-45 °C	-40 °C	-35 °C	-30 °C	-25 °C	-20 °C	-15 °C	-10 °C	-5 °C	0 °C	5 °C	10 °C	>10 °C	
Forced lubrication	Mineral oil	ISO VG 320	-	-	-	-	-	-	-	-	-	-	2	2	1	x
		ISO VG 220	-	-	-	-	-	-	-	-	-	2	2	1	x	x
	PAO oil	ISO VG 320	-	-	-	-	-	-	-	2	2	1	1	x	x	
		ISO VG 220	-	-	-	-	-	-	2	2	1	x	x	x	x	
Dip lubrication	Mineral oil	ISO VG 460	-	-	-	-	-	2	2	1	x	x	x	x	x	
		ISO VG 320	-	-	-	-	2	2	1	x	x	x	x	x	x	
		ISO VG 220	-	-	-	-	2	2	1	x	x	x	x	x	x	
	PAO oil	ISO VG 460	-	2	2	1	x	x	x	x	x	x	x	x	x	
		ISO VG 320	-	2	1	x	x	x	x	x	x	x	x	x	x	
		ISO VG 220	-	2	1	x	x	x	x	x	x	x	x	x	x	
	PAO-T <sup>1)</sup>	ISO VG 220	-	1	x	x	x	x	x	x	x	x	x	x	x	
		ISO VG 150	-	1	x	x	x	x	x	x	x	x	x	x	x	

Horizontal mounting position, sizes 2, 4, 6, 8, 10, 12

Lubrication	Base oil	Viscosity ISO-VG at 40 °C in mm <sup>2</sup> /s (cSt)	Oil temperature												
			-45 °C	-40 °C	-35 °C	-30 °C	-25 °C	-20 °C	-15 °C	-10 °C	-5 °C	0 °C	5 °C	10 °C	>10 °C
Forced lubrication	Mineral oil	ISO VG 320	-	-	-	-	-	-	-	-	-	-	1	1	x
		ISO VG 220	-	-	-	-	-	-	-	-	-	1	1	x	x
	PAO oil	ISO VG 320	-	-	-	-	-	-	-	-	1	1	x	x	
		ISO VG 220	-	-	-	-	-	-	-	1	1	x	x	x	
Dip lubrication	Mineral oil	ISO VG 460	-	-	-	-	-	1	1	x	x	x	x	x	
		ISO VG 320	-	-	-	-	-	1	1	x	x	x	x	x	
		ISO VG 220	-	-	-	-	-	1	1	x	x	x	x	x	
	PAO oil	ISO VG 460	-	-	1	1	x	x	x	x	x	x	x	x	
		ISO VG 320	-	1	1	x	x	x	x	x	x	x	x	x	
		ISO VG 220	-	1	1	x	x	x	x	x	x	x	x	x	
	PAO-T <sup>1)</sup>	ISO VG 220	-	1	x	x	x	x	x	x	x	x	x	x	
		ISO VG 150	-	1	x	x	x	x	x	x	x	x	x	x	

Horizontal mounting position, sizes 19, 20, 21, 22

Lubrication	Base oil	Viscosity ISO-VG at 40 °C in mm <sup>2</sup> /s (cSt)	Oil temperature												
			-45 °C	-40 °C	-35 °C	-30 °C	-25 °C	-20 °C	-15 °C	-10 °C	-5 °C	0 °C	5 °C	10 °C	>10 °C
Dip lubrication	Mineral oil	ISO VG 460	-	-	-	-	-	4	4	2	x	x	x	x	x
		ISO VG 320	-	-	-	-	4	4	2	x	x	x	x	x	
		ISO VG 220	-	-	-	-	4	4	2	x	x	x	x	x	
	PAO oil	ISO VG 460	-	4	4	2	x	x	x	x	x	x	x	x	
		ISO VG 320	-	4	2	x	x	x	x	x	x	x	x	x	
		ISO VG 220	-	4	2	x	x	x	x	x	x	x	x	x	
PAO-T <sup>1)</sup>	ISO VG 220	-	2	x	x	x	x	x	x	x	x	x	x		
	ISO VG 150	-	2	x	x	x	x	x	x	x	x	x	x		

x Permitted without additional heating

#### Additional heating required

(Before starting up the gear unit, the gear unit must be heated up to starting temperature!)

1	1 heating element required
2	2 heating elements required
4	4 heating elements required
-	Not permitted, special actions required

Heating elements are only permitted in combination with oil temperature monitoring. An electrical oil level monitoring system (available on request) is additionally required for heating elements of ATEX design.

Depending on the type and size, up to 4 heating elements can be installed in the gear unit.

Recommended ISO oil viscosity for	H1	H2 / H3	H4	B2 / B3	B4
Dip lubrication	VG 320	VG 460	VG 320	VG 460	VG 320
Forced lubrication	VG 320				

Labyrinth seals are not permitted to be used with heating elements. For details on the monitoring devices and heating elements, see from page 10/34 "Devices and filters".

<sup>1)</sup> Synthetic oil on a polyalphaolefin basis for temperatures higher than -35 °C. Minimum start temperature (required minimum oil temperature at gear unit start-up).

## Options for operation

### Heating

#### Heating elements

##### Selection and ordering data

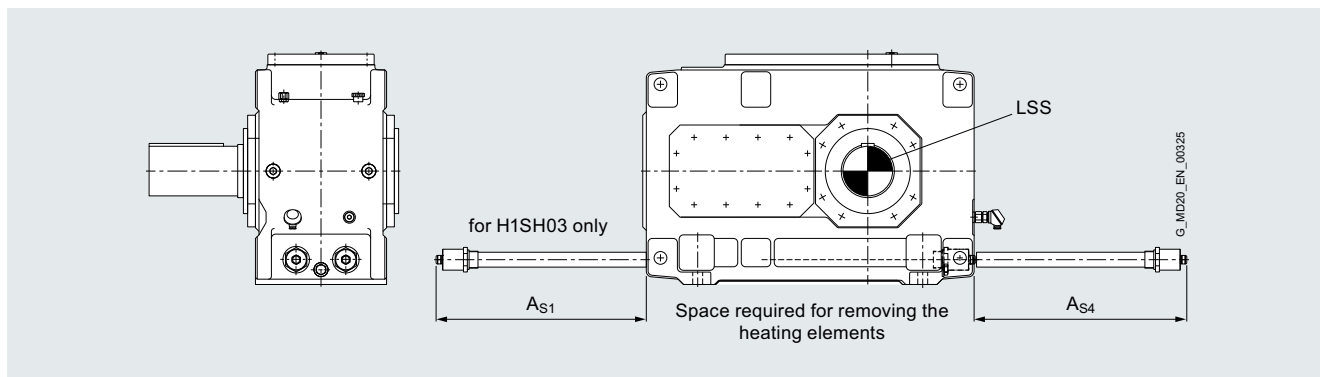
###### Ordering information:

When ordering heating elements and temperature monitoring, **-Z** and the following order codes must be added to the Article No.

Data position of the Article No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order code	
Article No.:	2	L	P	3	0	2	.	.	.	.	.	.	.	.	.	.	-Z	■ ■ ■
<b>Screw-in heating elements (standard version IP65, 230 V, 50 Hz, cable inlet axial)</b>																		
One heating element																		J 0 0
Two heating elements <sup>1)</sup>																		J 0 1
Four heating elements <sup>1)</sup>																		J 0 3
<b>Oil temperature monitoring (standard version)</b>																		
ATH-SW22																		H 4 3
<b>Oil temperature recording (standard version; separate evaluation unit required)</b>																		
Pt100 resistance thermometer																		H 4 0
Pt100 resistance thermometer with transmitter																		H 4 2
<b>Screw-in heating element (ATEX design category 2 + 3) 230 V, 50 Hz, cable inlet acc. to manufacturer's choice</b>																		
One heating element																		J 0 5
Two heating elements <sup>1)</sup>																		J 0 6
Four heating elements <sup>1)</sup>																		J 0 8
<b>Oil temperature recording (ATEX design category 2 + 3; separate evaluation unit required)</b>																		
Pt100 resistance thermometer																		H 4 4

<sup>1)</sup> Restrictions might apply depending on the installation space required.  
For availability and dimensions, see configurator.

## Dimensional drawings



## Type H1

Size	Installed power in W			Installation space in mm	
	1 heating element	2 heating elements	4 heating elements	AS1	AS4
03	215	–	–	450 <sup>1)</sup>	–
05	215	430	–	–	450
07	380	760	–	–	520
09	470	940	–	–	620
11	810	1620	–	–	830
13	1160	2320	–	–	1130
15	1270	2540	–	–	1230
17	1270	2540	–	–	1230
19	1600	3200	–	–	1530

## Type H2

Size	Installed power in W			Installation space in mm
	1 heating element	2 heating elements	4 heating elements	AS4
04	215	–	–	450
05	215	430	–	450
06	470	–	–	620
07	380	760	–	520
08	700	–	–	730
09	470	940	–	620
10	950	–	–	930
11	810	1620	–	830
12	1160	–	–	1130
13	1270	1970	–	1230
14	1270	2080	–	1230
15	1600	2550	–	1530
16	1600	2550	–	1530
17	1600	2870	–	1530
18	1600	3200	–	1530
19	–	3200	4600	1530
20	–	3200	5100	1530
21	–	2540	4628	1230
22	–	2540	4628	1230

## Type H3

Size	Installed power in W			Installation space in mm
	1 heating element	2 heating elements	4 heating elements	AS4
05	215	430	–	450
06	470	–	–	620
07	380	760	–	520
08	700	–	–	730
09	470	940	–	620
10	950	–	–	930
11	810	1620	–	830
12	1160	–	–	1130
13	1270	1970	–	1230
14	1270	2220	–	1230
15	1600	2550	–	1530
16	1600	2644	–	1530
17	1600	2870	–	1530
18	1600	3200	–	1530
19	–	3200	4600	1530
20	–	3200	5100	1530
21	–	2540	4860	1230
22	–	3200	5520	1530

## Type H4

Size	Installed power in W			Installation space in mm
	1 heating element	2 heating elements	4 heating elements	AS4
07	380	760	–	520
08	700	–	–	730
09	470	940	–	620
10	950	–	–	930
11	810	1620	–	830
12	1160	–	–	1130
13	1270	1970	–	1230
14	1600	2300	–	1530
15	1600	2550	–	1530
16	1600	2870	–	1530
17	1600	2870	–	1530
18	1600	3200	–	1530
19	–	3200	4600	1530
20	–	3200	5100	1530
21	–	2540	4860	1230
22	–	3200	5520	1530

LSS: Low speed shaft

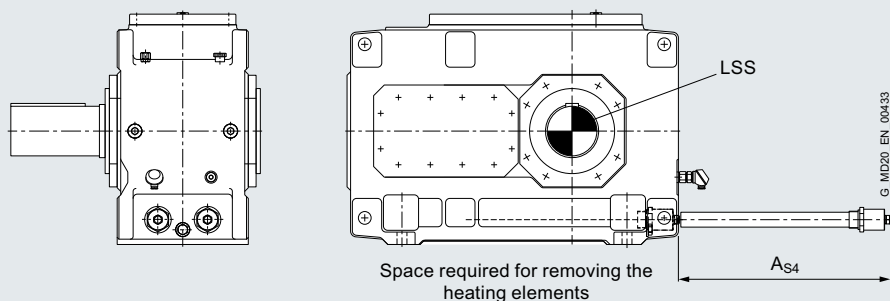
<sup>1)</sup> For type H1, the heating element is installed on housing side 1.

## Options for operation

## Heating

## Heating elements – Types B2 to B4

## Dimensional drawings



## Type B2

Size	Installed power in W			Installation space in mm $A_{S4}$
	1 heating element	2 heating elements	4 heating elements	
04	215	–	–	450
05	215	430	–	450
06	470	–	–	620
07	380	760	–	520
08	700	–	–	730
09	470	940	–	620
10	810	–	–	830
11	810	1620	–	830
12	950	–	–	930
13	1160	1860	–	1130
14	1270	2080	–	1230
15	1270	2540	–	1230
16	1270	2540	–	1230
17	1600	2870	–	1530
18	1600	3200	–	1530

## Type B4

Size	Installed power in W			Installation space in mm $A_{S4}$
	1 heating element	2 heating elements	4 heating elements	
05	215	430	–	450
06	470	–	–	620
07	380	760	–	520
08	700	–	–	730
09	470	940	–	620
10	950	–	–	930
11	810	1620	–	830
12	1160	–	–	1130
13	1270	1970	–	1230
14	1600	2300	–	1530
15	1600	2550	–	1530
16	1600	2870	–	1530
17	1600	2870	–	1530
18	1600	3200	–	1530
19	–	3200	4600	1530
20	–	3200	5100	1530
21	–	2540	4860	1230
22	–	3200	5520	1530

## Type B3

Size	Installed power in W			Installation space in mm $A_{S4}$
	1 heating element	2 heating elements	4 heating elements	
04	215	–	–	450
05	215	430	–	450
06	470	–	–	620
07	380	760	–	520
08	700	–	–	730
09	470	940	–	620
10	950	–	–	930
11	810	1620	–	830
12	1160	–	–	1130
13	1270	1970	–	1230
14	1270	2080	–	1230
15	1600	2550	–	1530
16	1600	2550	–	1530
17	1600	2870	–	1530
18	1600	3200	–	1530
19	–	3200	4600	1530
20	–	3200	5100	1530
21	–	2540	4628	1230
22	–	2540	4628	1230

Overview

Backstop

With single drives which, for example, convey bulk or general cargo "upward", a power failure may cause the conveyed medium to drive the gear unit and motor "in reverse" and the material falls onto the placement point. This can be prevented using a backstop that is integrated in the gear unit.

Attached at a position with the highest possible speed, optimal backstops are assigned to the gear unit types and sizes for Flender FZG gear units.

If several drives are driving a system simultaneously, the same effect can be achieved using torque-limited backstops. The standard backstop is attached in such a way that the direction of rotation that is to be stopped can normally also be changed in the system by our service personnel. For the design with a backstop, it is necessary to specify the direction of rotation of the low speed shaft (LSS). For gear units with low speed shaft (LSS) at both ends, the direction of rotation must be specified for the relevant shaft extension. The direction of rotation is determined by the view of the shaft face of the low speed shaft (LSS).

For specifying the direction of rotation for gear units without a backstop, see page 10/32.

Design		Helical gear unit – type				Bevel helical gear unit – type		
		H1	H2	H3	H4	B2	B3	B4
A								
B								
C	-							
D	-							

① Backstop Sz. 7–10  
⑥ Backstop Sz. 19–22

② Backstop from Sz. 11  
⑦ Backstop Sz. 5–10

③ Backstop Sz. 4–14  
⑧ Backstop Sz. 11–22

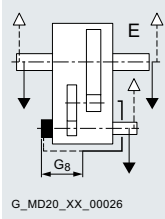
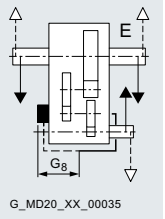
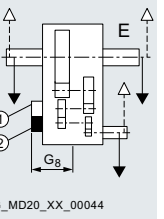
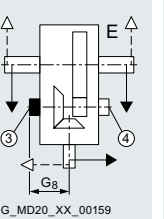
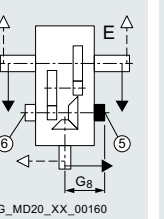
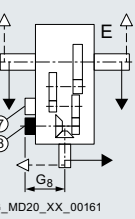
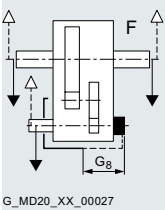
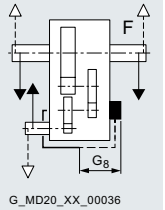
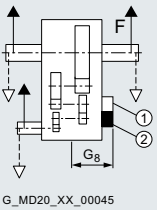
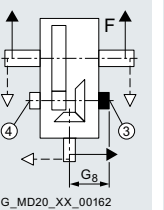
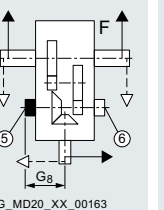
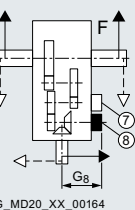
④ Backstop from Sz. 15–18

⑤ Backstop Sz. 4–18

# Options for operation

## Backstop

### Overview (continued)

Design							
Helical gear unit – type				Bevel helical gear unit – type			
H1	H2	H3	H4	B2	B3	B4	
E	–	 G_MD20_XX_00026	 G_MD20_XX_00035	 G_MD20_XX_00044	 G_MD20_XX_00159	 G_MD20_XX_00160	 G_MD20_XX_00161
F	–	 G_MD20_XX_00027	 G_MD20_XX_00036	 G_MD20_XX_00045	 G_MD20_XX_00162	 G_MD20_XX_00163	 G_MD20_XX_00164

① Backstop Sz. 7–10  
⑥ Backstop Sz. 19–22

② Backstop from Sz. 11  
⑦ Backstop Sz. 5–10

③ Backstop Sz. 4–14  
⑧ Backstop Sz. 11–22

④ Backstop from Sz. 15–18

⑤ Backstop Sz. 4–18

No backstop can be implemented for versions G, H and I.

### Dimensions

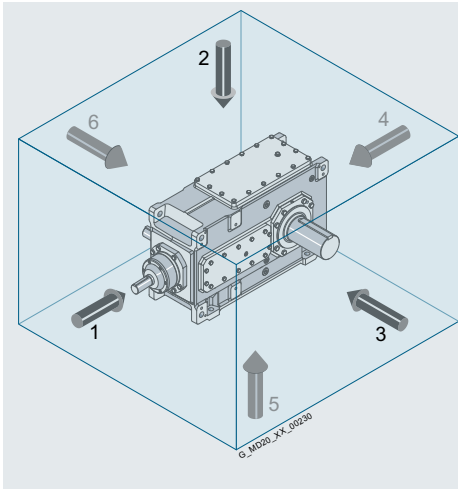
Gear unit size	Dimensions in mm					
	<b>Backstop G8<sup>1)</sup> for type</b>					
	H2	H3	H4	B2 <sup>2)</sup>	B3	B4
4	207	–	–	284	204	–
5	253	234	–	323	223	236
6	253	234	–	323	223	236
7	280	287	286	375	281	286
8	280	287	286	375	281	286
9	331	317	317	452	317	317
10	331	317	317	452	317	317
11	392	369	333	497	368	333
12	392	369	333	497	368	333
13	448	457	391	559	451	391
14	448	457	391	559	451	391
15	527	522	487	585	497	487
16	527	522	487	585	497	487
17	576	534	487	703	564	487
18	576	534	487	703	564	487
19	670	614	590	–	621	561
20	670	614	590	–	621	561
21	690	635	610	–	640	580
22	690	635	610	–	640	580

<sup>1)</sup> Max. dimensions; details acc. to order-related documentation.

<sup>2)</sup> Backstop not possible for  
 B2SH up to size 12, version A, C, E, F  
 B2FH up to size 12, version A, C  
 B2DH up to size 12, version B, D  
 B2SH size 13 and 14, version A, C, E, F  
 B2SH size 15 to 18, version B, D, E, F  
 B2FH size 13 and 14, version A, C  
 B2FH size 15 to 18, version B, D  
 B2DH size 14, version B, D  
 BSDH size 16 and 18, version A, C



**Selection and ordering data**



Irrespective of the mounting position of the gear unit, the face designations "right" and "left" always refer to the horizontal mounting position with the view on side 1.

Side 2 is on top.  
Mounting cover on top (2),  
looking at drive front face (1):  
Side 3 = right  
Side 6 = left

Ordering information:

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z ■ ■ ■</b>
<b>Backstop/direction of rotation</b>												
Mounting of standard backstop, catalog version												<b>L 0 0</b>
Design with torque limiting												<b>L 1 0</b>
Design with torque limiting, attachment prepared												<b>L 1 2</b>
Design with torque limiting for ATEX												<b>L 1 4</b>
Design with torque limiting for ATEX, attachment prepared												<b>L 1 6</b>
Direction of rotation, looking at low speed shaft extension (LSS): Clockwise												<b>L 9 0</b>
Direction of rotation, looking at low speed shaft extension (LSS): Counter-clockwise												<b>L 9 3</b>
Direction of rotation, looking at low speed shaft extension (LSS), shaft journals on side 3												<b>L 9 4</b>
Direction of rotation, looking at low speed shaft extension (LSS), shaft journals on side 6												<b>L 9 5</b>

## Options for operation

Information about oil, information about installation

### Overview

#### Information about oil

Flender FZG gear units are supplied without oil filling as standard.

Ordering information:

The following options can be selected by ordering the gear units with the order code **-Z**:

- Permissible type of oil

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z</b> ■ ■ ■
<b>Permissible type of oil</b>												
Provided for mineral oil												H 0 0
Provided for synthetic oil on a polyalphaolefin basis (PAO oil)												H 0 2
Provided for synthetic low temperature oil on a polyalphaolefin basis (PAO-T oil) Suitable for ambient temperatures colder than -35 °C.												H 0 3

Different types of oils can be selected in the selection tool.

- Permitted oil viscosities (for recommendations, [see page 10/19](#))

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z</b> ■ ■ ■
<b>Oil viscosity</b>												
ISO VG 460 <sup>1)</sup>												H 1 0
ISO VG 320												H 1 1
ISO VG 220												H 1 2

#### Information about installation

Ordering information:

The following options regarding altitude and installation location are selected using the order code **-Z**:

- Altitude

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z</b> ■ ■ ■
<b>Altitude</b>												
Up to 1000 m												G 3 0
1001 to 2000 m												G 3 1
2001 to 3000 m												G 3 2
3001 to 4000 m												G 3 3
4001 to 5000 m												G 3 4

- Installation location

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z</b> ■ ■ ■
<b>Installation location</b>												
Enclosed room or building with gates												G 3 5
Building without gates												G 3 6
Outdoors												G 3 7

<sup>1)</sup> Not available for gear units with forced lubrication and gear units with mounted auxiliary drive.  
Not recommended for vertically installed gear units.

**Overview****Oil level indicator**

Flender FZG gear units are designed with a dip stick for checking the oil level. In addition, an oil level indicator of the type

FSA 127, FSA 176, FSA 254 or an oil level indicator with an integrated FSA-T dial thermometer can be ordered.

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	-Z ■ ■ ■
<b>Oil level indicator</b>												
Oil level indicator of type FSA 127												H 5 2
Oil level indicator FSA 176												H 5 3
Oil level indicator FSA 254												H 5 4
Oil level indicator with integrated dial thermometer FSA-T 127												H 5 5
Oil level indicator with integrated dial thermometer FSA-T 176												H 5 6
Oil level indicator with integrated dial thermometer FSA-T 254												H 5 7

**Housing material**

Cast iron (EN-GJL-200) is the housing material used as standard. Alternatively, a welded housing and a housing made of spheroidal cast iron steel can also be ordered.

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	-Z ■ ■ ■
<b>Housing material</b>												
Housing made of spheroidal cast iron steel EN-GJS-400-15 (GGG-40)												K 2 1
Welded steel												K 2 2

**Oil drain valve**

In the basic design, Flender FZG gear units are provided with an oil drain screw with a permanent magnet.

An additional hook-type quick coupling with a hose fitting according to DIN 3489 can further facilitate the oil change.

Oil drain valves, which can be ordered in various designs, facilitate oil changes.

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	-Z ■ ■ ■
<b>Oil drain</b>												
Gear unit in mounting position "H": Oil drain valve on gear unit side 4, straight design												K 3 0
Gear unit in mounting position "V": Oil drain valve on gear unit side 4, straight design												K 3 7
Screw plug with permanent magnet in addition to oil drain valve												K 3 8
Oil drain valve on gear unit side 4, angled relative to gear unit side 6												K 3 9
Oil drain valve on gear unit side 4, angled relative to gear unit side 3												K 3 9

**Gear unit ventilation**

Flender FZGs are standard-equipped with an air filter that is suitable for use near splash water and dust accumulations for equalizing the pressure difference between the interior of the

gear unit and the ambient air. Air filters for other kinds of ambient conditions can also be ordered.

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	-Z ■ ■ ■
<b>Gear unit ventilation</b>	<b>Filter mesh</b>	<b>Description</b>										
MANN air filter	40 µm	<ul style="list-style-type: none"> <li>For gear units with special dust protection requirements</li> <li>With filling sieve, filter mesh oil: 530 µm</li> </ul>										K 7 1
MANN air filter, encapsulated design	40 µm	<ul style="list-style-type: none"> <li>For gear units with special dust protection requirements</li> <li>When risk exists of unit becoming completely covered</li> <li>With filling sieve, filter mesh oil 530 µm</li> </ul>										K 7 2
Wet air filter	3 µm	<ul style="list-style-type: none"> <li>For gear units that are used intermittently</li> <li>For use in extremely humid environments</li> </ul>										K 7 3

# Options for operation

## Explosion protection ATEX

### Overview

#### Explosion protection according to directive 2014/34/EU

Flender gear units can be delivered as a modified, certified version upon customer request.

These gear units can be used in hazardous environments.

They then satisfy the requirements of the guideline 2014/34/EU.

Description of the environment			Assignment of the device properties			Flender gear unit Delivery portfolio?
Duration of explosion hazard: The quantified specification is only used for orientation	Explosion hazard due to:		Property	Safety requirements	Safe when considering the following:	
Continuously frequently, more than 1000 h/year	Gases, mist, vapors Zone 0	Dust Zone 20	Category 1	Very high	Seldom occurring faults	No
Occasionally, short-term, between 10 and 1000 h/year	Zone 1	Zone 21	Category 2	High	Typically occurring faults	Yes
Very seldom, short-term, less than 10 h/year	Zone 2	Zone 22	Category 3	Normal	Conditions in normal operation	Yes

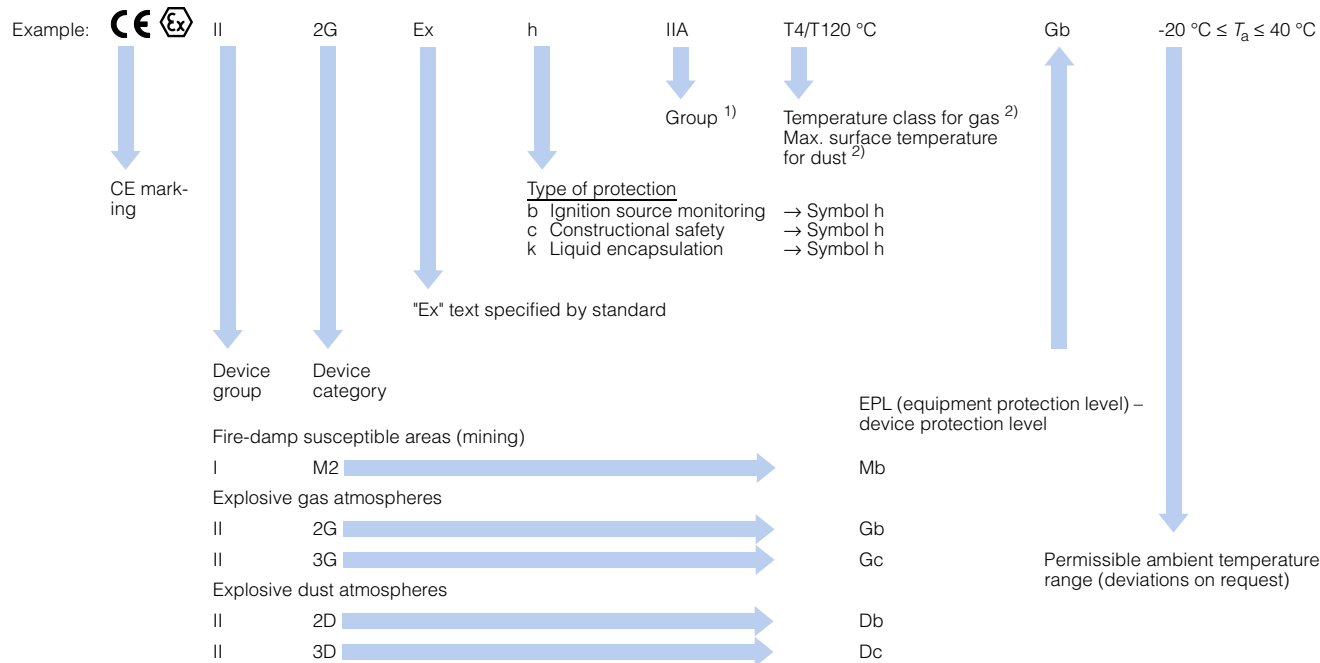
For gear units in ATEX design, the thermal layout of the parameters cited in this catalog may be different.

FZG gear units can be installed in combined zones, e.g. in 22/2. The corresponding selection can be made in the configurator.

Consultation is required here!

**Notice! Flender gear units are not permitted for hybrid mixtures (simultaneous occurrence of explosive gas and dust atmospheres)!**

#### Marking according to EN ISO 80079-36/37



**1) Explanation of groups**

Group I - Fire-damp susceptible areas (mining)  
 Mine damp/methane

Group II - Gas group

Subgroup	Example
IIA	Propane
IIB	Ethylene
IIC	Hydrogen

Group III - Dust group

Subgroup	Definition
IIIA	Combustible lint
IIIB	Non-conductive dust
IIIC	Conductive dust

**2) Temperature**

Temperature class for gas

450 °C	T1 standard
300 °C	T2 standard
200 °C	T3 standard
135 °C	T4 standard
100 °C	T5 on request
085 °C	T6 on request

For dust, the maximum surface temperature is specified in °C:

T120 °C
T150 °C
T200 °C

(This concerns the certified maximum value of the surface temperature of the gear unit and of all of the components used in the gear unit BOM (e.g. motor pumps, resistance thermometers, etc.).  
 The real maximum surface temperature of the gear unit and gear unit components is often well below the certified maximum value.)

Ordering information and ATEX codes

Explosion protection		Data position of the Article No.																Order code	Further necessary options			
Zone	Minimum ignition energy	ATEX code																-	Z	Taconite	Pt100	Coating system acc. to ATEX IIC condition
		1	2	3	4	5	6	7	8	9	10 <sup>1)</sup>	11	12	13	14	15	16					
		Article No.: <b>2LP302</b> . . . . .																<b>-Z</b>				
<b>Device group 1 – Devices for use in fire damp-prone areas (ATEX M2)</b>																						
		CE Ex I	M2	Ex	h					Mb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 0 0</b>	x				
<b>Device group 2 – Devices for use in the other areas (ATEX)</b>																						
<b>21</b>	> 3 mJ	CE Ex II	2D	Ex	h	IIIA				T 120 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 0 1</b>	x	x			
	≤ 3 mJ	CE Ex II	2D	Ex	h	IIIA				T 120 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 0 2</b>	x	x			
	> 3 mJ	CE Ex II	2D	Ex	h	IIIB				T 120 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 0 3</b>	x	x			
	≤ 3 mJ	CE Ex II	2D	Ex	h	IIIB				T 120 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 0 4</b>	x	x			
	> 3 mJ	CE Ex II	2D	Ex	h	IIIC				T 120 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 0 5</b>	x	x			
	≤ 3 mJ	CE Ex II	2D	Ex	h	IIIC				T 120 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 0 6</b>	x	x			
	> 3 mJ	CE Ex II	2D	Ex	h	IIIA				T 150 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 0 7</b>	x	x			
	≤ 3 mJ	CE Ex II	2D	Ex	h	IIIA				T 150 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 0 8</b>	x	x			
	> 3 mJ	CE Ex II	2D	Ex	h	IIIB				T 150 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 0 9</b>	x	x			
	≤ 3 mJ	CE Ex II	2D	Ex	h	IIIB				T 150 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 1 0</b>	x	x			
	> 3 mJ	CE Ex II	2D	Ex	h	IIIC				T 150 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 1 1</b>	x	x			
	≤ 3 mJ	CE Ex II	2D	Ex	h	IIIC				T 150 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 1 2</b>	x	x			
	> 3 mJ	CE Ex II	2D	Ex	h	IIIA				T 200 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 1 3</b>	x	x			
	≤ 3 mJ	CE Ex II	2D	Ex	h	IIIA				T 200 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 1 4</b>	x	x			
	> 3 mJ	CE Ex II	2D	Ex	h	IIIB				T 200 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 1 5</b>	x	x			
	≤ 3 mJ	CE Ex II	2D	Ex	h	IIIB				T 200 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 1 6</b>	x	x			
	> 3 mJ	CE Ex II	2D	Ex	h	IIIC				T 200 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 1 7</b>	x	x			
	≤ 3 mJ	CE Ex II	2D	Ex	h	IIIC				T 200 °C Db	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 1 8</b>	x	x			
<b>22</b>	> 3 mJ	CE Ex II	3D	Ex	h	IIIA				T 120 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 1 9</b>	x	x			
	≤ 3 mJ	CE Ex II	3D	Ex	h	IIIA				T 120 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 2 0</b>	x	x			
	> 3 mJ	CE Ex II	3D	Ex	h	IIIB				T 120 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 2 1</b>	x	x			
	≤ 3 mJ	CE Ex II	3D	Ex	h	IIIB				T 120 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 2 2</b>	x	x			
	> 3 mJ	CE Ex II	3D	Ex	h	IIIC				T 120 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 2 3</b>	x	x			
	≤ 3 mJ	CE Ex II	3D	Ex	h	IIIC				T 120 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 2 4</b>	x	x			
	> 3 mJ	CE Ex II	3D	Ex	h	IIIA				T 150 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 2 5</b>	x	x			
	≤ 3 mJ	CE Ex II	3D	Ex	h	IIIA				T 150 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 2 6</b>	x	x			
	> 3 mJ	CE Ex II	3D	Ex	h	IIIB				T 150 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 2 7</b>	x	x			
	≤ 3 mJ	CE Ex II	3D	Ex	h	IIIB				T 150 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 2 8</b>	x	x			
	> 3 mJ	CE Ex II	3D	Ex	h	IIIC				T 150 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 2 9</b>	x	x			
	≤ 3 mJ	CE Ex II	3D	Ex	h	IIIC				T 150 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 3 0</b>	x	x			
	> 3 mJ	CE Ex II	3D	Ex	h	IIIA				T 200 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 3 1</b>	x	x			
	≤ 3 mJ	CE Ex II	3D	Ex	h	IIIA				T 200 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 3 2</b>	x	x			
	> 3 mJ	CE Ex II	3D	Ex	h	IIIB				T 200 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 3 3</b>	x	x			
	≤ 3 mJ	CE Ex II	3D	Ex	h	IIIB				T 200 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 3 4</b>	x	x			
	> 3 mJ	CE Ex II	3D	Ex	h	IIIC				T 200 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 3 5</b>	x	x			
	≤ 3 mJ	CE Ex II	3D	Ex	h	IIIC				T 200 °C Dc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 3 6</b>	x	x			
<b>1</b>	-	CE Ex II	2G	Ex	h	IIA		T1		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 3 7</b>	x	x			
		CE Ex II	2G	Ex	h	IIA		T2		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 3 8</b>	x	x			
		CE Ex II	2G	Ex	h	IIA		T3		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 3 9</b>	x	x			
		CE Ex II	2G	Ex	h	IIA		T4		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 4 0</b>	x	x			
		CE Ex II	2G	Ex	h	IIB		T1		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 4 1</b>	x	x			
		CE Ex II	2G	Ex	h	IIB		T2		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 4 2</b>	x	x			
		CE Ex II	2G	Ex	h	IIB		T3		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 4 3</b>	x	x			
		CE Ex II	2G	Ex	h	IIB		T4		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 4 4</b>	x	x			
		CE Ex II	2G	Ex	h	IIC		T1		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 4 5</b>	x	x			
		CE Ex II	2G	Ex	h	IIC		T2		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 4 6</b>	x	x			
		CE Ex II	2G	Ex	h	IIC		T3		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 4 7</b>	x	x			
		CE Ex II	2G	Ex	h	IIC		T4		Gb	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 4 8</b>	x	x			
<b>2</b>	-	CE Ex II	3G	Ex	h	IIA		T1		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 4 9</b>					
		CE Ex II	3G	Ex	h	IIA		T2		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 5 0</b>					
		CE Ex II	3G	Ex	h	IIA		T3		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 5 1</b>					
		CE Ex II	3G	Ex	h	IIA		T4		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 5 2</b>					
		CE Ex II	3G	Ex	h	IIB		T1		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 5 3</b>					
		CE Ex II	3G	Ex	h	IIB		T2		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 5 4</b>					
		CE Ex II	3G	Ex	h	IIB		T3		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 5 5</b>					
		CE Ex II	3G	Ex	h	IIB		T4		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 5 6</b>					
		CE Ex II	3G	Ex	h	IIC		T1		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 5 7</b>		x			
		CE Ex II	3G	Ex	h	IIC		T2		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 5 8</b>		x			
		CE Ex II	3G	Ex	h	IIC		T3		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 5 9</b>		x			
		CE Ex II	3G	Ex	h	IIC		T4		Gc	-20 °C ≤ T <sub>a</sub> ≤ 40 °C						<b>W 6 0</b>		x			

<sup>1)</sup> The product designation is based on the ambient temperature range stated for a specific order (order codes Y01 and Y02).



## Options for operation

### Corrosion protection

#### Overview

##### Corrosion protection

To protect the gear unit against corrosion and external influences, Flender gear units with high-value coating systems are offered in various colors.

The corrosion protection system is designed in accordance with the standard ISO 12944-2.

The following is a list of the selection of the coating system based on the corrosivity category for the standard protection lifetime class "medium".

If the required corrosivity category is not known, it is possible to determine the corrosivity category and the recommended coating system in the configurator based on the climatic load (e.g. sea climate, tropics, etc.) and application (e.g. conveyor system, cable railways, wastewater treatment, etc.).

Coating systems for the alternative protection lifetime classes "low" and "high" can also be selected by means of the configurator.

If there are any special requirements for the coating system beyond this, please contact Flender.

##### Description of the corrosivity categories

Based on ISO 12944-2, the atmospheric ambient conditions have been divided into five corrosivity categories. These are described below.

Corrosivity category	Description
<b>C1</b> Normal environmental pollution	<ul style="list-style-type: none"> <li>Indoor installation</li> <li>Heated buildings with a neutral atmosphere</li> </ul>
<b>C2</b> Low environmental pollution	<ul style="list-style-type: none"> <li>Indoor and outdoor installation</li> <li>Unheated buildings with condensation, production areas with low humidity, e.g. warehouses</li> <li>Atmospheres with little pollution, rural areas</li> </ul>
<b>C3</b> Average environmental pollution	<ul style="list-style-type: none"> <li>Indoor and outdoor installation</li> <li>Production areas with high levels of humidity and some air pollution</li> <li>Urban and industrial atmospheres with moderate sulfur dioxide loads</li> <li>Coastal areas with low salinity</li> </ul>
<b>C4</b> High environmental pollution	<ul style="list-style-type: none"> <li>Indoor and outdoor installation</li> <li>Environments with high humidity and occasionally high levels of atmospheric and chemical pollution</li> <li>Occasional acidic or caustic wet cleaning</li> <li>Industrial areas and coastal areas with moderate salt levels</li> </ul>
<b>C5</b> Very high environmental pollution	<ul style="list-style-type: none"> <li>Indoor and outdoor installation</li> <li>Buildings/areas with almost constant condensation and severe pollution</li> <li>Industrial areas with high humidity and aggressive atmosphere</li> <li>Regular acidic or caustic wet cleaning, including cleaning with chemical agents</li> <li>Coastal areas with high salinity</li> </ul>

##### Selection of the coating system

When selecting the coating system based on the corrosivity category determined or specified by the customer, you must consider whether explosion protection acc. to ATEX 2014/34/EU is required.

If explosion protection according to ATEX 2014/34/EU is required for areas of the explosion subgroup IIC or with minimum ignition energy  $\leq 3$  mJ, then it is essential to select an electrostatically conductive coating (order codes B85, B86, B87) of the relevant corrosion category.

##### Assignment of the coating system to the corrosivity category (protection lifetime class medium)

Corrosivity category	Standard coating with top coat	Electrostatically conductive coating for explosion protection acc. to ATEX 2014/34/EU with explosion subgroup IIC or minimum ignition energy $\leq 3$ mJ
<b>C1 to C3</b>	Coating system 002 [B41]	Coating system 012 [B85]
<b>C4</b>	Coating system 004 [B43]	Coating system 013 [B86]
<b>C5</b>	Coating system 005 [B44]	Coating system 014 [B87]

**Overview**Ordering information:

Data position of the Article No.		1 to 6	7	8	9	10	11	12	13	14	15	16	Order code		
Article No.:		<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z</b> ■ ■ ■		
Coating system	Description												B	4	1
002	Standard coating with top coat, medium corrosion resistance												B	4	1
004	Standard coating with top coat, high corrosion resistance												B	4	3
005	Standard coating with top coat, very high corrosion resistance												B	4	4
012	Electrostatically conductive coating with top coat, medium corrosion resistance (design with explosion protection acc. to ATEX 2014/34/EU with explosion subgroup IIC or minimum ignition energy ≤ 3 mJ)												B	8	5
013	Electrostatically conductive coating with top coat, high corrosion resistance (design with explosion protection acc. to ATEX 2014/34/EU with explosion subgroup IIC or minimum ignition energy ≤ 3 mJ)												B	8	6
014	Electrostatically conductive coating with top coat, very high corrosion resistance (design with explosion protection acc. to ATEX 2014/34/EU with explosion subgroup IIC or minimum ignition energy ≤ 3 mJ)												B	8	7
003	Standard coating <b>without</b> top coat <sup>1)</sup>												B	4	2

**Color selection**

The top coat of the Flender gear units has the default color RAL 5015 (sky blue). The gear units can also be supplied in other colors upon request.

Cover caps at the gear unit end for covering the shafts and fan covers are normally powder-coated in the yellow warning color RAL 1003 (to warn about rotating parts) and are compatible with all standard coating systems and conductive coatings.

Ordering information:

When ordering gear units in a different color, **-Z** must be added to the Article No.

Data position of the Article No.		1 to 6	7	8	9	10	11	12	13	14	15	16	Order code		
Article No.:		<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z</b> ■ ■ ■		
Color selection													C	0	1
RAL 5009 azure blue													C	0	1
RAL 5010 gentian blue													C	0	2
<b>RAL 5015 sky blue</b>													C	0	0
RAL 6011 reseda green													C	0	6
RAL 7011 steel gray													C	1	3
RAL 7016 anthracite gray													C	1	2
RAL 7030 stone gray													C	1	1
RAL 7031 blue gray													C	0	7
RAL 7035 light gray													C	0	8
RAL 9005 jet black													C	1	0
Unpainted, primed													C	1	5

Other colors are available on request (see also page 10/32, Further information).

<sup>1)</sup> Not suitable for areas and applications with corrosivity category C5 or explosion protection according to ATEX 2014/34/EU with explosion subgroup IIC or minimum ignition energy ≤ 3 mJ. Without the top coat to be applied by the customer, only corrosivity category C1 is achieved.

## Options for operation

### Test reports, further information

#### Overview

##### Test reports

The declaration of compliance with the order in accordance with EN 10204-2.1 is part of the standard scope of supply.

- Declaration of compliance with the order 2.1  
Certificate in which the manufacturer confirms that the supplied products comply with the requirements of the order without details of test results.

- Test report 2.2  
Certificate in which the manufacturer confirms that the supplied products comply with the requirements of the order complete with the results of non-specific tests.

##### Ordering information:

When ordering with additional test report in accordance with EN 10204-2.2, **-Z** must be added to the Article No.

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z</b> ■ ■ ■
<b>Test reports</b>												
Additionally with test report to EN 10204-2.2												
D 9 7												

##### Direction of rotation

For gear units without a backstop, the direction of rotation of the low speed shaft (LSS) can be specified using the following order codes. For gear units with double-extended low speed shaft (LSS), the direction of rotation must be specified for the relevant shaft journal. The direction of rotation is determined by the view of the shaft face of the low speed shaft (LSS).

For gear units with direction of rotation identical "at both ends", no order code is required.

For determining the direction of rotation for gear units with a backstop, [see page 10/25](#).

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z</b> ■ ■ ■
<b>Direction of rotation</b>												
Low speed shaft (LSS) rotating clockwise												L 9 0
Low speed shaft (LSS) rotating counter-clockwise												L 9 3
Direction of rotation of low speed shaft, looking at right-side spigot (side 3) <sup>1)</sup>												L 9 4
Direction of rotation of low speed shaft, looking at left-side spigot (side 6) <sup>1)</sup>												L 9 5

##### Further information

##### Ordering information:

The following further information can be provided in the Article No. using the order code **-Z**.

Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	<b>2LP302</b>	.	.	.	.	.	.	.	.	.	.	<b>-Z</b> ■ ■ ■
<b>Further information</b>												
Color tone top coat RAL <sup>2)</sup>												Y 0 0
Minimum ambient temperature (°C)												Y 0 1
Maximum ambient temperature (°C)												Y 0 2
Input speed $n_1$ Flender gear units (rpm)												Y 2 0
Driven machine output $P_2$ (kW) <sup>3)</sup>												Y 2 1
Driven machine torque $T_2$ (Nm) <sup>3)</sup>												Y 2 2
Input power $P_1$ Flender gear units (kW)												Y 2 3
Additional text available for product description												Y 9 9

<sup>1)</sup> This option applies to gear units with low speed shaft (LSS) at both ends.

<sup>2)</sup> Further colors, other than those offered in the catalog.

<sup>3)</sup> Specification of  $P_2$  or  $T_2$



## Overview

The production and assembly of the gear unit and accessories are carried out with the utmost care, taking into account all of the prescribed regulations and personal experience.

Because the Flender gear unit series is a product with a certain percentage of stocked components, a measurement log for the exact installed part is not available in every case.

For reasons of efficiency, manufacturing batches are only randomly measured based on defined test quantities.

Nevertheless, test certificates can be created for Flender gear units on the basis of the certification of the production batch.

Test certificate	Check according to F 7200 (gearing and shafts before assembly of gear unit)		Issuer
2.1	P 1.1	Certificate of conformity with the order	SAP
2.2	P 1.2	Chemical analysis, mechanical characteristic values of standard components	SAP
3.1	P 4.1	Chemical analysis (raw material)	Supplier
	P 4.2	Characteristic mechanical values (raw material)	
	P 4.3	Ultrasonic test (UT); (raw material)	
	P 4.4	Crack detection test (MT)	Factory
	P 4.5 <sup>4)</sup>	Hardness pattern depth	
	P 4.6	Tooth flank geometry	
	P 4.7	Temper etch detection	
	P 4.16	Crack detection test (MT)	Factory
	P 4.17 <sup>4)</sup>	Hardness pattern depth	
	P 4.18	Tooth flank geometry	
	P 4.19	Temper etch detection	
	P 4.8	P 6.8 <sup>5)</sup> Main dimensions	Factory
	P 4.9 <sup>1)</sup>	P 6.9 <sup>5)</sup> Tooth contact pattern (tendency indication)	
	P 4.10	P 6.10 <sup>5)</sup> Airborne sound <sup>1)</sup> (1 gear unit per item)	Factory
	P 4.11	P 6.11 <sup>5)</sup> Structure-borne sound <sup>1)</sup> (1 gear unit per item)	Factory
	P 4.12	P 6.12 <sup>5)</sup> Temperature trend <sup>1); 3)</sup> (1 gear unit per item)	Factory
	P 4.13	P 6.13 <sup>5)</sup> End temperature <sup>1); 3)</sup>	Factory
	P 4.14	P 6.14 <sup>5)</sup> Paint thickness (1 gear unit per item)	Factory
	P 4.15	P 6.15 <sup>5)</sup> Alignment log for IDS drive unit on swing base/base frame	Factory
	Factory confirmation <sup>2)</sup>	Function test run per direction of rotation (without load), check and confirmation of oil tightness, normal heat and noise development, and general visual acceptance)	Factory
	Factory confirmation	Total circumferential backlash for gear unit (on high speed shaft (HSS), low speed shaft (LSS) fixed)	Factory

### Note:

Request test certificates for housing material from Flender.

<sup>1)</sup> Only practical for test station run "with at least partial load", load test or partial load test separately according to the table below.

<sup>2)</sup> The test range encompasses: Load-free test run depending on type, size and type of lubrication, check for oil tightness, normal heat and noise development, and general visual acceptance, for meaningful measurement results order a load/partial load test run at additional cost.

<sup>3)</sup> Only practical with at least 4 hours of load-free test run (can be ordered separately).

<sup>4)</sup> Only on the basis of the test sample of the furnace batch.

<sup>5)</sup> The P4. tests are created by authorized employees at the factory. The P6. tests can be performed on request in the presence of the customer or by a third party authorized by the customer when the order is placed. Please contact Flender in this regard. The contractually agreed upon test measures remain the deliverables. Please request the load or partial load from Flender prior to placing the order to determine the additional costs.

## Options for operation

Devices and filters

### Pressure measuring instrument

#### Overview

##### Pressure measuring instrument (pressure gauge)

The pressure gauge can be used to carry out a visual inspection of the function of forced lubrication. Any mounting position is possible. No warning or electronic evaluation can take place.

#### Technical specifications

Pressure measuring instrument	
Display range	Dual scale external 0 ... 10 bar black/internal 0 ... 140 psi red
Connection	bottom
Permissible ambient temperature	-34 °C ... +100 °C
Permissible medium temperature	+100 °C
Degree of protection	IP65



### Pressure monitor

#### Overview

##### Pressure monitor type 0180

The device is used to ensure that the forced lubrication functions. A defined pressure is generated by reducing the wire diameter. In the event of faults (e.g. due to dirty filters), a pressure drop may be detected. At 0.5 bar, the measuring device sends a signal, which can be evaluated at the customer's end. Optionally, in connection with other devices, a pre-warning at 0.8 bar is possible, and a shutdown at 0.3 bar.

No pressure setting is required for commissioning.

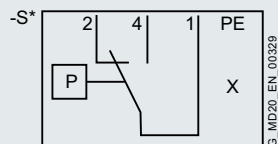


#### Technical specifications

Pressure monitor	
Permissible ambient temperature	-30 °C ... +100 °C
Degree of protection	IP65
Max. switching power	4 A/250 V AC/250 VA 2 A/24 V DC 1 A/50 V DC 0.02 A/250 V DC
Cable entry	PG9

#### Circuit diagrams

##### Electrical connection and cable entry



- S Code for switch
- \* Placeholder for equipment identifier
- X Placeholder for ident number

**Overview****P200 pressure transmitter for gauge pressure**

The pressure transmitter is used for the permanent pressure check. Viscosity or speed-related fluctuations can be determined and warning or shutdown points can be set on the customer's evaluation devices.

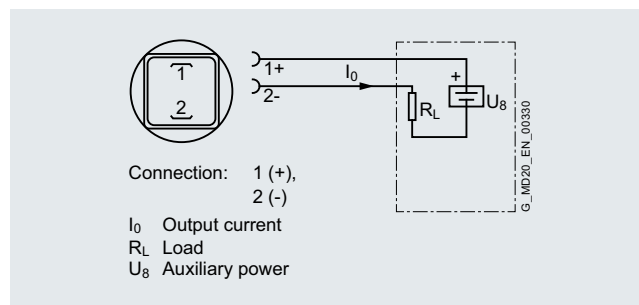
The housing is made of stainless steel.

**Technical specifications****P200 pressure transmitter**

<b>Measuring range</b>	0 – 10 bar, bursting pressure >25 bar
<b>Process connection</b>	G $\frac{1}{4}$ " external according to EN 837-1 ( $\frac{1}{4}$ "-BSP external)
<b>Output signal</b>	4 ... 20 mA
<b>Voltage</b>	7... 33 V DC

**Circuit diagrams****Electrical connection and cable entry**

Screw connection M16  $\times$  1.5  
Connector acc. to EN 175301-803-A



Connection with current output and connector according to EN 175301

**Dial thermometer****Overview****Dial thermometer**

The dial thermometers are used for visual temperature monitoring.

They are installed in a protective tube so that the dial thermometer can be replaced without oil drainage.

Other versions for vertical installation or a right or left-angled display for horizontal installation are also available.

**Technical specifications****Dial thermometer**

<b>Display range</b>	Dual scale: external -20 ... +120 °C black internal -4 ... +249 °F red
<b>Permissible ambient temperature</b>	-40 °C ... +70 °C



## Options for operation

### Devices and filters

#### Temperature monitor

##### Overview

##### Temperature monitor ATHs-SW-22

###### Flender standard version

The temperature monitor works according to the principle of liquid expansion. It has two switching points.

The temperature monitor with protective tube must be immersed in the medium along its entire length, because otherwise major switching deviations will occur. The order-specific minimum and maximum temperatures that are to be set are specified in the gear unit documentation.

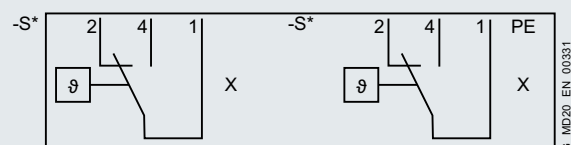


##### Technical specifications

Temperature monitor	
Max. switching power	2 A/230 V AC/460 VA p.f. = 0.6 10 A/230 V AC/2300 W p.f. = 1 0.25 A/230 V DC/58 W
Setting range	-20° C ... +100 °C, switching differential 3 – 4%
Permissible ambient temperature	-50 °C ... +80 °C (on switch head and trunk line in use -40 °C ... +80 °C)
Degree of protection	IP65
Cable entry	PG9

##### Circuit diagrams

###### Electrical connection and cable entry



- S Code for switch
- \* Placeholder for equipment identifier
- X Placeholder for ident number

G\_MD20\_EN\_00331

**Overview****Resistance thermometer**

The measured resistance changes its electrical resistance due to temperature fluctuations.

With the Pt100/RTD the operating temperature can continuously be monitored by means of an evaluation unit of the customer's supply. It is possible to set several switching points on the evaluation unit.

Pt100 resistance thermometer for oil sump

This resistance thermometer is used for measuring the oil temperature in the gear unit housing or oil tank. The Pt100 can be replaced without loss of oil (installation in a Thermowell).



In addition to the oil sump temperature, the bearing temperature can also be monitored. The electronics and connection head are identical to the measuring device shown above.

**Technical specifications**

Resistance thermometer	
Connection head	Degree of protection IP65, hinged aluminum cover
Cable gland	M16 × 1.5
Permissible ambient temperature	-40 °C ... 100 °C

## Options for operation

Devices and filters

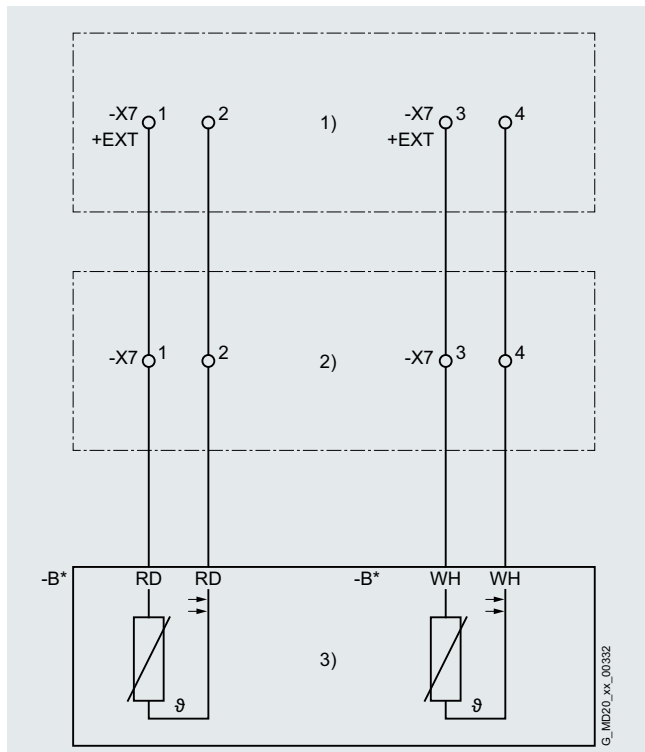
### Resistance thermometer

#### Circuit diagrams

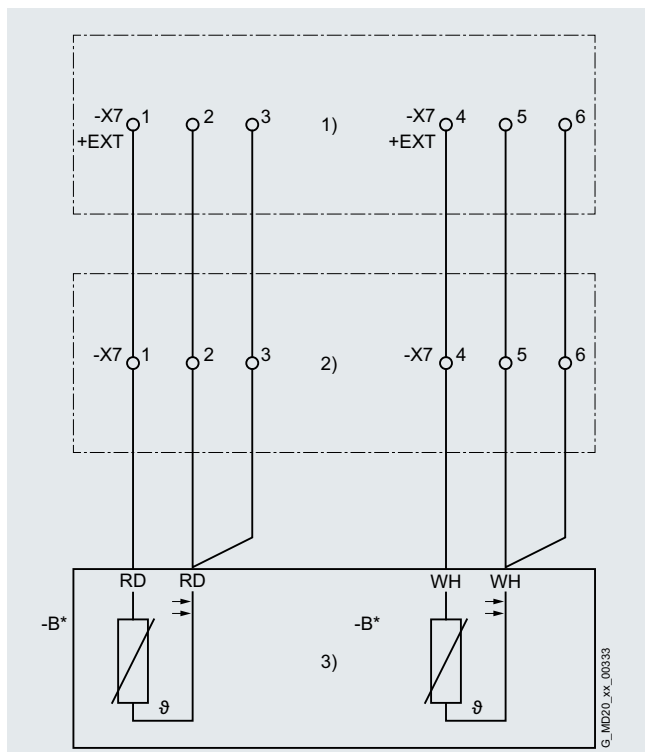
##### Connection

Measurement inaccuracies can be minimized by means of multi-conductor technology.

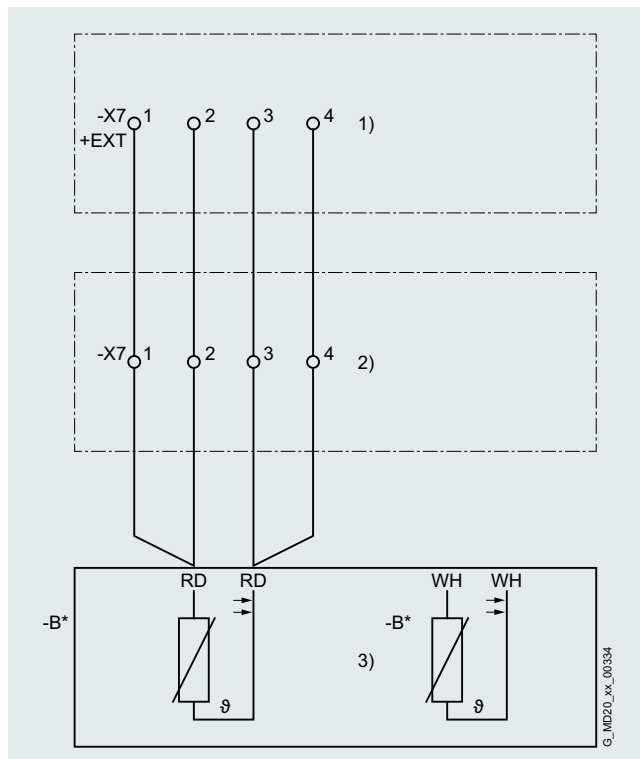
From connection head, a 2, 3 and 4-wire circuit can be implemented (only a single connection is possible here):



2-wire circuit

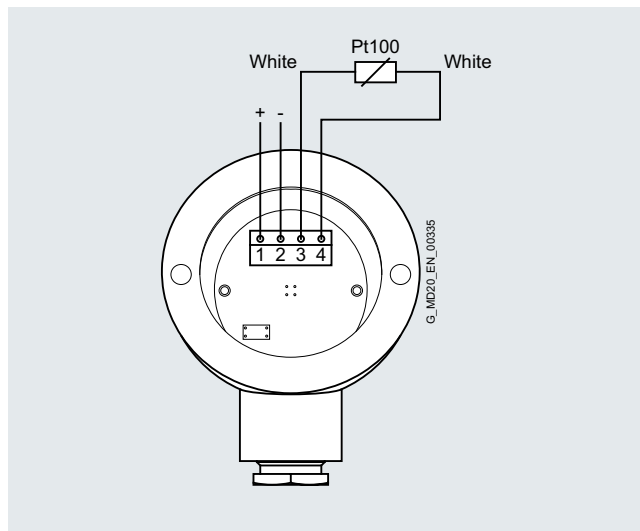


3-wire circuit



4-wire circuit

**Optionally with transmitter** 4 ... 20 mA available (permitted ambient temperature range then -40 °C to +85 °C)



- 1) Evaluation unit of customer's supply
- 2) Terminal box
- 3) Resistance thermometer

## ATEX resistance thermometer Pt100, basic version without type test certificate

## Overview

**ATEX resistance thermometer Pt100, basic version without type test certificate**

This resistance thermometer is installed for measuring bearing and oil temperature in compliance with directive 2014/34/EU (ATEX). The resistance thermometer is used as a simple electrical resource according to EN 60079-11 for use as a category 2 device in potentially explosive gas or dust environments. No EC type test certificate is available for this resistance thermometer.



## Technical specifications

## ATEX resistance thermometers

<b>Permitted for hazardous atmosphere</b>	Category 2 (Zones 1 and 21), gas (G), temperature class T4 and dust (D), maximum surface temperature +120 °C
<b>Type of protection</b>	ia
<b>Connection head</b>	Degree of protection IP65, hinged aluminum cover
<b>Cable gland</b>	M20 × 1.5
<b>Permissible ambient temperature</b>	-40 °C ... +100 °C

## Options for operation

Devices and filters

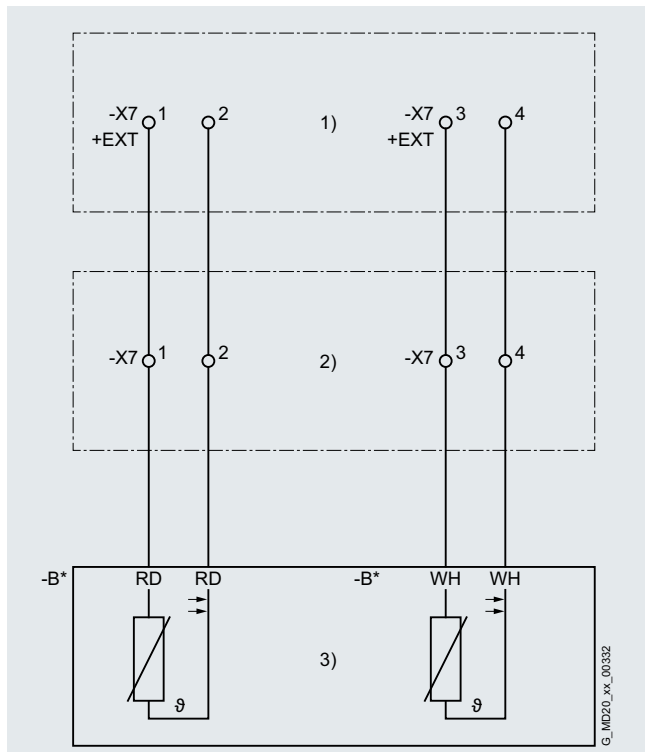
### ATEX resistance thermometer Pt100, basic version without type test certificate

#### Circuit diagrams

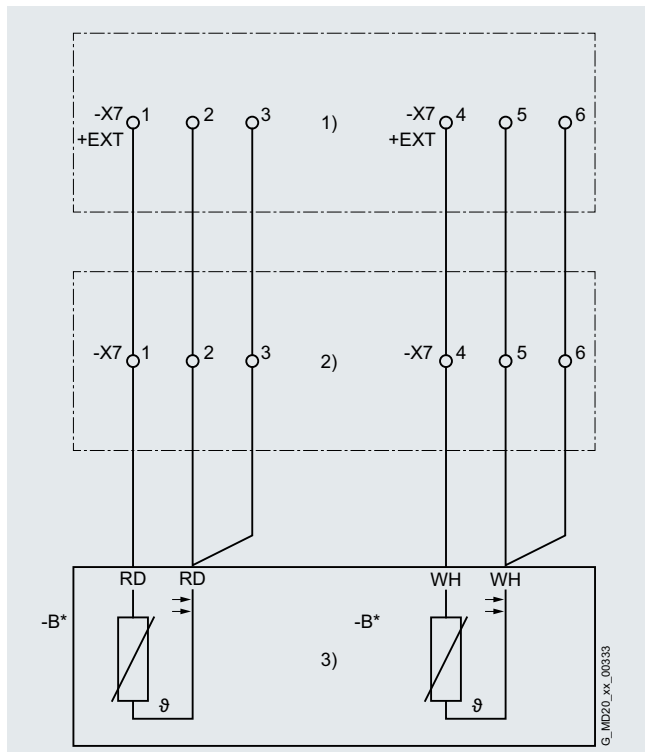
##### Connection

Measurement inaccuracies can be minimized by means of multi-conductor technology.

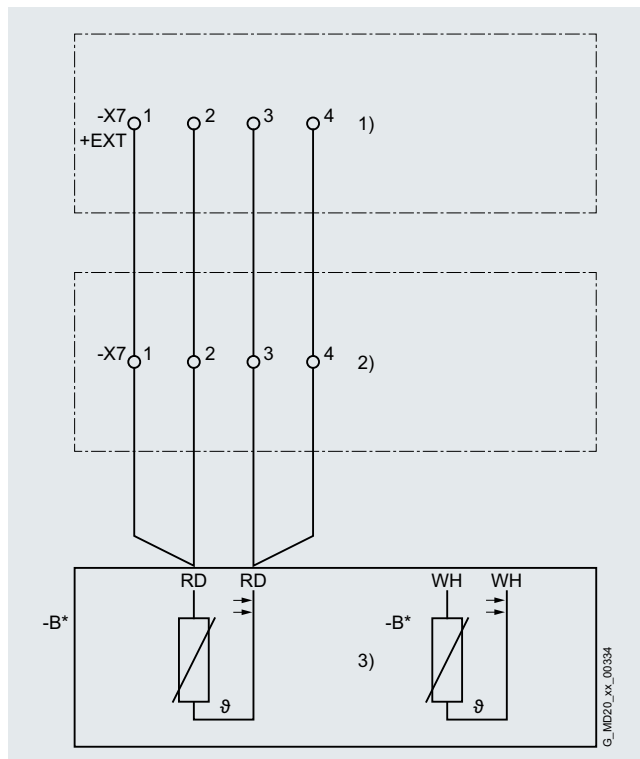
From connection head, a 2, 3 and 4-wire circuit can be implemented (only a single connection is possible here):



2-wire input



3-wire input



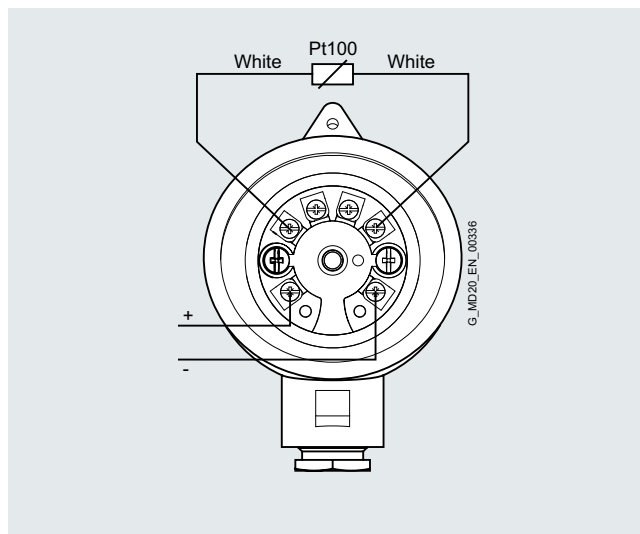
4-wire input

##### Optionally available with the following transmitters

(permitted ambient temperature range then -40 °C to +85 °C)

##### Transmitter type

- SITRANS TH100, 4 ... 20 mA;
- SITRANS TH300, 4 ... 20 mA, HART;
- SITRANS TH400, PROFIBUS PA;
- SITRANS TH400, FOUNDATION Fieldbus



- 1) Evaluation unit of customer's supply
- 2) Terminal box
- 3) Resistance thermometer



## Resistance thermometer Pt100, version with ATEX type test certificate

## Overview

**Resistance thermometer Pt100, version with ATEX type test certificate PTB 09 ATEX 2014X and IECEx – certificate PTB 11.0010X**

This resistance thermometer is used for measuring the oil temperature in the oil sump in a hazardous area. The measuring insert of the Pt100 can be replaced without oil loss. The sensor is designed with a fixed process connection.



## Technical specifications

ATEX marking



PTB 09 ATEX 2014 X / IECEx PTB 11.0010X

II 1/2 D Ex ia/ib IIC T200°C Da/Db

II 1/2 G Ex ia/ib IIC T6/T4...T1 Ga/Gb

II 3 G Ex ic IIC T6/T4...T1 Gc

Temperature, electrical data  
see certificate/operating instructions



## Options

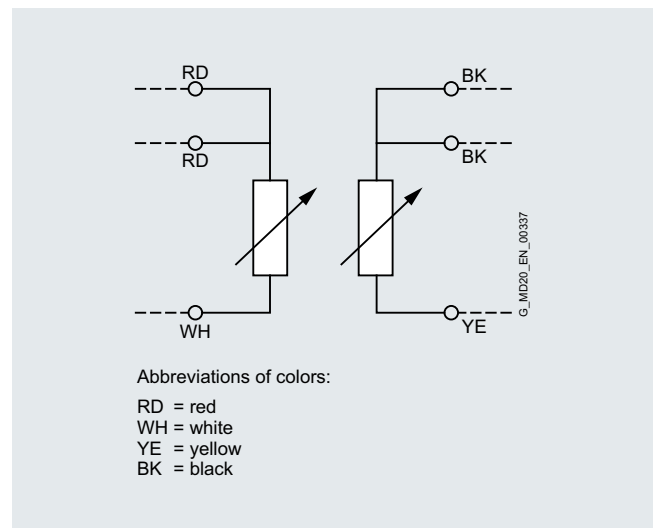
**Some additionally available options for this measuring device are:**

- Other communication protocols: HART, PROFIBUS PA, Foundation Fieldbus
- Other certificates: CSA, EAC, NEPSI
- Other types of protection: Ex n, Ex d (other connection head)
- Further approvals: Marine
- On-site display (different connection head)

## Circuit diagrams

**Connection**

2 × Pt100, tolerance class EN 60715B  
3-wire circuit



Abbreviations of colors: RD = red; WH = white; YE = yellow; BK = black

## Pt100 resistance thermometer

Gas (G)	Temperature class T4, explosion group IIC
Type of protection	ia
Connection head	BB0, degree of protection IP65, hinged aluminum cover
Cable gland	made of brass M20 x 1.5
Permissible ambient temperature	-40 °C ... +85 °C
Measuring range	-50 °C ... +400 °C
Dust (D)	Certified for max. permissible surface temperature +200 °C, dust group IIIC

## Options for operation

### Devices and filters

#### Fill level measurement of liquids with SITRANS LVL100 and LVL200 vibration switches

##### Overview

##### **Fill level measurement of liquids with SITRANS LVL100 and LVL200 vibration switches with failsafe function**

LVL100 and LVL200 are vibration limit level switches for monitoring the oil level when the gear unit is at a standstill.

##### Note:

For error-free recording of the fill level, the gear unit must be at a standstill and sufficient time must be allowed for the oil to return!

##### LVL100 vibration switch

This switching device is available with the following approvals:

- CE, CSA
- IECEX d
- ATEX
- Marine approvals ABS, DNV, LR, RINA, GL, CCS
- FDA, 3A
- Namur

##### LVL200 vibration switch

If it is not certain what type of power supply is available, it is recommended that the LVL200 is used, because it provides both types of connections in one device.



Vibration switches SITRANS LVL100 (left) and LVL200 (right)

##### Technical specifications

LVL100 vibration switch	
Process temperature	-40 °C ... +150 °C
Degree of protection	IP65
Frequency	approx. 1100 Hz
Connection	Acc. to DIN 43650 incl. connector

LVL200 vibration switch	
Process temperature	-50 °C ... +150 °C
Housing	Aluminum
Degree of protection	IP66
Cable entry	M20 × 1.5
Safety category	SIL2
Frequency	approx. 1200 Hz

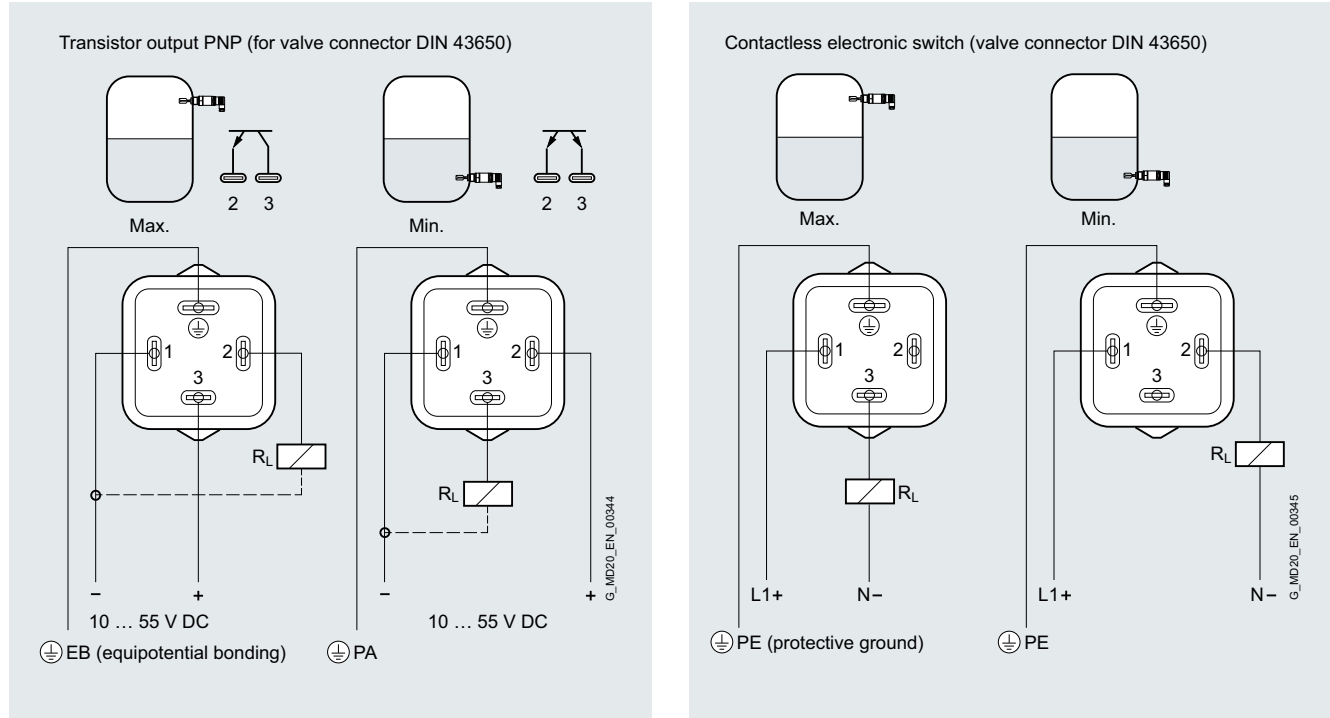
The normal design without a tube extension can be used for horizontal installation in a housing.

For a vertical installation or installation in an oil level pipe, a version with a tube extension is used.

**Circuit diagrams**

**SITRANS LVL100 vibration switch connection**

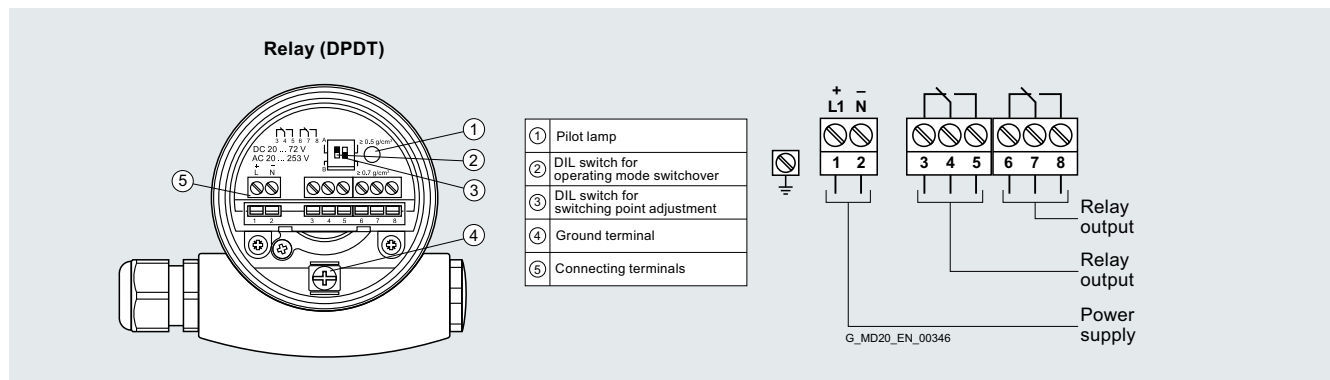
Two standard versions are available:



1) with transistor output PNP, 10 ... 55 V DC

2) for 20 ... 250 V AC/DC

**SITRANS LVL200 vibration switch connection**



Connection:  
Double relay (DPDT)  
20 ... 72 V DC/20 ... 250 V AC (3 A)

## Options for operation

### Devices and filters

#### Volumetric flow measuring device

##### Overview

##### Volumetric flow measuring device

As an alternative to the pressure monitor, a flow monitor can be used to check whether the oil circuit of a forced lubrication is functioning.

It can be used both as a stand-alone device and in combination with a pressure monitor.

The volumetric flow measuring device is designed with an indicator scale and two contacts (change-over contacts).

Optionally, the volumetric flow measuring device is also available without an indicating scale with an analog output signal and with a digital differential pressure transmitter with a digital display and two programmable contacts (normally open or normally closed contacts).

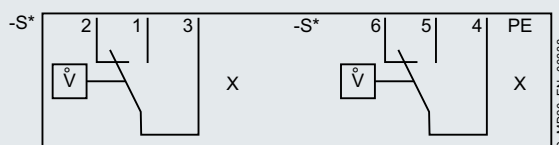


##### Technical specifications

Volumetric flow measuring device	
Permissible ambient temperature	-20 °C ... +70 °C
Permissible medium temperature	-20 °C ... +70 °C
Max. switching power	5 A/250 V AC/500 VA; 0.4 A/30 V DC/25 W
Degree of protection	IP65
2 change-over contacts	can be set separately

##### Circuit diagrams

##### Connection diagram standard version "A"



- S Code for switch
- \* Placeholder for equipment identifier
- X Placeholder for ident number

G\_MD20\_EN\_00338

#### Coarse filter

##### Overview

##### Coarse filter W5911

The coarse filter is installed in the oil circuit downstream of the pump and filters coarse particles of contamination out of the flow of oil. In this way, the oil is kept clean and clogging of the spray nozzles or screens is prevented. The filter sieve of the coarse filter can be cleaned during standstills.



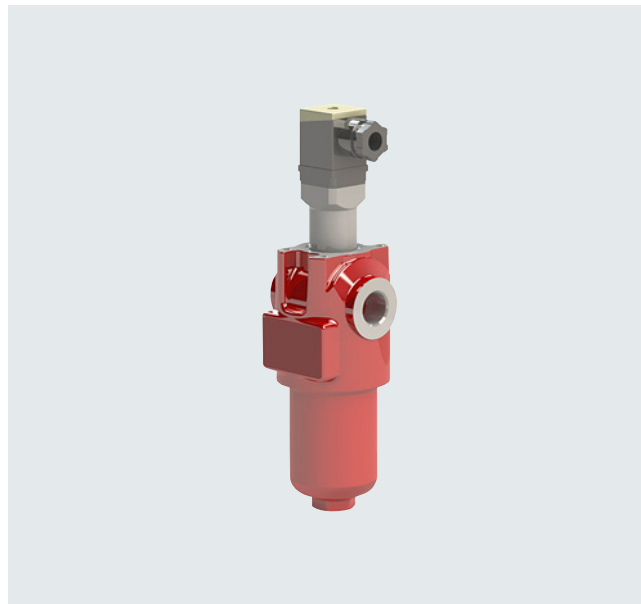
## Overview

**Line filter LF W 60 I C 50 D 1.x /-L24-A2**

Line filters consist of a filter head with a filter bowl screwed into it. The filters are suitable for both directions of flow. The line filters are equipped with an optical and electrical contamination indicator in the filter head.

Creator and copyright holder of the image:

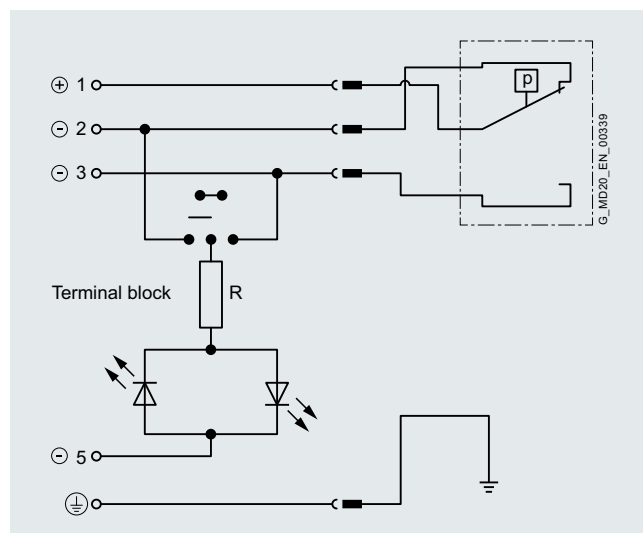
HYDAC Filtrertechnik GmbH  
Industriegebiet  
66280 Sulzbach/Saar



## Technical specifications

Line filter	
Filter mesh	50 µm
Lamp	24 V
Contamination indicator	Response pressure 2 bar
Type of indicator	Optical indicator and electric switch
Weight	0.150 kg
Response pressure or indication range	2 bar -10% 5 bar -10% 8 bar ±10%
Permitted positive operating pressure	210 bar
Permitted temperature range	-30 °C ... +100 °C
Connection thread	G 1/2"
Max. tightening torque	33 Nm
Switching type	NC contacts or NO contacts, switching contacts (change-over contacts)
Max. switching voltage	24 V, 48 V, 115 V, 230 V depending on use of lamps
Electronic connection	M20 plug-in connection cable socket acc. to EN 175301-803
Max. switching capacity with ohmic load	60 W DC 100 VA AC
Switching capacity <sup>1)</sup>	Ohmic 3 A at 24 V DC Ohmic 0.03 ... 5 A at max. 230 V AC
Degree of protection according to DIN 40050	IP65 (only with attached and correctly wired cable socket)
Ordering example	VM 5 D.0/-L24

## Circuit diagrams



<sup>1)</sup> Required amperage > 20 mA

## Options for operation

### Devices and filters

#### Double changeover filter

##### Overview

##### Double changeover filter

The double changeover filters are equipped with a filter sieve with a filter mesh of 60 µm. They are provided with a contamination indicator, which visually indicates the degree of contamination. In addition, a signal can be activated via an electrical contact, if the contamination exceeds the permitted degree.

The double changeover filters are designed for continuous filtration. They are suited for manually switching to the second filter chamber during operation, thus ensuring 100% availability of the system.



a) Boxer design for oil quantities up to 70 l/min  
b) Double changeover filter for larger quantities of oil

##### Technical specifications

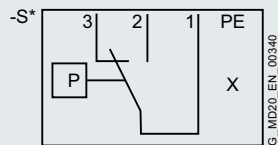
###### Double changeover filter

###### Electrical limit data (max. contact load)

Operational voltage	≤ 250 V DC and ≤ 250 V AC
Switching current	≤ 1 A
Switching capacity	≤ 30 W or ≤ 60 VA
Degree of protection	IP65

##### Circuit diagrams

###### Circuit diagram for electrically connecting the contamination indicator



- S Code for switch
- \* Placeholder for equipment identifier
- X Placeholder for ident number

## Overview

Production plants must run more and more reliably with minimum downtime.

Objectives:

- Improved productivity and availability of the plant
- Detection, diagnostics and localization of faults
- Optimization of the maintenance activities and their scheduling
- Purchasing of replacement parts based on need

Result:

- Repairs that can be planned and optimal stocking of replacement parts
- Reduced maintenance costs thanks to early detection of wear-related faults
- Prevention of collateral damage
- The maintenance is efficiently supported



Acceleration sensor

Gear unit type/Mounting position	Size range	Malfunction message, machine protection/monitoring			Function
		Basic	Advanced	Professional	
H1_H	3 ... 19	<ul style="list-style-type: none"> <li>• Pt100 in oil sump</li> <li>• 1 vibration transmitter</li> <li>• Wiring in the terminal box, 2 devices</li> </ul>	<ul style="list-style-type: none"> <li>• Pt100 in oil sump</li> <li>• 1 vibration transmitter</li> <li>• 2 x Pt100 at the low speed shaft and at the high speed shaft <sup>1)</sup></li> <li>• Wiring in the terminal box, 5 ... 6 devices</li> </ul>	<ul style="list-style-type: none"> <li>• Pt100 in oil sump</li> <li>• 3 vibration transmitters</li> <li>• 2 x Pt100 at each shaft <sup>1)</sup></li> <li>• Wiring of all devices in the terminal box (8 ... 14)</li> </ul>	<ul style="list-style-type: none"> <li>• Acquiring and recording measured values via existing system controller (PLC)</li> <li>• Shutdown of the machine in the event of impermissible operating conditions</li> <li>• Detection of faults only in late stage</li> <li>• Condition-based maintenance not possible</li> </ul>
H2_H	4 ... 28				
H3_H	5 ... 28				
H4_H	7 ... 28				
B2_H	4 ... 18				
B3_H	4 ... 28				
B4_H	5 ... 28				
<b>Malfunction message, machine protection/monitoring Smart Sensor DX500</b>					
H1_H	3 ... 18	<ul style="list-style-type: none"> <li>• Online condition monitoring sensor for early detection of errors, recommended up to size 18</li> </ul>			
H2_H	4 ... 18	<ul style="list-style-type: none"> <li>• Attached to gear unit, including 5 m of cable for the power supply and 10 m for the Ethernet connection</li> </ul>			
H3_H	5 ... 18	<ul style="list-style-type: none"> <li>• Fixed measuring point and "RED" warning signal when maximum vibration values specified for a specific drive are exceeded.</li> </ul>			
H4_H	7 ... 18	<p><b>Function</b></p> <ul style="list-style-type: none"> <li>• Early detection of damage</li> </ul>			
B2_H	4 ... 18	<ul style="list-style-type: none"> <li>• Measures vibration, analyzes measured data online on the gear unit.</li> </ul>			
B3_H	4 ... 18	<ul style="list-style-type: none"> <li>• Automatic alarm when gear unit-specific limits are exceeded</li> </ul>			
B4_H	5 ... 18	<ul style="list-style-type: none"> <li>• Integrated analysis function: Sensor works autonomously</li> <li>• Easy, independent monitoring and diagnostic solution, primarily for gear units in the low to medium torque range in many industrial applications</li> </ul>			
<b>Early detection of damage: Mobile measurement Condition monitoring – mobile</b>					
H1_H	3 ... 19	<p><b>Basic</b></p> <ul style="list-style-type: none"> <li>• Optical marking of measuring points</li> <li>• Gear unit kinematics (frequency)</li> </ul>	<p><b>Advanced</b></p> <ul style="list-style-type: none"> <li>• Acceleration sensors on the bearings</li> <li>• Wiring in switch box</li> <li>• Gear unit kinematics (frequency)</li> </ul>	<p><b>Function</b></p> <ul style="list-style-type: none"> <li>• Preparation of the gear unit for recording and evaluating sensor data via a mobile condition monitoring measuring device (measuring device not included in scope of supply)</li> <li>• Regular, manually initiated measurements, performed by customer's maintenance personnel or service employees</li> </ul>	
H2_H	4 ... 28				
H3_H	5 ... 28				
H4_H	7 ... 28				
B2_H	4 ... 18				
B3_H	4 ... 28				
B4_H	5 ... 28				
<b>Early detection of damage: Online system Condition monitoring – Online</b>					
H1_H	3 ... 19	<p><b>Advanced</b></p> <ul style="list-style-type: none"> <li>• Acceleration sensors on the bearings</li> <li>• Wiring in terminal box</li> <li>• Gear unit kinematics (frequency)</li> </ul>	<p><b>Professional</b></p> <ul style="list-style-type: none"> <li>• Acceleration sensors on the bearings</li> <li>• Speed sensor <sup>2)</sup></li> <li>• Wiring in terminal box</li> <li>• Gear unit kinematics (frequency)</li> </ul>	<p><b>Function</b></p> <ul style="list-style-type: none"> <li>• Preparation of the gear unit for recording and evaluating via a permanently installed measuring system with remote access (not included in scope of supply)</li> <li>• Continuous, automatic recording, evaluation and monitoring of measured data</li> <li>• For alerting via the system: Diagnostics by qualified personnel</li> <li>• Remote access via secure Internet connection, monitoring by service provider, e.g. Flender</li> </ul>	
H2_H	4 ... 28				
H3_H	5 ... 28				
H4_H	7 ... 28				
B2_H	4 ... 18				
B3_H	4 ... 28				
B4_H	5 ... 28				

<sup>1)</sup> For bevel helical gear units (B..) only 1x Pt100 on the high speed shaft (HSS).

<sup>2)</sup> Supplied loose; the attachment of an encoder to the coupling is possible via a second setscrew thread (must be ordered when ordering the coupling!) and the sensor.

## Options for operation

Devices and filters

### Condition monitoring and machine protection

#### Overview (continued)

#### **Sensor packages for gear unit monitoring and machine protection**

##### Measuring nipples for shock pulse measurement

These measuring nipples are special screws, which are mounted in a threaded hole with conical centering on the housing. A sensor can be placed on the measuring nipple to measure gear unit vibrations and to use this to assess the condition of the gear unit.

With the head shape, a reproducible positioning of the sensor is achieved for recurring measurements and the comparability of measurements is improved.



SPM nipple

## Heating

#### Overview

##### **Heating**

When the minimum oil temperature is undershot, the gear unit oil must be heated up. The ambient temperature is not relevant for this.

To reach the necessary oil temperatures, the gear unit must be heated at the customer's end using a suitable means. The following options are available to do this:

- Heating plates that are secured under the gear unit
- Use of heating covers
- Heat radiators to heat up the gear unit, especially add-on assemblies and pipes, from the outside
- Steam and hot water pipes with a constantly circulating heating medium that run alongside the gear unit
- Heating elements

Heating elements can be selected and ordered for this function for Flender FZG gear units as standard. Depending on the type, size and requirement, up to 4 heating elements can be installed in the gear unit.

The heating elements are switched (on/off) either via thermostats or temperature monitors ATH or Pt100 with control unit. The heating system must be shut down when the oil temperature reaches 20 °C.

The heating element can be replaced without any oil loss. It is necessary to observe the dismantling space for this ([see from page 10/21](#)).

In a standard scenario, the heating elements are installed on the face-end output in the housing (side 4):

##### Notes:

- Undershooting of the limit temperatures of the gear unit oil can often be prevented even without heating systems by running the gear unit load-free.
- For severely fluctuating ambient temperatures that make additional cooling necessary, a mechanical fan (mounted on the gear unit shaft) should be avoided. Electrically driven fans are especially well-suited for this scenario.



Cartridge type heating element with replaceable heating insert

#### Technical specifications

##### **Standard heating element**

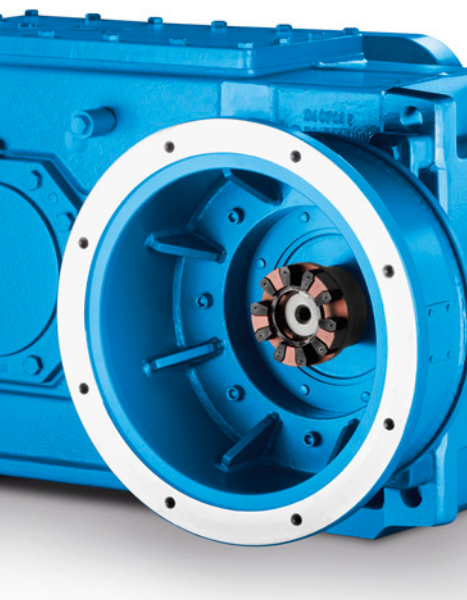
##### Heating

##### *Replaceable ceramic heating insert*

Degree of protection	IP65
Voltage	230 V
Specific heating output	0.7 W/cm <sup>2</sup>



## Options for installation and add-on parts



<b>11/2</b>	<b>Motor bell housing for IEC standard motor (EN 50347)</b>
11/2	Motor frame sizes that can be mounted
11/3	Fitting dimensions for IEC standard motors
<b>11/4</b>	<b>Motor bell housing for IEC standard motor with N-BIPEX coupling</b>
	<u>Helical gear units</u>
11/4	Type H2, gear unit sizes 4 to 12
11/6	Type H3, gear unit sizes 5 to 18
11/10	Type H4, gear unit sizes 7 to 18
	<u>Bevel helical gear units</u>
11/12	Type B2, gear unit sizes 4 to 12
11/14	Type B3, gear unit sizes 4 to 18
11/16	Type B4, gear unit sizes 5 to 18
<b>11/18</b>	<b>Motor bell housing for IEC standard motor with N-EUPEX coupling</b>
	<u>Helical gear units</u>
11/18	Type H2, gear unit sizes 4 to 14
11/20	Type H3, gear unit sizes 5 to 18
11/24	Type H4, gear unit sizes 7 to 18
	<u>Bevel helical gear units</u>
11/26	Type B2, gear unit sizes 4 to 12
11/28	Type B3, gear unit sizes 4 to 18
11/30	Type B4, gear unit sizes 5 to 18
<b>11/32</b>	<b>Vibration-damping torque reaction arm for gear unit housing</b>
11/32	Types H2, H3, H4, B2, B3, B4
<b>11/34</b>	<b>Gear unit swing base for bevel helical gear unit</b>
	<u>Types B3 and B4</u>
11/36	Article No. overview
11/38	Torque reaction arm
11/39	Motor support
11/40	Transport, ATEX
11/41	Additional options and notes
<b>11/42</b>	<b>Mounting flange - long spacer</b>
<b>11/44</b>	<b>Mounting flange - short spacer</b>
<b>11/46</b>	<b>Piggy back</b>

## Options for installation and add-on parts

Motor bell housing for IEC standard motor (EN 50347)

### Motor frame sizes that can be mounted

#### Overview

Motor bell housings allow a flange motor to be attached to the gear unit by means of a coupling without a much setup effort.

Overview of the respective largest attachable motor sizes:

Gear unit size	Type of gear unit					
	H2	H3	H4	B2	B3	B4
<b>Horizontal mounting position</b>						
<b>4</b>	200	–	–	200	200	–
<b>5/6</b>	225	225	–	225	225	160
<b>7/8</b>	280	280	180	280	280	200
<b>9/10</b>	280	280	225	280	280	225
<b>11/12</b>	315M	315M	250	315M	315M	280
<b>13/14</b>	On request	355	315M	355	355	315M
<b>15/16</b>		355	315	On request	355	355M
<b>17/18</b>		355	355 M		355	355
<b>Vertical mounting position</b>						
<b>4</b>	225	–	–	200	200	–
<b>5/6</b>	250	250	–	225	225	160
<b>7/8</b>	315M	315M	180	280	280	200
<b>9/10</b>	315M	315M	225	280	280	225
<b>11/12</b>	315M	315M	250	315M	315M	280
<b>13/14</b>	355	355	315M	355	355	315M
<b>15/16</b>	On request	355	315	On request	355	355M
<b>17/18</b>		355	355 M		355	355

#### Basis

- Recommended factor for driven machine for the gear unit
- Continuous duty
- 50 Hz, 4-pole motor; motor utilization 100%
- No downrating of the motor, e.g. due to high ambient temperatures

#### Note

Flender gear units with motor bell housings are the standard for use with flexible couplings from Flender.

The coupling types N-EUPEX B and N-BIPEX are used.

The combinations listed in the tables are the existing solutions with an especially short delivery time.

The gear unit with motor bell housing is suitable both for installing on the gear unit feet and as a shaft-mounted gear unit for connecting with a torque reaction arm.

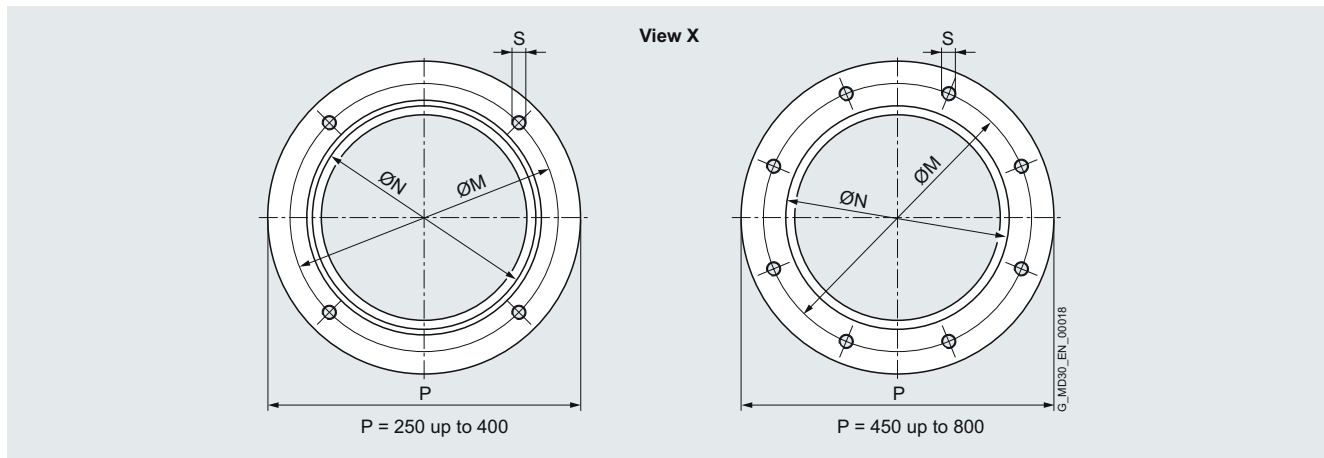
Other sizes or assignments are possible. Please contact Flender.

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor (EN 50347)

#### Fitting dimensions for IEC standard motors

#### Dimensional drawings



#### Flange dimensions

For three-phase motors with squirrel-cage rotor according to EN 50347

		Motor frame sizes											
		100L	112M	132S 132M	160M 160L	180M 180L	200L	225S 225M	250M	280S 280M	315S 315M	315L <sup>1)</sup>	
Max. power $P_N$ at 50 Hz	kW	3	4	7.5	15	22	30	45	55	90	132	200	315
ØP	mm	250	250	300	350	350	400	450	550	550	660	660	800
ØN (H7)	mm	180	180	230	250	250	300	350	450	450	550	550	680
ØM	mm	215	215	265	300	300	350	400	500	500	600	600	740
S		4 x M12				4 x M16		8 x M16			8 x M20		

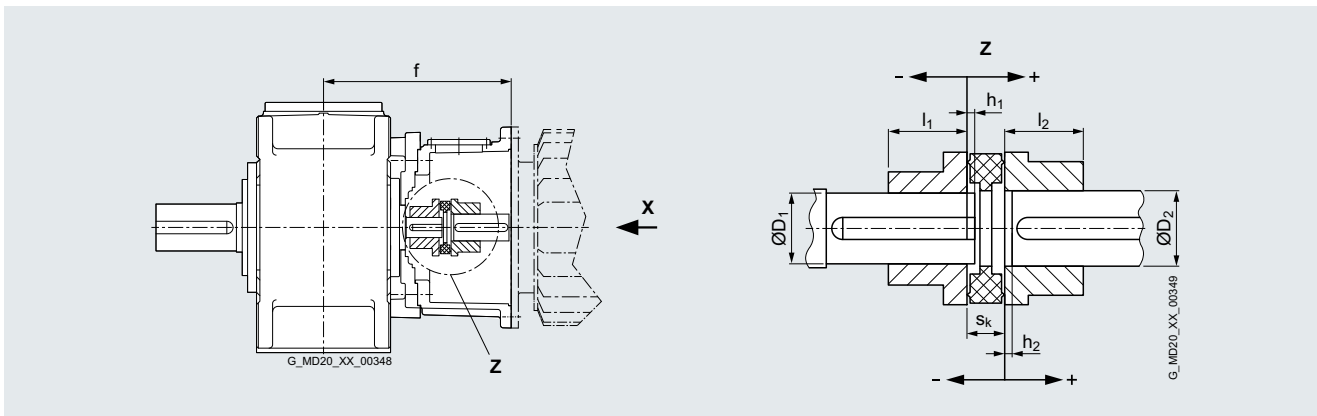
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-BIPEX coupling

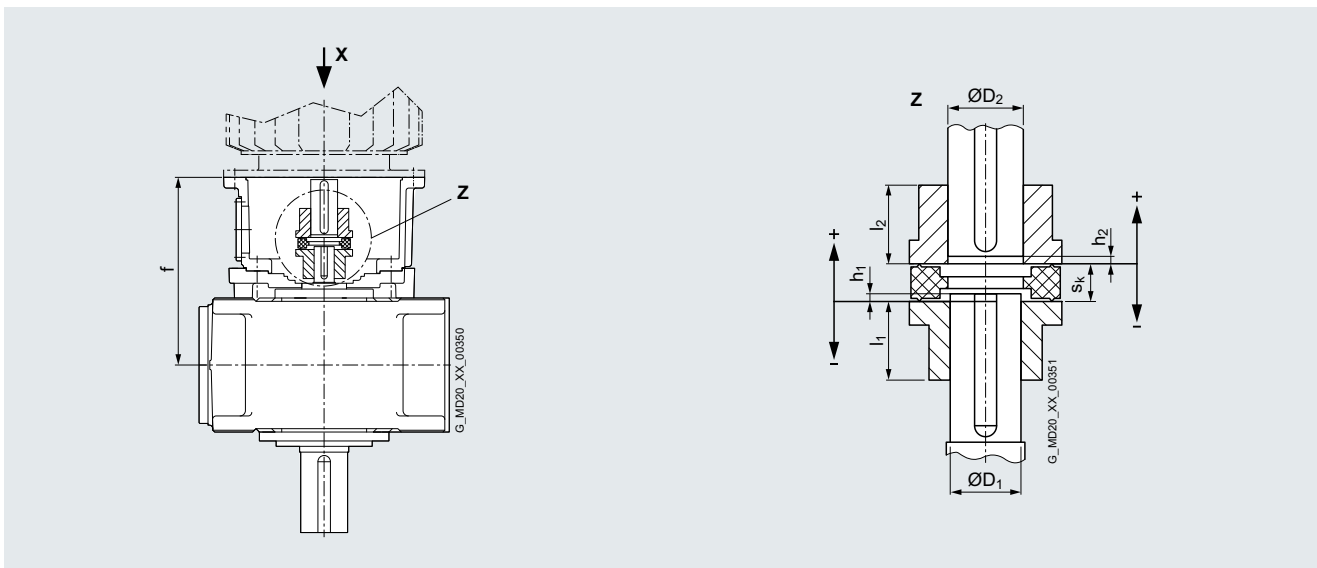
Helical gear unit, type H2, gear unit sizes 4 to 12

### Design

#### Horizontal mounting position



#### Vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure.  
For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), see page 11/3.
- Helical gear unit in design C, D, G, H, I on request only.
- Not in connection with Taconite E or labyrinth seal at the drive shaft.

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-BIPEX coupling

#### Helical gear unit, type H2, gear unit sizes 4 to 12

#### Design (continued)

Size	Dimensions in mm																			
	IEC motor <sup>1)</sup>	Ratios $i_N$ 6 - 11 (sizes 4, 5, 7, 9, 11) 8 - 14 (sizes 6, 8, 10, 12)										Ratios $i_N$ 12 - 22 (sizes 4, 5, 7, 9, 11) 16 - 28 (sizes 6, 8, 10, 12)								
		N-BIPEX BWN	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$		N-BIPEX BWN	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$
<b>4</b>	160 <sup>4)</sup>	-	-	-	-	-	-	-	-	-	<sup>8)</sup>	38	24	45	32	45	42	14	0	370
	180 <sup>4)</sup>	-	-	-	-	-	-	-	-	-	<sup>8)</sup>	38	24	45	32	45	42	14	0	370
	200 <sup>4)</sup>	-	-	-	-	-	-	-	-	-	<sup>8)</sup>	42	26	50	32	50	55	10	0	376
	225 <sup>4)</sup>	<sup>3) 8)</sup>	48	28	56	45	56	60	21	0	417	<sup>3) 8)</sup>	48	28	56	32	56	60	1	0
<b>5/6</b>	200	-	-	-	-	-	-	-	-	-	<sup>8)</sup>	42	26	50	38	50	55	9	0	402
	225 <sup>5)</sup>	-	-	-	-	-	-	-	-	-		48	28	56	38	56	60	0	0	443
	250 <sup>4)</sup>	<sup>3) 8)</sup>	55	30	65	50	65	65	20.5	0	444.5	<sup>3)</sup>	55	30	65	38	65	65	0.5	0
<b>7/8</b>	225	-	-	-	-	-	-	-	-	-	<sup>8)</sup>	48	28	56	50	56	60	14.5	0	473.5
	250 <sup>6)</sup>	-	-	-	-	-	-	-	-	-	<sup>8)</sup>	55	30	65	50	65	65	15	0	475
	280 <sup>6)</sup>	-	-	-	-	-	-	-	-	-		55 <sup>9)</sup>	30	65	50	65	75	-2	2	494
	315 <sup>2) 4)</sup>	<sup>3) 8)</sup>	65 <sup>9)</sup>	35	75	60	75	85	19	0	531	<sup>3)</sup>	65 <sup>9)</sup>	35	75	50	75	80	-3	3
<b>9/10</b>	280	-	-	-	-	-	-	-	-	-	<sup>8)</sup>	55 <sup>9)</sup>	30	65	60	65	75	20	0	530
	315 <sup>2) 7)</sup>	<sup>3) 8)</sup>	65 <sup>9)</sup>	35	75	75	75	80	19	0	566	<sup>3) 8)</sup>	65 <sup>9)</sup>	35	75	60	75	80	19	0
<b>11/12</b>	315 <sup>2)</sup>	-	-	-	-	-	-	-	-	-	<sup>8)</sup>	65 <sup>9)</sup>	35	75	70	75	80	14	0	606

1) Other gear unit and motor sizes on request.

2) Only frame sizes 315 S and 315 M.

3) Only for vertical gear units.

4) For type H2D. Version A + B, mounting not possible.

5) For type H2D. Size 5, version A + B mounting not possible.

6) For type H2D. Size 7, version A + B mounting not possible.

7) For type H2D. Size 9, version A + B mounting not possible.

8) Parallel key shortened on gear unit side.

9) Cam ring 95 ShoreA.

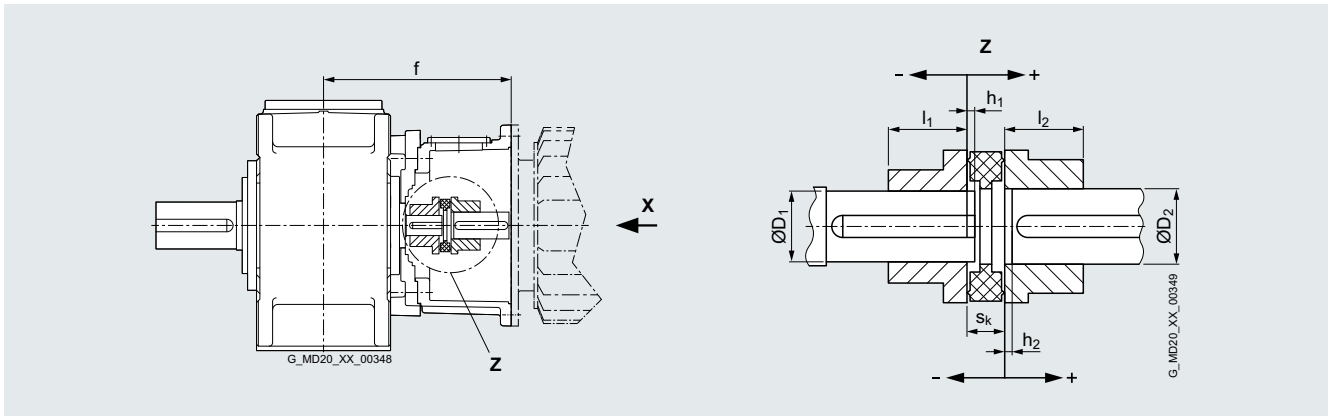
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-BIPEX coupling

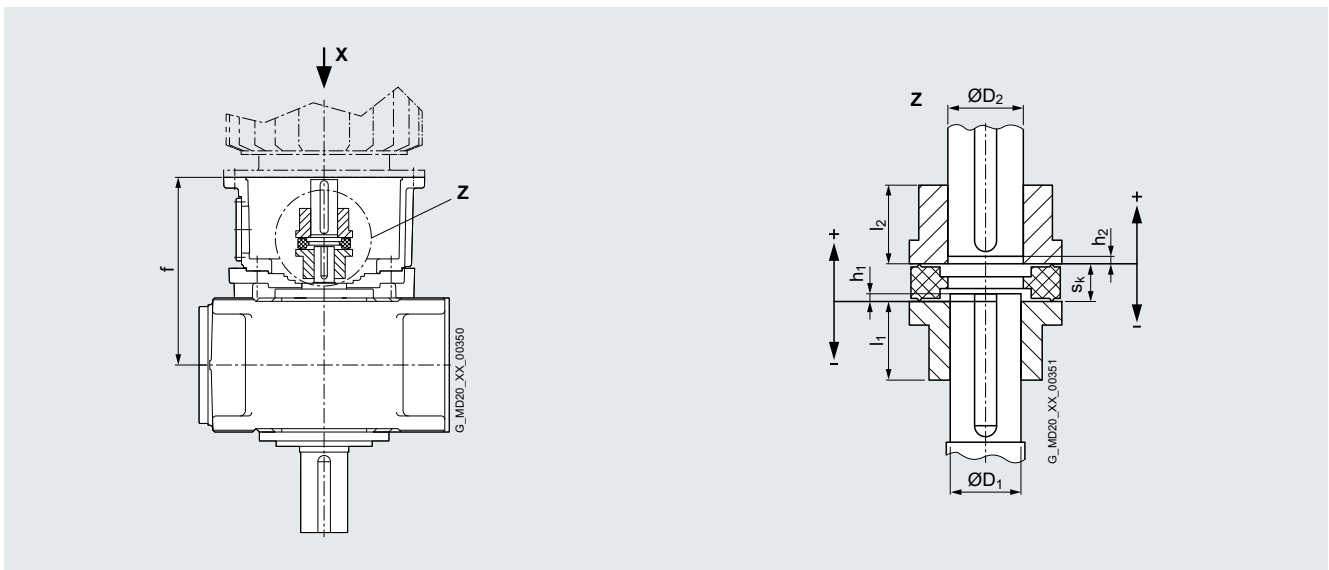
Helical gear unit, type H3, gear unit sizes 5 to 18

### Design

#### Horizontal mounting position



#### Vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure. For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), [see page 11/3](#).
- Helical gear unit in design G, H, I on request only.
- Not in connection with Taconite E or labyrinth seal at the drive shaft.

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-BIPEX coupling

#### Helical gear unit, type H3, gear unit sizes 5 to 18

#### Design (continued)

Size	Dimensions in mm																		
	IEC motor <sup>1)</sup>	N-BIPEX BWN	s <sub>k</sub>	l <sub>1</sub>	D <sub>1</sub>	l <sub>2</sub>	D <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	f	N-BIPEX BWN	s <sub>k</sub>	l <sub>1</sub>	D <sub>1</sub>	l <sub>2</sub>	D <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	f
<b>5/6</b>	132	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	160	38	24	45	40	45	42	0	0	364	<sup>6)</sup> 38	24	45	30	45	42	5	-1	338
	180	38	24	45	40	45	48	0	0	364	<sup>6)</sup> 38	24	45	30	45	48	5	-1	338
	200	<sup>6)</sup> 42	26	50	40	50	55	16	0	350	42	24	50	30	50	55	-3	3	350
	225	<sup>6)</sup> 48	28	56	40	56	60	7	0	391	–	–	–	–	–	–	–	–	–
	250	<sup>3) 4) 6)</sup> 55	30	61	40	65	65	9	0	391	–	–	–	–	–	–	–	–	–
<b>7/8</b>	160	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	180	–	–	–	–	–	–	–	–	–	<sup>6)</sup> 38	24	45	35	45	48	12	0	367
	200	42	26	50	45	50	55	-2	2	405	<sup>6)</sup> 42	26	50	35	50	55	2	0	379
	225	<sup>6)</sup> 48	28	56	45	56	60	13	0	420	48	28	56	35	56	60	-7	0	420
	250	<sup>6)</sup> 55	30	65	45	65	65	15	0	420	55	30	65	35	65	65	-5	0	420
	280	55 <sup>7)</sup>	30	65	45	65	75	-5.5	0	440.5	–	–	–	–	–	–	–	–	–
315 <sup>2)</sup>	<sup>4)</sup> 65 <sup>7)</sup>	35	75	45	75	80	-7.5	0	477.5	–	–	–	–	–	–	–	–	–	
<b>9/10</b>	180	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	200	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	225	<sup>6)</sup> 48	28	56	60	56	60	3.5	0	519.5	<sup>6)</sup> 48	28	56	45	56	60	13.5	0	484.5
	250	<sup>6)</sup> 55	30	65	60	65	65	5.5	0	519.5	<sup>6)</sup> 55	30	65	45	65	65	15.5	0	484.5
	280	<sup>6)</sup> 55 <sup>7)</sup>	30	65	60	65	75	20	0	505	55 <sup>7)</sup>	30	65	45	65	75	-2.5	2.5	505
315 <sup>2)</sup>	<sup>4) 6)</sup> 65 <sup>7)</sup>	35	75	60	75	80	15	0	545	<sup>4)</sup> 65 <sup>7)</sup>	35	75	45	75	80	-3.5	3.5	542	
<b>11/12</b>	225	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	250	–	–	–	–	–	–	–	–	–	<sup>6)</sup> 55	30	65	50	65	65	15.5	0	489.5
	280	<sup>6)</sup> 55 <sup>7)</sup>	30	65	70	65	75	5	0	540	55 <sup>7)</sup>	30	65	50	65	75	-2.5	2.5	510
	315 <sup>2)</sup>	<sup>6)</sup> 65 <sup>7)</sup>	35	75	70	75	80	3	0	577	65 <sup>7)</sup>	35	75	50	75	80	-3.5	3.5	547
<b>13/14</b>	250	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	280	–	–	–	–	–	–	–	–	–	<sup>6)</sup> 55 <sup>7)</sup>	30	65	60	65	75	16	0	599
	315 <sup>2)</sup>	<sup>6)</sup> 75	40	85	85	85	80	14	0	666	<sup>6)</sup> 65 <sup>7)</sup>	35	75	60	75	80	14	0	636
	315 (200 kW) <sup>5)</sup>	<sup>6)</sup> 75 <sup>7)</sup>	40	85	85	85	80	14	0	666	<sup>6)</sup> 75 <sup>7)</sup>	40	85	60	85	80	14	0	636
	315 (250 kW) <sup>5)</sup>	<sup>6)</sup> 75 <sup>7)</sup>	40	85	85	85	80	14	0	666	<sup>6)</sup> 75 <sup>7)</sup>	40	85	60	85	80	14	0	636
	315 (315 kW) <sup>5)</sup>	<sup>6)</sup> 75 <sup>8)</sup>	40	85	85	85	80	14	0	666	<sup>6)</sup> 75 <sup>8)</sup>	40	85	60	85	80	14	0	636
	355 (355 kW) <sup>5)</sup>	<sup>6)</sup> 75 <sup>8)</sup>	40	85	85	85	90	12	0	668	75 <sup>8)</sup>	40	85	60	85	90	-6.5	6.5	668
355 (400 kW) <sup>5)</sup>	<sup>6)</sup> 90 <sup>7)</sup>	45	100	85	100	90	17	0	668	–	–	–	–	–	–	–	–	–	

<sup>1)</sup> Other motor sizes on request.

<sup>2)</sup> Only frame sizes 315 S and 315 M.

<sup>3)</sup> Length l<sub>1</sub> of the coupling hub shortened for placement on the gear unit shaft.

<sup>4)</sup> Only for vertical gear units.

<sup>5)</sup> Non-standard motor (sizes not included in EN 50347).

<sup>6)</sup> Parallel key shortened on gear unit side.

<sup>7)</sup> Cam ring 95 ShoreA.

<sup>8)</sup> Cam ring 64 ShoreD.

## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-BIPEX coupling

### Helical gear unit, type H3, gear unit sizes 5 to 18

#### Design (continued)

Size	Dimensions in mm																		
	Ratios $i_N$										Ratios $i_H$								
IEC motor <sup>1)</sup>	N-BIPEX BWN	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	N-BIPEX BWN	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	
<b>15/16</b>	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
315 <sup>2)</sup>	-	-	-	-	-	-	-	-	-	4)	65 <sup>5)</sup>	35	75	75	75	80	11	0	684
315 (200 kW) <sup>3)</sup>	-	-	-	-	-	-	-	-	-	4)	75 <sup>5)</sup>	40	85	75	85	80	16	0	684
315 (250 kW) <sup>3)</sup>	-	-	-	-	-	-	-	-	-	4)	75 <sup>5)</sup>	40	85	75	85	80	16	0	684
315 (315 kW) <sup>3)</sup> 4)	90	45	100	100	100	80	1	0	764	4)	75 <sup>6)</sup>	40	85	75	85	80	16	0	684
355 (355 kW) <sup>3)</sup>	90	45	100	100	100	90	-1.5	1.5	768		75 <sup>6)</sup>	40	85	75	85	90	-8	8	716
355 (400 kW) <sup>3)</sup>	90 <sup>5)</sup>	45	100	100	100	90	-1.5	1.5	768		75 <sup>6)</sup>	40	85	75	85	90	-8	8	716
<b>17/18</b>	315 <sup>2)</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
315 (200 kW) <sup>3)</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
315 (250 kW) <sup>3)</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
315 (315 kW) <sup>3)</sup>	-	-	-	-	-	-	-	-	-	4)	75 <sup>6)</sup>	40	85	75	85	80	16	0	714
355 (355 kW) <sup>3)</sup>	90	45	100	100	100	90	-1.5	1.5	798		75 <sup>6)</sup>	40	85	75	85	90	-8	8	746
355 (400 kW) <sup>3)</sup>	90 <sup>5)</sup>	45	100	100	100	90	-1.5	1.5	798		75 <sup>6)</sup>	40	85	75	85	90	-8	8	746

1) Other motor sizes on request.

2) Only frame sizes 315 S and 315 M.

3) Non-standard motor (sizes not included in EN 50347).

4) Parallel key shortened on gear unit side.

5) Cam ring 95 ShoreA.

6) Cam ring 64 ShoreD.



## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-BIPEX coupling

#### Helical gear unit, type H3, gear unit sizes 5 to 18

#### Design (continued)

Size	Dimensions in mm										
	IEC motor <sup>1)</sup>	N-BIPEX BWN	s <sub>k</sub>	l <sub>1</sub>	D <sub>1</sub>	l <sub>2</sub>	D <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	f	
<b>5/6</b>	132		28	20	35	24	35	38	-1	1	302
	160		38	24	45	24	45	42	-2	2	338
	180		38	24	45	24	45	48	-2	2	338
	200		-	-	-	-	-	-	-	-	-
	225		-	-	-	-	-	-	-	-	-
	250		-	-	-	-	-	-	-	-	-
<b>7/8</b>	160	<sup>4)</sup>	38	24	45	28	45	42	2	0	367
	180	<sup>4)</sup>	38	24	45	28	45	48	2	0	367
	200		42	26	50	28	50	55	-6	2	379
	225		48	28	56	28	56	60	-17	0	420
	250		-	-	-	-	-	-	-	-	-
	280		-	-	-	-	-	-	-	-	-
	315 <sup>2)</sup>		-	-	-	-	-	-	-	-	-
<b>9/10</b>	180	<sup>4)</sup>	38	24	45	32	45	48	12.5	0	431.5
	200	<sup>4)</sup>	42	26	50	32	50	55	2.5	0	443.5
	225		48	28	56	32	56	60	-3.5	3	484.5
	250		55	30	65	32	65	65	-2.5	2	484.5
	280		-	-	-	-	-	-	-	-	-
	315 <sup>2)</sup>		-	-	-	-	-	-	-	-	-
<b>11/12</b>	225	<sup>4)</sup>	48	28	56	42	56	60	3.5	0	489.5
	250	<sup>4)</sup>	55	30	65	42	65	65	5.5	0	489.5
	280		55 <sup>5)</sup>	30	65	42	65	75	-7.5	7.5	510
	315 <sup>2)</sup>		65 <sup>5)</sup>	35	75	42	75	80	-8.5	8.5	547
<b>13/14</b>	250	<sup>4)</sup>	55	30	65	50	65	65	11.5	0	578.5
	280		55 <sup>5)</sup>	30	65	50	65	75	-4.5	4.5	599
	315 <sup>2)</sup>		65 <sup>5)</sup>	35	75	50	75	80	-5.5	5.5	636
	315 (200 kW) <sup>3)</sup>		75 <sup>5)</sup>	40	85	50	85	80	-3	3	636
	315 (250 kW) <sup>3)</sup>		75 <sup>5)</sup>	40	85	50	85	80	-3	3	636
	315 (315 kW) <sup>3)</sup>		75 <sup>6)</sup>	40	85	50	85	80	-3	3	636
	355 (355 kW) <sup>3)</sup>		-	-	-	-	-	-	-	-	-
	355 (400 kW) <sup>3)</sup>		-	-	-	-	-	-	-	-	-
<b>15/16</b>	280	<sup>4)</sup>	55 <sup>5)</sup>	30	65	60	65	75	13	0	647
	315 <sup>2)</sup>	<sup>4)</sup>	65 <sup>5)</sup>	35	75	60	75	80	11	0	684
	315 (200 kW) <sup>3)</sup>	<sup>4)</sup>	75 <sup>5)</sup>	40	85	60	85	80	16	0	684
	315 (250 kW) <sup>3)</sup>	<sup>4)</sup>	75 <sup>5)</sup>	40	85	60	85	80	16	0	684
	315 (315 kW) <sup>3)</sup>	<sup>4)</sup>	75 <sup>6)</sup>	40	85	60	85	80	16	0	684
	355 (355 kW) <sup>3)</sup>		75 <sup>6)</sup>	40	85	60	85	90	-8	8	716
	355 (400 kW) <sup>3)</sup>		75 <sup>6)</sup>	40	85	60	85	90	-8	8	716
	<b>17/18</b>	315 <sup>2)</sup>	<sup>4)</sup>	65 <sup>5)</sup>	35	75	60	75	80	11	0
315 (200 kW) <sup>3)</sup>		<sup>4)</sup>	75 <sup>5)</sup>	40	85	60	85	80	16	0	714
315 (250 kW) <sup>3)</sup>		<sup>4)</sup>	75 <sup>5)</sup>	40	85	60	85	80	16	0	714
315 (315 kW) <sup>3)</sup>		<sup>4)</sup>	75 <sup>6)</sup>	40	85	60	85	80	16	0	714
355 (355 kW) <sup>3)</sup>			75 <sup>6)</sup>	40	85	60	85	90	-8	8	746
355 (400 kW) <sup>3)</sup>			75 <sup>6)</sup>	40	85	60	85	90	-8	8	746

1) Other motor sizes on request.

2) Only frame sizes 315 S and 315 M.

3) Non-standard motor (sizes not included in EN 50347).

4) Parallel key shortened on gear unit side.

5) Cam ring 95 ShoreA.

6) Cam ring 64 ShoreD.

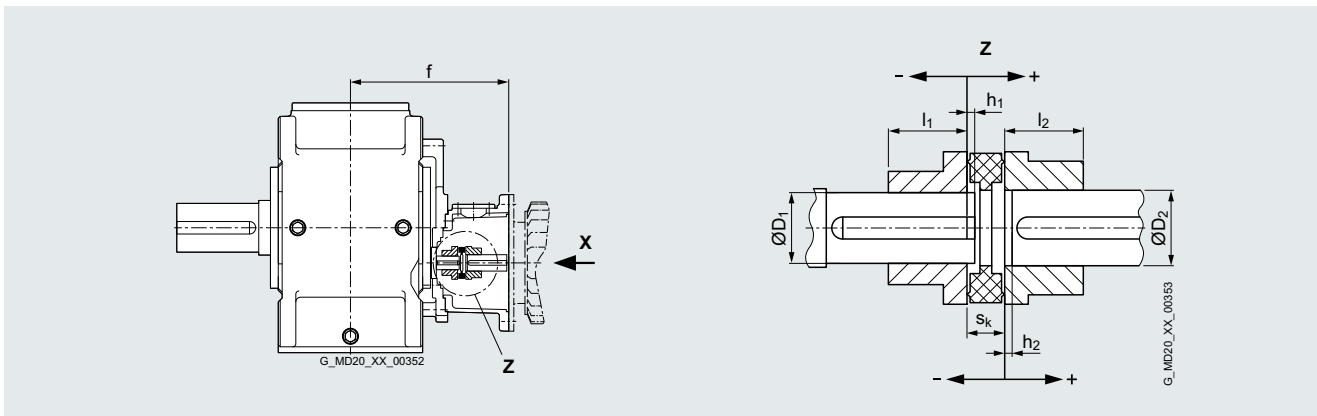
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-BIPEX coupling

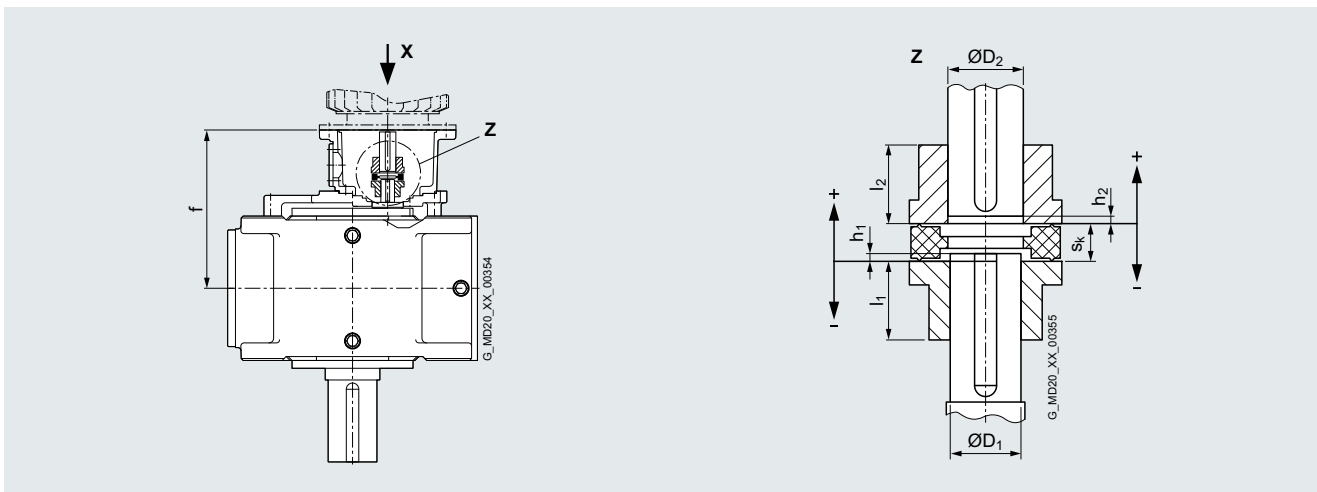
Helical gear unit, type H4, gear unit sizes 7 to 18

### Design

#### Horizontal mounting position



#### Vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure. For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), [see page 11/3](#).
- Helical gear unit in design G, H, I on request only.
- Not in connection with Taconite E or labyrinth seal at the drive shaft.

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-BIPEX coupling

#### Helical gear unit, type H4, gear unit sizes 7 to 18

#### Design (continued)

Size	Dimensions in mm																			
	IEC motor <sup>1)</sup>	N-BIPEX BWN	s <sub>k</sub>	l <sub>1</sub>	D <sub>1</sub>	l <sub>2</sub>	D <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	f	Ratio $i_N$ 100 - 180 (sizes 7, 9, 11) 125 - 224 (sizes 8, 10, 12) 100 - 180 (sizes 13, 15, 17) 125 - 224 (size 14) 112 - 200 (sizes 16, 18)	N-BIPEX BWN	s <sub>k</sub>	l <sub>1</sub>	D <sub>1</sub>	l <sub>2</sub>	D <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	f
<b>7/8</b>	100	-	-	-	-	-	-	-	-	-	<sup>4)</sup> 24	18	30	24	30	28	10	-2	296	
	112	-	-	-	-	-	-	-	-	-	<sup>4)</sup> 24	18	30	24	30	28	10	-2	296	
	132	<sup>4)</sup> 28	20	35	30	35	38	1.5	0	328.5	28	20	35	24	35	38	-4.5	4	328.5	
	160	38	24	45	30	45	42	-0.5	0	364.5	38	24	45	24	45	42	-5	5.5	364.5	
	180	38	24	45	30	45	48	-0.5	0	364.5	-	-	-	-	-	-	-	-	-	
<b>9/10</b>	132	-	-	-	-	-	-	-	-	-	28	20	35	28	35	38	-2.5	2	369.5	
	160	<sup>4)</sup> 38	24	45	35	45	42	3.5	0	405.5	38	24	45	28	45	42	-3.5	3	405.5	
	180	<sup>4)</sup> 38	24	45	35	45	48	3.5	0	405.5	38	24	45	28	45	48	-3.5	3	405.5	
	200	42	26	50	35	50	55	-3.5	3	417.5	-	-	-	-	-	-	-	-	-	
	225	48	28	56	35	56	60	-8	7.5	458.5	-	-	-	-	-	-	-	-	-	
<b>11/12</b>	160	-	-	-	-	-	-	-	-	-	<sup>4)</sup> 38	24	45	32	45	42	16.5	0	447.5	
	180	<sup>4)</sup> 38	24	45	45	45	48	10.5	0	473.5	<sup>4)</sup> 38	24	45	32	45	48	16.5	0	447.5	
	200	<sup>4)</sup> 42	26	50	45	50	55	0.5	0	485.5	<sup>4)</sup> 42	26	50	32	50	55	6.5	0	459.5	
	225	<sup>4)</sup> 48	28	56	45	56	60	17.5	0	500.5	48	28	56	32	56	60	-1.5	1	500.5	
	250	<sup>4)</sup> 55	30	65	45	65	65	16.5	0	500.5	-	-	-	-	-	-	-	-	-	
<b>13/14</b>	160	-	-	-	-	-	-	-	-	-	<sup>4)</sup> 38	24	45	38	45	42	1.5	0	517.5	
	180	-	-	-	-	-	-	-	-	-	<sup>4)</sup> 38	24	45	38	45	48	1.5	0	517.5	
	200	<sup>4)</sup> 42	26	50	50	50	55	11.5	0	529.5	<sup>4)</sup> 42	26	50	38	50	55	17.5	0	503.5	
	225	48	28	56	50	56	60	-3.5	3	579.5	<sup>4)</sup> 48	28	56	38	56	60	8.5	0	544.5	
	250	55	30	65	50	65	65	-2.5	2	579.5	<sup>4)</sup> 55	30	65	38	65	65	10.5	0	544.5	
	280	<sup>4)</sup> 55 <sup>5)</sup>	30	65	50	65	75	15	0	565	-	-	-	-	-	-	-	-	-	
	315 <sup>2)</sup>	<sup>4)</sup> 65 <sup>5)</sup>	35	75	50	75	80	8	0	602	-	-	-	-	-	-	-	-	-	
<b>15/16</b>	200	-	-	-	-	-	-	-	-	-	42	26	50	50	50	55	-4	-3.5	598.5	
	225	48	28	56	60	56	60	-0.5	0	648.5	<sup>4)</sup> 48	28	56	50	56	60	9.5	0	613.5	
	250	<sup>4)</sup> 55	30	65	60	65	65	1.5	0	648.5	<sup>4)</sup> 55	30	65	50	65	65	11.5	0	613.5	
	280	<sup>4)</sup> 55 <sup>5)</sup>	30	65	60	65	75	16	0	634	<sup>5)</sup> 55 <sup>5)</sup>	30	65	50	65	75	-9	9	634	
	315 <sup>2)</sup>	<sup>4)</sup> 65 <sup>5)</sup>	35	75	60	75	80	14	0	671	<sup>5)</sup> 65 <sup>5)</sup>	35	75	50	75	80	-5.5	5.5	671	
	315 (200 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>5)</sup>	40	85	60	85	80	19	0	671	-	-	-	-	-	-	-	-	-	
	315 (250 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>5)</sup>	40	85	60	85	80	19	0	671	-	-	-	-	-	-	-	-	-	
	315 (315 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>6)</sup>	40	85	60	85	80	19	0	671	-	-	-	-	-	-	-	-	-	
<b>17/18</b>	225	-	-	-	-	-	-	-	-	-	<sup>4)</sup> 48	28	56	50	56	60	4.5	0	623.5	
	250	-	-	-	-	-	-	-	-	-	<sup>4)</sup> 55	30	65	50	65	65	6.5	0	623.5	
	280	<sup>4)</sup> 55 <sup>5)</sup>	30	65	60	65	75	11	0	644	<sup>5)</sup> 55 <sup>5)</sup>	30	65	50	65	75	-7	7	644	
	315 <sup>2)</sup>	<sup>4)</sup> 65 <sup>5)</sup>	35	75	60	75	80	9	0	681	<sup>5)</sup> 65 <sup>5)</sup>	35	75	50	75	80	-8	8	681	
	315 (200 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>5)</sup>	40	85	60	85	80	14	0	681	-	-	-	-	-	-	-	-	-	
	315 (250 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>5)</sup>	40	85	60	85	80	14	0	681	-	-	-	-	-	-	-	-	-	
	315 (315 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>6)</sup>	40	85	60	85	80	14	0	681	-	-	-	-	-	-	-	-	-	
	355 (355 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>6)</sup>	40	85	60	85	90	-9	9	713	-	-	-	-	-	-	-	-	-	

<sup>1)</sup> Other motor sizes on request.

<sup>2)</sup> Only frame sizes 315 S and 315 M.

<sup>3)</sup> Non-standard motor (sizes not included in EN 50347).

<sup>4)</sup> Parallel key shortened on gear unit side.

<sup>5)</sup> Cam ring 95 ShoreA.

<sup>6)</sup> Cam ring 64 ShoreD.

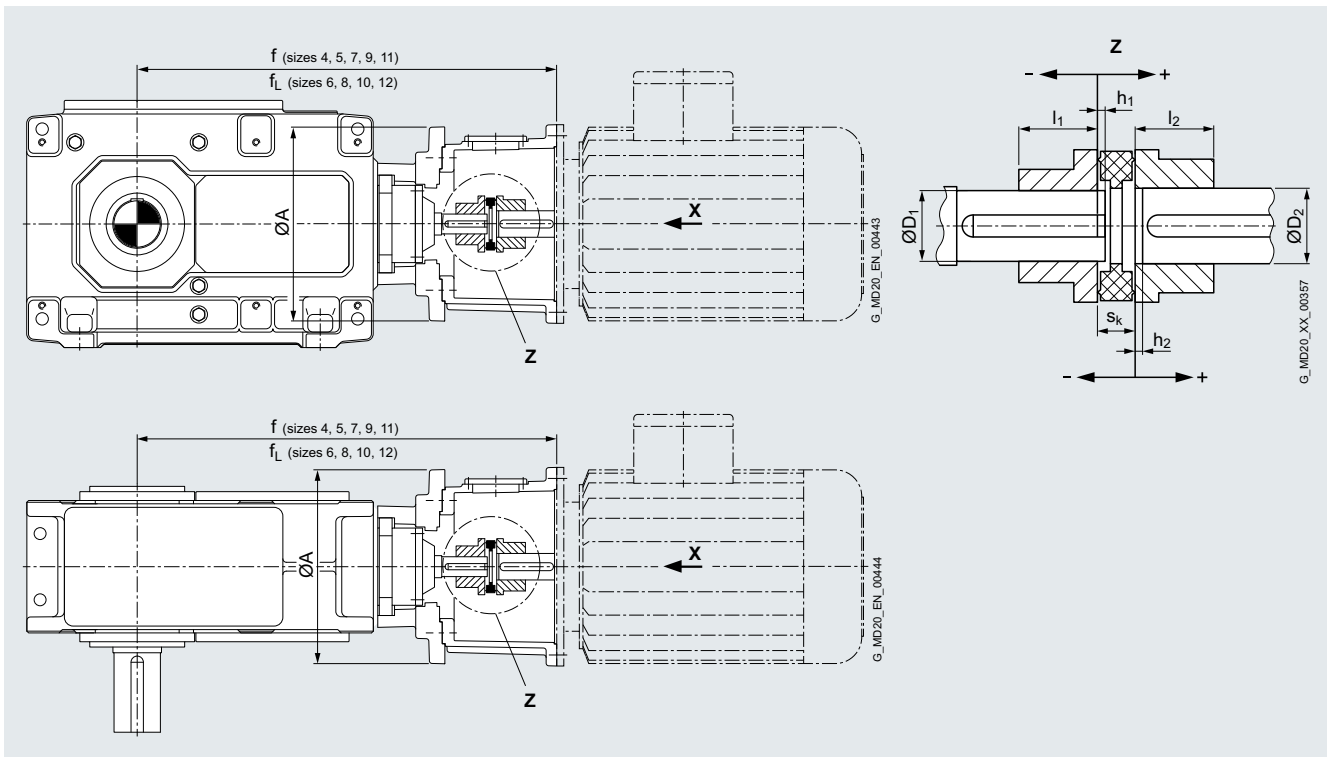
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-BIPEX coupling

Bevel helical gear unit, type B2, gear unit sizes 4 to 12

### Design

#### Horizontal and vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure. For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), see page 11/3.
- Not in connection with Taconite E or labyrinth seal at the drive shaft.

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-BIPEX coupling

#### Bevel helical gear unit, type B2, gear unit sizes 4 to 12

#### Design (continued)

Size	Dimensions in mm																					
	Ratios $i_N$ 5 - 11.2 (sizes 4, 5, 7, 9, 11) 6.3 - 14 (sizes 6, 8, 10, 12)													Ratios $i_N$ 12.5 - 18 (sizes 4, 5, 7, 9, 11) 16 - 22.4 (sizes 6, 8, 10, 12)								
IEC motor <sup>1)</sup>	N-BIPEX BWN	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	$f_L$	$A$	N-BIPEX BWN	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	$f_L$	$A$
<b>4</b>	180	-	-	-	-	-	-	-	-	-	-	38	24	45	35	45	48	0.5	0	678.5	-	350
	200	<sup>3)</sup> 42	26	50	45	50	55	16.5	0	684.5	-	350	42	26	50	35	50	55	-2	1.5	684.5	-
<b>5/6</b>	200	-	-	-	-	-	-	-	-	-	-	<sup>3)</sup> 42	26	50	40	50	55	7.5	0	763.5	798.5	350
	225	-	-	-	-	-	-	-	-	-	-	48	28	56	40	56	60	-1.5	0	804.5	839.5	350
<b>7/8</b>	250	-	-	-	-	-	-	-	-	-	-	<sup>3)</sup> 55	30	65	50	65	65	5	0	915	960	440
	280	<sup>3)</sup> 55 <sup>4)</sup>	30	65	70	65	75	11	0	934	979	440	55 <sup>4)</sup>	30	65	50	65	75	-7	7	934	979
<b>9/10</b>	280	-	-	-	-	-	-	-	-	-	-	55 <sup>4)</sup>	30	65	60	65	75	-4.5	4.5	1074	1124	445
<b>11/12</b>	315 <sup>2)</sup>	-	-	-	-	-	-	-	-	-	-	<sup>3)</sup> 65 <sup>4)</sup>	35	75	70	75	80	14	0	1256	1326	520

<sup>1)</sup> Other gear unit and motor sizes on request.

<sup>2)</sup> Only frame sizes 315 S and 315 M.

<sup>3)</sup> Parallel key shortened on gear unit side.

<sup>4)</sup> Cam ring 95 ShoreA.

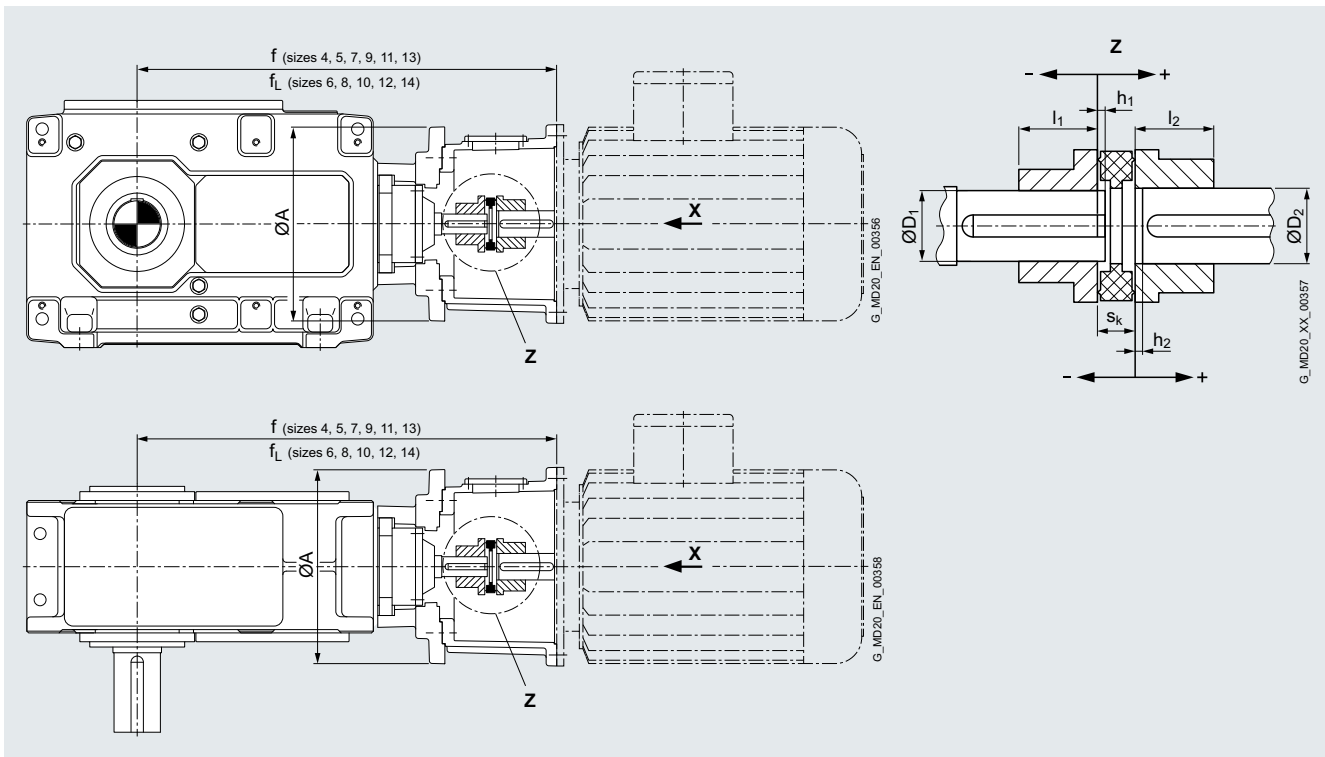
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-BIPEX coupling

Bevel helical gear unit, type B3, gear unit sizes 4 to 18

### Design

#### Horizontal and vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure. For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), see page 11/3.
- Not in connection with Taconite E or labyrinth seal at the drive shaft.

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-BIPEX coupling

#### Bevel helical gear unit, type B3, gear unit sizes 4 to 18

#### Design (continued)

Size	Dimensions in mm																								
	Ratios $i_N$ 12.5 - 45 (sizes 4, 5, 7, 9, 10) 16 - 56 (sizes 6, 8, 10, 12) 12.5 - 45 (sizes 13, 15, 17) 16 - 56 (size 14) 14 - 50 (sizes 16, 18)											Ratios $i_N$ 50 - 71 (sizes 4, 5, 7, 9, 10) 63 - 90 (sizes 6, 8, 10, 12) 50 - 71 (sizes 13, 15, 17) 63 - 90 (size 14) 56 - 80 (sizes 16, 18)													
IEC motor <sup>1)</sup>	N-BIPEX BWN	s <sub>k</sub>	l <sub>1</sub>	D <sub>1</sub>	l <sub>2</sub>	D <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	f	f <sub>L</sub>	A	N-BIPEX BWN	s <sub>k</sub>	l <sub>1</sub>	D <sub>1</sub>	l <sub>2</sub>	D <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	f	f <sub>L</sub>	A			
<b>4</b>	132	–	–	–	–	–	–	–	–	–	–	4)	28	20	35	25	35	38	13.5	0	646.5	–	250		
	160	38	24	45	30	45	42	-4.5	0	708.5	–	250	4)	38	24	45	25	45	42	11.5	0	682.5	–	250	
	180	38	24	45	30	45	48	-4.5	0	708.5	–	250	4)	38	24	45	25	45	48	11.5	0	682.5	–	250	
	200	4)	42	26	50	30	50	55	12	0	694.5	–	250	–	–	–	–	–	–	–	–	–	–	–	
<b>5/6</b>	160	4)	38	24	45	35	45	42	18	0	771.5	806.5	350	4)	38	24	45	28	45	42	-2.5	0	771.5	806.5	350
	180	4)	38	24	45	35	45	48	18	0	771.5	806.5	350	4)	38	24	45	28	45	48	-2.5	0	771.5	806.5	350
	200	4)	42	26	50	35	50	55	7.5	0	783.5	818.5	350	4)	42	26	50	28	50	55	-13	0	783.5	818.5	350
	225	48	28	56	35	56	60	-1.5	0	824.5	859.5	350	–	–	–	–	–	–	–	–	–	–	–	–	
<b>7/8</b>	160	–	–	–	–	–	–	–	–	–	–	–	38	24	45	35	45	42	0.5	0	903.5	948.5	440		
	180	–	–	–	–	–	–	–	–	–	–	–	38	24	45	35	45	48	0.5	0	903.5	948.5	440		
	200	4)	42	26	50	45	50	55	17	0	909.5	954.5	440	42	26	50	35	50	55	-3.5	0	909.5	954.5	440	
	225	4)	48	28	56	45	56	60	7.5	0	950.5	995.5	440	4)	48	28	56	35	56	60	2.5	0	935.5	980.5	440
	250	4)	55	30	65	45	65	65	8	0	952	997	440	4)	55	30	65	35	65	65	5	0	935.5	980.5	440
	280	55 <sup>5)</sup>	30	65	45	65	75	-6	5	971	1016	440	–	–	–	–	–	–	–	–	–	–	–	–	
<b>9/10</b>	200	–	–	–	–	–	–	–	–	–	–	–	4)	42	26	50	40	50	55	1.5	0	1034.5	1084.5	440	
	225	4)	48	28	56	55	56	60	1.5	0	1075.5	1125.5	440	48	28	56	40	56	60	-7.5	0	1075.5	1125.5	440	
	250	4)	55	30	65	55	65	65	3	0	1077	1127	440	55	30	65	40	65	65	-7	0	1077	1127	440	
	280	55 <sup>5)</sup>	30	65	55	65	75	-8	8	1096	1146	440	55 <sup>5)</sup>	30	65	40	65	75	-6	0	1076	1126	440		
<b>11/12</b>	225	–	–	–	–	–	–	–	–	–	–	–	48	28	56	50	56	60	-5.5	0	1243.5	1313.5	440		
	250	4)	55	30	65	70	65	65	5	0	1260	1330	440	55	30	65	50	65	65	-3.5	0	1243.5	1313.5	440	
	280	55 <sup>5)</sup>	30	65	70	65	75	-7	7	1279	1349	440	4)	55 <sup>5)</sup>	30	65	50	65	75	11	0	1229	1299	440	
	315 <sup>2)</sup>	65 <sup>5)</sup>	35	75	70	75	80	-8	8	1316	1386	440	4)	65 <sup>5)</sup>	35	75	50	75	80	0	9	1266	1336	440	
<b>13/14</b>	280	–	–	–	–	–	–	–	–	–	–	–	4)	55 <sup>5)</sup>	30	65	60	65	75	11	0	1424	1494	650	
	315 <sup>2)</sup>	65 <sup>5)</sup>	35	75	80	75	80	14	0	1481	1551	445	4)	65 <sup>5)</sup>	35	75	60	80	80	9	0	1461	1531	650	
	315 (200 kW) <sup>3)</sup>	4)	75 <sup>5)</sup>	40	85	80	85	80	14	0	1481	1551	445	4)	75 <sup>5)</sup>	40	85	60	90	80	9	0	1461	1531	650
	315 (250 kW) <sup>3)</sup>	4)	75 <sup>5)</sup>	40	85	80	85	80	14	0	1481	1551	445	4)	75 <sup>5)</sup>	40	85	60	90	80	9	0	1461	1531	650
	315 (315 kW) <sup>3)</sup>	4)	75 <sup>6)</sup>	40	85	80	85	80	14	0	1481	1551	445	4)	75 <sup>6)</sup>	40	85	60	100	80	9	0	1461	1531	650
	355 (355 kW) <sup>3)</sup>	On request											On request												
	355 (400 kW) <sup>3)</sup>	On request											On request												
<b>15/16</b>	315 <sup>2)</sup>	–	–	–	–	–	–	–	–	–	–	–	4)	65 <sup>5)</sup>	35	75	70	75	80	12	0	1700	1746	650	
	315 (200 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–	–	–	4)	75 <sup>5)</sup>	40	85	70	85	80	17	0	1700	1746	650	
	315 (250 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–	–	–	4)	75 <sup>5)</sup>	40	85	70	85	80	17	0	1700	1746	650	
	315 (315 kW) <sup>3)</sup>	75 <sup>6)</sup>	40	85	90	85	80	-8	0	1750	1796	650	4)	75 <sup>6)</sup>	40	85	70	85	80	17	0	1700	1746	650	
	355 (355 kW) <sup>3)</sup>	On request											On request												
	355 (400 kW) <sup>3)</sup>	On request											On request												
<b>17/18</b>	315 (200 kW) <sup>3)</sup>	On request											On request												
	315 (250 kW) <sup>3)</sup>	On request											On request												
	315 (315 kW) <sup>3)</sup>	On request											On request												
	355 (355 kW) <sup>3)</sup>	On request											On request												
	355 (400 kW) <sup>3)</sup>	On request											On request												

1) Other motor sizes on request.

2) Only frame sizes 315 S and 315 M.

3) Non-standard motor (sizes not included in EN 50347).

4) Parallel key shortened on gear unit side.

5) Cam ring 95 ShoreA.

6) Cam ring 64 ShoreD.

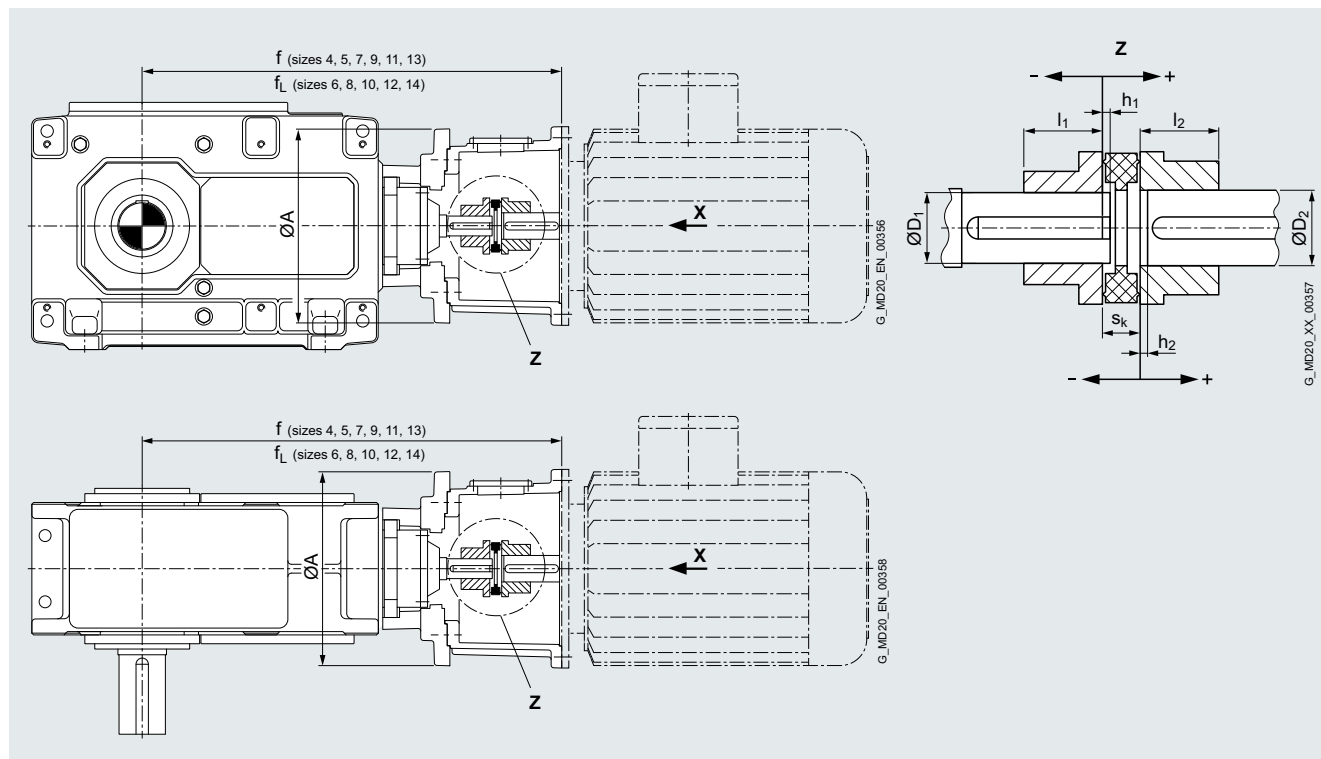
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-BIPEX coupling

Bevel helical gear unit, type B4, gear unit sizes 5 to 18

### Design

#### Horizontal and vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure. For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), see page 11/3.
- Not in connection with Taconite E or labyrinth seal at the drive shaft.



**Options for installation and add-on parts**  
 Motor bell housing for IEC standard motor with N-BIPEX coupling

**Bevel helical gear unit, type B4, gear unit sizes 5 to 18**

**Design (continued)**

Size	Dimensions in mm																						
	Ratios $i_N$ 80 - 180 (sizes 5, 7, 9, 11) 100 - 224 (sizes 6, 8, 10, 12) 80 - 180 (sizes 13, 15, 17) 100 - 224 (size 14) 90 - 200 (sizes 16, 18)										Ratios $i_N$ 200 - 315 (sizes 5, 7, 9, 11) 250 - 400 (sizes 6, 8, 10, 12) 200 - 315 (sizes 13, 15, 17) 250 - 400 (size 14) 224 - 355 (sizes 16, 18)												
IEC motor <sup>1)</sup>	N-BIPEX BWN	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	$f_L$	A	N-BIPEX BWN	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	$f_L$	A	
<b>5/6</b>	100	-	-	-	-	-	-	-	-	-	-	<sup>4)</sup> 24	18	25	20	25	28	8	0	735	770	250	
	112	24	18	25	28	25	28	-1	1	750	785	250	<sup>4)</sup> 24	18	25	20	25	28	8	0	735	770	250
	132	<sup>4)</sup> 28	20	35	28	35	38	2.5	0	767.5	802.5	250	<sup>4)</sup> 28	20	35	20	35	38	2.5	0	767.5	802.5	250
	160	<sup>4)</sup> 38	24	45	28	45	42	1.5	0	802.5	837.5	250	-	-	-	-	-	-	-	-	-	-	-
<b>7/8</b>	112	-	-	-	-	-	-	-	-	-	-	<sup>4)</sup> 24	18	25	25	25	28	8	0	855	900	250	
	132	<sup>4)</sup> 28	20	35	30	35	38	7.5	0	887.5	932.5	250	<sup>4)</sup> 28	20	35	25	35	38	13	0	872.5	917.5	250
	160	38	24	45	30	45	42	-2.5	2	933.5	978.5	250	<sup>4)</sup> 38	24	45	25	45	42	12	0	907.5	952.5	250
	180	38	24	45	30	45	48	-4.5	2.5	933.5	978.5	250	-	-	-	-	-	-	-	-	-	-	-
	200	<sup>4)</sup> 42	26	50	30	50	55	11.5	0	919.5	964.5	250	-	-	-	-	-	-	-	-	-	-	-
<b>9/10</b>	132	-	-	-	-	-	-	-	-	-	-	<sup>4)</sup> 28	20	35	28	35	38	1.5	0	1001.5	1051.5	350	
	160	<sup>4)</sup> 38	24	45	35	45	42	17.5	0	1036.5	1086.5	350	38	24	45	28	45	42	-1.5	1	1036.5	1086.5	350
	180	<sup>4)</sup> 38	24	45	35	45	48	17.5	0	1036.5	1086.5	350	38	24	45	28	45	48	-1.5	1	1036.5	1086.5	350
	200	<sup>4)</sup> 42	26	50	35	50	55	7.5	0	1048.5	1098.5	350	-	-	-	-	-	-	-	-	-	-	-
	225	48	28	56	35	56	60	-1	0.5	1089.5	1139.5	350	-	-	-	-	-	-	-	-	-	-	-
<b>11/12</b>	160	-	-	-	-	-	-	-	-	-	-	38	24	45	35	45	42	0.5	0	1223.5	1293.5	440	
	180	38	24	45	45	45	48	-3	2.5	1249.5	1319.5	440	38	24	45	35	45	48	0.5	0	1223.5	1293.5	440
	200	<sup>4)</sup> 42	26	50	45	50	55	16.5	0	1229.5	1299.5	440	42	26	50	35	50	55	-2	-1.5	1229.5	1299.5	440
	225	<sup>4)</sup> 48	28	56	45	56	60	7.5	0	1270.5	1340.5	440	48	28	56	35	56	60	-6.5	6	1270.5	1340.5	440
	250	<sup>4)</sup> 55	30	65	45	65	65	8	0	1272	1342	440	-	-	-	-	-	-	-	-	-	-	-
	280	55 <sup>5)</sup>	30	65	45	65	75	-5.5	-5.5	1291	1361	440	-	-	-	-	-	-	-	-	-	-	-
<b>13/14</b>	180	-	-	-	-	-	-	-	-	-	-	<sup>4)</sup> 38	24	45	40	45	48	5.5	0	1398.5	1468.5	440	
	200	<sup>4)</sup> 42	26	50	55	50	55	11.5	0	1404.5	1474.5	440	<sup>4)</sup> 42	26	50	40	50	55	1.5	0	1404.5	1474.5	440
	225	<sup>4)</sup> 48	28	56	55	56	60	2.5	0	1445.5	1515.5	440	48	28	56	40	56	60	-4	3.5	1445.5	1515.5	440
	250	<sup>4)</sup> 55	30	65	55	65	65	3	0	1447	1517	440	55	30	65	40	65	65	-3.5	3.5	1447	1517	440
	280	<sup>4)</sup> 55 <sup>5)</sup>	30	65	55	65	75	4	0	1446	1516	440	55 <sup>5)</sup>	30	65	40	65	75	-3	3	1446	1516	440
	315 <sup>2)</sup>	<sup>4)</sup> 65 <sup>5)</sup>	35	75	55	75	80	2	0	1483	1553	440	-	-	-	-	-	-	-	-	-	-	-
	315 (200 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>5)</sup>	40	85	55	85	80	2	0	1483	1553	440	-	-	-	-	-	-	-	-	-	-	-
	315 (250 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>5)</sup>	40	85	55	85	80	2	0	1483	1553	440	-	-	-	-	-	-	-	-	-	-	-
<b>15/16</b>	200	-	-	-	-	-	-	-	-	-	-	42	26	50	50	50	55	-6	5.5	1659.5	1705.5	440	
	225	<sup>4)</sup> 55	30	65	70	65	60	6.5	0	1700.5	1746.5	440	48	28	56	50	56	60	-3	2.5	1685.5	1731.5	440
	250	<sup>4)</sup> 55	30	65	70	65	65	5	0	1702	1748	440	55	30	65	50	65	65	-2	1.5	1685.5	1731.5	440
	280	55 <sup>5)</sup>	30	65	70	65	75	-7	7	1721	1767	440	<sup>4)</sup> 55 <sup>5)</sup>	30	65	50	65	75	11	0	1671	1717	440
	315 <sup>2)</sup>	<sup>4)</sup> 65 <sup>5)</sup>	35	75	70	75	80	4	0	1738	1784	440	<sup>4)</sup> 65 <sup>5)</sup>	35	75	50	75	80	9	0	1708	1754	440
	315 (200 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>5)</sup>	40	85	70	85	80	9	0	1738	1784	440	-	-	-	-	-	-	-	-	-	-	-
	315 (250 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>5)</sup>	40	85	70	85	80	9	0	1738	1784	440	-	-	-	-	-	-	-	-	-	-	-
	315 (315 kW) <sup>3)</sup>	<sup>4)</sup> 75 <sup>6)</sup>	40	85	70	85	80	9	0	1738	1784	440	-	-	-	-	-	-	-	-	-	-	-
	355 (355 kW) <sup>3)</sup>	<sup>4)</sup> On request	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	<b>17/18</b>	225	-	-	-	-	-	-	-	-	-	-	48	28	56	50	56	60	-3	2.5	1733.5	1793.5	440
250		-	-	-	-	-	-	-	-	-	-	55	30	65	50	65	65	-2	1.5	1733.5	1793.5	440	
280		55 <sup>5)</sup>	30	65	70	65	75	-7	7	1769	1829	440	<sup>4)</sup> 55 <sup>5)</sup>	30	65	50	65	75	12	0	1718.5	1778.5	440
315 <sup>2)</sup>		<sup>4)</sup> 65 <sup>5)</sup>	35	75	70	75	80	14	0	1776	1836	440	<sup>4)</sup> 65 <sup>5)</sup>	35	75	50	75	80	9	0	1756	1816	440
315 (200 kW) <sup>3)</sup>		<sup>4)</sup> 75 <sup>5)</sup>	40	85	70	85	80	19	0	1776	1836	440	<sup>4)</sup> 75 <sup>5)</sup>	40	85	70	85	80	14	0	1756	1816	440
315 (250 kW) <sup>3)</sup>		<sup>4)</sup> 75 <sup>5)</sup>	40	85	70	85	80	19	0	1776	1836	440	<sup>4)</sup> 75 <sup>5)</sup>	40	85	70	85	80	14	0	1756	1816	440
315 (315 kW) <sup>3)</sup>		<sup>4)</sup> 75 <sup>6)</sup>	40	85	70	85	80	19	0	1776	1836	440	-	-	-	-	-	-	-	-	-	-	-
355 (355 kW) <sup>3)</sup>		On request	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
355 (400 kW) <sup>3)</sup>	On request	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

1) Other motor sizes on request.  
 2) Only frame sizes 315 S and 315 M.  
 3) Non-standard motor (sizes not included in EN 50347).  
 4) Parallel key shortened on gear unit side.  
 5) Cam ring 95 ShoreA.  
 6) Cam ring 64 ShoreD.



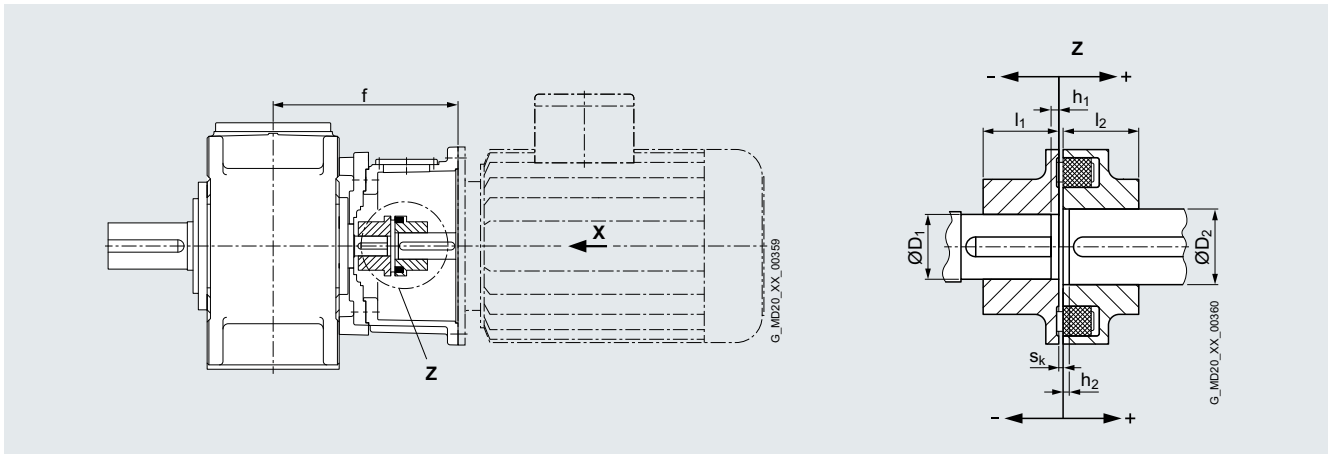
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-EUPEX coupling

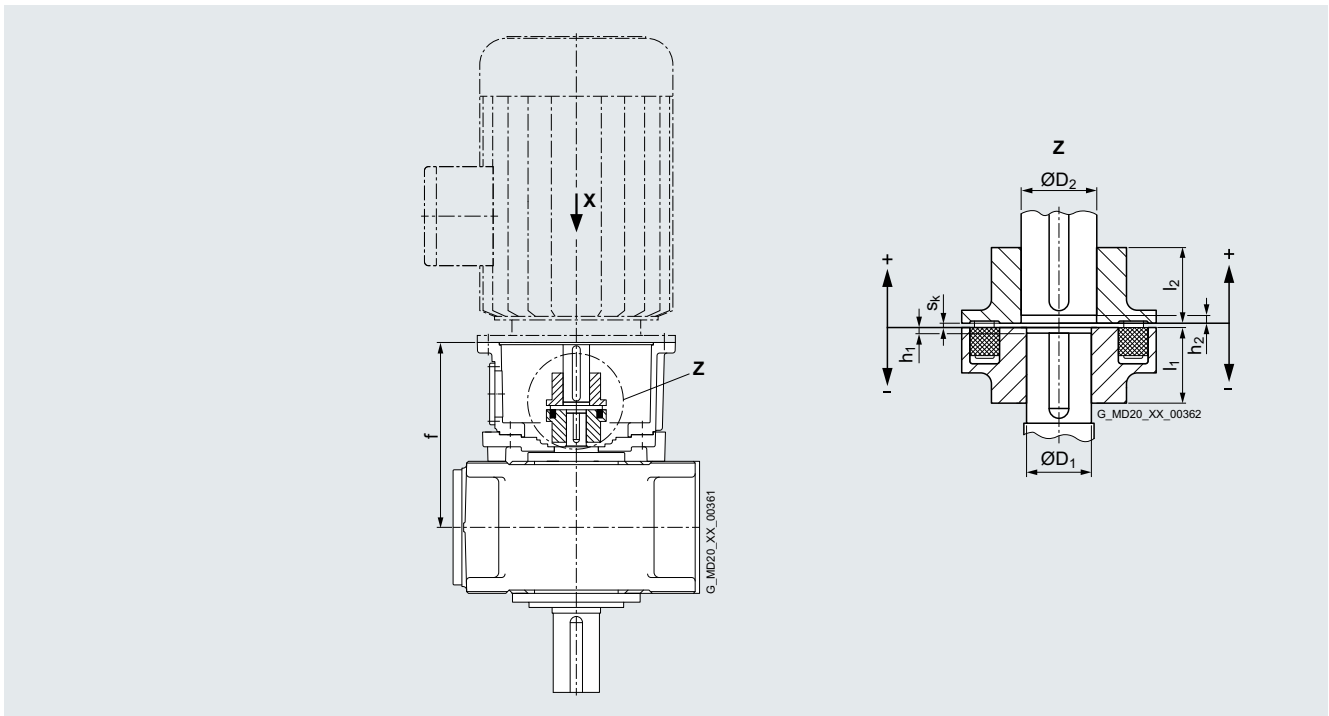
Helical gear unit, type H2, gear unit sizes 4 to 14

### Design

#### Horizontal mounting position



#### Vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure.  
For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), [see page 11/3](#).
- Helical gear unit in design C, D, G, H, I on request only.
- Not in connection with Taconite E or labyrinth seal at the drive shaft.

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-EUPEX coupling

#### Helical gear unit, type H2, gear unit sizes 4 to 14

#### Design (continued)

Size	Dimensions in mm																		
	Ratios $i_N$ 6 - 11 (sizes 4, 5, 7, 9, 11) 8 - 14 (sizes 6, 8, 10, 12)										Ratios $i_N$ 12 - 22 (sizes 4, 5, 7, 9, 11) 16 - 28 (sizes 6, 8, 10, 12)								
IEC motor <sup>1)</sup>	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	
<b>4</b>	160 <sup>4)</sup>	–	–	–	–	–	–	–	–	–	B125	3	50	32	50	42	0	7	370
	180 <sup>4)</sup>	–	–	–	–	–	–	–	–	–	B140	3	55	32	55	48	0	7	370
	200 <sup>4)</sup>	–	–	–	–	–	–	–	–	–	B160	4	60	32	60	55	0	12	376
	225 <sup>4)</sup>	<sup>3)</sup> B180	4	70	45	70	60	0	3	417	<sup>3)</sup> B180	4	70	32	70	60	0	8	402
<b>5/6</b>	200	–	–	–	–	–	–	–	–	–	B160	4	60	38	60	55	0	13	402
	225 <sup>5)</sup>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	250 <sup>4)</sup>	<sup>3)</sup> B180	4	70	50	70	65	0	5.5	444.5	<sup>3)</sup> B180	4	70	38	70	65	0	9	428
<b>7/8</b>	225	–	–	–	–	–	–	–	–	–	B180	4	70	50	70	60	0	9.5	473.5
	250 <sup>6)</sup>	–	–	–	–	–	–	–	–	–	B180	4	70	50	70	65	0	11	475
	280 <sup>6)</sup>	–	–	–	–	–	–	–	–	–	B200	4	80	50	80	75	0	10	474
	315 <sup>2) 4)</sup>	<sup>3)</sup> B225	4	90	60	90	80	0	12	531	<sup>3)</sup> B250	5.5	100	50	100	80	0	15.5	511
<b>9/10</b>	280	–	–	–	–	–	–	–	–	–	B200	4	80	60	80	75	0	5	530
	315 <sup>2) 7)</sup>	<sup>3)</sup> B225	4	90	75	90	80	-3	9	566	<sup>3)</sup> B225	4	90	60	90	80	0	12	566
<b>11/12</b>	315 <sup>2)</sup>	–	–	–	–	–	–	–	–	–	B225	4	90	70	90	80	0	17	606
Size	Ratios $i_N$ 12 - 20 (size 13) 16 - 25 (size 14)																		
IEC motor <sup>1)</sup>	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$										
<b>13/14</b>	355 (355 kW) <sup>8)</sup>	<sup>3)</sup> B280	5.5	110	85	110	90	-1	16.5	693									
	355 (400 kW) <sup>8)</sup>	<sup>3)</sup> B280	5.5	110	85	110	90	-1	16.5	693									

<sup>1)</sup> Other motor sizes on request.

<sup>2)</sup> Only frame sizes 315 S and 315 M.

<sup>3)</sup> Only for vertical gear units.

<sup>4)</sup> For type H2D. Version A + B, mounting not possible.

<sup>5)</sup> For type H2D. Size 5, version A + B mounting not possible.

<sup>6)</sup> For type H2D. Size 7, version A + B mounting not possible.

<sup>7)</sup> For type H2D. Size 9, version A + B mounting not possible.

<sup>8)</sup> Non-standard motor (sizes not included in EN 50347).

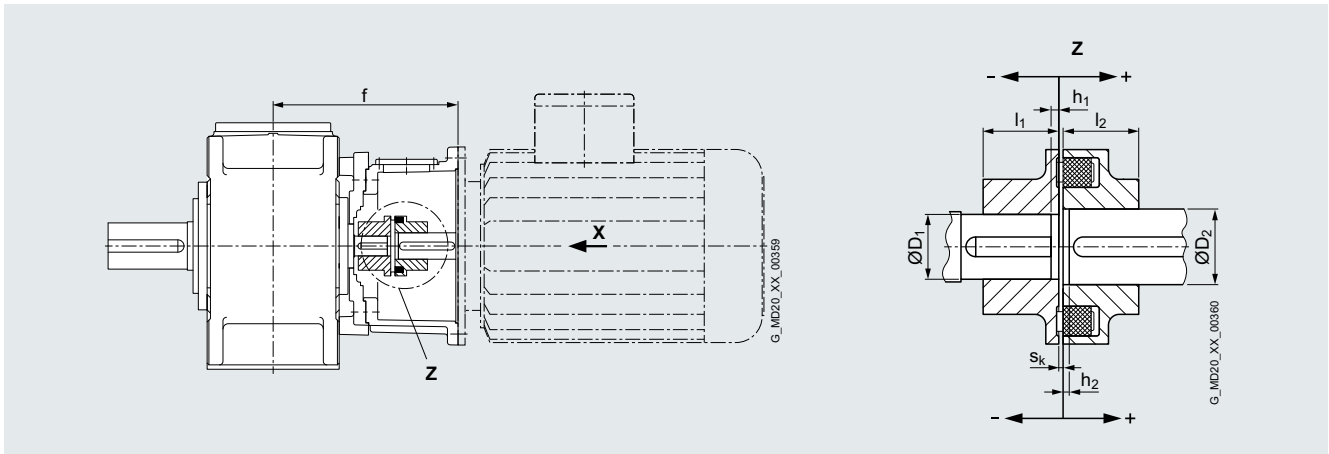
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-EUPEX coupling

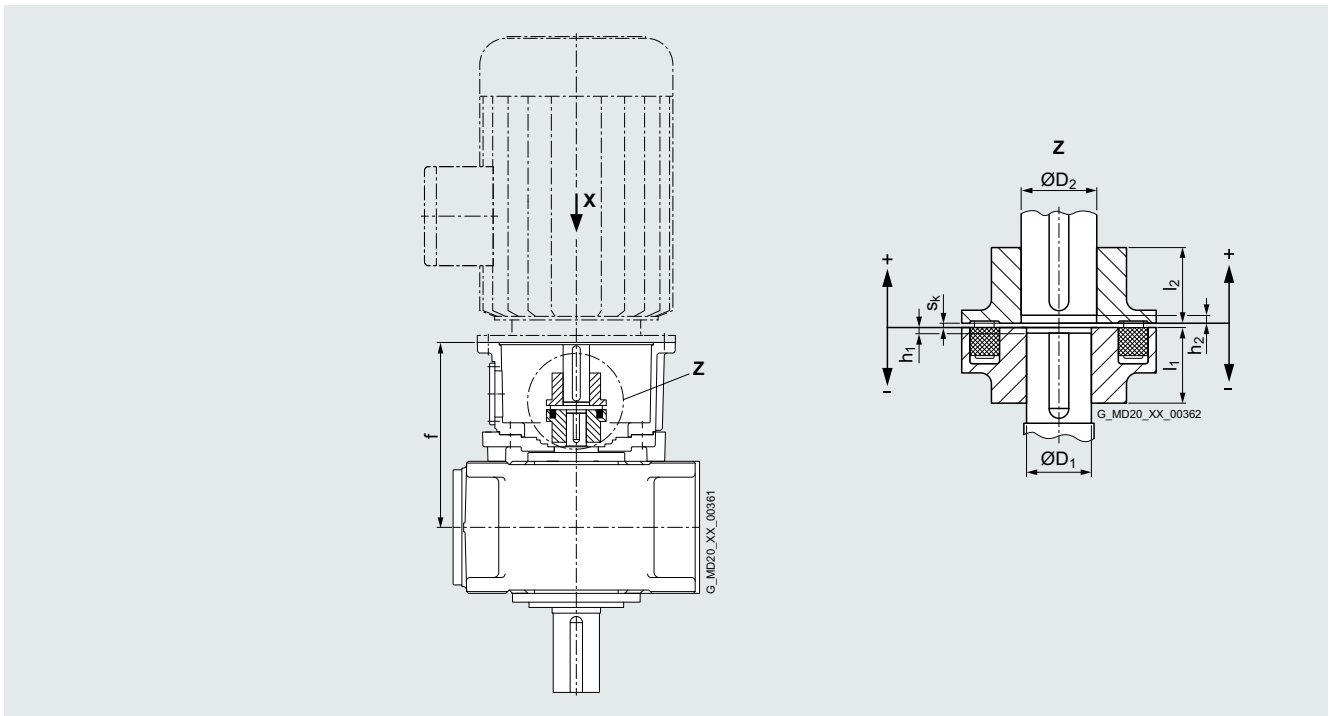
Helical gear unit, type H3, gear unit sizes 5 to 18

### Design

#### Horizontal mounting position



#### Vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure.  
For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), [see page 11/3](#).
- Helical gear unit in design G, H, I on request only.
- Not in connection with Taconite E or labyrinth seal at the drive shaft.

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-EUPEX coupling

#### Helical gear unit, type H3, gear unit sizes 5 to 18

#### Design (continued)

Size	Dimensions in mm																		
	Ratios $i_N$ 25 - 45 (sizes 5, 7, 9, 11) 31.5 - 56 (sizes 6, 8, 10, 12) 22.4 - 45 (sizes 13, 15, 17) 28 - 56 (size 14) 25 - 50 (sizes 16, 18)										Ratios $i_N$ 50 - 63 (sizes 5, 7, 9, 11) 63 - 80 (sizes 6, 8, 10, 12) 50 - 63 (sizes 13, 15, 17) 63 - 80 (size 14) 56 - 71 (sizes 16, 18)								
IEC motor <sup>1)</sup>	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	f	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	f	
<b>5/6</b>	132	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	160	B125	3	50	40	50	42	-12	9	364	B125	3	50	30	50	42	-7	8	338
	180	B140	3	55	40	55	48	-6.5	14.5	364	B140	3	55	30	55	48	-5	10	338
	200	B160	4	60	40	60	55	0	6	350	B160	4	60	30	60	55	-17	9	350
	225	B180	4	70	40	70	60	-10	7	391	–	–	–	–	–	–	–	–	–
	250	<sup>3)</sup> B180	4	70	40	70	65	-11.5	5	391	–	–	–	–	–	–	–	–	–
<b>7/8</b>	160	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	180	–	–	–	–	–	–	–	–	B140	3	55	35	55	48	0	9	367	
	200	B160	4	60	45	60	55	0	0	379	B160	4	60	35	60	55	-9	12	379
	225	B180	4	70	45	70	60	0	11	420	B180	4	70	35	70	60	-18	12.5	420
	250	B180	4	70	45	70	65	0	11	420	B180	4	70	35	70	65	-15	16	420
	280	B200	4	80	45	80	75	-14.5	17	441	–	–	–	–	–	–	–	–	–
<b>9/10</b>	180	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	200	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	225	B180	4	70	60	70	60	-13.5	7	520	B180	4	70	45	70	60	0	10.5	485
	250	B180	4	70	60	70	65	11.5	9	520	B180	4	70	45	70	65	0	10.5	485
	280	B200	4	80	60	80	75	0	6	505	B200	4	80	45	80	75	-5	26	505
	315 <sup>2)</sup>	<sup>3)</sup> B225	4	90	60	90	80	0	13	542	<sup>3)</sup> B225	4	90	45	90	80	-12	26	542
<b>11/12</b>	225	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	250	–	–	–	–	–	–	–	–	B180	4	70	65	70	65	0	10.5	490	
	280	B200	4	80	70	80	75	-12	9	540	B200	4	80	75	80	75	-14	17	510
	315 <sup>2)</sup>	B225	4	90	70	90	80	0	-2	547	–	–	–	–	–	–	–	–	
<b>13/14</b>	250	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	280	–	–	–	–	–	–	–	–	B200	4	80	60	80	75	0	10	599	
	315 <sup>2)</sup>	B225	4	90	85	90	80	-18	4	666	B225	4	90	60	90	80	0	17	636
	315 (200 kW) <sup>4)</sup>	B225	4	90	85	90	80	-18	4	666	B225	4	90	60	90	80	0	17	636
	315 (250 kW) <sup>4)</sup>	B225	4	90	85	90	80	-18	4	666	B225	4	90	60	90	80	0	17	636
	315 (315 kW) <sup>4)</sup>	B225	4	90	85	90	80	-18	4	666	B250	4	100	60	100	80	0	17	636
	355 (355 kW) <sup>4)</sup>	B280	5.5	110	85	110	90	2.5	0	643	B280	5.5	110	60	110	90	0	22.5	643
	355 (400 kW) <sup>4)</sup>	B280	5.5	110	85	110	90	2.5	0	643	–	–	–	–	–	–	–	–	

1) Other motor sizes on request.  
2) Only frame sizes 315 S and 315 M.

3) Only for vertical gear units.  
4) Non-standard motor (sizes not included in EN 50347).

## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-EUPEX coupling

### Helical gear unit, type H3, gear unit sizes 5 to 18

#### Design (continued)

Size	Dimensions in mm																	
	Ratios $i_N$										Ratios $i_N$							
IEC motor <sup>1)</sup>	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$
<b>15/16</b> 280	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
315 <sup>2)</sup>	–	–	–	–	–	–	–	–	–	B225	4	90	75	90	80	-8	12	684
315 (200 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–	B225	4	90	75	90	80	-8	12	684
315 (250 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–	B225	4	90	75	90	80	-8	12	684
315 (315 kW) <sup>3)</sup>	B250	4	100	100	100	80	-8.5	0	764	B225	4	90	75	90	80	-8	12	684
355 (355 kW) <sup>3)</sup>	B280	5.5	110	100	110	90	-17.5	0	743	B280	5.5	110	75	110	90	0	25.5	691
355 (400 kW) <sup>3)</sup>	B280	5.5	110	100	110	90	-17.5	0	743	B280	5.5	110	75	110	90	0	25.5	691
<b>17/18</b> 315 <sup>2)</sup>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
315 (200 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
315 (250 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
315 (315 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–	B225	4	90	75	90	80	-6.5	13.5	714
355 (355 kW) <sup>3)</sup>	B280	5.5	110	100	110	90	-17.5	0	773	B280	5.5	110	75	110	90	0	25.5	721
355 (400 kW) <sup>3)</sup>	B280	5.5	110	100	110	90	-17.5	0	773	B280	5.5	110	75	110	90	0	25.5	721

<sup>1)</sup> Other motor sizes on request.

<sup>2)</sup> Only frame sizes 315 S and 315 M.

<sup>3)</sup> Non-standard motor (sizes not included in EN 50347).

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-EUPEX coupling

#### Helical gear unit, type H3, gear unit sizes 5 to 18

#### Design (continued)

Size	Dimensions in mm									
	IEC motor <sup>1)</sup>	N-EUPEX	s <sub>k</sub>	l <sub>1</sub>	D <sub>1</sub>	l <sub>2</sub>	D <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	f
<b>5/6</b>	132	B95	3	35	24	35	38	-7	12	302
	160	B125	3	50	24	50	42	-17	8	338
	180	B140	3	55	24	55	48	-15	10	338
	200	–	–	–	–	–	–	–	–	–
	225	–	–	–	–	–	–	–	–	–
	250	–	–	–	–	–	–	–	–	–
	<b>7/8</b>	160	B125	3	50	28	50	42	-7	12
180		B140	3	55	28	55	48	-10	9	367
200		B160	4	60	28	60	55	-17	13	379
225		–	–	–	–	–	–	–	–	–
250		–	–	–	–	–	–	–	–	–
280		–	–	–	–	–	–	–	–	–
<b>9/10</b>	180	B140	3	55	32	55	48	0	8.5	431.5
	200	B160	4	60	32	60	55	0	19.5	443.5
	225	B180	4	70	32	70	60	-9	21.5	484.5
	250	B180	4	70	32	70	65	-5.5	25	484.5
	280	–	–	–	–	–	–	–	–	–
	315 <sup>2)</sup>	–	–	–	–	–	–	–	–	–
<b>11/12</b>	225	B180	4	70	42	70	60	-9.5	11	489.5
	250	B180	4	70	42	70	65	-9.5	11	489.5
	280	–	–	–	–	–	–	–	–	–
	315 <sup>2)</sup>	–	–	–	–	–	–	–	–	–
<b>13/14</b>	250	B180	4	70	50	70	65	-5	9.5	578.5
	280	B200	4	80	50	80	75	-5	30	599
	315 <sup>2)</sup>	–	–	–	–	–	–	–	–	–
	315 (200 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–
	315 (250 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–
	315 (315 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–
	355 (355 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–
	355 (400 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–
<b>15/16</b>	280	B200	4	80	60	80	75	0	13	647
	315 <sup>2)</sup>	B225	4	90	60	90	80	0	20	684
	315 (200 kW) <sup>3)</sup>	B225	4	90	60	90	80	0	20	684
	315 (250 kW) <sup>3)</sup>	B225	4	90	60	90	80	0	20	684
	315 (315 kW) <sup>3)</sup>	B250	4	100	60	100	80	0	20	684
	355 (355 kW) <sup>3)</sup>	B280	5.5	110	60	110	90	0	25.5	691
	355 (400 kW) <sup>3)</sup>	B280	5.5	110	60	110	90	0	25.5	691
	<b>17/18</b>	315 <sup>2)</sup>	B225	4	90	60	90	80	0	20
315 (200 kW) <sup>3)</sup>		B225	4	90	60	90	80	0	20	714
315 (250 kW) <sup>3)</sup>		B225	4	90	60	90	80	0	20	714
315 (315 kW) <sup>3)</sup>		B250	4	100	60	100	80	0	20	714
355 (355 kW) <sup>3)</sup>		B280	5.5	110	60	110	90	0	25.5	721
355 (400 kW) <sup>3)</sup>		B280	5.5	110	60	110	90	0	25.5	721

<sup>1)</sup> Other motor sizes on request.

<sup>2)</sup> Only frame sizes 315 S and 315 M.

<sup>3)</sup> Non-standard motor (sizes not included in EN 50347).

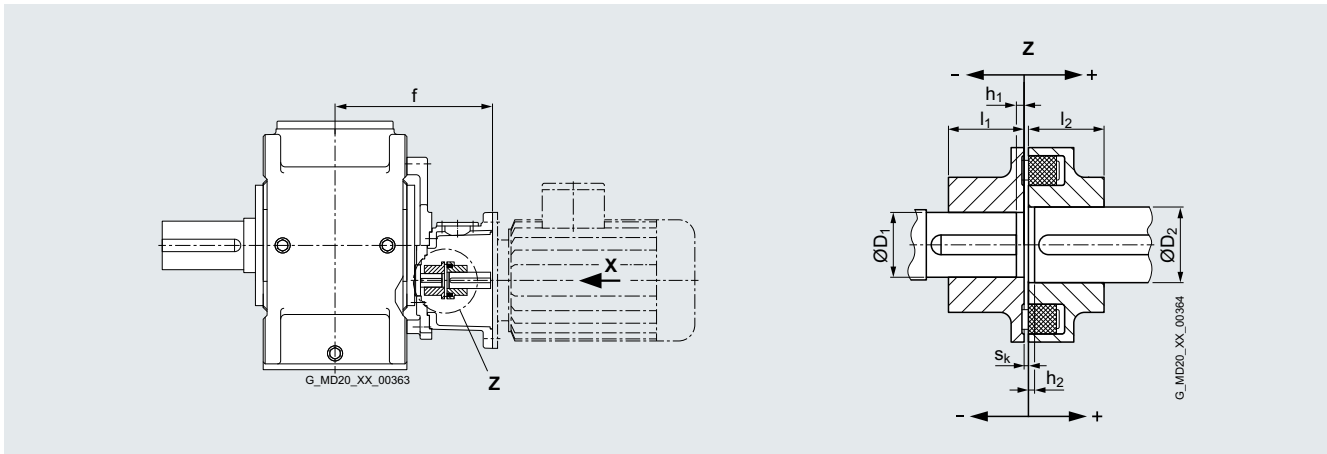
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-EUPEX coupling

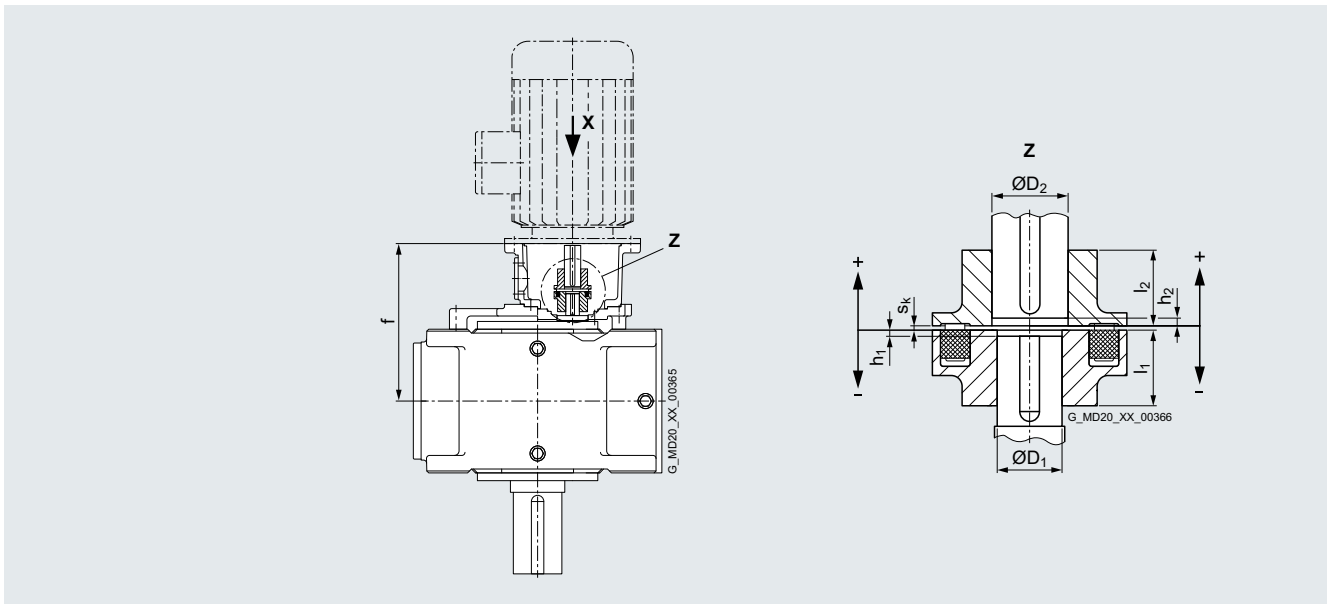
Helical gear unit, type H4, gear unit sizes 7 to 18

### Design

#### Horizontal mounting position



#### Vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure.  
For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), see [page 11/3](#).
- Helical gear unit in design G, H, I on request only.
- Not in connection with Taconite E or labyrinth seal at the drive shaft.



## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-EUPEX coupling

#### Helical gear unit, type H4, gear unit sizes 7 to 18

#### Design (continued)

Size	Dimensions in mm																		
	IEC motor <sup>1)</sup>	Ratios $i_N$ 100 - 180 (sizes 7, 9, 11) 125 - 224 (sizes 8, 10, 12) 100 - 180 (sizes 13, 15, 17) 125 - 224 (size 14) 112 - 200 (sizes 16, 18)									Ratios $i_N$ 200 - 355 (sizes 7, 9, 11) 250 - 450 (sizes 8, 10, 12) 200 - 355 (sizes 13, 15, 17) 250 - 450 (size 14) 224 - 400 (sizes 16, 18)								
	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	
<b>7/8</b>	100	-	-	-	-	-	-	-	-	B80	3	30	24	30	28	-7	6	296	
	112	-	-	-	-	-	-	-	-	B80	3	30	24	30	28	-7	6	296	
	132	B95	3	35	30	35	38	-7	8	328.5	-	-	-	-	-	-	-	-	
	160	B125	3	50	30	50	42	-6.5	15	364.5	B125	3	50	24	50	42	-17	15	364.5
	180	B140	3	55	30	55	48	-17	4.5	364.5	-	-	-	-	-	-	-	-	
<b>9/10</b>	132	-	-	-	-	-	-	-	-	B95	3	35	28	35	38	-10	11.5	369.5	
	160	B125	3	50	35	50	42	-6.5	11	405.5	B125	3	50	28	50	42	-13	14.5	405.5
	180	B140	3	55	35	55	48	-10	7.5	405.5	B140	3	55	28	55	48	-20	7.5	405.5
	200	B160	4	60	35	60	55	-10	14.5	417.5	-	-	-	-	-	-	-	-	
	225	B180	4	70	35	70	60	-18.5	21	458.5	-	-	-	-	-	-	-	-	
<b>11/12</b>	160	-	-	-	-	-	-	-	-	B125	3	50	32	50	42	0	4.5	447.5	
	180	B140	3	55	45	55	48	-7	3.5	437.5	B140	3	55	32	55	48	0	4.5	447.5
	200	B160	4	60	45	60	55	-6.5	15	485.5	B160	4	60	32	60	55	0	15.5	459.5
	225	B180	4	70	45	70	60	0	6.5	500.5	B180	4	70	32	70	60	-3	23.5	500.5
	250	B180	4	70	45	70	65	0	6.5	500.5	-	-	-	-	-	-	-	-	
<b>13/14</b>	160	-	-	-	-	-	-	-	-	B125	3	50	38	50	42	-9	10.5	517.5	
	180	-	-	-	-	-	-	-	-	B140	3	55	38	55	48	-3.5	16	517.5	
	200	B160	4	60	50	60	55	-2	8.5	529.5	B160	4	60	38	60	55	0	4.5	503.5
	225	B180	4	70	50	70	60	-9.5	21	579.5	B180	4	70	38	70	60	-4	11.5	544.5
	250	B180	4	70	50	70	65	-7.5	23	579.5	B180	4	70	38	70	65	-4	11.5	544.5
	280	B200	4	80	50	80	75	0	16	565	-	-	-	-	-	-	-	-	
	315 <sup>2)</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>15/16</b>	200	-	-	-	-	-	-	-	-	B160	4	60	50	60	55	0	3.5	572.5	
	225	B180	4	70	60	70	60	-15.5	9	648.5	B180	4	70	50	70	60	0	14.5	613.5
	250	B180	4	70	60	70	65	-13.5	11	648.5	B180	4	70	50	70	65	0	14.5	613.5
	280	B200	4	80	60	80	75	0	10	634	B200	4	80	50	80	75	-3	32	634
	315 <sup>2)</sup>	B225	4	90	60	90	80	0	17	671	-	-	-	-	-	-	-	-	
	315 (200 kW) <sup>3)</sup>	B225	4	90	60	90	80	0	17	671	-	-	-	-	-	-	-	-	
	315 (250 kW) <sup>3)</sup>	B225	4	90	60	90	80	0	17	671	-	-	-	-	-	-	-	-	
	315 (315 kW) <sup>3)</sup>	B225	4	90	60	90	80	0	17	671	-	-	-	-	-	-	-	-	
<b>17/18</b>	225	-	-	-	-	-	-	-	-	B180	4	70	50	70	60	-3	16.5	623.5	
	250	-	-	-	-	-	-	-	-	B180	4	70	50	70	65	-4	15.5	623.5	
	280	B200	4	80	60	80	75	-5	10	644	B200	4	80	50	80	75	-6	34	644
	315 <sup>2)</sup>	B225	4	90	60	90	80	0	22	681	-	-	-	-	-	-	-	-	
	315 (200 kW) <sup>3)</sup>	B225	4	90	60	90	80	0	22	681	-	-	-	-	-	-	-	-	
	315 (250 kW) <sup>3)</sup>	B225	4	90	60	90	80	0	22	681	-	-	-	-	-	-	-	-	
	315 (315 kW) <sup>3)</sup>	B225	4	90	60	90	80	0	22	681	-	-	-	-	-	-	-	-	
	355 (355 kW) <sup>3)</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

<sup>1)</sup> Other motor sizes on request.

<sup>2)</sup> Only frame sizes 315 S and 315 M.

<sup>3)</sup> Non-standard motor (sizes not included in EN 50347).

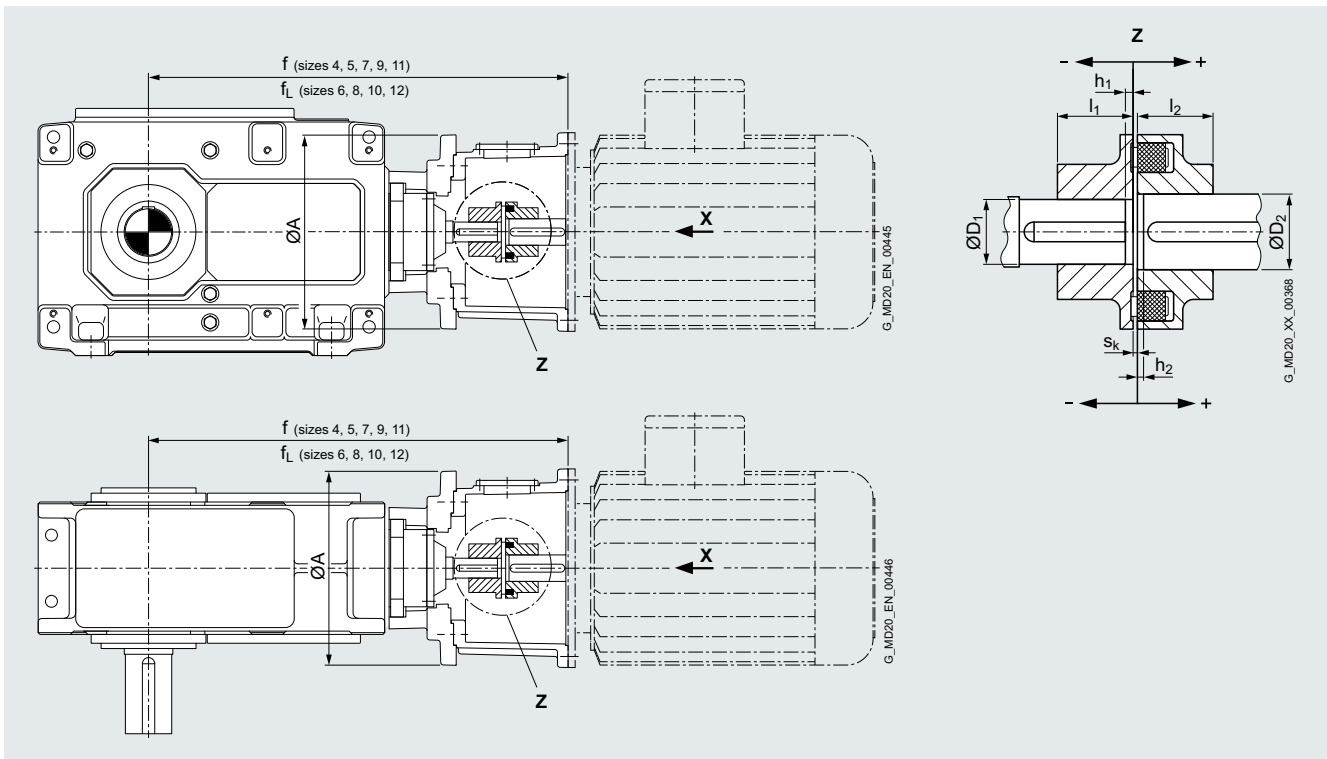
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-EUPEX coupling

Bevel helical gear unit, type B2, gear unit sizes 4 to 12

### Design

#### Horizontal and vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure. For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), [see page 11/3](#).
- Not in connection with Taconite E or labyrinth seal at the drive shaft.

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-EUPEX coupling

#### Bevel helical gear unit, type B2, gear unit sizes 4 to 12

#### Design (continued)

Size	Dimensions in mm											
	IEC motor <sup>1)</sup>	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	$f$	$f_L$	$A$
<b>4</b>	180	–	–	–	–	–	–	–	–	–	–	–
	200	B160	4	60	45	60	55	0	5.5	684.5	–	400
<b>5/6</b>	200	–	–	–	–	–	–	–	–	–	–	–
	225	–	–	–	–	–	–	–	–	–	–	–
<b>7/8</b>	250	–	–	–	–	–	–	–	–	–	–	–
	280	B200	4	80	70	80	75	-9	6	934	979	550
<b>9/10</b>	280	–	–	–	–	–	–	–	–	–	–	–
<b>11/12</b>	315 <sup>2)</sup>	–	–	–	–	–	–	–	–	–	–	–

<sup>1)</sup> Other gear unit and motor sizes on request.

<sup>2)</sup> Only frame sizes 315 S and 315 M.

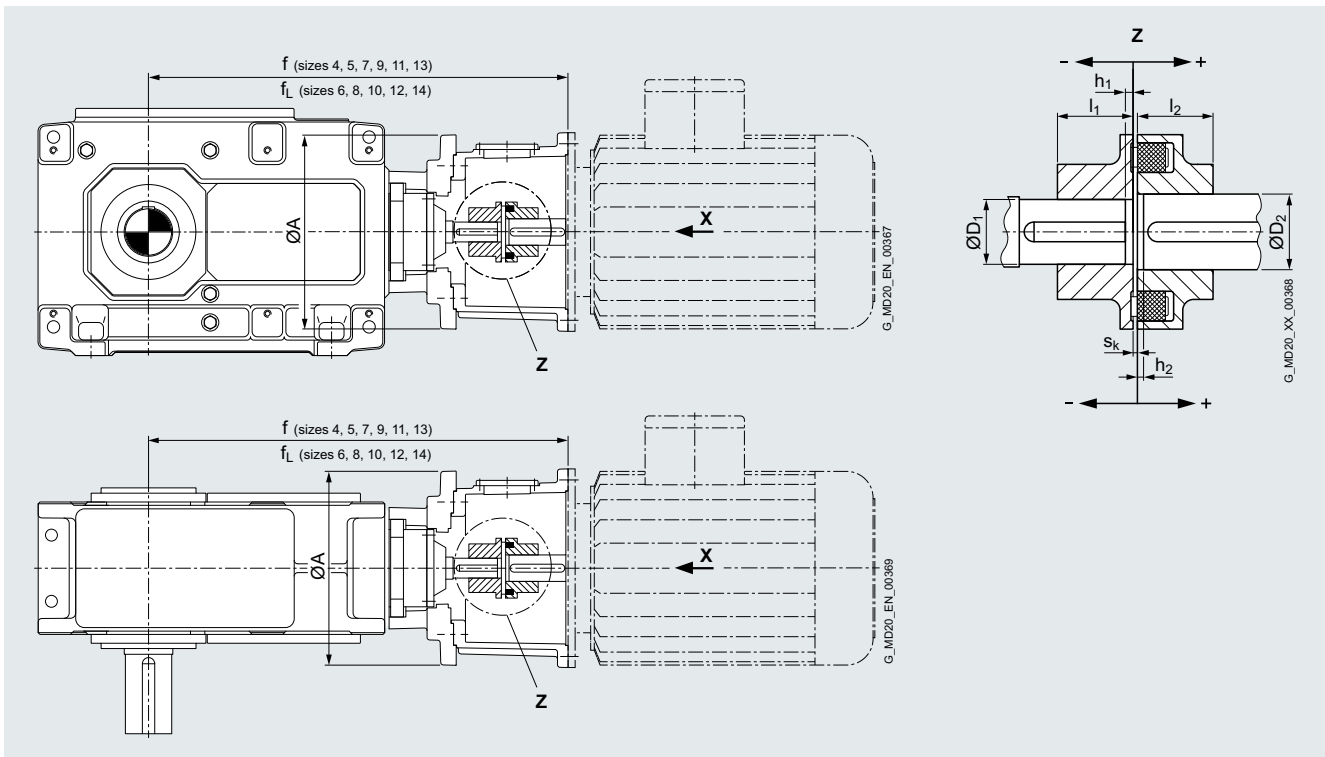
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-EUPEX coupling

Bevel helical gear unit, type B3, gear unit sizes 4 to 18

### Design

#### Horizontal and vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure. For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), [see page 11/3](#).
- Not in connection with Taconite E or labyrinth seal at the drive shaft.

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-EUPEX coupling

#### Bevel helical gear unit, type B3, gear unit sizes 4 to 18

#### Design (continued)

Size	Dimensions in mm																						
	IEC motor <sup>1)</sup>	N-EUPEX X	s <sub>k</sub>	l <sub>1</sub>	D <sub>1</sub>	l <sub>2</sub>	D <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	f	f <sub>L</sub>	A	N-EUPEX	s <sub>k</sub>	l <sub>1</sub>	D <sub>1</sub>	l <sub>2</sub>	D <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	f	f <sub>L</sub>	A
<b>4</b>	132	–	–	–	–	–	–	–	–	–	–	–	B95	3	35	25	35	38	0	4.5	646.5	–	250
	160	B125	3	50	30	50	42	0	-0.5	682.5	–	250	B125	3	50	25	50	42	0	9.5	682.5	–	250
	180	B140	3	55	30	55	48	0	-0.5	682.5	–	250	B140	3	55	25	55	48	0	9.5	682.5	–	250
	200	B160	4	60	30	60	55	0	11	694.5	–	250	–	–	–	–	–	–	–	–	–	–	–
<b>5/6</b>	160	B125	3	50	35	50	42	0	3.5	771.5	806.5	340	B125	3	50	28	50	42	-7	17	771.5	806.5	340
	180	B140	3	55	35	55	48	0	3.5	771.5	806.5	340	B140	3	55	28	55	48	-2	22	771.5	806.5	340
	200	B160	4	60	35	60	55	0	15	783.5	818.5	340	B160	4	60	28	60	55	-8	27	783.5	818.5	340
	225	B180	4	70	35	70	60	-8	18	824.5	859.5	340	–	–	–	–	–	–	–	–	–	–	–
<b>7/8</b>	160	–	–	–	–	–	–	–	–	–	–	–	B125	3	50	35	50	42	-8	13	903.5	948.5	440
	180	–	–	–	–	–	–	–	–	–	–	–	B140	3	55	35	55	48	-3	18	903.5	948.5	440
	200	B160	4	60	45	60	55	0	5.5	909.5	954.5	440	B160	4	60	35	60	55	0	1.5	885.5	930.5	440
	225	B180	4	70	45	70	60	0	1.5	935.5	980.5	440	B180	4	70	35	70	60	0	22	935.5	980.5	440
	250	B180	4	70	45	70	65	0	1.5	935.5	980.5	440	B180	4	70	35	70	65	0	22	935.5	980.5	440
	280	B200	4	80	45	80	75	0	17	950.5	945.5	440	–	–	–	–	–	–	–	–	–	–	–
<b>9/10</b>	200	–	–	–	–	–	–	–	–	–	–	–	B160	4	60	40	60	55	0	21	1034.5	1084.5	440
	225	B180	4	70	55	70	60	-2	5	1060.5	1110.5	440	B180	4	70	40	70	60	0	17	1060.5	1110.5	440
	250	B180	4	70	55	70	65	0	6.5	1060.5	1110.5	440	B180	4	70	40	70	65	0	17	1060.5	1110.5	440
	280	B200	4	80	55	80	75	0	22	1046	1096.5	440	B200	4	80	40	80	75	0	2	1046	1096	440
<b>11/12</b>	225	–	–	–	–	–	–	–	–	–	–	–	B180	4	70	50	70	60	-9	21	1243.5	1313.5	440
	250	B180	4	70	70	70	65	-5	0	1243.5	1313.5	440	B180	4	70	50	70	65	-9	21	1243.5	1313.5	440
	280	B200	4	80	70	80	75	-12	8	1258.5	1328.5	440	B200	4	80	50	80	75	0	15	1229	1299	440
	315 <sup>2)</sup>	B225	4	90	70	90	80	-10	17	1296	1366	440	B225	4	90	50	90	80	0	22	1266	1336	440
<b>13/14</b>	280	–	–	–	–	–	–	–	–	–	–	–	B200	4	80	60	80	75	0	15	1424	1494	445
	315 <sup>2)</sup>	B225	4	90	80	90	80	-9	8	1481	1551	445	B225	4	90	60	90	80	0	22	1461	1531	445
	315 (200 kW) <sup>3)</sup>	B225	4	90	80	90	80	-9	8	1481	1551	445	B225	4	90	60	90	80	0	22	1461	1531	445
	315 (250 kW) <sup>3)</sup>	B225	4	90	80	90	80	-9	8	1481	1551	445	B225	4	90	60	90	80	0	22	1461	1531	445
	315 (315 kW) <sup>3)</sup>	B225	4	90	80	90	80	-9	8	1481	1551	445	B225	4	90	60	90	80	0	22	1461	1531	445
	355 (355 kW) <sup>3)</sup>	On request											On request										
	355 (400 kW) <sup>3)</sup>	On request											On request										
<b>15/16</b>	315 <sup>2)</sup>	–	–	–	–	–	–	–	–	–	–	–	B225	4	90	70	90	80	-3	14	1698	1744	520
	315 (200 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–	–	–	B225	4	90	70	90	80	-3	14	1698	1744	520
	315 (250 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–	–	–	B225	4	90	70	90	80	-3	14	1698	1744	520
	315 (315 kW) <sup>3)</sup>	B250	5	100	90	100	80	-21	0	1728	1774	520	B250	4	100	70	100	80	-3	14	1698	1744	520
	355 (355 kW) <sup>3)</sup>	On request											On request										
	355 (400 kW) <sup>3)</sup>	On request											On request										
	315 (200 kW) <sup>2)</sup>	–	–	–	–	–	–	–	–	–	–	–	–	B225	4	90	80	90	80	-10	1	1945	2000.5
315 (250 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–	–	–	–	B225	4	90	80	90	80	-10	1	1945	2000.5	645
315 (315 kW) <sup>3)</sup>	–	–	–	–	–	–	–	–	–	–	–	–	B250	4	100	80	100	80	-10	1	1945	2000.5	645
355 (355 kW) <sup>3)</sup>	On request												On request										
355 (400 kW) <sup>3)</sup>	On request												On request										

<sup>1)</sup> Other motor sizes on request.

<sup>2)</sup> Only frame sizes 315 S and 315 M.

<sup>3)</sup> Non-standard motor (sizes not included in EN 50347).

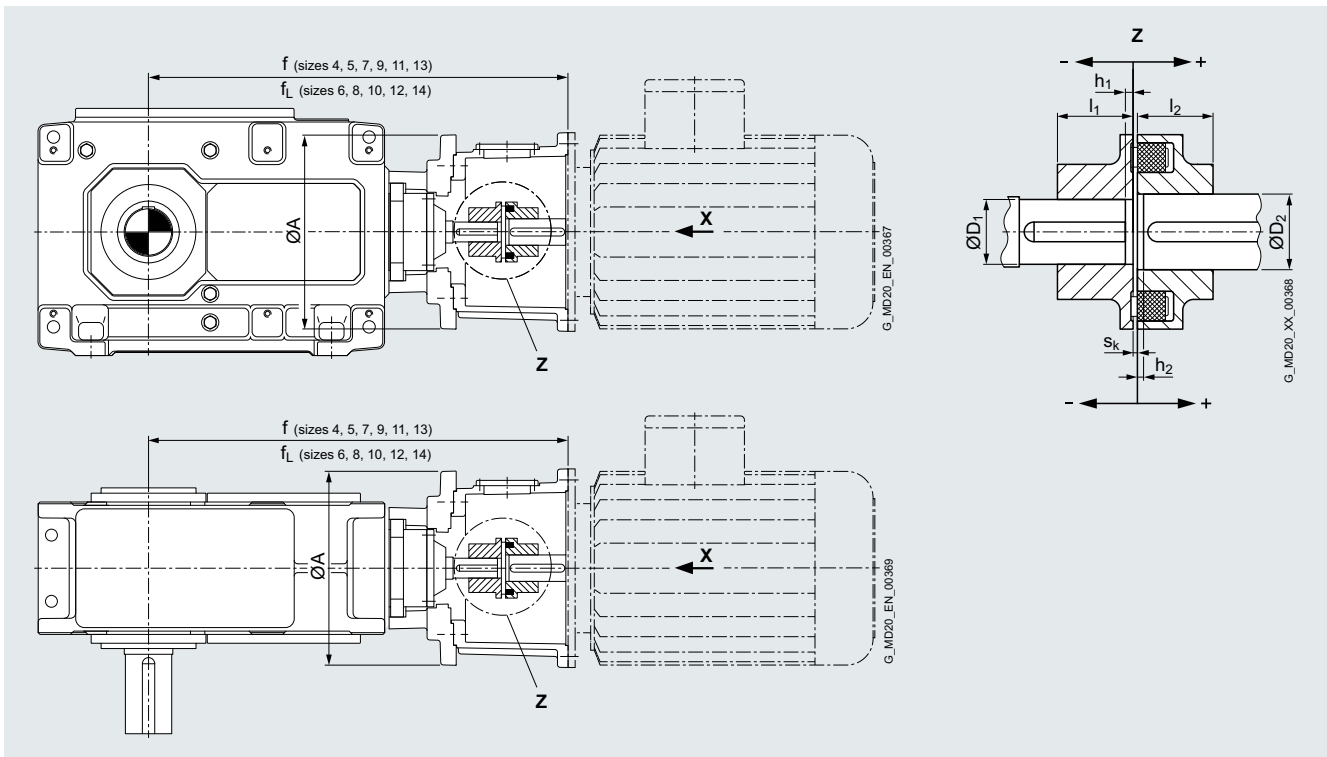
## Options for installation and add-on parts

Motor bell housing for IEC standard motor with N-EUPEX coupling

Bevel helical gear unit, type B4, gear unit sizes 5 to 18

### Design

#### Horizontal and vertical mounting position



- For applications with special design requirements (high switching frequency, alternating direction of load; e.g. hoisting gears, traveling gears, etc.), a coupling design is to be checked in accordance with the respective valid coupling brochure. For deviating couplings, please consult Flender.
- For mounting dimensions for IEC motors EN 50347 (View X), [see page 11/3](#).
- Not in connection with Taconite E or labyrinth seal at the drive shaft.

## Options for installation and add-on parts

### Motor bell housing for IEC standard motor with N-EUPEX coupling

#### Bevel helical gear unit, type B4, gear unit sizes 5 to 18

#### Design (continued)

Size	Dimensions in mm																						
	Ratios $i_N$ 80 - 180 (sizes 5, 7, 9, 11) 100 - 224 (sizes 6, 8, 10, 12) 80 - 180 (sizes 13, 15, 17) 100 - 224 (size 14) 90 - 200 (sizes 16, 18)											Ratios $i_N$ 200 - 315 (sizes 5, 7, 9, 11) 250 - 400 (sizes 6, 8, 10, 12) 200 - 315 (sizes 13, 15, 17) 250 - 400 (size 14) 224 - 355 (sizes 16, 18)											
IEC motor <sup>1)</sup>	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	f	$f_L$	A	N-EUPEX	$s_k$	$l_1$	$D_1$	$l_2$	$D_2$	$h_1$	$h_2$	f	$f_L$	A	
5/6	100	-	-	-	-	-	-	-	-	-	-	B80	3	30	20	30	28	0	6	734	769	245	
	112	B80	3	30	28	30	28	0	1	734	769	245	B80	3	30	20	30	28	0	6	734	769	245
	132	B95	3	35	28	35	38	-5.5	8	766.5	801.5	245	B95	3	35	20	35	38	-6	12.5	766.5	801.5	245
	160	B125	3	50	28	50	42	-4.5	15	802.5	837.5	245	-	-	-	-	-	-	-	-	-	-	-
7/8	112	-	-	-	-	-	-	-	-	-	-	B80	3	30	25	30	28	-3.5	2.5	854	899	250	
	132	B95	3	35	30	35	38	-3	5.5	886.5	931.5	250	B95	3	35	25	35	38	0	3.5	871.5	916.5	250
	160	B125	3	50	30	50	42	0	-0.5	907.5	952.5	250	B125	3	50	25	50	42	0	9.5	907.5	952.5	250
	180	B140	3	55	30	55	48	0	-0.5	907.5	952.5	250	-	-	-	-	-	-	-	-	-	-	-
	200	B160	4	60	30	60	55	0	10.5	919.5	964.5	250	-	-	-	-	-	-	-	-	-	-	-
9/10	132	-	-	-	-	-	-	-	-	-	-	B95	3	35	28	35	38	-7.5	10	1000.5	1050.5	340	
	160	B125	3	50	35	50	42	0	3.5	1036.5	1086.5	340	B125	3	50	28	50	42	-7	16.5	1036.5	1086.5	340
	180	B140	3	55	35	55	48	0	3.5	1036.5	1086.5	340	B140	3	55	28	55	48	-2	21.5	1036.5	1086.5	340
	200	B160	4	60	35	60	55	0	14.5	1048.5	1098.5	340	-	-	-	-	-	-	-	-	-	-	-
	225	B180	4	70	35	70	60	0	25.5	1089.5	1139.5	340	-	-	-	-	-	-	-	-	-	-	-
11/12	160	-	-	-	-	-	-	-	-	-	-	B125	3	50	35	50	42	-8	12.5	1223.5	1293.5	440	
	180	B140	3	55	45	55	48	-0.5	0	1223.5	1293.5	440	B140	3	55	35	55	48	-3	17.5	1223.5	1293.5	440
	200	B180	4	70	45	70	55	0	5.5	1229.5	1299.5	440	B180	4	70	35	70	55	0	1.5	1205.5	1275.5	440
	225	B180	4	70	45	70	60	0	1.5	1255.5	1325.5	440	B180	4	70	35	70	60	0	21.5	1255.5	1325.5	440
	250	B180	4	70	45	70	65	0	1.5	1255	1325	440	-	-	-	-	-	-	-	-	-	-	-
	280	B200	4	80	45	80	75	0	17	1270.5	1340.5	440	-	-	-	-	-	-	-	-	-	-	-
13/14	180	-	-	-	-	-	-	-	-	-	-	B140	3	55	40	55	48	-3	12.5	1398.5	1468.5	440	
	200	B160	4	60	55	60	55	-7.5	3	1404.5	1474.5	440	B160	4	60	40	60	55	0	20.5	1404.5	1474.5	440
	225	B180	4	70	55	70	60	-1.5	5	1430.5	1500.5	440	B180	4	70	40	70	60	0	16.5	1430.5	1500.5	440
	250	B180	4	70	55	70	65	0	6.5	1430	1500	440	B180	4	70	40	70	65	0	16.5	1430	1500	440
	280	B200	4	80	55	80	75	0	22	1446	1516	440	B225	4	90	40	90	75	-7	25	1446	1516	440
	315 <sup>2)</sup>	B225	4	90	55	90	80	-5	24	1483	1553	440	-	-	-	-	-	-	-	-	-	-	-
	315 (200 kW) <sup>3)</sup>	B225	4	90	55	90	80	-5	24	1483	1553	440	-	-	-	-	-	-	-	-	-	-	-
	315 (250 kW) <sup>3)</sup>	B225	4	90	55	90	80	-5	24	1483	1553	440	-	-	-	-	-	-	-	-	-	-	-
15/16	200	-	-	-	-	-	-	-	-	-	-	B160	4	60	50	60	55	-1	8.5	1635.5	1681.5	440	
	225	B200	4	80	70	80	60	-4.5	0	1685.5	1731.5	440	B180	4	70	50	70	60	-9	20.5	1685.5	1731.5	440
	250	B200	4	80	70	80	65	-4.5	0	1685.5	1731.5	440	B180	4	70	50	70	65	-7	22.5	1685.5	1731.5	440
	280	B200	4	80	70	80	75	-11.5	8.5	1701	1747	440	B200	4	80	50	80	75	0	15	1671	1717	440
	315 <sup>2)</sup>	B225	4	90	70	90	80	-10	17	1738	1784	440	B225	4	90	50	90	80	0	22	1708	1754	440
	315 (200 kW) <sup>3)</sup>	B225	4	90	70	90	80	-10	17	1738	1784	440	-	-	-	-	-	-	-	-	-	-	-
	315 (250 kW) <sup>3)</sup>	B225	4	90	70	90	80	-10	17	1738	1784	440	-	-	-	-	-	-	-	-	-	-	-
	315 (315 kW) <sup>3)</sup>	B225	4	90	70	90	80	-10	17	1738	1784	440	-	-	-	-	-	-	-	-	-	-	-
	355 (355 kW) <sup>3)</sup>	B250	5	100	70	100	90	0	28	1533	1603	645	-	-	-	-	-	-	-	-	-	-	-
	17/18	225	-	-	-	-	-	-	-	-	-	-	B180	4	70	50	70	60	-9	20.5	1733.5	1793.5	440
250		-	-	-	-	-	-	-	-	-	-	B180	4	70	50	70	65	-7	22.5	1733.5	1793.5	440	
280		B200	4	80	70	80	75	-11.5	8.5	1749	1809	440	B200	4	80	50	80	75	0	15	1719	1779	440
315 <sup>2)</sup>		B225	4	90	70	90	80	-9.5	17.5	1786	1846	440	B225	4	90	50	90	80	0	22	1756	1816	440
315 (200 kW) <sup>3)</sup>		B225	4	90	70	90	80	-9.5	17.5	1786	1846	440	-	-	-	-	-	-	-	-	-	-	-
315 (250 kW) <sup>3)</sup>		B225	4	90	70	90	80	-9.5	17.5	1786	1846	440	-	-	-	-	-	-	-	-	-	-	-
315 (315 kW) <sup>3)</sup>		B225	4	90	70	90	80	-9.5	17.5	1786	1846	440	-	-	-	-	-	-	-	-	-	-	-
355 (355 kW) <sup>3)</sup>		B250	5	100	70	100	90	-8	20	1788	1848	645	-	-	-	-	-	-	-	-	-	-	-
355 (400 kW) <sup>3)</sup>		B280	5	110	70	110	90	-8	20	1788	1848	645	-	-	-	-	-	-	-	-	-	-	-

<sup>1)</sup> Other motor sizes on request.

<sup>2)</sup> Only frame sizes 315 S and 315 M.

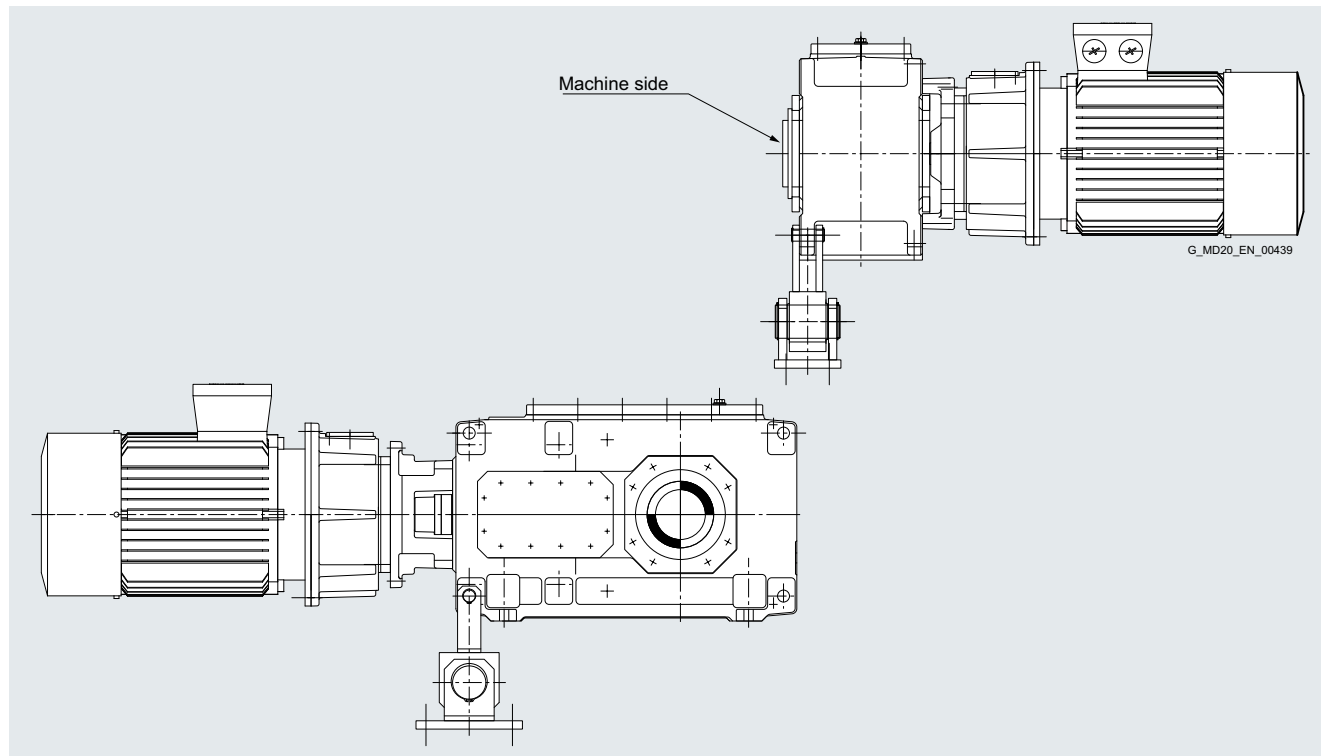
<sup>3)</sup> Non-standard motor (sizes not included in EN 50347).

## Options for installation and add-on parts

### Vibration-damping torque reaction arm for gear unit housing

Types H2, H3, H4, B2, B3, B4

#### Overview



The maximum transmissible torque is limited by the torque reaction arm.

The following applies:  $T_{\max} = f_{\text{DMST}} \times T_{2\text{rated}}$

Peak torque factor  $f_{\text{DMST}}$  for torque reaction arm <sup>1)</sup>

Gear unit size	Type						
	H2	H3	H4	B2	B3	B4	
4	1.3	–	–	1.2	1.2	–	
5	1.9	2.0	–	1.2	1.6	2.0	
6	1.6	1.7	–	1.2	1.4	1.7	
7	2.0	2.0	2.0	1.3	1.8	2.0	
8	1.7	2.0	2.0	1.2	1.6	2.0	
9	1.5	1.6	1.7	1.2	1.2	1.7	
10	1.3	1.4	1.4	1.2	1.2	1.4	
11	2.0	2.0	2.0	1.9	2.0	1.2	
12	2.0	2.0	2.0	1.8	2.0	1.2	
13	–	2.0	2.0	1.4	1.8	2.0	
14	–	1.9	2.0	1.3	1.7	2.0	
15	–	1.5	1.7	–	1.4	1.6	
16	–	1.4	1.5	–	1.3	1.5	
17	–	1.2	1.3	–	1.2	1.3	
18	–	1.2	1.2	–	1.2	1.2	
19 – 22	On request						

<sup>1)</sup> The specified table values are minimum values. If necessary, higher peak torques can be permitted if the direction of rotation and motor type are specified. Consultation is required.

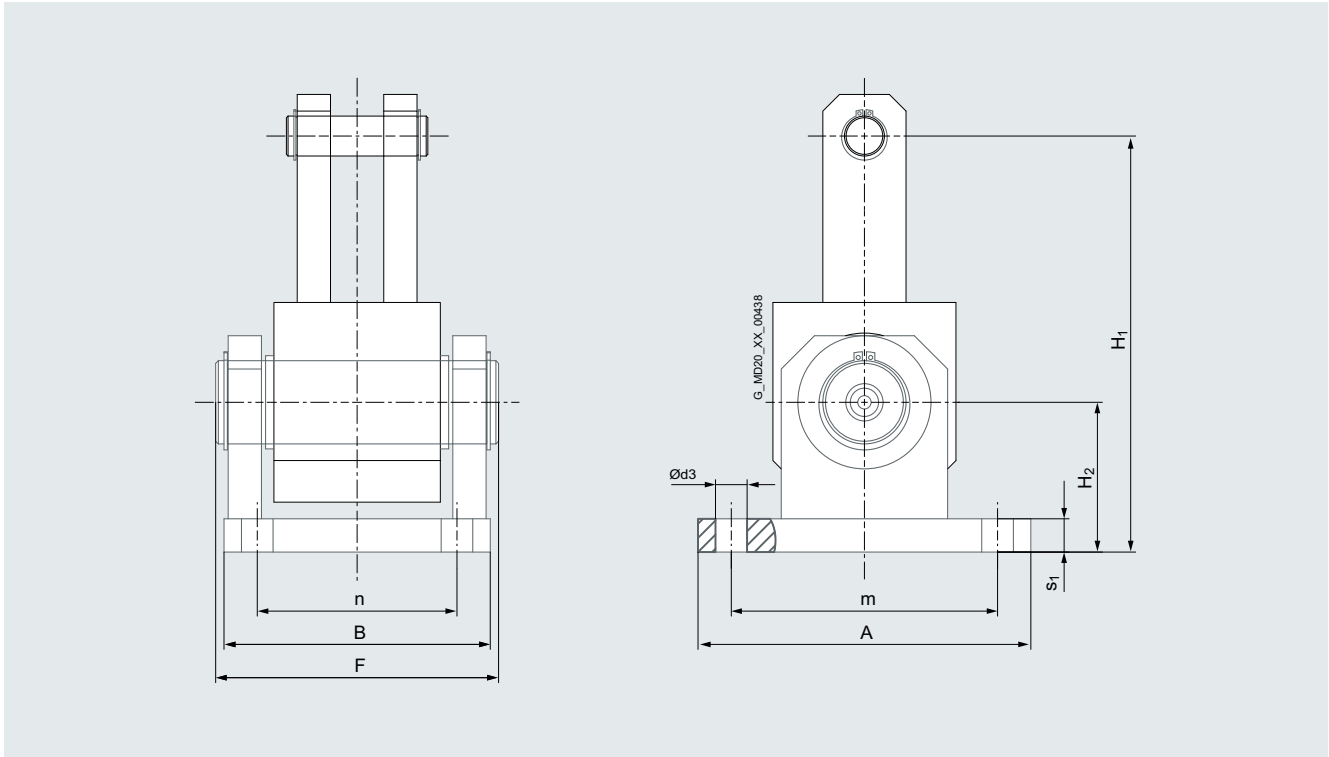


## Options for installation and add-on parts

### Vibration-damping torque reaction arm for gear unit housing

Types H2, H3, H4, B2, B3, B4

#### Overview (continued)



Gear unit size	Dimensions in mm										Metalastik socket	Weight kg
	A	B	$\varnothing d_3$	F	H <sub>1</sub>	H <sub>2</sub>	m	n	s <sub>1</sub>			
<b>4</b>	160	110	19	116	200	65	120	70	15	79	6.8	
<b>5 + 6</b>	200	160	19	170	250	90	160	120	20	95	16	
<b>7 + 8</b>	320	200	19	195	400	140	260	130	25	772	37	
<b>9 + 10</b>	320	200	19	195	400	140	260	130	25	772	42	
<b>11 + 12</b>	400	300	24	320	500	175	320	240	30	805	155	
<b>13 + 14</b>	400	300	24	320	500	175	320	240	30	805	159	
<b>15 + 16</b>	400	300	24	320	500	175	320	240	30	805	163	
<b>17 + 18</b>	400	300	24	320	500	175	320	240	30	805	167	
<b>19 – 22</b>	On request											

Torque reaction arm on the driven machine side (helical gear unit version C, D, G, H, I only on request).

For gear units without motor bell housings, couplings that do not transmit any lateral forces must be used.

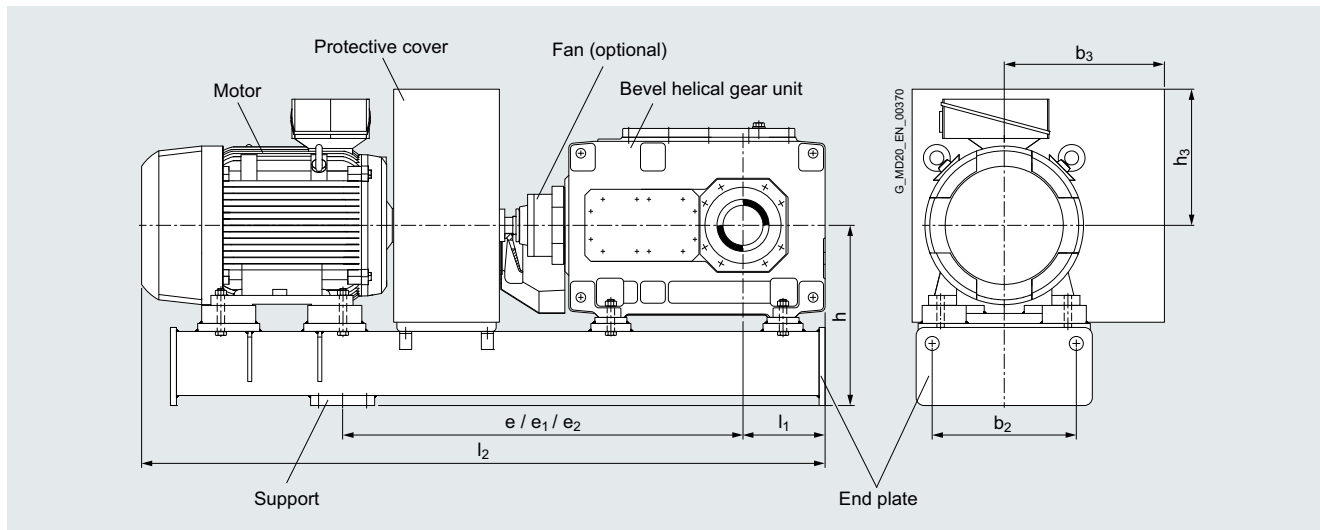
Torque reaction arm in combination with fan only on request.

## Options for installation and add-on parts

### Gear unit swing base for bevel helical gear unit

#### Types B3 and B4

#### Overview



The gear unit swing base is a special beam construction that is perfectly laid out for accommodating the individual components of a drive assembly. The drive assembly can be mounted as a unit in the customer's work machine. The individual components are aligned to one another during the installation.

The drive assembly mainly consists of a bevel helical gear unit and a motor.

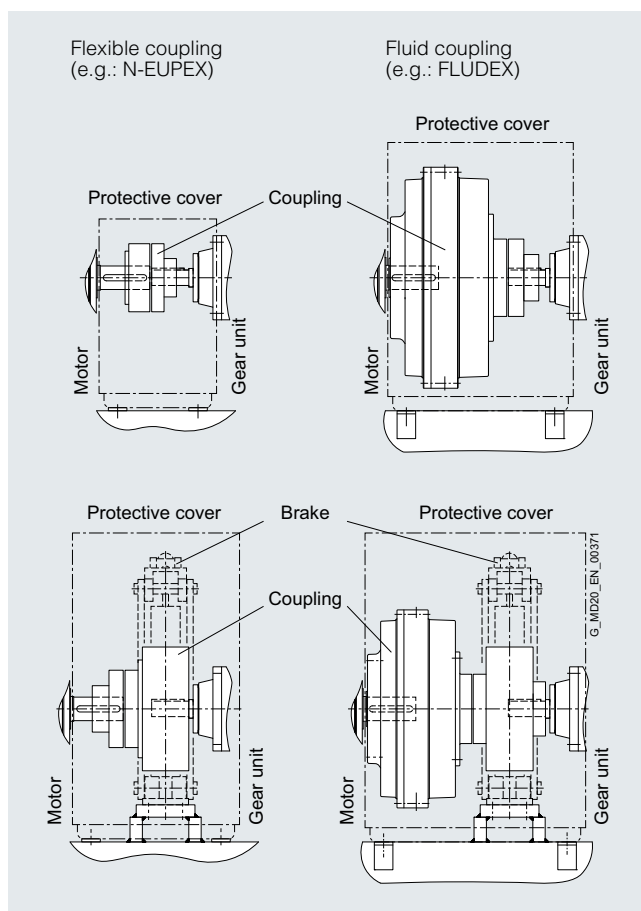
The gear units encompass the types B3 and B4 in sizes 4 to 18. Types B2 and T3 and sizes 19 to 28 are also available on request. You can find details about the gear unit in Chapter 6.

Flexible couplings (e.g. N-EUPEX) and fluid couplings (e.g. FLUDEX) are available for connecting the main components. Depending on the requirement, drive-side brakes of various manufacturers and types can be provided.

The coupling and brake are protected against accidental contact by a protective cover. In connection with a fluid coupling, the protective cover must be equipped with a monitoring system (see notes).

Gear units with gear unit swing bases are provided as a shaft-mounted gear unit for connecting to a torque reaction arm. The gear unit swing base is available with or without a vibration-damping support (see torque reaction arm).

A drive assembly can also be implemented as a foundation installation. The beam construction needed for this is the base frame. This is not shown in this catalog, but is available upon request.



## Options for installation and add-on parts

### Gear unit swing base for bevel helical gear unit

Types B3 and B4

**Overview** (continued)**Connection dimensions**

Gear unit sizes	Dimensions in mm											
	Gear unit type B3						Gear unit type B4					
	e	e <sub>1</sub>	e <sub>2</sub>	h	h <sub>1</sub>	h <sub>2</sub>	e	e <sub>1</sub>	e <sub>2</sub>	h	h <sub>1</sub>	h <sub>2</sub>
4	850	850	1250	380	430	610	–	–	–	–	–	–
5	1000	1050	1300	450	515	715	1000	950	1250	450	515	715
6	1050	1100	1350	450	515	715	1050	1000	1300	450	515	715
7	1150	1250	1450	540	630	880	1150	1050	1350	540	630	880
8	1200	1300	1500	540	630	880	1200	1100	1400	540	630	880
9	1350	1450	1650	630	720	970	1350	1250	1500	630	720	970
10	1400	1500	1700	630	720	970	1400	1300	1550	630	720	970
11	1550	1650	1900	740	880	1280	1550	1450	1650	740	880	1280
12	1600	1700	1950	740	880	1280	1600	1500	1700	740	880	1280
13	1750	1900	2150	850	990	1390	1750	1700	1900	850	990	1390
14	1750	1900	2150	850	990	1390	1750	1700	1900	850	990	1390
15	2000	2200	2450	975	1150	1650	2000	2000	2200	975	1150	1650
16	2000	2200	2450	975	1150	1650	2000	2000	2200	975	1150	1650
17	2200	2500	2750	1025	1200	1700	2200	2200	2400	1025	1200	1700
18	2200	2500	2750	1025	1200	1700	2200	2200	2400	1025	1200	1700

h<sub>1</sub> and h<sub>2</sub>, see graphic page 11/38.

Gear unit sizes	Dimensions in mm														Type
	Dimension b <sub>2</sub> for motor axis heights														
	100	112	132	160	180	200	225	250	280	315	355	400	450		
4	240	240	340	340	420	420	600	600	600	–	–	–	–	B3	
5/6	290	290	290	420	420	420	600	600	600	700	–	–	–		
7/8	340	340	340	340	420	420	600	600	600	700	–	–	–		
9/10	420	420	420	420	420	420	600	600	600	800	800	–	–		
11/12	490	490	490	490	490	490	490	700	700	700	1000	1000	1000		
13/14	600	600	600	600	600	600	600	600	600	700	1000	1000	1000		
15/16	700	700	700	700	700	700	700	700	700	700	1000	1000	1000		
17/18	800	800	800	800	800	800	800	800	800	800	800	1000	1000		
5/6	290	290	290	420	420	420	–	–	–	–	–	–	–	B4	
7/8	340	340	340	340	420	420	600	600	–	–	–	–	–		
9/10	420	420	420	420	420	420	600	600	600	–	–	–	–		
11/12	490	490	490	490	490	490	490	700	700	700	–	–	–		
13/14	600	600	600	600	600	600	600	600	600	700	–	–	–		
15/16	700	700	700	700	700	700	700	700	700	700	1000	1000	–		
17/18	800	800	800	800	800	800	800	800	800	800	800	1000	–		

h, h<sub>1</sub>, h<sub>2</sub> If motor axis height ≤ Gear unit axis height  
 e Elastic (flexible) coupling  
 e<sub>1</sub> FLUDEX coupling without antechamber, with or without drum brake (f<sub>A</sub> = 2)  
 e<sub>2</sub> FLUDEX coupling with antechamber, with or without drum brake (f<sub>A</sub> = 1.5)  
 l<sub>1</sub>, l<sub>2</sub>, b<sub>3</sub>, h<sub>3</sub> Dimensions determined by installed components, motor, coupling, brakes, etc.  
 (to be found in dimension drawing or bid drawing)

The specifications e, e<sub>1</sub> and e<sub>2</sub> can be adapted to customer specifications, changes to several dimensions are possible during this.

## Options for installation and add-on parts

Gear unit swing base for bevel helical gear unit

### Article No. overview

#### Selection and ordering data

The following ordering information refers to the gear unit swing base with separate Article No. and order position.

The Article No. is supplemented with order codes (Y..) assigned by the configurator.	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	
	Article No.	<b>2DA061</b>	■	-	.	■	■	■	.	-	.	.	0
<b>Gear unit type and fan</b>													
B3/T3 without fan			1										
B4 without fan			2										
B3_E without fan			3										
B3/T3 with fan			5										
B3_E with fan			6										
<b>Gear unit sizes</b>													
4						D							
5						E							
6						F							
7						G							
8						H							
9						J							
10						K							
11						L							
12						M							
13						N							
14						P							
15						Q							
16						R							
17						S							
18						T							
<b>Motor frame sizes (specifications required for motor)</b>													
IEC motor 56 M								A	0				
IEC motor 63 M								B	0				
IEC motor 71 M								C	0				
IEC motor 80 M								D	0				
IEC motor 100 S								E	0				
IEC motor 100 L								F	0				
IEC motor 112 S								G	0				
IEC motor 112 M								H	0				
IEC motor 112 L								J	0				
IEC motor 132 S								K	0				
IEC motor 132 M								L	0				
IEC motor 132 L								M	0				
IEC motor 160 S								N	0				
IEC motor 160 M								P	0				
IEC motor 160 L								Q	0				
IEC motor 180 S								R	0				
IEC motor 180 M								S	0				
IEC motor 180 L								T	0				
IEC motor 200 S								U	0				
IEC motor 200 M								V	0				
IEC motor 200 L								W	0				
IEC motor 225S								A	1				
IEC motor 225M								B	1				
IEC motor 225L								C	1				
IEC motor 250S								D	1				
IEC motor 250M								E	1				
IEC motor 250L								F	1				
IEC motor 280S								G	1				
IEC motor 280M								H	1				
IEC motor 280L								J	1				
IEC motor 315S								K	1				
IEC motor 315M								L	1				
Non-standard motor 315L (based on EN 50347)								M	1				
Non-standard motor 355S (based on EN 50347)								N	1				
Non-standard motor 355M (based on EN 50347)								P	1				
Non-standard motor 355L (based on EN 50347)								Q	1				
Non-standard motor 400S (based on EN 50347)								R	1				
Non-standard motor 400M (based on EN 50347)								S	1				
Non-standard motor 400L (based on EN 50347)								T	1				

## Options for installation and add-on parts

### Gear unit swing base for bevel helical gear unit

#### Article No. overview

#### Selection and ordering data (continued)

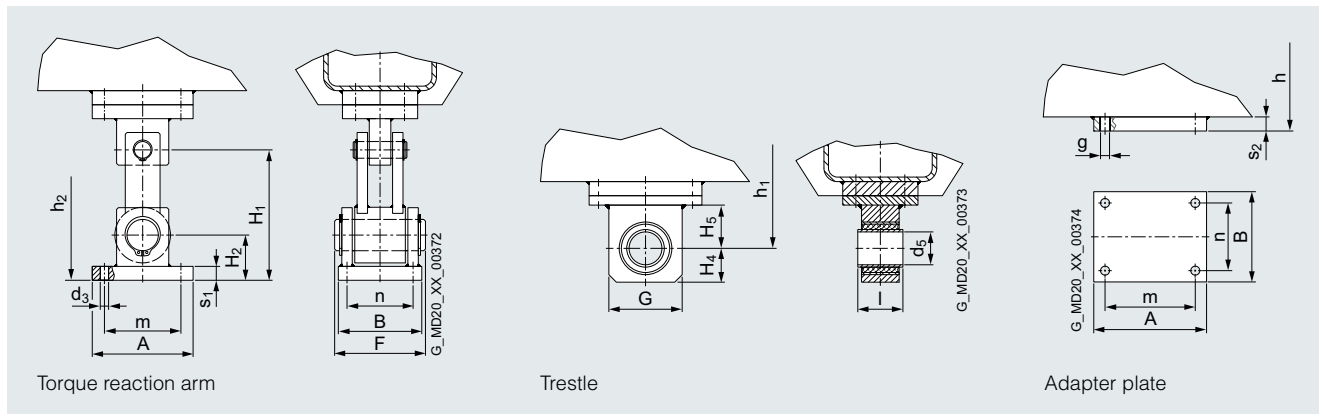
The Article No. is supplemented with order codes (Y..) assigned by the configurator.	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16		
Article No.		2DA061	.	-	.	.	■	■	■	-	■	■	.	0
<b>Motor frame sizes (specifications required for motor)</b>														
Special motor 56						A	4							
Special motor 63						B	4							
Special motor 71						C	4							
Special motor 80						D	4							
Special motor 100						E	4							
Special motor 112						F	4							
Special motor 132						G	4							
Special motor 160						H	4							
Special motor 180						J	4							
Special motor 200						K	4							
Special motor 225						L	4							
Special motor 250						M	4							
Special motor 280						N	4							
Special motor 315						P	4							
Special motor 355						Q	4							
Special motor 400						R	4							
Special motor 450						S	4							
<b>Cover support high speed shaft (HSS)</b>														
Without cover support												0		
Cover support for flexible coupling (specifications for coupling needed)												1		
Cover support for fluid coupling (specifications for coupling needed)												2		
<b>Brake size</b>														
Without brake												0		
200												1		
250												2		
315												3		
400												4		
500												5		
630												6		
710												7		
<b>Brake type (further brake types on request)</b>														
Without brake												A		
Siegerland TE												B		
Siegerland SBH												C		

## Options for installation and add-on parts

### Gear unit swing base for bevel helical gear unit

#### Torque reaction arm

#### Overview



Assignment to gear unit size <sup>1)</sup>		Dimensions in mm															
Standard support	Reinforced support	m	n	g	d <sub>3</sub>	A	B	s <sub>2</sub>	d <sub>5</sub>	l	G	H <sub>4</sub>	H <sub>5</sub>	s <sub>1</sub>	H <sub>1</sub>	H <sub>2</sub>	F
4	-	95	65	M12	15	120	90	25	25	56	60	30	38	12	180	50	96
5 - 6	4	120	70	M16	19	160	110	25	32	72	75	40	50	15	200	65	116
7 - 10	5 - 6	160	120	M16	19	200	160	25	50	110	110	55	70	20	250	90	170
11 - 14	7 - 10	260	130	M16	19	320	200	25	100	120	180	90	115	25	400	140	195
15 - 18	11 - 14	320	240	M20	24	400	300	30	124	230	240	110	145	30	500	175	320
-	15 - 18	320	240	M20	24	400	300	30	124	230	240	110	145	30	500	175	320

h<sub>1</sub> and h<sub>2</sub>, see table page 11/35.

A drive assembly with a gear unit swing base has two connection interfaces. One interface is the low speed shaft (LSS). The second interface is the torque reaction arm. This is available in various designs and versions.

The torque reaction arm is vibration-damping and is provided for foundation mounting. The trestle is vibration-damping and

prepared for accommodating a customer-side foundation connection.

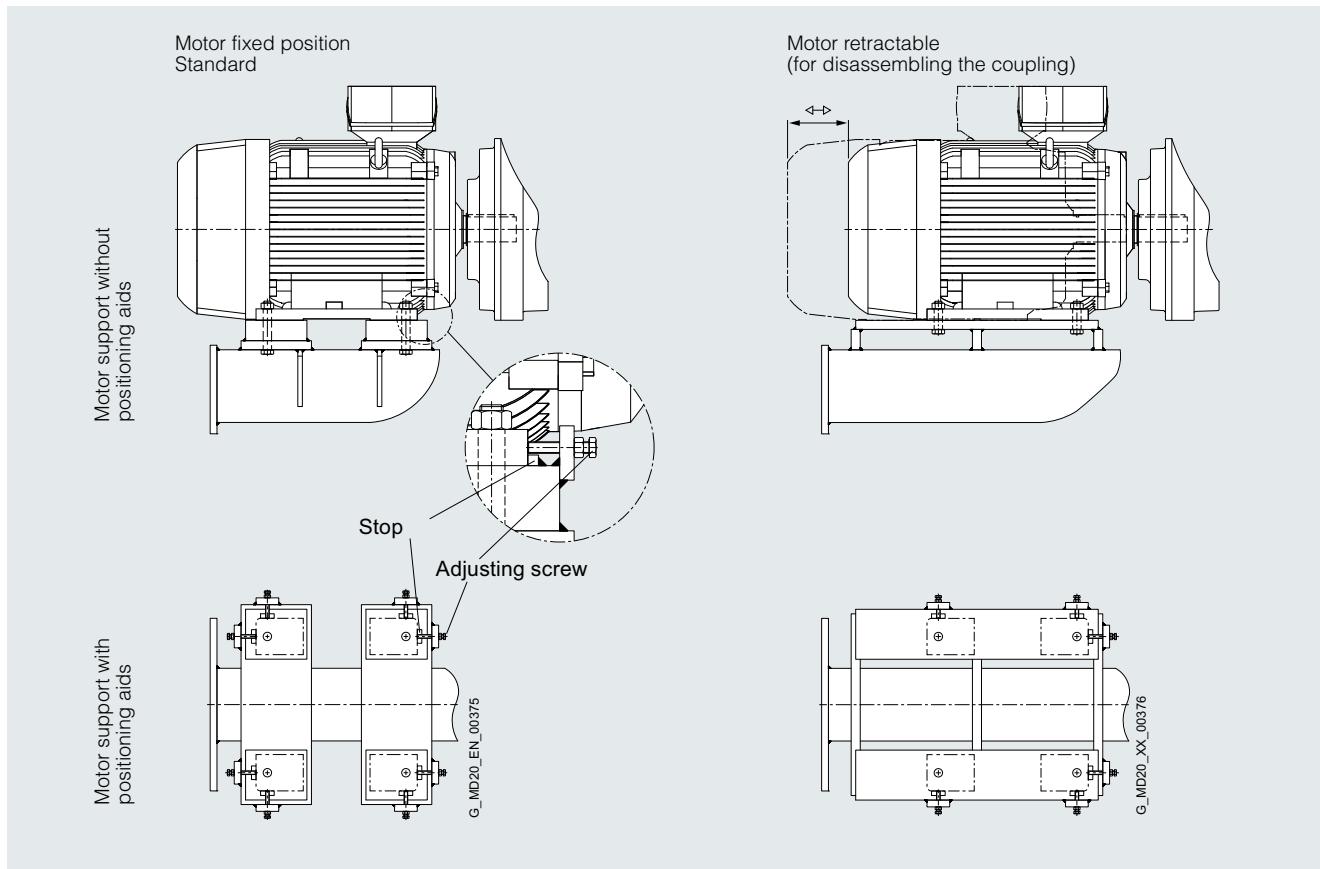
Furthermore, it is possible to prepare the gear unit swing base for a torque reaction arm. In this case, the gear unit swing base is equipped with an adapter plate.

	Data position of the Article No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.		2	D	A	0	6	1	.	.	.	.	.	.	.	.	.	.	-Z
<b>Torque reaction arm</b>																		
Torque reaction arm (standard)																		K 0 3
Torque reaction arm (reinforced)																		K 0 4
Torque reaction arm (front side of motor)																		K 0 5
Trestle (standard)																		K 0 6
Trestle (reinforced)																		K 0 7
Trestle (front side of motor)																		K 0 8
Adapter plate (standard)																		K 0 9
Adapter plate (reinforced)																		K 1 0
Adapter plate (front side of motor)																		K 1 1

<sup>1)</sup> The user cannot select the reaction arm variant (standard or reinforced), as this is defined depending on the layout of the drive train.

**Overview**

**Positioning of motors on gear unit swing base**



To facilitate assembly, the support surfaces of the motor feet on the swing base can be provided with various help options.

Adjusting screws are provided for aligning the motor. They can be used to align the motor on the swing base to the gear unit drive shaft. The adjusting screws are available in several variants and combinations.

Side-mounted adjusting screws can be provided for the gear unit.

Stops can be attached after the motor is aligned. This makes it possible to re-position the motor exactly in the same position after disassembly. The stops can be implemented in several variants and combinations.

The standard swing base version is designed for a fixed position of the motor. Upon request, the gear unit swing base can be implemented for axial offsetting of the motor, e.g. for coupling disassembly. Adjusting screws or alignment blocks are not possible on the fan side of the motor.

Note:

To ensure that an N-EUPEX coupling version A in combination with a fan-cooled gear unit can be disassembled even without the "motor retractable" swing base option, you must ensure that coupling part 2/3 is positioned on the motor shaft.

	Data position of the Article No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code	
Article No.	<b>2DA061</b>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	-Z	■ ■ ■
<b>Component positioning</b>																			
Adjusting screws the motor output side																			G 8 0
Adjusting screws on side of motor																			G 8 1
Adjusting screws on motor fan side																			G 8 2
Stops on motor output side																			G 8 3
Stops on side of motor																			G 8 4
Stops on motor fan side																			G 8 5
Adjusting screws on side of gear unit																			G 8 6
<b>Motor option</b>																			
Motor retractable																			N 0 0

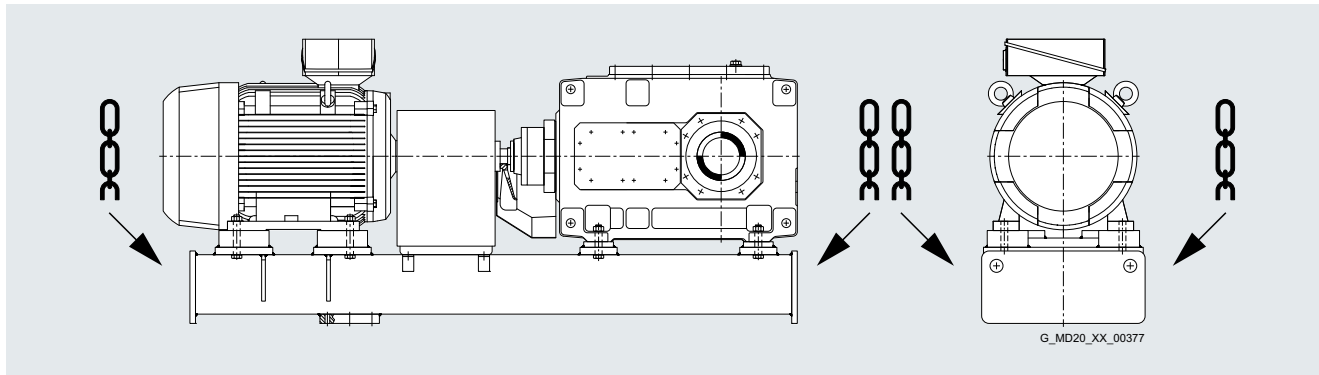


## Options for installation and add-on parts

### Gear unit swing base for bevel helical gear unit

#### Transport, ATEX

#### Overview



**Note:**

The drive unit must be transported and handled with suitable equipment only. Additional specifications and information can be found in the supplied documentation.

The end plates on the swing base are designed to be rectangular (standard). Upon request, both end plates can be trapezoidal or "trapezoidal on the motor side and square on the gear unit side" or "rectangular on the motor side and square on the gear unit side".

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.		<b>2DA061</b>	.	.	.	.	.	.	.	.	.	.	-Z ■ ■ ■
<b>End plate shape</b>													
End plates on both sides trapezoidal													K 4 0
End plates on both sides rectangular													K 4 1
End plates trapezoidal on motor side and square on gear unit side													K 4 2
End plates rectangular on motor side and square on gear unit side													K 4 3

For practical transport, a holder can be attached for air filters, screw plugs or replacement fusible lock screws in various

designs and located in different positions can be attached to the gear unit swing base.

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.		<b>2DA061</b>	.	.	.	.	.	.	.	.	.	.	-Z ■ ■ ■
<b>Screw plug holder</b>													
Transport air filter for gear unit on front of gear unit low speed shaft (LSS)													L 0 0
Transport air filter for gear unit and auxiliary drive on front of gear unit low speed shaft (LSS)													L 0 1
2 units of replacement fusible lock screws for fluid couplings on front of gear unit high speed shaft (HSS)													L 0 2
3 units of replacement fusible lock screws for fluid couplings on front of gear unit high speed shaft (HSS)													L 0 3

For usage locations with special requirements for transporting drives (e.g. underground), the gear unit swing base can be equipped with special transport aids such as receptacles for

forklift tines or skids. These options will be carried out upon request.

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code
Article No.		<b>2DA061</b>	.	.	.	.	.	.	.	.	.	.	-Z ■ ■ ■
<b>Transport aids</b>													
Forklift holder													M 5 0
Skids													M 5 1
<b>ATEX requirements</b>													
Swing bases in ATEX design													X 0 0



## Options for installation and add-on parts

### Gear unit swing base for bevel helical gear unit

#### Additional options and notes

#### Overview

To protect the drive train from excess heat due to the sun's rays, a sun roof can be attached for many designs. In the event of an

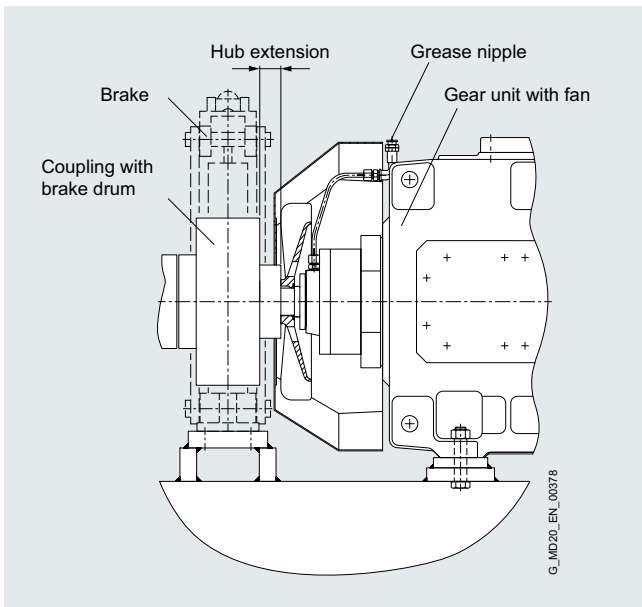
order, the definition of the dimensions and arrangement must be closely coordinated with Flender.

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code			
	Article No.	2DA061 . . . . . -											-Z	■	■	■
<b>Sun roof</b>																
Sun roof over entire drive train														L	5	0
Sun roof over gear unit														L	5	1
Sun roof over motor														L	5	2

A protective cover can be attached to prevent unintentional contact with the rotating low speed shaft, including a possible coupling.

	Data position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	"-Z" and order code			
	Article No.	2DA061 . . . . . -											-Z	■	■	■
<b>Protective cover slow speed shaft (LSS)</b>																
Holder for cover of low speed shaft (LSS) on side 3 (looking toward high speed shaft (HSS))														M	0	0
Holder for cover of low speed shaft (LSS) on side 6 (looking toward high speed shaft (HSS))														M	0	1
Holder for cover of low speed shaft (LSS) both sides														M	0	2

If the drive unit is to be used in an environment that requires an ATEX design, the corresponding option must be selected.



For the combination of gear unit with fan cooling and drum brakes, the coupling must always be implemented with extended hubs (see figure).

The position of the grease nipple for the Taconite type seal on the drive shaft is always above the housing on the front panel, regardless of the cooling option.



In the event of an accident, there is a risk of hot oil escaping when fluid couplings are used. In the worst case scenario, this can lead to irreversible personal injury. To reduce the risk to a minimum, each FLUDEX coupling must be designed with an EOC system. The information, version and ordering data can be found in the coupling catalog.

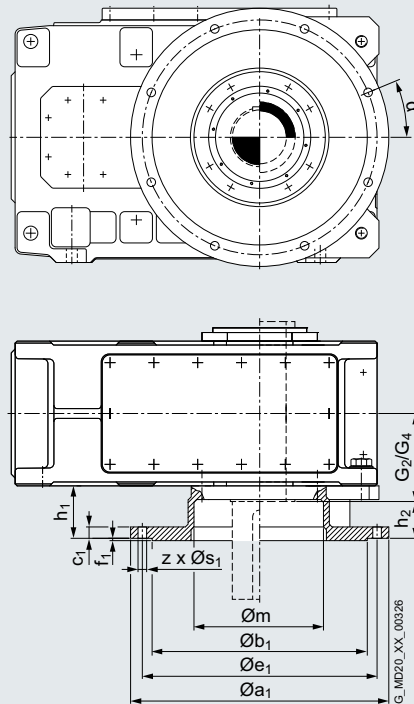
## Options for installation and add-on parts

Mounting flange - long spacer, mounting flange - short spacer

### Mounting flange - long spacer

#### Overview

#### Mounting flange - long spacer for sizes 4 to 12



Mounting flange - long spacer, sizes 4 to 12

#### Notes:

Possible versions, [see Table 3](#).

Combinations with backstop or pump on request.

Combinations with motor bell housings or fans for H gear units of version C and D on request.

Table 1

Torque factor $f$										
<b>H2.., H3.., H4.., B3.., B4..</b>										
Factor	Size	4	5	6	7	8	9	10	11	12
$f$		1.1	1.2	1.6	1.2	1.4	1.3	1.5	1.3	1.4
<b>B2..</b>										
Factor	Size	4	5	6	7	8	9	10	11	12
$f$		1.0	1.0	1.3	1.0	1.2	1.1	1.3	1.1	1.2

## Options for installation and add-on parts

### Mounting flange - long spacer, mounting flange - short spacer

#### Mounting flange - long spacer

#### Overview (continued)

##### Mounting flange - long spacer for sizes 4 to 12 (continued)

Table 2

Size <sup>1)</sup>	Dimensions in mm									Additional weight kg	H2S., H2D., H2H., H3S., H3D., H3H., H4S., H4D., H4H., B3S., B3D., B3H., B4S., B4D., B4H.	B2S., B2H., B2D.
	a <sub>1</sub>	b <sub>1</sub> f7	c <sub>1</sub>	e <sub>1</sub>	f <sub>1</sub>	h <sub>1</sub>	h <sub>2</sub>	m <sub>max</sub>	Z × s <sub>1</sub>			
4	450	350	24.5	400	5	82.5	50	205	8 × 17.5	40	140	170
5	550	450	25	500	5	90	52.5	245	8 × 17.5	60	165	200
6	550	450	25	500	5	90	52.5	245	8 × 17.5	65	165	200
7	660	550	25	600	5	135	90	290	8 × 22	90	195	235
8	660	550	30	600	5	135	90	315	8 × 22	100	195	235
9	660	550	29	600	6	134	84	325	12 × 22	110	235	270
10	660	550	34	600	6	134	84	355	12 × 26	120	235	270
11	800	680	44	740	6	184	129	420	12 × 26	210	270	320
12	800	680	44	740	6	184	129	435	12 × 26	220	270	320

Table 3

Possible types, sizes, versions				
Size	H2.H	H2.V	H3.H, H4.H, B2.H, B3.H, B4.H	H3.V, H4.V, B2.V, B3.V, B4.V
4	A + B	B	A + B + C + D	B + C
5	A + B	B	A + B + C + D	B + C
6	A + B	B	A + B + C + D	B + C
7	A + B	B	A + B + C + D	B + C
8	A + B	B	A + B + C + D	B + C
9	A + B	B	A + B + C + D	B + C
10	A + B + C + D	B + C	A + B + C + D	B + C
11	A + B	B	A + B + C + D	B + C
12	A + B + C + D	B + C	A + B + C + D	B + C

#### Mounting flange - long spacer

Position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	2LP302 . . . . . -Z											
<b>Housing support</b>												■ ■ ■
Mounting flange - long spacer												K 0 2

<sup>1)</sup>  $T_{2max} \leq T_{2N}/f$

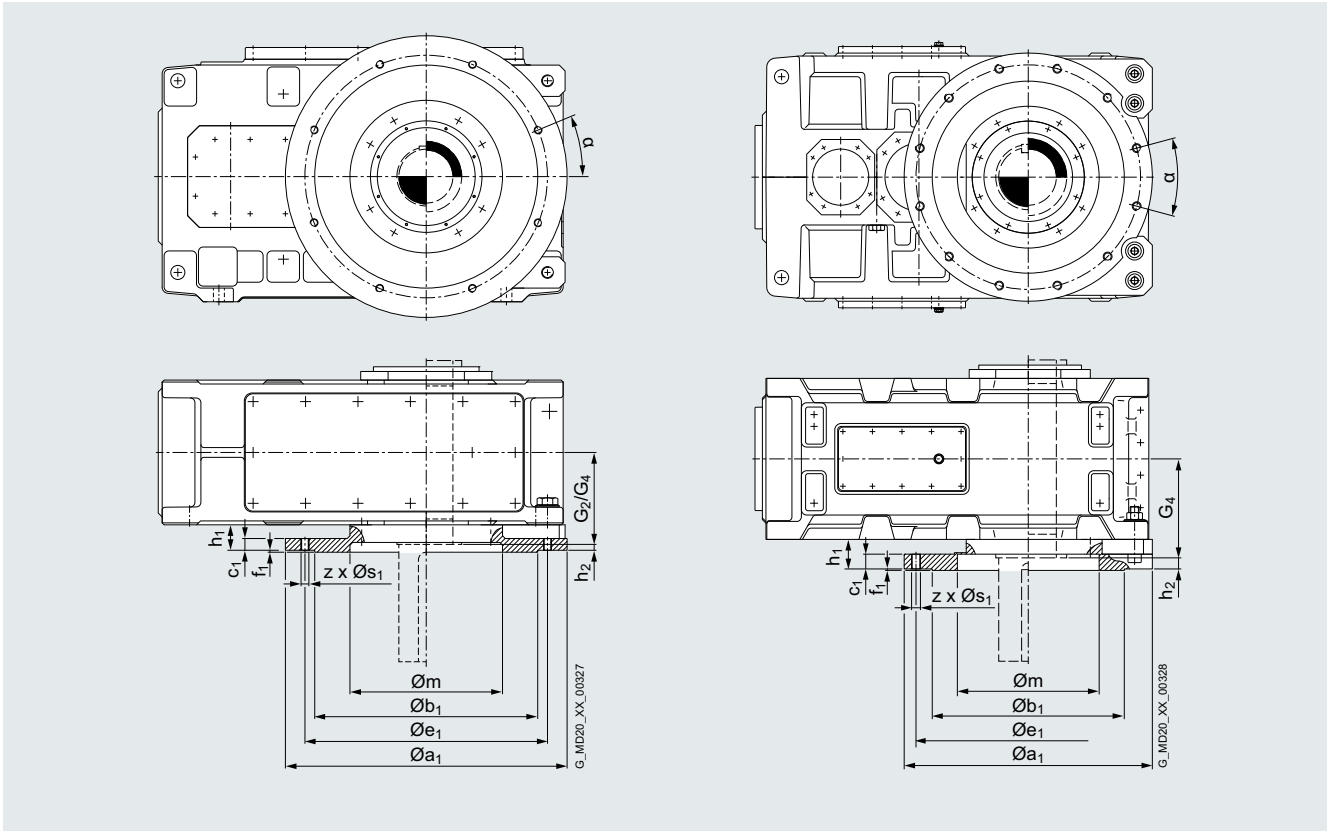
## Options for installation and add-on parts

Mounting flange - long spacer, mounting flange - short spacer

### Mounting flange - short spacer

Overview (continued)

#### Mounting flange - short spacer for sizes 4 to 16



Mounting flange - short spacer, sizes 4 to 12 on left, sizes 13 to 16 on right

**Notes:**

Beyond size 13, only housings without feet are used, i.e. in mounting position M.

Possible versions, see Table 3.

Combinations with backstop or pump on request.

Combinations with motor bell housings or fans for H gear units of version C and D on request.

Table 1

Torque factor <i>f</i>														
<b>H2., H3., H4., B3., B4..</b>														
Factor	Size	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>f</i>		1.1	1.2	1.5	1.2	1.4	1.3	1.5	1.3	1.4	1.4	1.1	1.4	1.2
<b>B2..</b>														
Factor	Size	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>f</i>		1.0	1.0	1.2	1.0	1.2	1.1	1.3	1.1	1.2	1.2	1.0	1.2	1.0

## Options for installation and add-on parts

### Mounting flange - long spacer, mounting flange - short spacer

#### Mounting flange - short spacer

#### Overview (continued)

#### Mounting flange - short spacer for sizes 4 to 16 (continued)

Table 2

Type	Size <sup>1)</sup>	Dimensions in mm									Additional weight kg	H2S., H2D., H2H., H3S., H3D., H3H., H4S., H4D., H4H., B3S., B3D., B3H., B4S., B4D., B4H.	B2S., B2H., B2D.
		a <sub>1</sub>	b <sub>1</sub> f7	c <sub>1</sub>	e <sub>1</sub>	f <sub>1</sub>	h <sub>1</sub>	h <sub>2</sub>	m <sub>max</sub>	Z × s <sub>1</sub>			
..S., ..D., ..H.	4	445	340	25	400	5	55	22.5	205	8 × M 16	35	140	170
..S., ..D., ..H.	5	565	430	25	515	5	60	22.5	245	8 × M 16	55	165	200
..S., ..D., ..H.	6	565	430	25	515	5	60	22.5	245	8 × M 16	55	165	200
..S., ..D., ..H.	7	670	530	25	620	5	60	15	295	8 × M 20	80	195	235
..S., ..D., ..H.	8	670	530	40	620	5	80	35	300	8 × M 20	110	195	235
..S., ..D., ..H.	9	670	530	35	620	5	80	30	320	12 × M 20	105	235	270
..S., ..D., ..H.	10	730	560	35	680	5	80	30	355	12 × M 24	125	235	270
..S., ..D., ..H.	11	730	560	40	680	5	90	35	400	12 × M 24	145	270	320
..S., ..D., ..H.	12	730	560	40	680	5	90	35	420	12 × M 24	155	270	320
..S.	13	840	650	50	760	5	100	37.5	450	12 × M 30	245	335	390
..D., ..H.	13	840	650	50	760	5	100	37.5	450	12 × M 30	240	335	–
..S.	14	840	650	50	760	5	100	37.5	480	12 × M 30	255	335	390
..D., ..H.	14	840	650	50	760	5	100	37.5	480	12 × M 30	245	335	390
..S.	15	960	750	50	880	5	100	30	530	16 × M 30	315	380	460
..D., ..H.	15	960	750	50	880	5	100	30	530	16 × M 30	305	380	–
..S.	16	960	750	50	880	5	100	30	540	16 × M 30	320	380	460
..D., ..H.	16	960	750	50	880	5	100	30	540	16 × M 30	315	380	450

Table 3

Possible types, sizes, versions				
Size	H2SH, H2HH, H2DH	H2.V	H3SH, H4SH, B2SH, B3SH, B4SH, H3HH, H4HH, B2HH, B3HH, B4HH, H3DH, H4DH, B2DH, B3DH, B4DH	H3.V, H4.V, B2.V, B3.V, B4.V
4	A + B	B	A + B + C + D	B + C
5	A + B	B	A + B + C + D	B + C
6	A + B	B	A + B + C + D	B + C
7	A + B	B	A + B + C + D	B + C
8	A + B	B	A + B + C + D	B + C
9	A + B	B	A + B + C + D	B + C
10	A + B + C + D	B + C	A + B + C + D	B + C
11	A + B	B	A + B + C + D	B + C
12	A + B + C + D	B + C	A + B + C + D	B + C
13	A + B	B	A + B + C + D	B + C
14	A + B + C + D	B + C	A + B + C + D	B + C
15 <sup>2)</sup>	A + B + C + D	B + C	A + B + C + D	B + C
16 <sup>2)</sup>	A + B + C + D	B + C	A + B + C + D	B + C

#### Mounting flange - short spacer

Position of the Article No.	1 to 6	7	8	9	10	11	12	13	14	15	16	Order code
Article No.:	2LP302 . . . . . -Z											
<b>Housing support</b>	<div style="display: flex; justify-content: space-between; align-items: center;"> <span>Mounting flange - short spacer</span> <div style="border: 1px solid black; padding: 2px;"> <span style="background-color: #0056b3; color: white; padding: 2px;">K</span> <span style="background-color: #0056b3; color: white; padding: 2px;">0</span> <span style="background-color: #0056b3; color: white; padding: 2px;">1</span> </div> </div>											

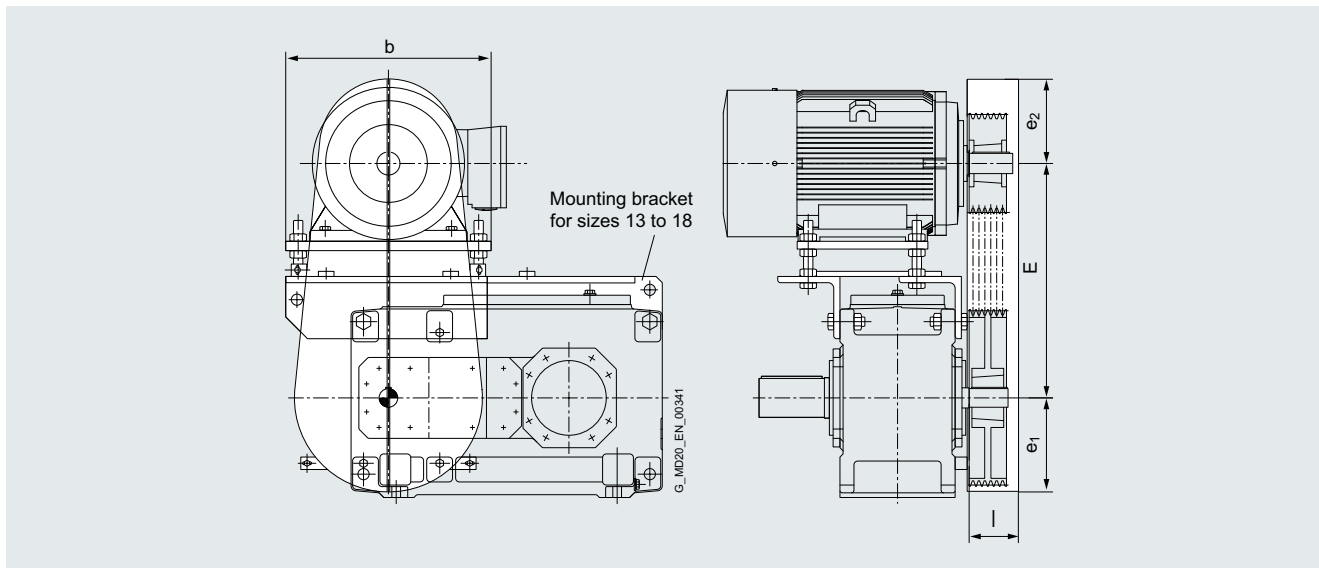
<sup>1)</sup>  $T_{2max} \leq T_{2N}/f$

<sup>2)</sup> Type B2.. Size 15 + 16 not possible in version A or C!

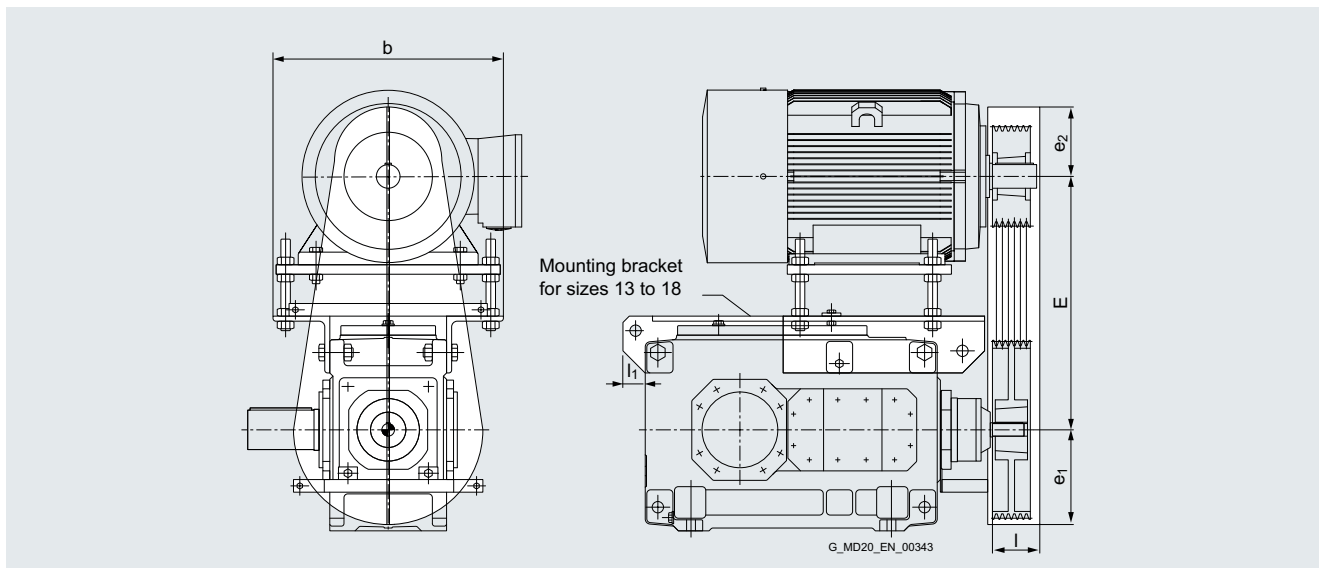
# Options for installation and add-on parts

## Piggy back

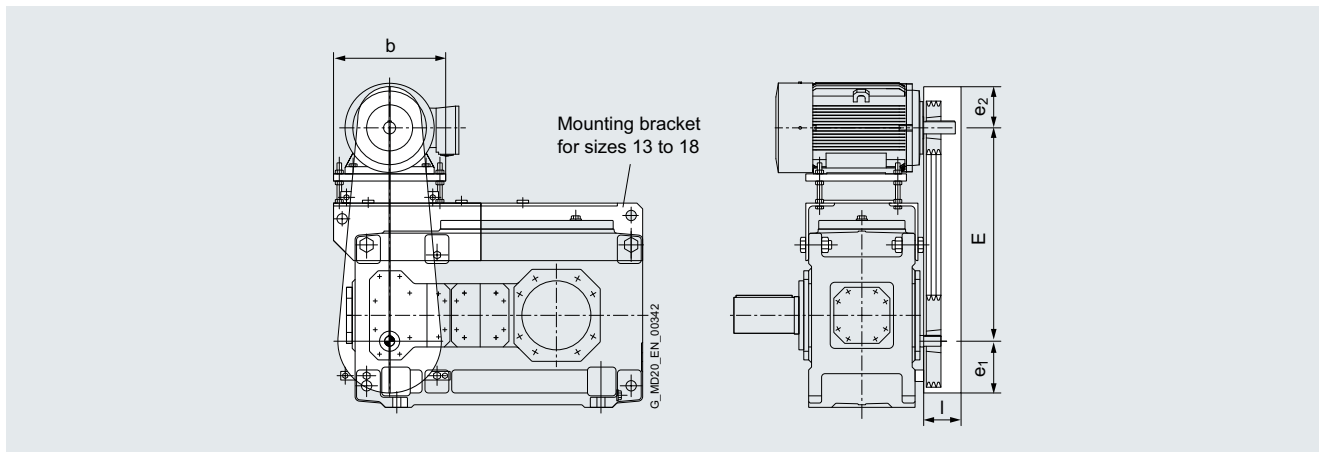
### Overview



Piggy back for helical gear unit, horizontal installation, type H3



Piggy back for bevel helical gear unit, horizontal installation, types B3 and B4



Piggy back for helical gear unit, horizontal installation, type H4

**Overview** (continued)

If motors cannot be positioned in front of the gear unit due to space concerns, it is possible to mount the motors piggy back.

Piggy back versions for gear units are listed here as examples, other sizes on request.

In addition, other speeds can be driven on the low speed shaft by changing the pulley drive and the drive is protected during high dynamic peak loads from the application.

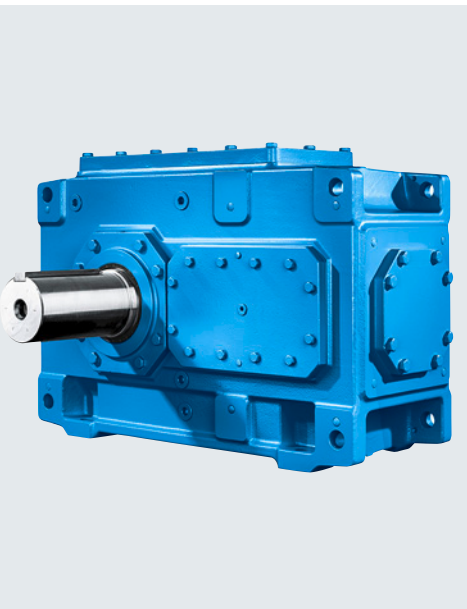
Type Size	IEC motor	$i$ gear units	$i$ belt drive	$i_{total}$	Belt pulley motor shaft	Belt number	Dimensions in mm				
							b	E	$e_1$	$e_2$	l
<b>H3.H</b> 5	132 S	71 – 90	1.25 1.4 1.6 1.8	89 – 162	SPZ 140	2	390	493	180	177	120
	132 M	50 – 90		63 – 162	SPZ 140	3	390	493	180	177	120
	160 M	35.5 - 71		44 – 128	SPZ 180	3	390	530	180	140	120
	160 L	25 – 50		31 – 90	SPA 180	3	390	530	180	140	120
<b>H4.H</b> 9	112 M	315 355	1.25 1.4 1.6 1.8	394 – 639	SPZ 112	2	390	672	125	108	70
	132 S	224 – 355		280 – 639	SPZ 140	2	390	701	180	154	120
	132 M	160 – 315		200 – 567	SPZ 140	3	390	701	180	154	120
	160 M	112 - 224		140 – 403	SPZ 180	3	390	742	180	143	120
	160 L	100 – 160		125 – 288	SPA 180	3	390	742	180	143	120
<b>B3.H</b> 4	112 M	56 – 71	1.25 1.4 1.6 1.8	70 – 127.8	SPZ 112	2	375	421	120	104	85
	132 S	45 – 71		56.3 - 127.8	SPZ 140	2	455	434	180	182	120
	132 M	31.5 - 45		39.4 – 81	SPZ 140	3	455	434	180	182	120
	160 M	20 – 45		25 – 81	SPZ 180	3	455	476	180	140	120
	160 L	31.5 35.5		39.4 – 63.9	SPA 180	3	455	476	180	140	120
<b>B4.H</b> 9	132 S	224 – 315	1.25 1.4 1.6 1.8	280 – 567	SPZ 140	2	550	572	180	178	120
	132 M	160 – 315		200 – 567	SPZ 140	3	550	572	180	178	120
	160 M	112 - 224		140 – 403	SPZ 180	3	550	615	180	135	120
	160 L	80 – 160		100 – 288	SPA 180	3	550	615	180	135	120
	180 M	80 – 140		100 – 252	SPA 250	3	550	626	250	184	120
	180 L	80 – 112		100 – 202	SPA 250	3	550	626	250	184	120

## Options for installation and add-on parts

### Notes



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# Appendix

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#### Overview

For general terms and conditions of Flender GmbH, see:

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