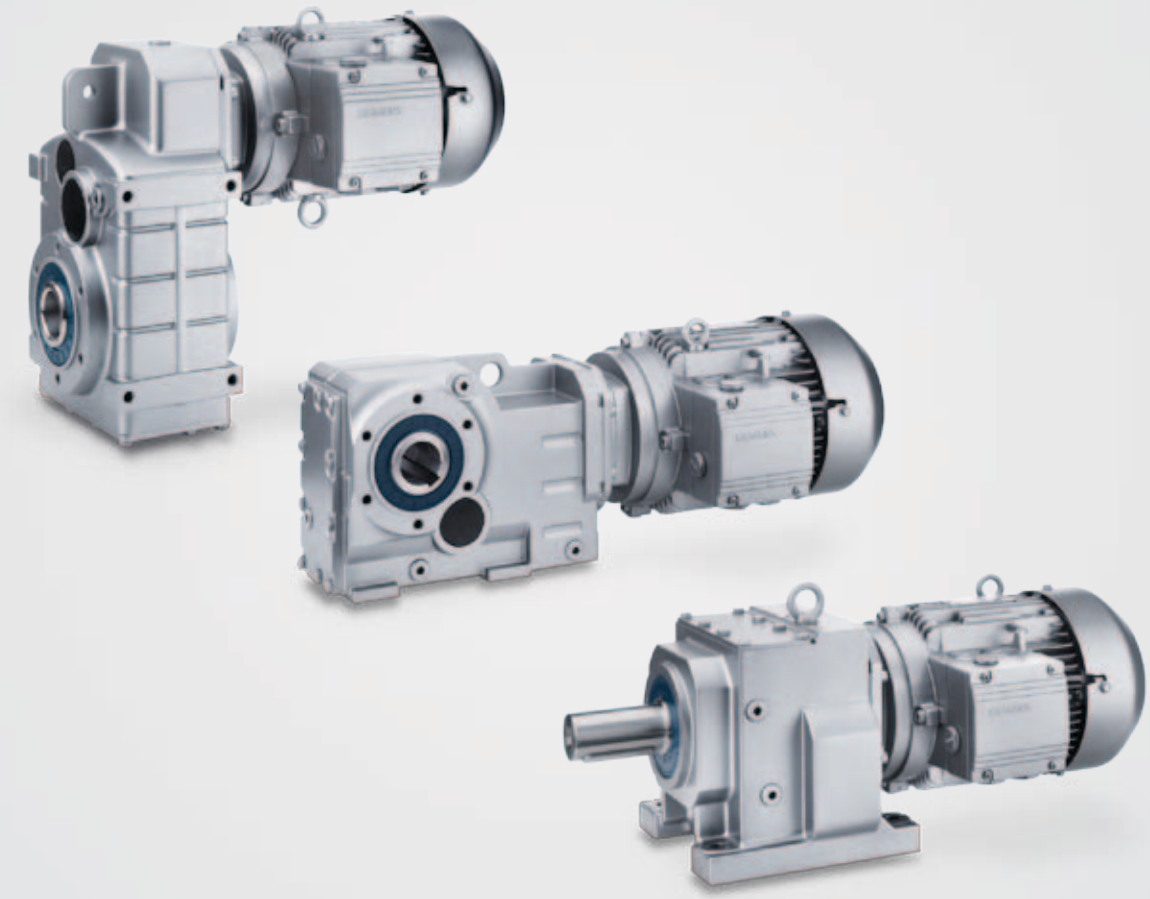
MOTOX Geared Motors

Catalog D 87.1 · 2011



MOTOX

Answers for industry.

SIEMENS

Related catalogs

Low-Voltage Motors D 81.1
IEC Squirrel-Cage Motors

E86060-K5581-A111-A3-7600

FLENDER
Standard Couplings MD 10.1

E86060-K5710-A111-A3-7600

SINAMICS G110, SINAMICS G120 D 11.1
Standard Inverters
SINAMICS G110D, SINAMICS G120D
Distributed Inverters

E86060-K5511-A111-A6-7600

SINAMICS G130 D 11
Drive Converter Chassis Units
SINAMICS G150
Drive Converter Cabinet Units

E86060-K5511-A101-A4-7600

MICROMASTER DA 51.2
MICROMASTER 420/430/440
Inverters
0.12 kW to 250 kW

E86060-K5151-A121-A6-7600

MICROMASTER/COMBIMASTER DA 51.3
MICROMASTER 411 Inverter
COMBIMASTER 411
Distributed Drive Solutions

E86060-K5251-A131-A2-7600

Industrial Communication IK PI
Part 5:
SIMATIC ET 200 Distributed I/O
ET 200S FC Frequency converter

E86060-K6710-A101-B6-7600

AC NEMA & IEC Motors D81.2
Further details available on the Internet at: U.S./Canada

Only PDF
http://www.sea.siemens.com/motors

MOTOX Konfigurator MOTOX
MOTOX Configurator
Information / Configuration
(CD)

E86060-D5203-A100-A5-X100

Additional documentation

You will find all information material, such as brochures, catalogs, manuals and operating instructions for standard drive systems up-to-date on the Internet at the address:

http://www.siemens.com/gearedmotors

You can order the listed documentation or download it in common file formats (PDF, ZIP).

MOTOX
Geared Motors

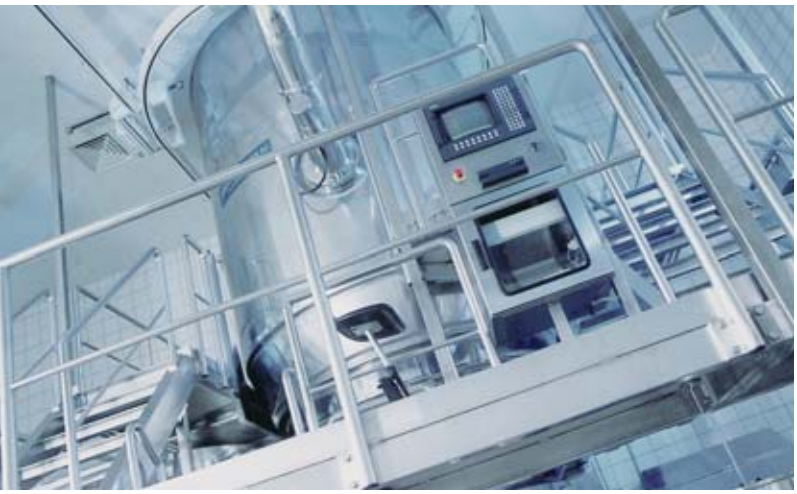
Catalog D 87.1 · 2011

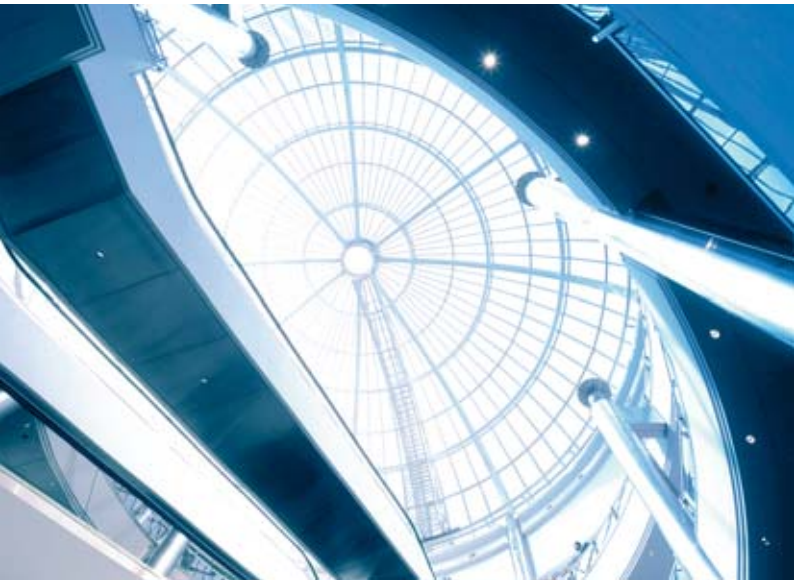
The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001 (Certified Registration No. DE-409908 QM08). The certificate is recognized by all IQNet countries.

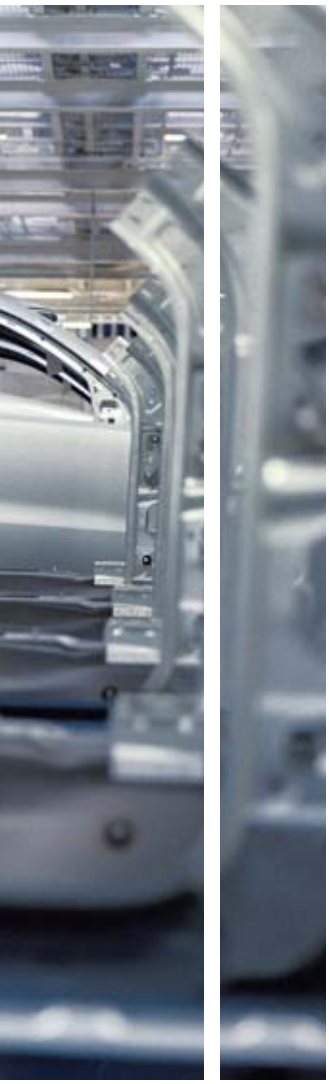
Supersedes:
Catalogs D 87.1 · 2008 and 2010

The products contained in this catalog can also be found in the electronic catalog MOTOX Configurator 7.4.
Order No.:
E86060-D5203-A100-A5-X100 (CD-ROM)

Please contact your local Siemens branch







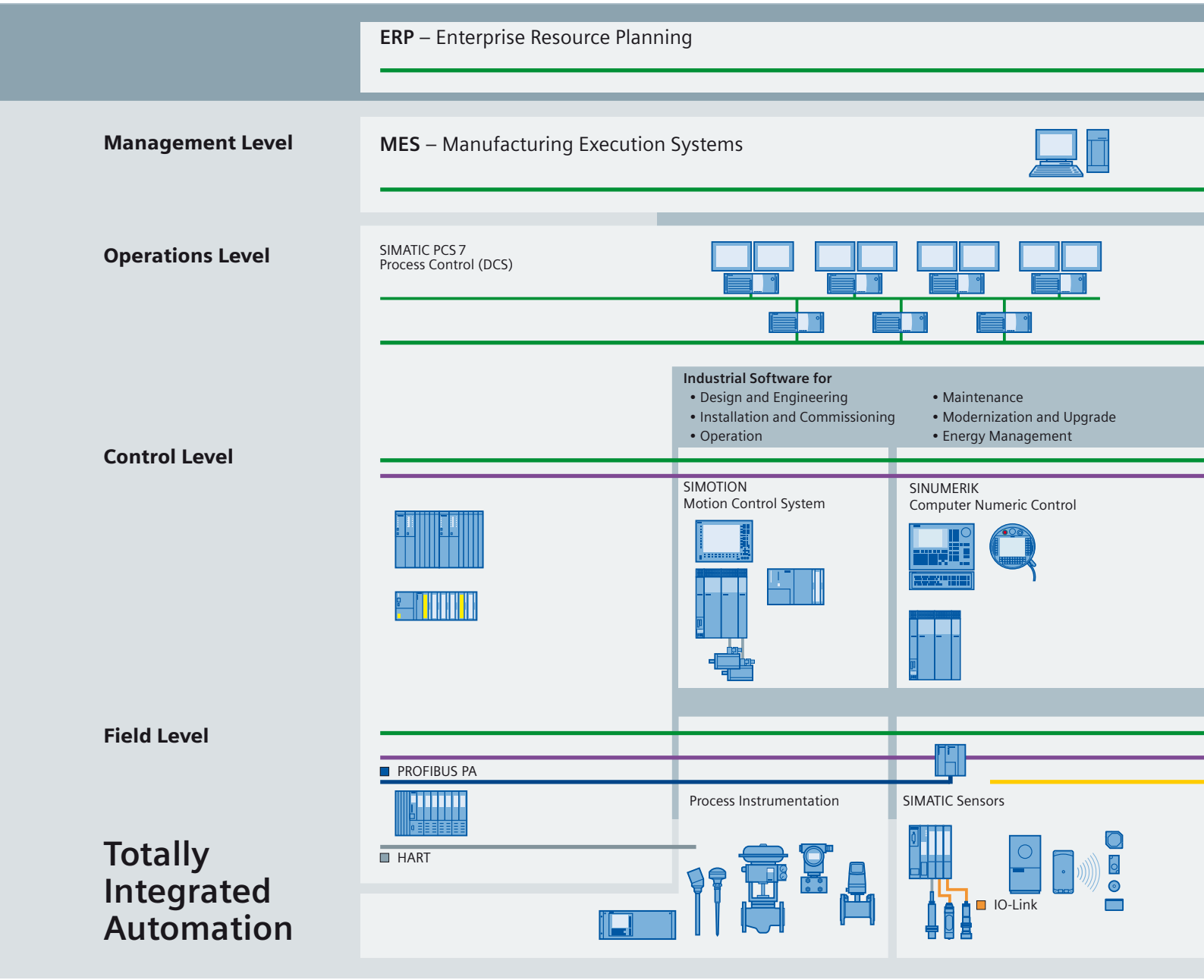
Answers for industry.

Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

Siemens offers automation, drive, and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

The high quality of our products sets industry-wide benchmarks. High environmental aims are part of our eco-management, and we implement these aims consistently. Right from product design, possible effects on the environment are examined. Hence many of our products and systems are RoHS compliant (Restriction of Hazardous Substances). As a matter of course, our production sites are certified according to DIN EN ISO 14001, but to us, environmental protection also means most efficient utilization of valuable resources. The best example are our energy-efficient drives with energy savings up to 60 %.

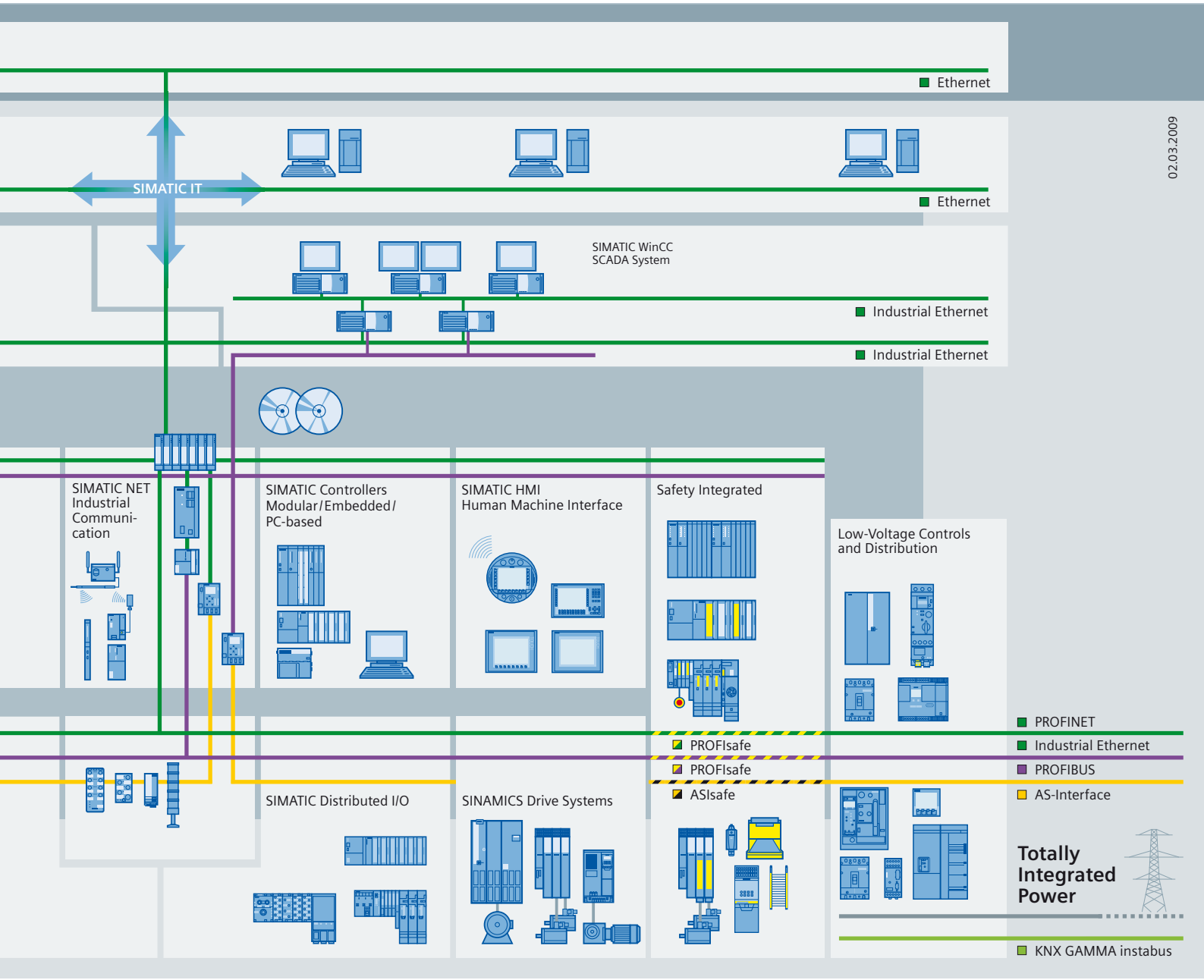
Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.



Setting standards in productivity and competitiveness.

Totally Integrated Automation.

Thanks to Totally Integrated Automation, Siemens is the only provider of an integrated basis for implementation of customized automation solutions – in all industries from inbound to outbound.



TIA is characterized by its unique continuity.

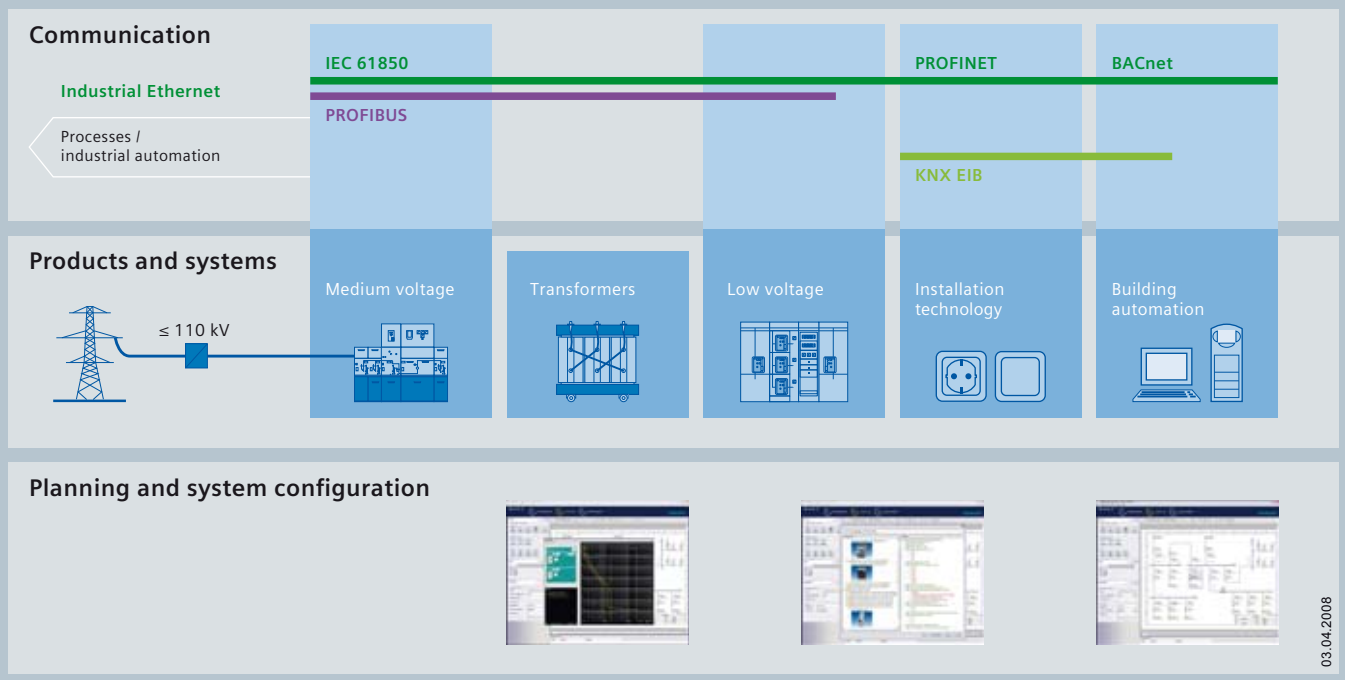
It provides maximum transparency at all levels with reduced interfacing requirements – covering the field level, production control level, up to the corporate management level. With TIA you also profit throughout the complete life cycle of your plant – starting with the initial planning steps through operation up to modernization, where we offer a high measure of investment security resulting from continuity in the further development of our products and from reducing the number of interfaces to a minimum.

The unique continuity is already a defined characteristic at the development stage of our products and systems.

The result: maximum interoperability – covering the controller, HMI, drives, up to the process control system. This reduces the complexity of the automation solution in your plant. You will experience this, for example, in the engineering phase of the automation solution in the form of reduced time requirements and cost, or during operation using the continuous diagnostics facilities of Totally Integrated Automation for increasing the availability of your plant.

Integrated power distribution from one source.

Totally Integrated Power.



Electrical power distribution in buildings requires integrated solutions. Our response: Totally Integrated Power. This means innovative and integrated, interface-optimized products and systems which have been optimally coordinated and complemented with communication and software modules that link power distribution to building automation or industrial automation. Totally Integrated Power accompanies power distribution projects from one end to the other. From A to Z.
From the planning to the building's use: Totally Integrated Power offers significant advantages in every project stage and to everyone involved in the project – the investors, electrical planning engineers, electricians, users and building facility managers.

Our portfolio comprises everything from engineering tools to the matching hardware: from switchgear and distribution systems for medium voltage to transformers, from switching and circuit-protection devices to low-voltage switchgear and busbar trunking systems, as far as to the small distribution board and the wall outlet. It goes without saying that both the medium-voltage switchgear, which requires no maintenance, and the low-voltage switchgear are type-tested, and their busbar connections, too. Comprehensive protection systems ensure the safety of man and machine at any time.

Much more than a catalog. The Industry Mall.

You have a catalog in your hands that will serve you well for selecting and ordering your products. But have you heard of the electronic online catalog (the Industry Mall) and all its benefits? Take a look around it sometime:

www.siemens.com/industrymall

Selecting

Find your products in the structure tree, in the new "Bread-crumb" navigation or with the integral search machine with expert functions. Electronic configurators are also integrated into the Mall. Enter the various characteristic values and the appropriate product will be displayed with the relevant order numbers. You can save configurations, load them and reset them to their initial status.

Ordering

You can load the products that you have selected in this way into the shopping basket at a click of the mouse. You can create your own templates and you will be informed about the availability of the products in your shopping cart. You can load the completed parts lists directly into Excel or Word.

Delivery status

When you have sent the order, you will receive a short e-mail confirmation which you can print out or save. With a click on "Carrier", you will be directly connected to the website of the carrier where you can easily track the delivery status.

Added value due to additional information

So you have found your product and want more information about it? In just a few clicks of the mouse, you will arrive at the image data base, manuals and operating instructions. Create your own user documentation with My Documentation Manager.
Also available are FAQs, software downloads, certificates and technical data sheets as well as our training programs. In the image database you will find, depending on the product, 2D/3Dgraphics, dimension drawings and exploded drawings, characteristic curves or circuit diagrams which you can download.

Convinced? We look forward to your visit!

Introduction

Guide to selecting and ordering geared motors

1

Description of the range of geared motors

MOTOX geared motors are available in an almost infinite number of combinations for adaptation to a wide range of drive scenarios.
All geared motors can be supplied with a mounted brake.
All the usual additional components and variants are also offered.

Made-to-measure solutions for all kinds of drive technology tasks are achieved with different gearbox types (helical, parallel shaft, bevel helical, helical worm, and worm).

Electronic catalog

MOTOX Configurator (CD)

The MOTOX Configurator makes it easy to select the right geared motor, providing you with the correct geared motor order numbers, prices and relevant documentation.

Data sheets and dimension drawings can be created for the different products.

Product range

The printed catalog contains the basic selection of standard MOTOX geared motors. The MOTOX Configurator, however, contains practically all combinations of MOTOX geared motors which are theoretically possible. It also contains additional sector-specific applications, such as:

- Monorail conveyor drives
- Extruder geared motors
- Cooling tower drives
- Mixer and agitator geared motors

You can also use the electronic catalog to configure explosion-proof ATEX geared motors for zones 1, 2, 21, and 22.

The MOTOX Configurator can also be accessed online at: www.siemens.com/gearedmotors.

Description of the range of geared motors (continued)

Helical geared motor D/Z

Helical geared motors and gearboxes

Torque	20 000 Nm
Power rating (50 Hz)	200 kW
Output speed (50 Hz)	0.05 ... 1 085 / min

Parallel shaft geared motor FD/FZ

Parallel shaft geared motors and gearboxes

Torque	34 000 Nm
Power rating (50 Hz)	200 kW
Output speed (50 Hz)	0.05 ... 738 / min

Bevel helical geared motor K

Bevel helical geared motors and gearboxes

Torque	20 000 Nm
Power rating (50 Hz)	200 kW
Output speed (50 Hz)	0.05 ... 403 / min

Helical worm geared motor C

Helical worm geared motors and gearboxes

Torque	1 590 Nm
Power rating (50 Hz)	9.2 kW
Output speed (50 Hz)	0.21 ... 149 / min

Worm geared motor S

Worm geared motors and gearboxes

Torque	116 Nm
Power rating (50 Hz)	1.1 kW
Output speed (50 Hz)	8.5 ... 566 / min

1

Guide to selecting and ordering geared motors

Guide to drive selection

This "guide to drive selection" takes you to the geared motor you require in easy-to-follow steps.

1st step	**Technical requirements of the geared motor -> see the "Configuring guide" section of this chapter**
Determine the required product profile, the following are required:	Gearbox type
	Power rating
	Output speed
	Service factor
	Radial force
	Ambient temperature
2nd step	**Preselection of the geared motor -> see subsequent pages**
Determine the range of possible geared motors	Size of the gearbox and the motor in accordance with the power rating and output speed
3rd step	**Detailed selection of the geared motor -> see the individual chapters for the different gearbox types**
Determine the basic order number	Define the order number in accordance with the power / torque and output speed
	Add more details to the order number in accordance with the mounting type, shaft, and mounting position of the geared motor
	Define the order code for the mounting type / mounting position
4th step	**Selection of motor options -> see chapter "Technical explanations and motor options"**
Complete the order number	Add more details to the order number in accordance with the voltage and frequency
	Define additional components and the associated order codes

Order number code

The order number consists of a combination of digits and letters and is divided into three blocks linked with hyphens for a better overview,

e.g.:

2KJ1503-1CE13-1AE2-Z

+D06+M55

The first block (positions 1 to 7) identifies the gearbox type, the second (positions 8 to 12) codes the output shaft and the motor type and additional design characteristics are coded in the third block (positions 13 to 16).

Ordering data:

- Complete order number, with a **-Z** suffix, and order code(s) or plain text.
- If a quotation is available, please specify the quotation number in addition to the order number.
- When ordering a complete geared motor as a spare part, please specify the works serial number for the previously supplied geared motor as well as the order number.

Structure of the order number		Position	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16	
MOTOX geared motors																					
1st to 5th positions: Digit, letter, letter, digit, digit	Helical gearbox E, 1-stage		**2**	**K**	**J**	**1**	**0**														
	Helical gearbox Z, 2-stage		**2**	**K**	**J**	**1**	**1**														
	Helical gearbox D, 3-stage		**2**	**K**	**J**	**1**	**2**														
	Parallel shaft gearbox FZ, 2-stage		**2**	**K**	**J**	**1**	**3**														
	Parallel shaft gearbox FD, 3-stage		**2**	**K**	**J**	**1**	**4**														
	Bevel helical gearboxes B and K		**2**	**K**	**J**	**1**	**5**														
	Helical worm gearbox C		**2**	**K**	**J**	**1**	**6**														
	Worm gearbox S		**2**	**K**	**J**	**1**	**7**														
6th and 7th positions: Digit, digit	Gearbox size																				
8th position: Digit	Output shaft																				
9th to 10th positions: Letter Letter	Motor size																				
11th position: Digit	Without motor													**0**							
	Standard motor													**1**							
12th position: Digit	Motor generation														**3**						
13th position: Digit	Frequency, voltage																				
14th position: Letter	Foot-mounted design																	**A**			
	Foot / flange-mounted design																	**B**			
	Torque arm																	**D**			
	Extruder flange																	**E**			
	Flange-mounted design (A-type)																	**F**			
	Housing flange (C-type)																	**H**			
	Mixer flange																	**M**			
	Agitator flange																	**R**			
15th to 16th positions: Letter, digit	Transmission ratio																				
	Special order versions: • Coded: order code also required • Non-coded: plain text also required																			–	**Z**

Guide to selecting and ordering geared motors

1

Order number code (continued)

Ordering example:

A bevel helical geared motor is required:

- Gearbox type / gearbox size K48
- Motor 0.37 kW, 4-pole with 50 Hz line frequency
- Output speed 13, transmission ratio i = 107.47
- Solid shaft V 30 x 60
- Mounting type / mounting position B3-00-A
- Terminal box position 1A

This results in the order number and order codes below:

Selection criteria	Requirements	Structure of the order number
Gearbox type	Bevel helical gearbox K, size 48	**2KJ1503**-■■■■■- ■■■■
Output shaft	Solid shaft V 30 x 60	2KJ1503-**1**■■■■- ■■■■
Motor size	Size 71; 0.37 kW; 4-pole	2KJ1503-1**CE**■■- ■■■■
Motor type	Standard motor	2KJ1503-1CE**1**■- ■■■■
Motor generation	LA / LG	2KJ1503-1CE1**3**- ■■■■
Frequency, line voltage	50 Hz, 220 … 240 / 380 … 420 V, D/Y (S100)	2KJ1503-1CE13-**1**■■■
Mounting type	Foot-mounted design	2KJ1503-1CE13-1**A**■■
Transmission ratio	i = 107.47	2KJ1503-1CE13-1A**E2**
Mounting position	B3-00-A	2KJ1503-1CE13-1AE2**-Z+D06**
Terminal box position	1A	2KJ1503-1CE13-1AE2-Z+D06**+M55**

Determining the gearbox type in accordance with the power rating and output speed

Power rating P_{Motor} kW (50 Hz)	Output speed n_2 (50 Hz) rpm	Torque T_2 Nm	Gearbox ratio i_{tot}	For further information, see page
	Helical geared motors E, D, and Z			
0.09	3.00 … 6.7	285 … 128.0	208.77 … 133.57	2/8
0.12	0.05 … 313.0	15 788 … 3.7	28 260.00 … 4.47	2/8 … 2/11
0.18	0.06 … 383.0	23 784 … 4.5	24 996.00 … 3.58	2/11 … 2/15
0.25	0.08 … 405.0	23 171 … 5.9	16 361.00 … 3.33	2/15 … 2/19
0.37	0.12 … 383.0	24 391 … 9.2	11 066.00 … 3.58	2/19 … 2/22
0.55	0.20 … 414.0	23 625 … 13.0	7 008.00 … 3.31	2/22 … 2/26
0.75	0.27 … 560.0	23 327 … 13.0	5 107.00 … 2.50	2/26 … 2/30
1.1	0.40 … 906.0	23 626 … 12.0	3 580.00 … 1.59	2/30 … 2/34
1.5	0.54 … 906.0	24 171 … 16.0	2 666.00 … 1.59	2/34 … 2/39
2.2	0.85 … 944.0	22 590 … 22.0	1 682.00 … 1.52	2/39 … 2/44
3	1.10 … 1 018.0	23 069 … 28.0	1 255.00 … 1.41	2/44 … 2/49
4	1.60 … 1 021.0	21 939 … 37.0	896.00 … 1.41	2/49 … 2/54
5.5	1.90 … 1 025.0	25 081 … 51.0	746.00 … 1.41	2/54 … 2/59
7.5	2.70 … 1 032.0	24 896 … 69.0	546.00 … 1.41	2/59 … 2/59
9.2	5.70 … 1 032.0	15 282 … 85.0	253.08 … 1.41	2/64 … 2/67
11	4.40 … 1 035.0	24 093 … 101.0	243.82 … 1.41	2/67 … 2/70
15	6.00 … 1 074.0	23 923 … 133.0	243.82 … 1.36	2/70 … 2/74
18.5	7.10 … 1 081.0	24 799 … 163.0	206.34 … 1.36	2/74 … 2/77
22	9.60 … 1 077.0	21 959 … 195.0	153.12 … 1.36	2/77 … 2/80
30	12.10 … 1 085.0	23 633 … 264.0	121.67 … 1.36	2/80 … 2/83
37	14.60 … 1 081.0	24 268 … 327.0	100.96 … 1.36	2/83 … 2/85
45	18.30 … 1 085.0	23 533 … 396.0	80.77 … 1.36	2/85 … 2/88
55	21.00 … 902.0	24 634 … 582.0	69.41 … 1.64	2/88 … 2/89
75	35.00 … 512.0	20 716 … 1 399.0	42.95 … 2.90	2/89 … 2/91
90	35.00 … 512.0	24 859 … 1 678.0	42.95 … 2.90	2/91 … 2/92
110	88.00 … 180.0	11 887 … 5 852.0	16.86 … 8.30	2/92
132	88.00 … 179.0	14 312 … 7 046.0	16.86 … 8.30	2/92
160	88.00 … 179.0	17 348 … 8 540.0	16.86 … 8.30	2/92
200	88.00 … 180.0	21 612 … 10 640.0	16.86 … 8.30	2/92
	Parallel shaft geared motors FZ and FD			
0.09	2.30 … 4.7	367 … 184.0	280.41 … 191.34	3/6
0.12	0.05 … 111	16 202 … 10.0	29 000.00 … 12.62	3/6 … 3/9
0.18	0.05 … 210	24 072 … 8.2	25 299.00 … 6.53	3/9 … 3/12
0.25	0.09 … 355	22 462 … 6.7	15 519.00 … 3.80	3/12 … 3/15
0.37	0.13 … 73	23 944 … 49.0	10 863.00 … 18.86	3/15 … 3/15
0.55	0.19 … 170	24 147 … 31.0	7 163.00 … 8.06	3/18 … 3/20
0.75	0.28 … 368	22 934 … 19.0	5 021.00 … 3.80	3/20 … 3/23
1.1	0.38 … 379	24 675 … 28.0	3 739.00 … 3.80	3/23 … 3/26
1.5	0.61 … 379	21 388 … 38.0	2 359.00 … 3.80	3/26 … 3/26
2.2	0.82 … 372	23 638 … 56.0	1 760.00 … 4.33	3/30 … 3/33
3	1.2 … 639	22 720 … 45.0	1 236.00 … 3.80	3/33 … 3/33
4	1.4 … 671	24 905 … 57.0	1 030.00 … 4.33	3/37 … 3/39
5.5	2.4 … 364	22 097 … 144.0	403.86 … 3.97	3/39 … 3/42
7.5	3.0 … 738	24 243 … 97.0	403.86 … 3.97	3/42 … 3/45
9.2	4.9 … 305	18 067 … 288.0	299.20 … 4.77	3/45 … 3/47
11	3.0 … 306	35 066 … 343.0	299.20 … 4.77	3/47 … 3/49
15	3.5 … 306	40 468 … 468	248.85 … 4.77	3/49 … 3/51
18.5	4.5 … 259	39 601 … 683	242.01 … 5.68	3/51 … 3/53
22	5.5 … 386	37 909 … 545	242.01 … 3.80	3/53 … 3/55
30	6.7 … 388	42 449 … 738	218.54 … 3.80	3/55 … 3/56

Determining the gearbox type in accordance with the power rating and output speed (continued)

Power rating P_{Motor} kW (50 Hz)	Output speed n_2 (50 Hz) rpm			Torque T_2 Nm			Gearbox ratio i_{tot}			For further information, see page
	Parallel shaft geared motors FZ and FD									
37	8.4	…	387	42 287	…	913	175.92	…	3.80	3/56 … 3/58
45	11.0	…	388	39 088	…	1 106	134.16	…	3.80	3/58 … 3/59
55	14.8	…	280	35 564	…	1 874	100.21	…	5.28	3/59 … 3/59
75	18.5	…	281	38 668	…	2 547	80.17	…	5.28	3/61
90	22.0	…	281	39 878	…	3 056	68.90	…	5.28	3/61 … 3/62
110	28.0	…	179	37 832	…	5 880	53.66	…	8.34	3/62 … 3/63
132	35.0	…	178	36 188	…	7 080	42.63	…	8.34	3/63
160	38.0	…	178	39 965	…	8 581	38.84	…	8.34	3/63
200	49.0	…	179	38 777	…	10 691	30.25	…	8.34	3/63 … 3/63
	Bevel helical geared motors B and K									
0.09	3.70	…	7.2	231	…	120.0	179.13	…	124.78	4/6
0.12	0.05	…	187.0	16 836	…	6.1	30 135.00	…	7.49	4/6 … 4/9
0.18	0.06	…	277.0	23 014	…	6.2	24 187.00	…	4.94	4/9 … 4/12
0.25	0.08	…	378.0	24 007	…	6.3	16 951.00	…	3.57	4/12 … 4/15
0.37	0.12	…	93.0	24 723	…	38.0	11 463.00	…	14.75	4/15 … 4/18
0.55	0.19	…	300.0	24 353	…	18.0	7 224.00	…	4.56	4/18 … 4/21
0.75	0.26	…	392.0	24 688	…	18.0	5 405.00	…	3.57	4/21 … 4/25
1.1	0.42	…	403.0	22 504	…	26.0	3 410.00	…	3.57	4/25 … 4/25
1.5	0.55	…	403.0	23 582	…	36.0	2 601.00	…	3.57	4/29 … 4/32
2.2	0.77	…	374.0	25 008	…	56.0	1 862.00	…	3.84	4/32 … 4/35
3	1.10	…	402.0	23 639	…	71.0	1 286.00	…	3.57	4/35 … 4/38
4	1.50	…	255.0	23 702	…	142.0	968.00	…	5.36	4/38 … 4/41
5.5	2.20	…	270.0	22 492	…	195.0	669.00	…	5.36	4/41 … 4/43
7.5	2.70	…	271.0	24 988	…	264.0	548.00	…	5.36	4/43 … 4/45
9.2	3.40	…	263.0	24 013	…	335.0	429.00	…	5.54	4/45 … 4/47
11	4.20	…	264.0	25 035	…	399.0	191.34	…	5.54	4/47 … 4/49
15	6.00	…	264.0	23 790	…	544.0	191.34	…	5.54	4/49 … 4/50
18.5	7.70	…	207.0	22 997	…	853.0	191.34	…	7.10	4/50 … 4/52
22	8.50	…	303.0	24 779	…	693.0	172.78	…	4.83	4/52 … 4/53
30	12.30	…	305.0	23 340	…	938.0	120.16	…	4.83	4/53 … 4/54
37	15.40	…	304.0	22 951	…	1 161.0	95.48	…	4.83	4/54 … 4/54
45	18.60	…	305.0	23 084	…	1 407.0	79.23	…	4.83	4/56 … 4/57
55	23.00	…	306.0	22 493	…	1 714.0	63.38	…	4.83	4/57
75	35.00	…	225.0	20 465	…	3 188.0	42.43	…	6.61	4/58
90	35.00	…	225.0	24 558	…	3 826.0	42.43	…	6.61	4/58
110	76.00	…	123.0	13 790	…	8 531.0	19.56	…	12.10	4/59
132	76.00	…	123.0	16 604	…	10 272.0	19.56	…	12.10	4/59
160	76.00	…	123.0	20 126	…	12 450.0	19.56	…	12.10	4/59
200	76.00	…	123.0	25 074	…	15 511.0	19.56	…	12.10	4/59
	Helical worm geared motors C									
0.09	2.00	…	4	241	…	125	320.67	…	223.36	5/7
0.12	0.21	…	55	1 913	…	19	6 722.00	…	25.28	5/7… 5/9
0.18	0.37	…	54	1 885	…	29	3 719.00	…	25.28	5/9 … 5/10
0.25	0.60	…	53	1 782	…	41	2 256.00	…	25.28	5/10 … 5/12
0.37	0.91	…	54	1 918	…	60	1 510.00	…	25.28	5/12 … 5/14
0.55	1.7	…	68	1 870	…	68	440.70	…	20.31	5/14 … 5/14
0.75	2.4	…	145	1 969	…	44	440.70	…	9.67	5/15 … 5/16
1.1	3.7	…	149	1 983	…	62	390.00	…	9.67	5/16 … 5/18
1.5	5.8	…	149	1 779	…	85	247.00	…	9.67	5/18 … 5/20
2.2	11.4	…	148	1 355	…	125	126.18	…	9.67	5/20 … 5/21

Determining the gearbox type in accordance with the power rating and output speed (continued)

Power rating	Output speed			Torque			Gearbox ratio			For further information,
P_{Motor}	n_2 (50 Hz)			T_2			i_{tot}			see page
kW (50 Hz)	rpm			Nm						
Helical worm geared motors C										
3	14.6	…	148	1 668	…	170	98.17	…	9.67	5/21 … 5/22
4	22.0	…	149	1 482	…	227	65.32	…	9.67	5/22 … 5/23
5.5	34.0	…	130	1 302	…	367	41.85	…	11.15	5/23 ... 5/24
7.5	62.0	…	130	992	…	497	23.56	…	11.15	5/24
9.2	109.0	…	130	732	…	609	13.39	…	11.15	5/24
11	109.0	…	131	872	…	726	13.39	…	11.15	5/24
Worm geared motors S										
0.09	8.5	…	21.2	46.2	…	23.5	100	…	40	6/5
0.12	13.5	…	270	40.3	…	3.8	100	…	5	6/5 ... 6/6
0.18	10.6	…	564	82.0	…	2.8	100	…	5	6/6 ... 6/7
0.25	14.3	…	566	94.9	…	3.8	80	…	5	6/7 ... 6/8
0.37	22.8	…	548	90.9	…	5.9	60	…	5	6/8
0.55	46.5	…	560	82.1	…	8.6	30	…	5	6/8
0.75	70.0	…	574	81.9	…	11.6	30	…	5	6/9
1.1	143.0	…	572	59.4	…	17.0	20	…	5	6/9

1

Guide to selecting and ordering geared motors

Determining the gearbox type in accordance with the max. torque, transmission ratio, and size

Max. gearbox torque	Gearbox type	Order No.	Transmission ratio	For further information,
Nm				see page
	Helical gearbox E			
82	E38	**2KJ1001**	1.59 ... 9.33	2/93
170	E48	**2KJ1002**	1.52 ... 11.30	2/93
250	E68	**2KJ1003**	1.41 ... 12.40	2/94
450	E88	**2KJ1004**	1.71 ... 10.33	2/94
745	E108	**2KJ1005**	1.81 ... 5.46	2/95
1 000	E128	**2KJ1006**	1.36 ... 10.14	2/95
1 550	E148	**2KJ1007**	1.64 ... 13.67	2/95
	Helical gearbox Z			
90	Z18	**2KJ1100**	3.58 ... 43.15	2/96
140	Z28	**2KJ1101**	3.33 ... 51.35	2/97
220	Z38	**2KJ1102**	4.77 ... 44.12	2/99
450	Z48	**2KJ1103**	4.28 ... 51.28	2/101
800	Z68	**2KJ1104**	3.49 ... 48.09	2/103
1 680	Z88	**2KJ1105**	3.11 ... 50.73	2/105
3 100	Z108	**2KJ1106**	3.42 ... 59.05	2/107
5 100	Z128	**2KJ1107**	3.07 ... 44.19	2/109
8 000	Z148	**2KJ1108**	4.44 ... 57.50	2/111
14 000	Z168	**2KJ1110**	4.46 ... 46.61	2/113
20 000	Z188	**2KJ1111**	8.30 ... 52.35	2/115
220	Z38 - Z28	**2KJ1112**	207.00 ... 1 258.00	2/98
220	Z38 - D28	**2KJ1113**	1 343.00 ... 5 905.00	2/98
	Helical gearbox D			
90	D18	**2KJ1200**	32.26 ... 200.36	2/96
140	D28	**2KJ1201**	48.38 ... 241.05	2/97
220	D38	**2KJ1202**	30.74 ... 191.75	2/99
450	D48	**2KJ1203**	35.59 ... 208.77	2/101
800	D68	**2KJ1204**	37.80 ... 281.01	2/103
1 680	D88	**2KJ1205**	34.14 ... 300.41	2/105
3 100	D108	**2KJ1206**	42.61 ... 359.30	2/107
5 100	D128	**2KJ1207**	37.57 ... 268.16	2/109
8 000	D148	**2KJ1208**	34.15 ... 336.11	2/111
14 000	D168	**2KJ1210**	40.99 ... 341.61	2/113
20 000	D188	**2KJ1211**	42.95 ... 243.82	2/115
450	D48 - Z28	**2KJ1212**	223.00 ... 5 019.00	2/100
450	D48 - D28	**2KJ1213**	5 608.00 ... 27 940.00	2/100
800	D68 - Z28	**2KJ1214**	320.00 ... 7 548.00	2/102
800	D68 - D28	**2KJ1215**	8 422.00 ... 41 961.00	2/102
800	D88 - Z28	**2KJ1218**	341.00 ... 8 305.00	2/104
800	D88 - D28	**2KJ1220**	9 279.00 ... 46 233.00	2/104
3 100	D108 - Z38	**2KJ1223**	392.00 ... 15 853.00	2/106
3 100	D108 - D38	**2KJ1224**	15 280.00 ... 68 896.00	2/106
5 100	D128 - Z38	**2KJ1225**	1 280.00 ... 51 420.00	2/108
5 100	D128 - D38	**2KJ1226**	11 404.00 ... 51 420.00	2/108
5 100	D128 - Z48	**2KJ1227**	285.00 ... 1 271.00	2/108
8 000	D148 - Z38	**2KJ1228**	1 604.00 ... 14 830.00	2/110
8 000	D148 - D38	**2KJ1230**	14 294.00 ... 64 450.00	2/110
8 000	D148 - Z48	**2KJ1231**	398.00 ... 1 631.00	2/110
14 000	D168 - Z48	**2KJ1232**	1 463.00 ... 17 519.00	2/112
14 000	D168 - D48	**2KJ1233**	17 080 ... 71 317	2/112
14 000	D168 - Z68	**2KJ1234**	376 ... 1 226	2/112
20 000	D188 - Z48	**2KJ1235**	1 044 ... 12 504	2/114

Determining the gearbox type in accordance with the max. torque, transmission ratio, and size (continued)

Max. gearbox torque	Gearbox type	Order No.	Transmission ratio	For further information,
Nm				see page
	Helical gearbox D			
20 000	D188 - D48	**2KJ1236**	12 191 ... 50 901	2/114
20 000	D188 - Z68	**2KJ1237**	322 ... 896	2/114
	Parallel shaft gearbox FZ			
150	FZ28	**2KJ1300**	56.20 ... 280.00	3/65
290	FZ38B	**2KJ1301**	4.52 ... 56.72	3/67
540	FZ48B	**2KJ1302**	4.33 ... 60.71	3/69
1 000	FZ68B	**2KJ1303**	3.97 ... 61.17	3/71
1 900	FZ88B	**2KJ1304**	4.77 ... 64.58	3/73
3 400	FZ108B	**2KJ1305**	5.68 ... 64.21	3/75
6 100	FZ128B	**2KJ1306**	3.80 ... 56.42	3/77
9 000	FZ148B	**2KJ1307**	5.39 ... 68.23	3/79
14 000	FZ168B	**2KJ1308**	5.28 ... 53.48	3/81
20 000	FZ188B	**2KJ1310**	8.34 ... 52.63	3/83
32 681	FZ208	**2KJ1311**	9.01 ... 20.06	3/85
290	FZ38B - Z28	**2KJ1313**	303.00 ... 1 617.00	3/66
290	FZ38B - D28	**2KJ1314**	1 726.00 ... 7 591.00	3/66
	Parallel shaft gearbox FD			
150	FD28	**2KJ1400**	3.80 ... 59.65	3/65
290	FD38B	**2KJ1401**	56.28 ... 280.41	3/67
540	FD48B	**2KJ1402**	43.09 ... 268.80	3/69
1 000	FD68B	**2KJ1403**	50.48 ... 296.18	3/71
1 900	FD88B	**2KJ1404**	54.47 ... 404.92	3/73
3 400	FD108B	**2KJ1405**	48.24 ... 424.49	3/75
6 100	FD128B	**2KJ1406**	53.13 ... 447.96	3/77
9 000	FD148B	**2KJ1407**	62.93 ... 449.21	3/79
14 000	FD168B	**2KJ1408**	41.85 ... 369.26	3/81
20 000	FD188B	**2KJ1410**	48.46 ... 403.86	3/83
34 000	FD208	**2KJ1411**	24.03 ... 242.01	3/85
540	FD48B - Z28	**2KJ1413**	299.00 ... 4 197.00	3/68
540	FD48B - D28	**2KJ1414**	4 480.00 ... 19 701.00	3/68
1 000	FD68B - Z28	**2KJ1417**	317.00 ... 4 454.00	3/70
1 000	FD68B - D28	**2KJ1418**	4 755.00 ... 39 638.00	3/70
1 900	FD88B - Z28	**2KJ1422**	461.00 ... 6 000.00	3/72
1 900	FD88B - D28	**2KJ1423**	6 703.00 ... 54 705.00	3/72
3 400	FD108B - Z38	**2KJ1426**	466.00 ... 15 230.00	3/74
3 400	FD108B - D38	**2KJ1427**	16 603.00 ... 66 190.00	3/74
6 100	FD128B - Z38	**2KJ1428**	1 970.00 ... 15 663.00	3/76
6 100	FD128B - D38	**2KJ1430**	17 075.00 ... 68 070.00	3/76
6 100	FD128B - Z48	**2KJ1431**	439.00 ... 1 504.00	3/76
9 000	FD148B - Z38	**2KJ1432**	1 757.00 ... 16 239.00	3/78
9 000	FD148B - D38	**2KJ1433**	17 704.00 ... 70 576.00	3/78
9 000	FD148B - Z48	**2KJ1434**	477.00 ... 1 634.00	3/78
14 000	FD168B - Z48	**2KJ1435**	1 337.00 ... 16 007.00	3/80
14 000	FD168B - D48	**2KJ1436**	17 454.00 ... 65 160.00	3/80
14 000	FD168B - Z68	**2KJ1437**	398.00 ... 1 298.00	3/82
20 000	FD188B - Z48	**2KJ1438**	1 465.00 ... 17 537.00	3/82
20 000	FD188B - D48	**2KJ1440**	19 122.00 ... 71 388.00	3/82
20 000	FD188B - Z68	**2KJ1441**	444.00 ... 1 449.00	3/82
34 000	FD208 - Z68	**2KJ1442**	766.00 ... 8 251.00	3/84
34 000	FD208 - D68	**2KJ1443**	9 924.00 ... 61 412.00	3/84
34 000	FD208 - Z88	**2KJ1444**	284.00 ... 694.00	3/84

Determining the gearbox type in accordance with the max. torque, transmission ratio, and size (continued)

Max. gearbox torque	Gearbox type	Order No.	Transmission ratio	For further information,
Nm				see page
	Bevel helical gearbox B and K			
130	B28	**2KJ1500**	3.57 … 57.53	4/60
250	B38	**2KJ1501**	3.84 … 65.69	4/61
250	K38	**2KJ1502**	5.65 … 179.13	4/63
450	K48	**2KJ1503**	7.22 … 169.53	4/65
820	K68	**2KJ1504**	5.36 … 243.72	4/67
1 650	K88	**2KJ1505**	5.54 … 302.68	4/69
3 000	K108	**2KJ1506**	7.68 … 307.24	4/71
4 700	K128	**2KJ1507**	7.10 … 295.38	4/73
8 000	K148	**2KJ1508**	4.83 … 306.08	4/75
13 500	K168	**2KJ1510**	6.61 … 287.95	4/77
20 000	K188	**2KJ1511**	12.10 … 191.34	4/79
250	K38 - Z28	**2KJ1514**	181.00 … 2 797.00	4/62
250	K38 - D28	**2KJ1515**	2 986.00 … 13 129.00	4/62
450	K48 - Z28	**2KJ1516**	181.00 … 2 798.00	4/64
450	K48 - D28	**2KJ1517**	2 987.00 … 13 135.00	4/64
820	K68 - Z28	**2KJ1518**	277.00 … 4 282.00	4/66
820	K68 - D28	**2KJ1520**	4 572.00 … 20 103.00	4/66
1 650	K88 - Z28	**2KJ1523**	344.00 … 5 309.00	4/68
1 650	K88 - D28	**2KJ1524**	5 667.00 … 24 920.00	4/68
3 000	K108 - Z38	**2KJ1527**	1 466.00 … 13 556.00	4/70
3 000	K108 - D38	**2KJ1528**	13 066.00 … 58 914.00	4/70
3 000	K108 - Z48	**2KJ1530**	301.00 … 1 343.00	4/70
4 700	K128 - Z38	**2KJ1531**	1 410.00 … 13 032.00	4/72
4 700	K128 - D38	**2KJ1532**	12 562.00 … 56 640.00	4/72
4 700	K128 - Z48	**2KJ1533**	313.00 … 1 400.00	4/72
8 000	K148 - Z38	**2KJ1534**	1 466.00 … 13 505.00	4/74
8 000	K148 - D38	**2KJ1535**	13 017.00 … 58 692.00	4/74
8 000	K148 - Z68	**2KJ1536**	296.00 … 1 392.00	4/74
13 500	K168 - Z48	**2KJ1537**	1 233.00 … 14 767.00	4/76
13 500	K168 - D48	**2KJ1538**	14 397.00 … 60 115.00	4/76
13 500	K168 - Z68	**2KJ1540**	317.00 … 1 033.00	4/76
20 000	K188 - Z68	**2KJ1541**	669.00 … 9 201.00	4/78
20 000	K188 - D68	**2KJ1542**	8 689.00 … 53 767.00	4/78
20 000	K188 - Z88	**2KJ1543**	225.00 … 669.00	4/78
	Helical worm gearbox C			
118	C28	**2KJ1600**	25.28 … 372.00	5/25 … 5/26
243	C38	**2KJ1601**	9.67 … 320.67	5/28 … 5/30
387	C48	**2KJ1602**	9.67 … 320.67	5/32 … 5/34
687	C68	**2KJ1603**	11.67 … 364.00	5/36 … 5/38
1 590	C88	**2KJ1604**	11.15 … 440.70	5/40 … 5/42
225	C38 - Z28	**2KJ1605**	324.00 … 4 222.00	5/27
222	C38 - D28	**2KJ1606**	4 717.00 … 23 503.00	5/27
369	C48 - Z28	**2KJ1607**	324.00 … 4 222.00	5/31
364	C48 - D28	**2KJ1608**	4 717.00 … 23 503.00	5/31
680	C68 - Z28	**2KJ1610**	398.00 … 5 066.00	5/35
675	C68 - D28	**2KJ1611**	5 661.00 … 28 203.00	5/35
1 590	C88 - Z28	**2KJ1614**	6 722.00 … 33 491.00	5/39
1 590	C88 - D28	**2KJ1615**	462.00 … 6 016.00	5/39
	Worm gearbox S			
33	S08	**2KJ1730**	5 … 80	6/10 ... 6/10
64	S18	**2KJ1731**	5 … 80	6/10 ... 6/10
116	S28	**2KJ1732**	5 … 100	6/10 ... 6/10

Overview of "special versions"

Order code	Special version Designation	For further information, see page
	Input units	
A00	Input unit A with free input shaft	7/3, 7/30
A03	Input unit K2 (coupling lantern) with flexible coupling for connecting an IEC motor	7/3, 7/20
A04	Input unit K4 (short coupling lantern) with clamp connection for connecting an IEC motor	7/3, 7/23
A07	Input unit KQ (lantern for servomotor) with zero-free, flexible coupling for connecting a servomotor (with feather key)	7/3, 7/28
A08	Input unit KQS attachment (lantern for servomotor) with zero-free, flexible coupling for connecting a servomotor (with plain shaft)	7/3, 7/28
A09	Input unit P with free input shaft and piggy back for connecting an IEC motor	7/3, 7/33
A10	Input unit PS with free input shaft, piggy back and protective belt cover	7/3
N61	Size index .2 for KQ/KQS coupling lantern for servomotor	7/3
N62	Size index .3 for KQ/KQS coupling lantern for servomotor	7/3
N63	Size index .4 for KQ/KQS coupling lantern for servomotor	7/3
	Backstop in the input unit	
A15	Backstop X	7/18
	Coupling types and input unit options	
A16	Flexible coupling	7/3
A17	Friction clutch	7/18
A18	Proximity switch	7/18
A19	Speed monitor	7/18
	Piggy back position	
A22	3h	7/33
A23	9h	7/33
A24	12h	7/33
	Brake type	
B00 to B66	Brake types according to size and braking torque	8/29 … 8/30
	Brake design	
C01	Enclosed brake	8/42
C02	Manual brake release lever	8/39
C03	Manual brake release lever with locking mechanism	8/39
C04	Microswitch for release monitoring	8/38
C06	Reduced-noise rotor-hub connection and wear-resistant friction lining	8/36
C09	Basic anti-corrosion protection	8/42
C10	Increased anti-corrosion protection	8/42
C11	Enclosed brake with condensation drain hole	8/42
	Manual brake release lever position	
C26	1	8/39
C27	2	8/39
C28	3	8/39
C29	4	8/39
	Brake control voltage	
C46 ... C70	Brake standard voltage	8/32
	Mounting types / mounting positions	
D00 to E17	Geared motor mounting types and mounting positions	2/119 ... 2/129, 3/92 ... 3/95, 4/87 ... 4/91, 5/47 ... 5/49, 6/15
	Torque arm figure	
G09	Figure 1	4/81, 5/44
G10	Figure 2	4/81, 5/44
	Output shaft bearings	
G20	Radially reinforced output shaft bearings	2/133, 3/99, 4/95, 5/53

Overview of "special versions" (continued)

Order code	Special version Designation	For further information, see page
	Output sealing	
G22 + G31	Double radial shaft seal	2/132, 3/98, 4/94, 5/52
G23	Double sealing MSS1	2/132, 3/98, 4/94, 5/52
G24	Combination shaft sealing	2/132, 3/98, 4/94, 5/52
G25	High temperature resistant sealing	2/132, 3/98, 4/94, 5/52
	Oil level control	
G34	Oil sight glass	2/130, 3/96, 4/93, 5/50
	Gearbox ventilation	
G44	Vent filter	2/131, 3/97, 4/93, 5/51
G45	Pressure ventilation valve	2/131, 3/97, 4/93, 5/51
	Oil drain	
G53	Magnetic oil drain plug	2/131, 3/97, 4/94, 5/51
G54	Oil drain valve, straight	2/131, 3/97, 4/94, 5/51
	Hollow-shaft cover	
G60	Steel protection cover	3/99, 4/95, 5/52
G61	Steel protection cover (ATEX)	3/99, 4/95, 5/52
G62	Protection cover	3/99, 4/95, 5/52
G63	Protection cover (ATEX)	3/99, 4/95, 5/52
	Backstop for bevel helical gearbox	
G72	Backstop (gearbox)	4/96
	Options for gearbox output shafts	
G73	2nd shaft extension (output shaft on both sides)	4/96, 5/53, 6/16
	Dry-well options for mixer and agitator drives	
G89	Dry-well design with sight glass	2/133, 3/100, 4/97
G90	Dry-well design with sensor	2/133, 3/100, 4/97
	Reduced-backlash version	
G99	Reduced-backlash version	1/23, 2/93, 3/65, 4/62
	Flange diameter	
H01 to H06	Flange diameter	2/118, 3/91, 4/86, 5/46, 6/14
	Degree of protection	
K01	IP 55	8/8
K02	IP 56	8/8
K03	IP 65	8/8
	Lubricants	
K06	CLP ISO VG 220 - Mineral oil	1/46, 2/130, 3/94, 4/92
K07	CLP ISO PG VG 220 - Synthetic oil	1/46, 2/130, 3/96, 4/92
K08	CLP ISO PG VG 460 - Synthetic oil	1/46, 2/130, 3/96, 4/92, 5/50, 6/16
K10	CLP ISO E VG 220 - Biologically degradable oil	1/46, 2/130, 3/96, 4/92, 5/50
K11	CLP ISO H1 VG 460 - Oil for use in the food industry	1/46, 2/130, 3/96, 4/92, 5/50, 6/16
K12	CLP ISO PAO VG 220 - Oil for low temperature usage	1/46, 2/130, 3/96, 4/92, 5/50
K13	CLP ISO PAO VG 68 - Oil for lowest temperature usage	1/46, 2/130, 3/96, 4/92
	Long-term preservation	
K17	Long-term preservation up to 36 months	1/46
	Direction of rotation of the output shaft (required with backstop)	
K18	Clockwise	1/43, 4/96
K19	Counterclockwise	1/43, 4/96
	Rating plate and additional rating plates	
K26	Rating plate on stainless steel support plate	1/49
K41	2nd rating plate, enclosed separately	1/49
K68	2nd rating plate, mounted	1/49

Overview of "special versions" (continued)

Order code	Special version Designation	For further information, see page
	Surface treatment	
L00	Unpainted	1/48
L01	Primed according to corrosion category C2 G	1/48
L02	Surface protection for normal environmental stress	1/47
L03	Surface protection for minimal environmental stress	1/47
L04	Surface protection for medium environmental stress	1/47
L05	Surface protection for extremely high environmental stress	1/47
L09	Primed according to corrosion category C4 G	1/48
L19	Special pre-treatment before painting	1/48
L20	Surface protection for high environmental stress	1/47
	RAL colors	
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L51	RAL 7011 Steel gray	1/48
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L54	RAL 7035 Light gray	1/48
L55	RAL 7030 Stone gray	1/48
	Other colors can be selected by entering order code Y80 and plain text	1/48
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M08	Temperature class 180 (H)	8/25
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M12	Winding thermostat for disconnection (WT)	8/23
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M40	115 V supply voltage	8/24
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	Terminal box position	
M55 to M86	Location and position of the terminal box	8/11
	ECOFAST motor plugs	
N04	ECOFAST motor plug HAN 10E (single-bracket lock)	8/18
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	Canopy	
N22	Canopy	8/8
	Backstop on motor	
N23	Motor backstop	8/63
	2nd shaft extension on motor	
N39	2nd shaft extension	8/64
	Handwheel	
N40	Handwheel	8/65
	Motor side B, can be retrofitted	
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Overview of "special versions" (continued)

Order code	Special version Designation	For further information, see page
	Additional feet	
N49	Additional feet	8/65
	Designs in accordance with standards and specifications	
N30	Design in accordance with GOST-R	1/40, 8/3
N36	Design in accordance with CSA	1/40, 8/3
N37	Design in accordance with UL-R	1/40, 8/3
N38	Design in accordance with UL-R and CSA	1/40, 8/3
N65	Design in accordance with NEMA (electrical)	1/39, 8/3
N67	Design in accordance with CCC	1/40, 8/3
N69	Design in accordance with China Energy Efficiency Label	1/40, 8/3
	Versions for special environmental conditions	
N41	Motor-internal anti-corrosion protection	8/19
	Protection against humidity and acid	
N43	Increased protection against humidity and tropical climate	1/48
N44	Increased protection against acid and alkali	1/48
N54	Motor winding protection against humidity and acid	8/26
	External earthing	
N53	External earthing	8/19
	Motors prepared for encoder mounting	
N50	Encoder mounting prepared	8/60
	Pole number of the motor	
P00	2-pole	8/68, 8/68, 8/96
P01	6-pole	8/70, 8/84, 8/70, 8/98, 8/102, 8/132, 8/136, 8/132, 8/136
P02	8-pole	8/72, 8/86, 8/104, 8/122, 8/128
P04	4/2-pole	8/74, 8/106
P08	8/4-pole	8/76, 8/78
P07	8/2-pole	8/80
	Gateways EnDAT for absolute encoders	
Q02	Gateway EnDAT Profibus DP	8/63
Q03	Gateway EnDAT CANopen	8/63
Q04	Gateway EnDAT DeviceNET	8/63
	Incremental encoder IN	
Q44	Rotary pulse encoder 1XP8032-20 (IN 1024 TTL with coupling socket)	8/51
Q45	Rotary pulse encoder 1XP8032-21 (IN 2048 TTL with coupling socket)	8/51
Q46	Rotary pulse encoder 1XP8032-22 (IN 512 TTL with coupling socket)	8/51
Q47	Rotary pulse encoder 1XP8032-10 (IN 1024 HTL with coupling socket)	8/51
Q48	Rotary pulse encoder 1XP8032-11 (IN 2048 HTL with coupling socket)	8/51
Q49	Rotary pulse encoder 1XP8032-12 (IN 512 HTL with coupling socket)	8/51
Q50	Rotary pulse encoder 1XP8012-20 (IN 1024 TTL with flange socket)	8/50
Q51	Rotary pulse encoder 1XP8012-21 (IN 2048 TTL with flange socket)	8/50
Q52	Rotary pulse encoder 1XP8012-22 (IN 512 TTL with flange socket)	8/50
Q53	Rotary pulse encoder 1XP8012-10 (IN 1024 HTL with flange socket)	8/50
Q54	Rotary pulse encoder 1XP8012-11 (IN 2048 HTL with flange socket)	8/50
Q55	Rotary pulse encoder 1XP8012-12 (IN 512 HTL with flange socket)	8/50
Q56	Rotary pulse encoder 1XP8022-20 (IN 1024 TTL with cable terminal box)	8/52
Q57	Rotary pulse encoder 1XP8022-21 (IN 2048 TTL with cable terminal box)	8/52
Q58	Rotary pulse encoder 1XP8022-22 (IN 512 TTL with cable terminal box)	8/52
Q59	Rotary pulse encoder 1XP8022-10 (IN 1024 HTL with cable terminal box)	8/52
Q60	Rotary pulse encoder 1XP8022-11 (IN 2048 HTL with cable terminal box)	8/52
Q61	Rotary pulse encoder 1XP8022-12 (IN 512 HTL with cable terminal box)	8/52

Overview of "special versions" (continued)

Order code	Special version Designation	For further information, see page
	Cable terminal boxes for encoders 1XP8012, 1XP8032, 1XP8013, 1XP8023.1XP8014 and 1XP8024	
Q62	Connector	8/61
Q69	Cable with connector and ferrules, 2 m	8/61
Q70	Cable with connector and ferrules, 8 m	8/61
Q71	Cable with connector and ferrules, 15 m	8/61
Q72	Cable with coupling socket, 2 m	8/62
Q73	Cable with coupling socket, 8 m	8/62
Q74	Cable with coupling socket, 15 m	8/62
	Cable terminal boxes for encoders 1XP8022	
Q63	Cable with ferrules, 2 m	8/61
Q64	Cable with ferrules, 8 m	8/61
Q65	Cable with ferrules, 15 m	8/61
Q66	Cable with coupling socket, 2 m	8/62
Q67	Cable with coupling socket, 8 m	8/62
Q68	Cable with coupling socket, 15 m	8/62
	Absolute encoder IA	
Q80	Absolute encoder 1XP8014-20 (IA SSI protocol with flange socket)	8/55
Q81	Absolute encoder 1XP8024-20 (IA SSI protocol cable with coupling socket)	8/55
Q82	Absolute encoder 1XP8014-10 (IA EnDAT protocol with flange socket)	8/55
Q83	Absolute encoder 1XP8024-10 (IA EnDAT protocol cable with coupling socket)	8/55
	Resolver IR	
Q85	Resolver 1XP8013-10 (IR with flange socket)	8/54
Q86	Resolver 1XP8023-11 (IR cable with coupling socket)	8/54
Q87	Resolver 1XP8013-11 (IR with flange socket)	8/54
Q88	Resolver 1XP8023-10 (IR cable with coupling socket)	8/54
	Rugged encoder	
Q92	Rotary pulse encoder LL Leine & Linde	8/57
Q93	Rotary pulse encoder HOG 9	8/58
Q94	Rotary pulse encoder HOG 10	8/59
	Mechanical protection	
Q95	Encoder under cover	8/60

Configuring guide

Determining the drive data

Data relating to the machine to be driven (machine type, mass, input speed, speed range, etc.) is required in order to size the machine correctly. This data is then used to determine the required power rating, torque, and input speed of the geared motor. The correct drive can be selected based on its calculated power rating and speed.

Data required for selection

The following data is required in order to select the correct gearbox:

1. Type of driven machine
2. Daily operating time h
3. Required input power kW or required torque Nm
4. Required output speed n_2 of the geared motor rpm or gearbox ratio i
5. Operating voltage V and frequency Hz
6. Operating mode, number of startings, inverter-fed operation, type of startup
7. Moment of inertia J_{Load} kgm^2 of the driving machine reduced to the motor shaft
8. Type of power transmission on gearbox shafts (direct, coupling, belt, chain, gear wheel)
9. Radial force F_r N at the input shaft and direction of force with distance from the shaft shoulder to the point of application and axial force F_{ax} [N] with direction of force
10. Ambient temperature °C
11. Degree of protection
12. Mounting position
13. Required braking torque Nm
14. Any regulations (CSA, VIK, etc.)

Efficiency of the geared motor

The efficiency of the gearbox is determined by the gear teeth, rolling-contact bearing friction, and the shaft sealing rings, among other things. The starting efficiency also has to be taken into account, particularly as regards helical worm and worm gearboxes. Efficiency may be impaired at high input speeds, if a relatively large amount of oil is used (depending on mounting position), and during cold operation in low temperature ranges.

Helical, bevel helical, and parallel shaft gearboxes

MOTOX helical, parallel shaft, and bevel helical gearboxes are extremely efficient. As a rule, efficiencies of 98 % (1-stage), 96 % (2-stage), and 94 % (3-stage) can be assumed.

Helical worm and worm gearboxes

The gear teeth of the worm gearboxes lead to high sliding friction losses at high transmission ratios. Therefore, these gearboxes can be less efficient than other types. The efficiencies of the helical worm and worm gearboxes primarily depend on the transmission ratio in question.
With helical worm gearboxes, some of the transmission ratio is realized by the helical gear stage. In this way, higher degrees of efficiency can be achieved.
For further information see the chapter dealing with helical worm gearboxes.

Self-locking with worm gearboxes

In respect of restoring torques on worm gearboxes, the efficiency is considerably reduced in comparison to standard efficiency. The restoring efficiency can be calculated as follows: $\eta' = 2 - 1/\eta$. At a standard efficiency of $\eta \leq 0.5$, worm gearboxes are usually self-locking, which is determined by the particular lead angle of the worm gear teeth.
Self-locking only occurs with certain combinations of MOTOX gearboxes and is not always of benefit, as the associated loss of efficiency is then relatively high, which in turn requires increased motor power.

A worm gearbox is "self-locking while stationary" (static self-locking), if it is not possible to start from stationary when the worm wheel is driving.
A worm gearbox is "self-braking while running" (dynamic self-locking), if it is not possible to continue running when the worm wheel is driving while the gearbox is running – that is, if the running gearbox comes to a stop while the worm wheel is driving.

Shocks can neutralize self-locking.
A self-locking gearbox is, therefore, no substitute for a brake or backstop. If you want to use the self-locking braking effect for a technical purpose, please contact us.

Run-in phase for helical worm and worm gearboxes

The tooth flanks on new helical worm and worm gearboxes will not yet be fully smoothed, meaning that the friction angle will be greater and efficiency lower during initial operation. The higher the transmission ratio, the more pronounced the effect.

The run-in procedure should take approximately 24 hours of operation at full load. In most cases, the catalog values will then be reached.

Losses of splashing

With certain gearbox mounting positions, the first stage can become completely immersed in the gear lubricant. In the case of large gearboxes with a high input speed, particularly with vertical mounting positions, this may lead to increased losses of splashing, which must not be ignored. Please contact us if you want to use such gearboxes. If at all possible, you should choose horizontal mounting positions in order to keep losses of splashing to a minimum.

Determining the required service factor

The operating conditions are crucial in determining the service factor and for selecting the geared motor. These conditions are taken into account with service factor f_B.

The gearbox size or rated gear torque and the resulting service factor are not standardized and depend on the manufacturer.

In standard operation, i.e. with a uniform load provided by the driving machine, small masses to be accelerated, and a low number of startings, the service factor of $f_B = 1$ can be selected.

For different operating conditions see the tables found under "Service factor". If the motor power and the gearbox output speed are known, a gearbox type is selected with a service factor that meets the following condition.

$$f_{Btot} \leq f_B$$

For drives operating under special conditions, e.g. frequent reversing, short-time or intermittent duty, abnormal temperature ratios, reversal braking, extreme or rotating transverse forces on the gear output shaft, etc. please contact us for advice on how to design the drive configuration.

The operating conditions can vary greatly.
To determine the service factor, empirical values can be derived from the configuration of other similar applications. The driving machines can be assigned to three load groups according to their shock load. These groups can be assessed by means of their mass acceleration factor (m_{AF}).

In the case of high mass acceleration factors (m_{AF} >10), a large amount of play in the transmission elements, or high transverse forces, unexpected additional loads may arise.
Please contact us in such an event.

The mass acceleration factor m_{AF} is calculated as follows:

$$m_{AF} = \frac{J_{Load}}{(J_M + J_B + J_{add})}$$

All external moments of inertia are moments of inertia of the driving machine and the gearbox, which are to be reduced to the motor speed. In most cases the moment of inertia of the gearbox has no effect and can be ignored.
The calculation is made using the following formula:

$$J_{Load} = J_2 \cdot \left(\frac{n_2}{n_1}\right)^2 = \frac{J_2}{i^2}$$

Code	Description	Unit
f_{Btot}	Service factor of the driving machine	–
f_B	Service factor of the geared motor	–
m_{AF}	Mass acceleration factor	–
J_{Load}	All external moments of inertia (based on the motor shaft)	kgm²
J_M	Moment of inertia of the motor	kgm²
J_B	Moment of inertia of the brake	kgm²
J_{add}	Additional moment of inertia (e.g. centrifugal mass or high inertia fan)	kgm²
J_2	Moment of inertia based on the output speed of the gearbox	kgm²
n_1	Input speed of the motor	rpm
n_2	Output speed of the gearbox	rpm
i	Gearbox ratio	–
DC	Relative duty cycle	%

Required service factor

Service factor for helical, parallel shaft, and bevel helical gearboxes

The service factor of the driving machine f_{Btot} is determined from the tables by taking the load classification, number of startings, and duration of service per day into account.
Contact our drive experts to check drive sizing in the case of high shock loads and, for example, high motor and braking torques that are greater than 2.5x the rated motor torque.

$f_{Btot} = f_{B1}$

Load classification for driving machines

Shock load	Driving machine
I Light shock loads	Mass acceleration factor ≤ 0.3: Electric generators, belt conveyors, apron conveyors, screw conveyors, lightweight elevators, electric hoists, machine tool feed drives, turbo blowers, centrifugal compressors, mixers and agitators for uniform densities.
II Moderate shock loads	Mass acceleration factor ≤ 3: Machine tool main drives, heavyweight elevators, turning tools, cranes, shaft ventilators, mixers and agitators for non-uniform densities, piston pumps with multiple cylinders, metering pumps.
III Heavy shock loads	Mass acceleration factor ≤ 10: Punching presses, shears, rubber kneaders, machinery used in rolling mills and the iron and steel industry, mechanical shovels, heavyweight centrifuges, heavyweight metering pumps, rotary drilling rigs, briquetting presses, pug mills.

Service factors f_{B1}:

Daily operating duration		**4 hours**			**8 hours**			**16 hours**			**24 hours**		
Starts*) / h		< 10	10 … 200	> 200	< 10	10 … 200	> 200	< 10	10 … 200	> 200	< 10	10 … 200	> 200
Shock load	I	0.8	0.9	1.0	0.9	1.0	1.1	1.0	1.1	1.2	1.2	1.3	1.5
	II	1.0	1.1	1.3	1.1	1.2	1.3	1.2	1.4	1.5	1.4	1.5	1.6
	III	1.3	1.4	1.5	1.4	1.5	1.6	1.5	1.6	1.7	1.6	1.7	1.8

*) The number of startings is calculated from the sum of times it is switched on, braking operations, and changeovers.

Service factors for helical worm and worm gearboxes:

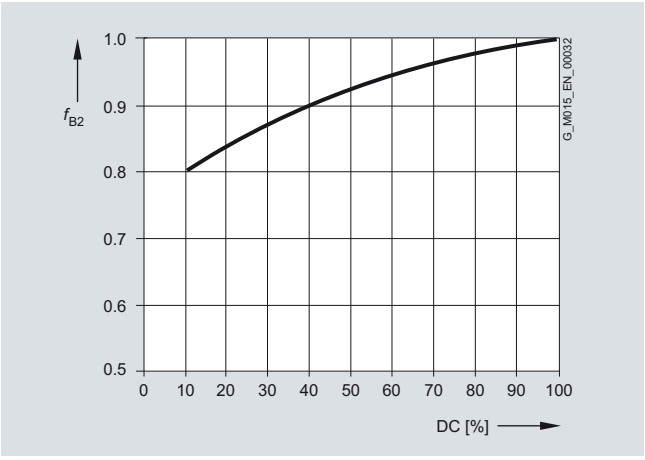
With worm gearboxes, two additional service factors are used, which take the duty cycle and ambient temperature into account. These additional factors can be determined from the graph opposite.

$f_{Btot} = f_{B1} \cdot f_{B2} \cdot f_{B3}$

In the standard version the gearboxes can operate at an ambient temperature of –20 °C to +40 °C.

In the case of a service factor $f_{B3} < 1$ for temperatures below 20 °C please contact us.

Service factor f_{B2} for short-time duty:



$$DC = \frac{\text{Loading time in min/h}}{60} \cdot 100$$

Required service factor (continued)

Example worm gearbox:

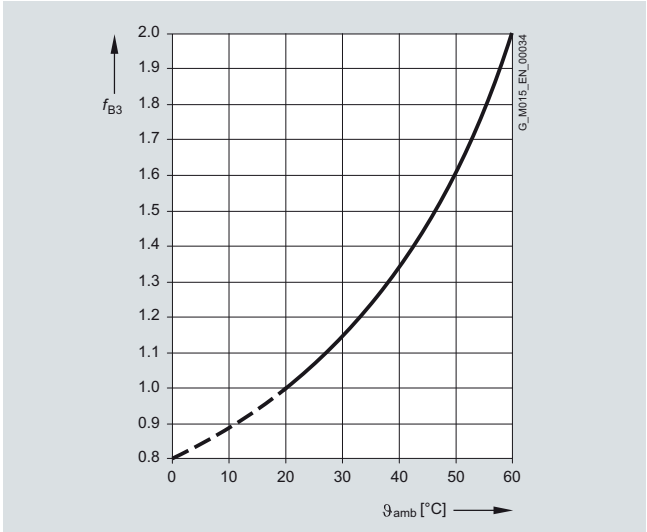
Mass acceleration factor 2.5 (shock load II), runtime 15 hours per day (read off at 16 hours), and 70 starts / h gives a service factor of f_{B1} = 1.4 for service factor f_{B1} according to the table.

A load duration of 30 minutes per hour gives a duty cycle (*DC*) of 50 %. According to the diagram, this results in a service factor of f_B = 0.94 for service factor f_{B2}.

At an ambient temperature of ϑ_{amb} = 20 °C, the diagram gives a service factor of f_{B3} = 1.0 for service factor f_{B3}.

So, the required service factor is
$f_{Btot} = 1.4 \cdot 0.94 \cdot 1.0 = 1.32$.

Service facor f_{B3} for the ambient temperature:



ϑ_{amb} = Ambient temperature

Maximum motor speed

At high motor speeds (>1.500 rpm) you will generally experience higher than average noise emissions and a lower than average bearing service life. This depends to a large extent on the transmission ratio and gearbox size in question. Furthermore, high speeds affect the thermal properties and service intervals of the gearbox.

The maximum input speed of the gearbox is usually 3.600 rpm. If you require higher speeds, please contact us.

Ambient temperature

In the standard version the gearboxes can operate at an ambient temperature of –20 °C to +40 °C, if the lubricant recommendations are kept. In the case of a few additional options the category temperatures must be checked.

Other temperature ranges -10 °C ... +50 °C on request.

Required torque T_{2req}

If the drive data and the service factor are selecetd, the required output torque can be determined.

$$T_{2req} = \frac{9550 \cdot P_1}{n_2} \cdot f_{Btot}$$

Selection of the gearbox

The following conditions need to be observed:

$P_1 > P_{req}$
$T_{2rated} > T_{2req}$
$f_B > f_{Btot}$
$T_2 > T_{req}$

Code	Description	Unit
f_{Btot}	Service factor of the driving machine	–
f_B	Service factor of the geared motor	–
P_{2m}	Input power of the motor	kW
P_{req}	Required input power	kW
T_{req}	Required torque	Nm
T_2	Output torque of the geared motor	Nm
T_{2rated}	Nominal output torque of the geared motor	Nm
T_{2req}	Required output torque of the driving machine	Nm

Reduced-backlash gearbox version

Helical, parallel shaft and bevel-helical gearboxes are available on request in a reduced-backlash version. In the transmission table, the torsion angle (φ) is specified for the reduced-backlash version. If a value is not specified, this gearbox cannot be realized with reduced backlash.

A high degree of positioning accuracy is achieved with reduced-backlash gearboxes and the shock loads in the gearbox are reduced at load changeover. When a gearbox is used that has a certain amount of play, the relative position of the output shaft of the gearbox cannot be determined precisely because the controller cannot detect whether the right or left flank of the tooth is engaged.

- Accurate positioning and repeatability
- Maintain position information in the case of a change of direction of rotation
- Reduced shock loading of the tooth flanks

Order code:

Reduced-backlash version **G99**

Permissible radial force

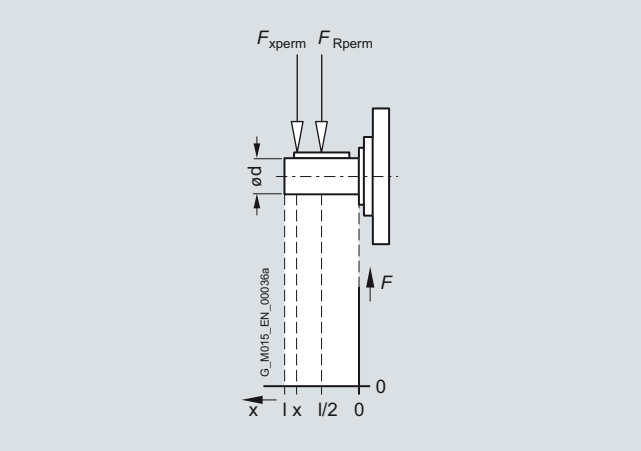
Available radial force

The available radial force F_{Ravail} at the shaft journals results from the available output torque of the geared motor T and the diameter d and type of the output element (e.g. sprocket wheel).

The type of output element determines factor C (see table below), by which the available radial force is to be increased.

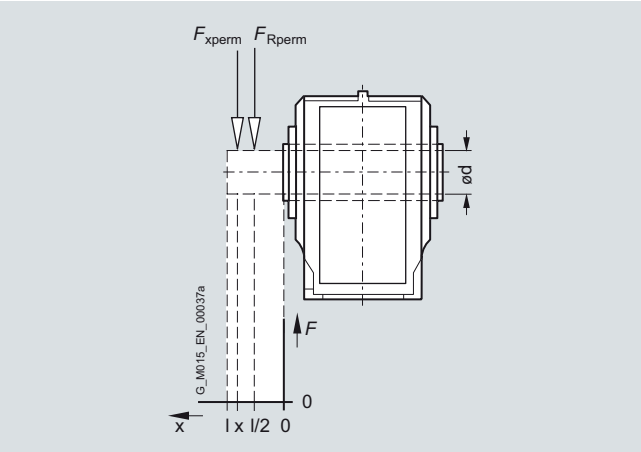
$$F_{Ravail} = 2000 \cdot \frac{T_2}{d} \cdot C$$

Code	Description	Unit
F_{Ravail}	Available radial force resulting from the output torque and the diameter of the output element	N
F_{Rperm}	Permissible radial force at the center of shaft extension	N
d	Diameter of the input element	mm
T_2	Output torque of the geared motor	Nm
F_{xperm1}	Permissible radial force, limited by the bearing service life, at a distance of x from the shaft shoulder	N
F_{xperm2}	Permissible radial force, limited by the shaft strength, at a distance of x from the shaft shoulder	N
C	Additional factor	–
b, d, l, y, z	Gearbox constants	mm
a	Gearbox constant	kNmm
F_{ax}	Axial force at d	N
α	Angle of action of the radial force	°



Factor C for the type of the transmission element

Transmission element	Design	C
Gear wheel	> 17 teeth	1.00
	≤ 17 teeth	1.15
Sprocket wheel	≥ 20 teeth	1.00
	14 – 19 teeth	1.25
	≤ 13 teeth	1.40
Toothed belt	Preload	1.50
V belt	Preload	2.00
Flat belt	Preload	2.50
Agitator / mixer	Rotating radial force	2.50



Permissible radial force (continued)

Permissible radial force

The permissible radial force F_{Rperm} is determined by the required bearing service life, among other things. The nominal service life L_{h10} is determined in accordance with ISO 281. The bearing service life can be calculated for special operating conditions on request, based on the calculation procedure for the modified service life L_{na}.

Furthermore, the permissible radial force is determined by the housing and shaft strength of the gearbox. The selection tables specify the permissible radial force F_{Rperm} for the output shafts. These values refer to the point of load at the center of the shaft extension and are minimum values, which apply to the worst possible conditions in the gearbox (force angle, mounting position, direction of rotation).

If the point of load is not at the center of the shaft extension, the permissible radial force must be calculated as follows: the smaller value of F_{xperm1} (bearing service life) and F_{xperm2} (shaft strength) is the permissible radial force. The calculation does not include additional axial forces.

If the direction of rotation of the output shaft and the additional axial forces are known, or the values in the table are insufficient, our drive experts have to perform the calculation. Our agitator and mixer drives allow you to achieve higher permissible radial forces. These drives are particularly well suited to large and rotating radial forces.

Permissible radial force in accordance with bearing service life for all gearbox types:

$$F_{xperm1} = F_{Rperm} \cdot \frac{y}{(z + x)}$$

Permissible radial force in accordance with shaft strength for bevel helical, parallel shaft, and helical worm gearboxes:

$$F_{xperm2} = \frac{a}{x}$$

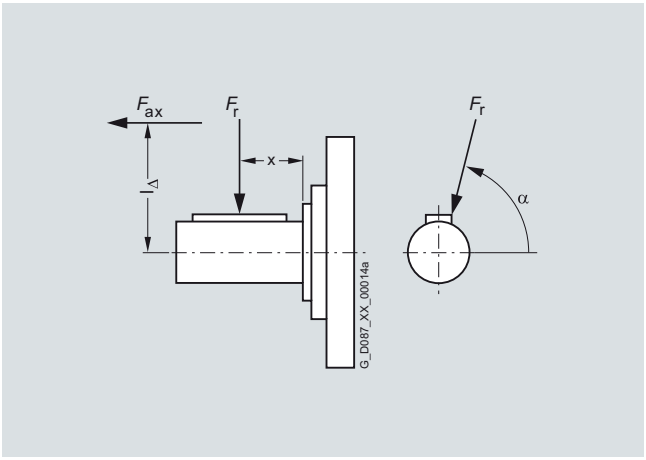
Permissible radial force in accordance with shaft strength for helical and worm gearboxes:

$$F_{xperm2} = \frac{a}{(b + x)}$$

The shaft strength only has to be calculated for solid shafts, with hollow shafts this step can be omitted.

Higher permissible radial forces

The permissible radial force load can be increased, taking the angle of force action α and the direction of rotation into account. Installing reinforced bearings also means that higher loads are permitted on the input shaft.



Permissible axial loads

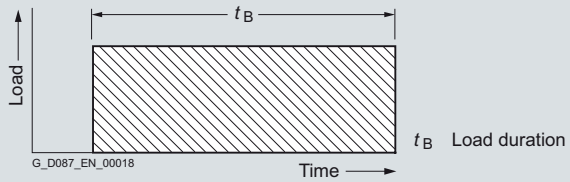
If no transverse force load is present, an axial force F_{ax} (tension or compression) of around 50 % of the specified radial force with standard bearings can be achieved for gearbox sizes 18 to 148.

You can use our "Calculation of input shaft bearing arrangement" assistant in the MOTOX Configurator to calculate the permissible forces. Combined forces with an axial and a radial component can also be calculated. Please contact us in case of doubt.

The permissible radial forces are specified in the gearbox chapters.

Determining the operating mode

If no specifications are made in the power tables, the power ratings specified in the power tables apply to the **S1 operating mode** (continuous duty with constant load) according to EN 60034-1. The same regulation defines the groups of operating modes specified below:



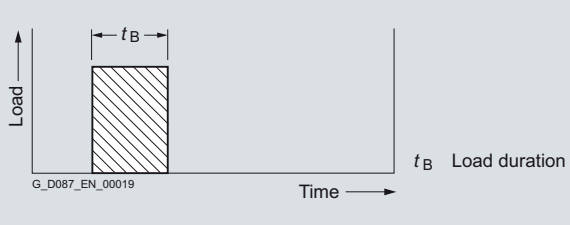
Operating mode S1 · Continuous duty

Operating modes in which starting and electrical braking **do not affect the overtemperature of the stator winding** of the motor:

Operating mode **S2**:

Short-time duty

Operating times of 10, 30, 60, and 90 min. are recommended. After each period of duty the motor remains at zero current until the winding has cooled down to the coolant temperature.

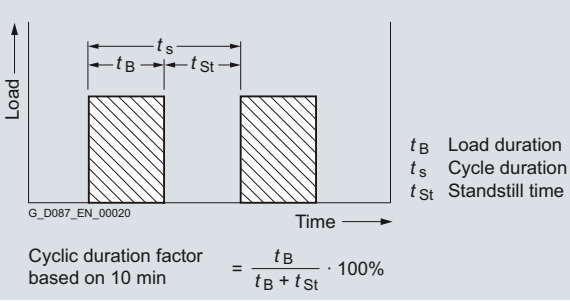


Operating mode S2 · Short-time duty

Operating mode **S3**:

Intermittent duty

Starting does not affect the temperature. Unless any agreement is made to the contrary, the cycle duration is 10 minutes. Values of 15 %, 25 %, 40 %, and 60 % are recommended for the cyclic duration factor.

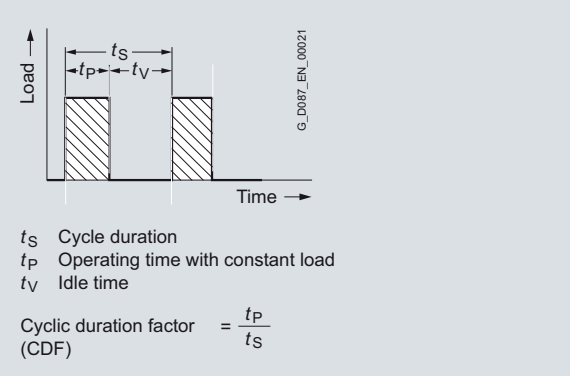


Operating mode S3 · Intermittent periodic duty

Operating mode **S6**:

Continuous duty with intermittent loading

Unless any agreement is made to the contrary, the cycle duration here is also 10 minutes. Values of 15 %, 25 %, 40 %, and 60 % are recommended for the load duration factor.

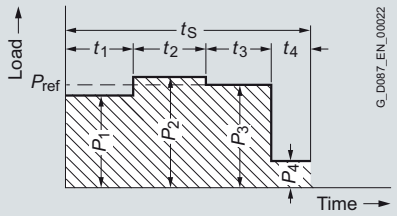


Determining the operating mode (continued)

Operating mode **S10**:

Duty with discrete constant loads

In this mode a maximum of four discrete loads are available, of which each load achieves the thermal steady state.
A load of the same value as the one used in S1 operating mode should be selected for this operating mode.

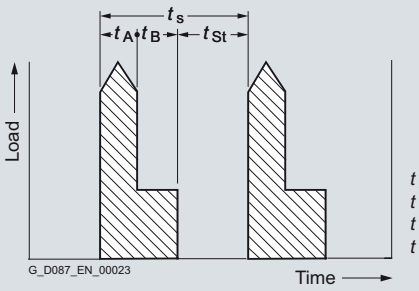


P_i Constant load within one load cycle
P_{ref} Reference load
t_S Cycle duration

Operating modes in which starting and braking have a corresponding **effect on the overtemperature of the stator winding** and of the rotor cage:

Operating mode **S4**:

Intermittent duty where starting affects the temperature



t_A Starting time
t_B Load duration
t_s Cycle duration
t_{St} Standstill time

Cyclic duration factor based on 10 min $= \frac{t_A + t_B}{t_A + t_B + t_{St}} \cdot 100\%$

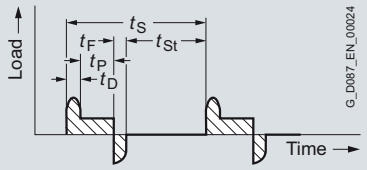
Operating mode S4 · Intermittent periodic duty with starting

Operating mode **S5**:

Intermittent duty where starting and braking affects the temperature

For the **S4** and **S5 operating modes**, this code should be followed by the cyclic duration factor, the moment of inertia of the motor (J_M), and the moment of inertia of the load (J_{Load}), both based on the motor shaft.

Unless any agreement is made to the contrary, the cycle duration here is also 10 minutes. Values of 15 %, 25 %, 40 %, and 60 % are recommended for the cyclic duration factor.



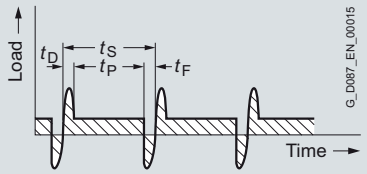
t_S Cycle duration
t_D Starting time
t_P Operating time with constant load
t_F Time with electrical braking
t_{St} Standstill time with windings at zero current

Cyclic duration factor (CDF) $= \frac{t_D + t_P + t_F}{t_S}$

Operating mode **S7**:

Continuous-operation periodic duty with starting and braking

For the S7 and S8 operating modes, the moment of inertia of the load (J_{Load}) based on the motor shaft must be known.



t_S Cycle duration
t_D Starting time
t_P Operating time with constant load
t_F Time with electrical braking

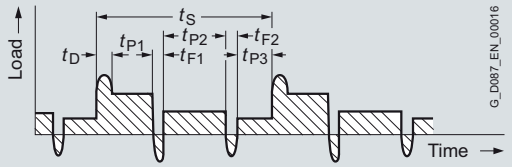
Cyclic duration factor = 1

Determining the operating mode (continued)

Operating mode **S8**:

Continuous-operation duty with non-periodic load and speed variations (inverter-fed operation)

Most of the intermittent operating conditions which occur in real situations are a combination of the operating modes defined above. All operating conditions must be specified in order to accurately define a suitable motor.



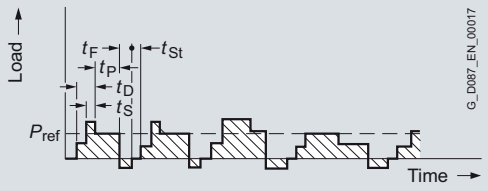
t_S Cycle duration
t_D Starting time
t_P Operating time with constant load (P1, P2, P3)
t_F Time with electrical braking (F1, F2)

Cyclic duration factor (CDF) $= \frac{t_D + t_{P1}}{t_S} \cdot \frac{t_{F1} + t_{P2}}{t_S} \cdot \frac{t_{F2} + t_{P3}}{t_S}$

Operating mode **S9**:

Continuous-operation duty with non-periodic load and speed variations (inverter-fed operation)

Most of the intermittent operating conditions which occur in real situations are a combination of the operating modes defined above. All operating conditions must be specified in order to accurately define a suitable motor.



t_D Starting time
t_P Operating time with constant load
t_F Time with electrical braking
t_{St} Standstill time with windings at zero current
t_S Time with overload

Operating modes according to EN 60034 (IEC 60034-1)

Operating mode	Description	Information required		k_{DC}
S1	Continuous duty with 100 % DC	–		
S2	Constant load for brief period, e.g. S2 - 30 min	Load duration	60 min	1.10
			30 min	1.20
			10 min	1.40
S3	Intermittent periodic duty without starting (cyclic operation), e.g. S3 - 40 %	Cyclic duration factor DC in % (based on 10 min)	60 %	1.10
			40 %	1.15
			25 %	1.30
			15 %	1.40
S4 … S10	Intermittent periodic duty with starting	Cyclic duration factor DC in %, times switched on per hour, load torque, and moment of inertia The operating mode and motor power can be determined if the number of startings per hour, starting time, load duration, type of braking, braking time, idle time, cycle time, standstill time, and required power are specified.	On request	

According to the table below, the motor list powers can be converted to the lower duty cycle using the corresponding k_{DC} factors for the S1, S2, and S3 operating modes.

With enhanced performance, you should note that the breakdown torque ratio must not fall below 1.6.

$$\frac{T_{Bd}}{T_{DC}}$$

$$P_{DC} = P_{rated} \cdot k_{DC}$$
$$T_{DC} \sim T_{rated} \cdot k_{DC}$$

Code	Description	Unit
P_{DC}	Power rating for the new duty cycle	–
P_{rated}	Rated motor power	kW
k_{DC}	Factor for enhanced performance	kgm^2
T_{DC}	Torque for the new duty cycle	Nm
T_{Bd}	Breakdown torque	Nm
T_{rated}	Rated torque	Nm

Coolant temperature and site altitude

The rated power specified in the selection tables in section 8 applies to continuous duty (S1) or inverter-fed operation (S9) according to IEC 60034-1 at the corresponding rated frequency, a coolant temperature of 40 °C and a site altitude of 1.000 m above sea level. Please contact us if higher coolant temperatures are to be used. The table containing correction factors provides a rough idea of derating if conditions are different.

This results in a permissible motor power of:

$$P_{perm} = P_{rated} \cdot k_{HT}$$

If the permissible motor power is no longer adequate for the drive, a check should be performed as to whether or not the motor with the next higher rated power fulfills the requirements.

Code	Description	Unit
P_{perm}	Permissible motor power	kW
P_{rated}	Rated motor power	kW
k_{HT}	Factor for abnormal coolant temperature and site altitude	–

Factor k_{HT} for different site altitudes and / or coolant temperatures

Site altitude (SA)	Coolant temperature (CT)					
m	< 30 °C	30… 40 °C	45 °C	50 °C	55 °C	60 °C
1 000	1.07	1.00	0.96	0.92	0.87	0.82
1 500	1.04	0.97	0.93	0.89	0.84	0.79
2 000	1.00	0.94	0.90	0.86	0.82	0.77
2 500	0.96	0.90	0.86	0.83	0.78	0.74
3 000	0.92	0.86	0.82	0.79	0.75	0.70
3 500	0.88	0.82	0.79	0.75	0.71	0.67
4 000	0.82	0.77	0.74	0.71	0.67	0.63

Selecting the brake

MOTOX geared motors can be supplied with fail-safe spring-operated disk brakes in order to reduce the motor's follow-on time or to hold loads, for example. Our MODULOG modular system can be used to assign / attach several brake sizes to one motor size. See Chapter 8 for information on assigning brake sizes to motor sizes, and on possible brake options.

The following information is required in order to select and check the brake:

- Speed
- Load torque
- Moments of inertia
- Number of startings

Selecting the braking torque

The braking torque must be selected in accordance with the particular drive scenario. The following criteria are crucial when it comes to making this selection: static safety, required braking time, permissible deceleration rate, and possible braking distance and brake wear.

The ambient conditions and number of startings are also important. Our drive experts will be able to provide optimum brake sizing.

In principle the selection is made according to the formula:

$$T_{br} > T_x \cdot \frac{k}{\eta}$$

Where k = 1.0 - 2.5 is selected. As a general rule of thumb, the factor for horizontal motion is around 1.0 - 1.5 and for vertical motion around 2.0 - 2.5. However, the exact specification of the braking torque depends to a large extent on the particular operating conditions.

Operating time of the brake

The time it takes the motor to come to a standstill comprises the following components: the application time of the brake t_1 and the braking time t_{br}. The first is the time it takes the brake to reach 90 % of its braking torque. This time may be circuit- and actuation-dependent. This information is provided for each brake in Chapter 8. The braking time can be calculated as follows:

$$t_{br} = \frac{(J_M + J_{add} + J_x \cdot \eta) \cdot n_{br}}{9.55 \cdot (T_{br} \pm T_x \cdot \eta)} \quad [s]$$

If T_x supports the braking operation, T_x is positive, otherwise it is negative.

Braking distance and positioning accuracy

Braking distance s_{br} is the distance traveled by the driven machine during braking time t_{br} and application time t_1. The formula below applies to horizontal motion and upward vertical motion. With linear motion, a positioning accuracy of around ± 15 % can be assumed. However, this can be heavily influenced by the condition of the brake.

$$s_{br} = v \cdot 100 \cdot (t_1 + 0.5 \cdot t_{br}) \quad [mm]$$

Braking energy per braking operation

The braking energy W per braking operation comprises the energy of the moments of inertia to be braked and the energy which must be applied in order to brake against a load torque:

$$W = \frac{T_{br}}{T_{br} \pm T_x \cdot \eta} \cdot \frac{(J_M + J_{perm} + J_x \cdot \eta) \cdot n_{br}^2}{182.5}$$

T_x is positive if the load torque is working against the braking torque
(horizontal motion, upward vertical motion).

T_x is negative if it supports the braking operation
(downward vertical motion).

The permissible operating energy Q_{perm} must be checked against the relevant number of startings using the "Permissible operating energy" diagram (see Chapter 8). This is of particular importance for emergency-stop circuits.

$$W < Q_{perm}$$

Code	Description	Unit
T_{br}	Rated braking torque	Nm
T_x	Load torque	Nm
k	Factor for taking operating conditions into account	kgm²
η	Efficiency	%
t_{br}	Braking time	s
t_1	Application time of the brake	ms
J_{mot}	Moment of inertia of the motor	kgm²
J_{add}	Additional moment of inertia (e.g. centrifugal mass or high inertia fan)	kgm²
J_x	Reduced moment of inertia of the load	kgm²
n_{br}	Braking speed	rpm
s_{br}	Braking distance	mm
W	Friction energy per braking operation	J
Q_{perm}	Permissible operating energy	J
L_{rated}	Service life of the brake lining until readjustment	h
$L_{ratedmax}$	Service life of the brake lining until replacement = total service life	h
v	Conveying speed	m/s
W_V	Friction energy until the brake is adjusted	MJ
W_{tot}	Friction energy until the brake lining is replaced	MJ
Z	Number of startings	1/h

Brake service life

The brake lining wears due to friction, which increases the air gap and the application time of the brake. The air gap can be readjusted. The friction lining should be replaced after it has been readjusted a certain number of times.

Service life of the brake lining until readjustment:

$$L_{rated} = \frac{W_V}{W \cdot Z}$$

Service life of the brake lining until replacement:

$$L_{ratedmax} = \frac{W_{tot}}{W \cdot Z}$$

Motors for inverter-fed operation

Selection of motors on the inverter

For selecting electrical drives on the inverter, the torque-speed response of the motors and the driving machine is important.

With inverter-fed operation, it is particularly important to pay attention to the torque limit curve. The torque of the driving machine must be smaller during continuous operation than the motor limit torque. The design of the motor depends to a large extent on the desired speed control range. In general, a range from 25 to 50 Hz is preferable.

The effectiveness of the self-ventilation is reduced with decreasing speed, which in turn also reduces the continuous output torque. Forced ventilation can be used to prevent the torque from decreasing.

The fan noise can increase at speeds that are higher than the rated speed of self-ventilated geared motors.
Above the frequency limit, the continuous output torque decreases (field weakening).

Bearings and bearing currents

With operation with inverters, additional bearing currents can occur. They are mainly caused by the steep voltage rises which occur during switching. Without output filters, significant voltage variations can occur on the winding terminals. This phenomenon mainly occurs with larger machines.

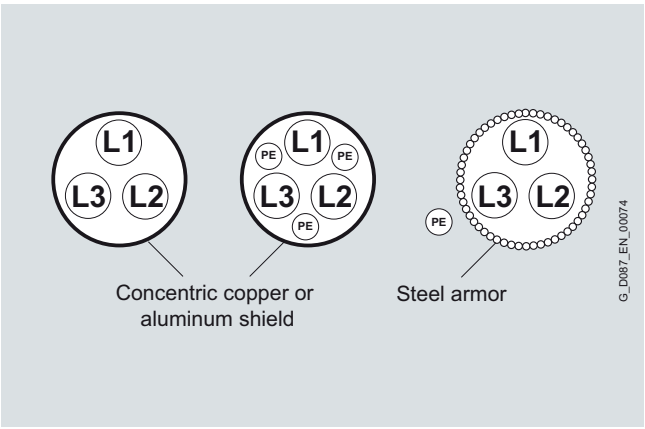
EMC-compliant installation of the drive system is a basic prerequisite for preventing premature bearing damage via bearing currents.

The most important measures for reducing bearing currents:

- Use of cables with a symmetrical cable cross-section,
- Use of grounding cables with low impedance in a large frequency range (0 Hz up to approximately 70 MHz), for example, plaited copper ribbon cables, HF litz wires,
- Separate HF equipotential-bonding cable between the motor housing and the driving machine,
- Separate HF equipotential-bonding cable between the motor housing and the inverter PE busbar,
- 360° HF contacting of the cable shield on the motor housing and the inverter PE busbar. This can be achieved using EMC cable glands at the motor end and EMC shield clips at the inverter end, for example,
- Use of motor reactors,
- Common-mode filters at the inverter output,
- Insulated motor bearing at the non-drive end.
  Motors from size 280 are delivered with bearing insulation for inverter-fed operation.

Mechanical stress and grease lifetime

High speeds that exceed the rated speed and the resulting increased vibrations alter the mechanical running smoothness and the bearings are subjected to increased mechanical stress. This reduces the grease lifetime and the bearing service life. More detailed information is available on request.



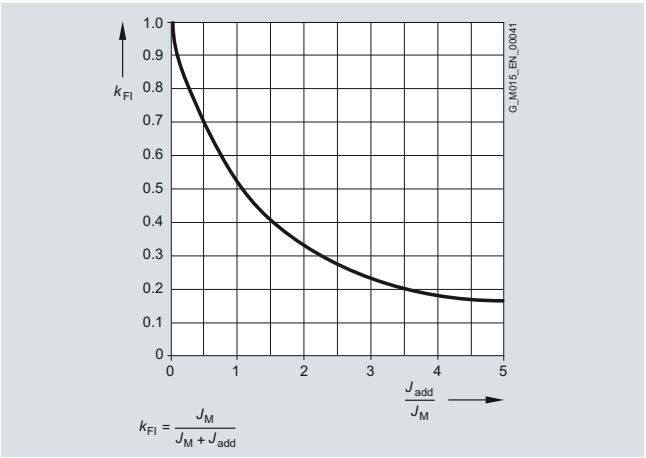
Determining the permissible number of startings Z_{perm}

A high number of startings means that the motor winding will be subject to a thermal load. The permissible no-load operating Z_0 for brake motors is specified in the no-load operating tables. The permissible number of startings Z_{perm} has to be determined for different operating cases. This value is influenced by the corresponding load torque, any additional moment of inertia, the power requirement, and the cyclic duration factor. These can be evaluated using the factors k_M, k_{FI}, and k_P.

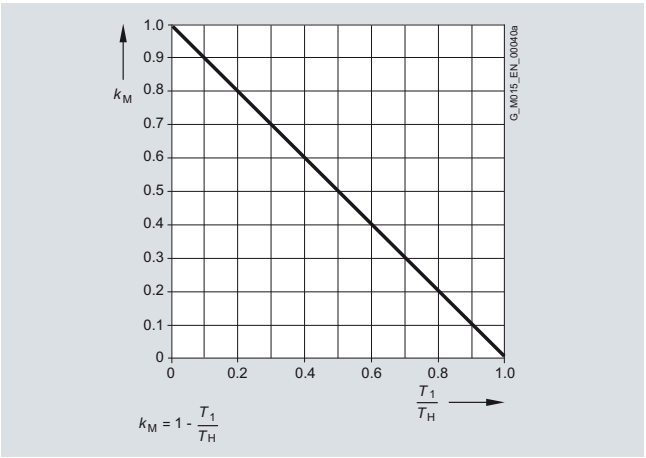
$$Z_{perm} = Z_0 \cdot k_M \cdot k_{FI} \cdot k_P$$

Code	Description	Unit
J_{mot}	Moment of inertia of the motor	kgm^2
J_{add}	Additional moment of inertia (e.g. centrifugal mass or high inertial fan)	kgm^2
k_M	Factor for taking the counter torque during acceleration into account	–
k_{FI}	Factor for taking the additional moment of inertia into account	–
k_P	Factor for taking the required power and duty cycle into account	–
T_{rated}	Rated torque of the motor	Nm
T_H	Acceleration torque of the motor	Nm
P_{rated}	Rated motor power	kW
Z_{perm}	Permissible number of startings	rph
Z_0	No-load operating from the list	rph

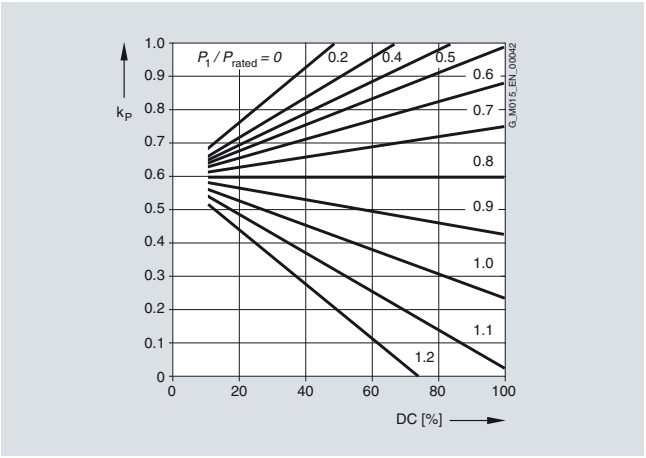
During operation at 60 Hz, the calculated permissible number of startings Z_{perm} must be reduced by 25 %. See the technical data for brakes found in Chapter 8 for the permissible number of startings during operation with function rectifiers.



Additional moment of inertia



Torque during acceleration



Required power and duty cycle

Checking the input torque for mounted units

Geared motors are usually integrated, i.e. they are mounted on the gearbox directly and the products are supplied as complete drives. Alternatively, the gearboxes can also be supplied with various input units for motor mounting. The criteria below must be taken into account, particularly for special motors.

Maximum input speed

We recommend that four-pole motors are mounted in order to achieve optimum gearbox service life. Higher input speeds can have an effect on bearing service life and the thermal properties of the gearbox, among other things.
See the section titled "Maximum speed", page 1/22.

Permissible radial force of the input shaft

Input units A and P can be powered by a V belt drive, for example. This results in a radial load on the input shaft. The permissible radial forces are specified in the section titled "Input unit".

Maximum input torque

The input units are primarily designed for four-pole standard three-phase AC motors. Considerably higher motor torques, which are above the maximum permissible input torque, may occur with special motors.

First of all, the continuous torque T_{1mot} of the motor and the permissible input torque of the input unit T_1 must be checked, along with the maximum torques (starting, breakdown, and braking). The torques for input units are specified in the section titled "Input unit". Please contact us if you have any questions.

$$T_{1mot} < T_1 = \frac{P_1 \cdot 9550}{n_1}$$

$$T_{1max} < 2.5 \cdot T_1$$

Code	Description	Unit
T_1	Permissible input torque of the input unit	Nm
T_{rated}	Rated torque of the motor	Nm
T_{1max}	Temporarily permissible max. input torque of the input unit	Nm
n_1	Input speed of the motor	rpm
P_1	Input power of the motor	kW

Overview of drive sizing data

Code	Description	Unit
a	Gearbox constant	kNmm
b, d, l, y, z	Gearbox constants	mm
C	Factor	–
d	Diameter of the input element	mm
DC	Cyclic duration factor (CDF)	%
f_{Btot}	Service factor of the driving machine	–
f_B	Service factor of the geared motor	–
F_{ax}	Axial force at d	N
F_r	Radial force at the output shaft	N
F_{Ravail}	Available radial force resulting from the output torque and the diameter of the output element	N
F_{Rperm}	Permissible radial force at the center of shaft extension (l/2)	N
F_{xperm1}	Permissible radial force, limited by the bearing service life, at a distance of x from the shaft shoulder	N
F_{xperm2}	Permissible radial force, limited by the shaft strength, at a distance of x from the shaft shoulder	N
i	Gearbox ratio	–
J_2	Moment of inertia based on the output speed of the gearbox	kgm^2
J_B	Moment of inertia of the brake	kgm^2
J_{Load}	All external moments of inertia (based on the motor shaft)	kgm^2
J_M	Moment of inertia of the motor	kgm^2
J_x	Reduced moment of inertia of the load	kgm^2
J_{add}	Additional moment of inertia (e.g. centrifugal mass or high inertia fan)	kgm^2
J_{Fan}	Centrifugal mass fan of handwheel	kgm^2
k	Factor for taking operating conditions into account	–
k_{DC}	Factor for enhanced performance	–
k_{FI}	Factor for taking the additional moment of inertia into account	–
k_{HT}	Factor for abnormal coolant temperature and site altitude	–
k_M	Factor for taking the counter torque during acceleration into account	–
k_P	Factor for taking the required power and duty cycle into account	–
L_{rated}	Service life of the brake lining until readjustment	h
$L_{ratedmax}$	Service life of the brake lining until replacement	h
m_{AF}	Mass acceleration factor	–
n_1	Input speed of the gearbox	rpm
n_2	Output speed of the gearbox	rpm
n_{br}	Braking speed	rpm

Code	Description	Unit
P_{2m}	Input power of the motor	kW
P_2	Output power of the gearbox	kW
P_{DC}	Power rating for the new duty cycle	kW
P_{req}	Required input power	kW
P_{rated}	Rated motor power	kW
P_{perm}	Permissible motor power	kW
Q_{perm}	Permissible operating energy	J
r	Radius of the output element	m
s_{br}	Braking distance	m
t_1	Application time of the brake	ms
t_{br}	Braking time	s
T_1	Permissible input torque of the input unit	Nm
T_{rated}	Rated torque of the motor	Nm
T_{1max}	Temporarily permissible max. input torque of the input unit	Nm
T_2	Output torque of the geared motor	Nm
T_{2req}	Required output torque of the driving machine	Nm
T_{2rated}	Nominal output torque of the geared motor	Nm
T_{br}	Rated braking torque	Nm
T_{DC}	Torque for the new duty cycle	Nm
T_{req}	Required torque	Nm
T_H	Acceleration torque of the motor	Nm
T_{Bd}	Breakdown torque	Nm
T_{rated}	Nominal torque	Nm
T_{avail}	Available torque of the geared motor	Nm
T_x	Load torque	Nm
v	Conveying speed	m/s
W	Friction energy per braking operation	J
W_{tot}	Friction energy until the brake lining is replaced	MJ
W_V	Friction energy until the brake is adjusted	MJ
Z	Number of startings	1/h
Z_{perm}	Permissible number of startings	1/h
Z_0	No-load operating from the list	1/h
α	Angle of action of the radial force	°
η	Efficiency	%
ϑ_{amb}	Ambient temperature	°C

Important drive technology variables

SI unit Variable	Abbreviation		Unit abbreviation		Designation or conversion rate *)
	SI	Previously	SI	Previously	
Length (distance)	l	L, s	m	m	1 km = 1.000 m
Area	A	F	m^2	m^2	1 m^2 = 100 dm^2
Volume	V	V	m^3	m^3	1 m^3 = 1.000 dm^3 1 dm^3 = 1 l
Plane angle	α, β, γ	α, β, γ	rad	Degrees °	1 rad = 1 m/m 1 L = π/2 rad 1° = π/180 rad
Rotation angle	ϕ	φ		Degrees °	1' = 1°/60; 1'' = 1'/60
Time					1 min = 60 s 1 h = 60 min
Time range	t	t	s	s	1 d = 24 h
Duration					1 a = 24 h
Frequency	f	f	Hz	1/s	1 Hz = 1/s
Speed	n	n	rpm	rev/min	Revolutions per minute
Velocity	v	v	m/s	m/s	1 km/h = $\frac{1}{3.6}$ m/s
Acceleration Free-fall acceleration	a g	b g	m/s^2	m/s^2	g = 9.81 m/s^2
Angular velocity	ω	Ω	rad/s	1/s	
Angular acceleration	α	ξ	rad/s^2	$1/s^2$	
Mass	m	m	kg	kg	1
Density		d	kg/dm^3	kg/dm^3	10^3
Force Weight force	F G	P, K G	N	kp	9.81 1 N = 1 kg · 1 m/s^2
Pressure Mechanical tension	p σ	p σ	Pa N/m^2 N/mm^2	 kp/cm^2 kp/mm^2	1 Pa = 1 N/m^2 9.81 · 10^4 9.81
Work Energy Quantity of heat	W W Q	A E Q	 J 	kpm kcal 	9.81 4.187 1 J = 1 Nm = 1 Ws
Force torque Torque Bending torque	 T 	M_t M_d M_b	 Nm 	 kpm 	9.81 1 Nm = 1 J
Power rating	P	N	W	PS	735.5; 1 W = 1 J/s = 1 Nm/s = $\frac{kgm^2}{s^3}$
Moment of inertia	J	θ	kgm^2	kpm^2	9.81

*) The numerical value of a variable in previously used units multiplied by the conversion rate gives the numerical value of the variable in the SI unit.

Conversion between kW and hp:

1 kW = 1.34102 hp

1 hp = 0.745700 kW

1 hp = 1.01387 PS

hp = horse power (US)
PS = Pferdestärke

Important drive technology variables (continued)

SI unit Variable	Abbreviation		Unit abbreviation		Designation or conversion rate *)
	SI	Previously	SI	Previously	
Dynamic viscosity	η	η	Pa · s	P	10^{-1}
Kinematic viscosity	υ	υ	m^2/s	St	10^{-4}
Electrical current intensity	I	I	A	A	1 A = 1 W/V = 1 V/Ω
Electrical voltage	U	U	V	V	1 V = 1 W/A
Electrical resistance	R	R	Ω	Ω	1 Ω = 1 V/A = 1/S
Electrical conductance	G	G	S	S	1 S = 1/Ω
Electrical capacitance	C	C	F	F	1 F = 1 C/V
Electric charge	Q	Q	C	C	1 C = 1 A · s
Inductance	L	L	H	H	1 H = 1 Vs/A
Magnetic flux density Induction	B	B	T	G	10^4 1 T = 1 Wb/m^2
Magnetic field strength	H	H	A/m	A/m	
Magnetic flux	ϕ	ϕ	Wb	M	10^8 1 Wb = 1 V · s
Temperature	T(ϑ)	t	K(°C)	°C	0 K = -273.15 °C

*) The numerical value of a variable in previously used units multiplied by the conversion rate gives the numerical value of the variable in the SI unit.

General technical data

1

Overview

MOTOX geared motors are available in an almost infinite number of combinations for adaptation to a wide range of drive scenarios. All the usual additional components and variants are also offered.

Made-to-measure solutions for all kinds of drive technology tasks are achieved with different gearbox types (helical, parallel shaft, bevel helical, helical worm, and worm), combined with motors by means of modular mounting technology.

Designs in accordance with standards and specifications

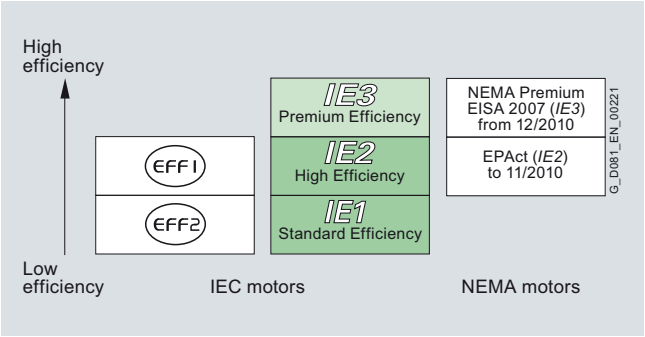
New efficiency classes and efficiences according to IEC 60034-30:2008 and IEC 60034-2-1:2007

New efficiency classes according to IEC 60034-30:2008

Different energy efficiency standards exist worldwide for asynchronous motors. To promote international harmonization, the international standard IEC 60034-30:2008 (Rotating electrical machines – Part 30: Efficiency classes of single-speed, three-phase, cage-induction motors (IE code)) was created. This groups low-voltage asynchronous motors into new efficiency classes (valid since October 2008). The efficiencies of IEC 60034-30:2008 are based on losses determined in accordance with the IEC 60034-2-1:2007 standard. This has been valid since November 2007 and will replace the previous standard IEC 60034-2:1996 as of November 2010. The supplementary losses are now measured and no longer added as a percentage.

New standard classes for efficiencies
A new nomenclature applies to the new efficiency classes (IE = International Efficiency):

- IE1 (Standard Efficiency)
- IE2 (High Efficiency)
- IE3 (Premium Efficiency)



New efficiency classes

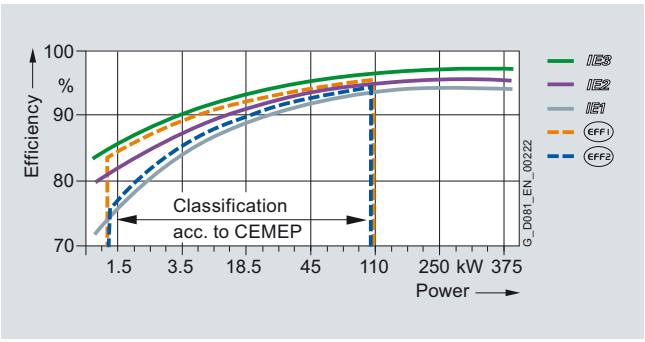
New measuring method according to IEC 60034-2-1:2007

With the new measuring method, the supplementary losses are no longer applied as a percentage (0.5 %), but instead they are determined with measurements (IEC 60034-2-1: 2007). The nominal efficiencies are therefore reduced from EFF1 to IE2 and from EFF2 to IE1, even though there have been no technical or physical changes to the motors.

Previously: P_{LL} = 0.5 % of *P* added

Now: P_{LL} = individual measurement

P_{LL} = load-dependent supplementary losses.



IE1 to IE3 efficiencies 4-pole 50 Hz

The following table shows examples of the efficiency values according to the new and old loss calculating methods.

	EFF measuring method (incl. percentage losses) EN / IEC 60034-2:1996 50 Hz	Losses determined according to IEC 60034-2:2007 50 Hz	Losses determined according to IEC 60034-2:2007 60 Hz
5.5 kW 4-pole	89.2 %	87.7 %	89.5 %
45 kW 4-pole	93.9 %	93.1 %	93.6 %
110 kW 4-pole	Not defined	94.5 %	95.0 %

Background information

The EuP directive (Energy Using Products) is implemented in the national laws of EU member countries. The framework conditions for the European directives have already been agreed. EU directive 2005/32/EC (= EuP directive) is based on IEC 60034-30:2008 with regard to the minimum efficiency values.

This directive is implemented in Germany in the form of the so-called "Energiebetriebene-Produkte-Gesetz" (EBPG - Energy Using Products Directive).

Designs in accordance with standards and specifications (continued)

The most important changes at a glance:

	CEMEP voluntary EU agreement	NEMA	EuP directive based on IEC 60034-30:2008 standard EuP = Energy Using Products
Description	Voluntary agreement between the EU commission and the European sector committee of manufacturers of electrical machines (CEMEP)	The current legislature in USA/CAN/MX also governs efficiencies	The EuP directive must be implemented in national law in all EU countries. The determination of losses, and therefore of efficiency classes, is based on IEC 60034-2-1:2007
Number of poles	2, 4	2, 4, 6	2, 4, 6
Performance range	1.1 – 90 kW	0.75 – 150 kW	0.75 – 375 kW
Level	Standard – EFF3 Enhanced efficiency – EFF2 Highly efficient – EFF1	High Efficiency NEMA Premium	Standard Efficiency – IE1 High Efficiency – IE2 Premium Efficiency – IE3
Voltage	400 V, 50 Hz	230 / 460 V, 60 Hz	< 1000 V, 50 / 60 Hz
Degree of protection	IP5X	Open + closed motors	All
Motors with brake	NO	YES	In agreement
Geared motors	NO	NO	YES
Ex motors	NO	YES	EuP directive – NO IEC 60034-30 – YES (but explosion protection always has a higher priority)
Law	Voluntary agreement; will be replaced on implementation of the national measures.	Up to 11/2010 EPACT (IE2) From 12/2010 EISA 2007 Premium (IE3) minimum efficiency	IEC 600034-30 standard, valid since October 2008, EuP

For more information on EuP:

- Excluded: Explosion-proof motors according to ATEX, brake motors, smoke-extraction motors
- Deadline 16 June 2011: IE2 minimum efficiency for motors from 0.75 kW to 375 kW
- Deadline 01 January 2015: IE3 minimum efficiency for motors from 7.5 kW to 375 kW or a combination of IE2 motor and frequency converter
- Deadline 01 January 2017: IE3 minimum efficiency for all motors from 0.75 kW to 375 kW or a combination of IE2 motor and frequency converter

Abbreviations

CEMEP – Comité Européen de Constructeurs de Machines Électriques et d'Électronique de Puissance (European sector committee of manufacturers of electrical machines)

EISA 2007 – Energy Independence and Security Act of 2007

EPACT – Energy Policy Act

NEMA – National Electrical Manufacturers Association

IEC – International Electrotechnical Commission

IE – International Efficiency

What will change?

The rating plates of the motors will be adapted to the new technical data and their clarity and readability will be enhanced (for examples, see page 1/38).

For motors up to frame size 315 L, this means:

- Nominal efficiencies in accordance with the IEC 60034-30 standard are specified regardless of the actual efficiency, i.e. in accordance with the standardized performance classes such as 7.5 kW, 11 kW and 15 kW, nominal efficiencies only will be offered in accordance with efficiency class IE1 and IE2.
- The rated currents have been adapted in accordance with the new efficiencies. The motor rated currents will increase minimally (by up to 3 %).
- There is no need for a voltage range to be specified on the new rating plates. The rated voltages only are specified.

  Note: The transition period for adjustment of mains voltages with increased tolerances within the EU expired on January 1, 2008. Since then the permissible mains tolerances are 230 / 400 V ±10 %, 50 Hz and 400 / 690 V ±10 %, 50 Hz.

Summary

The standard motor series LA and LG will be converted to the new efficiency designations "IE1" and "IE2" in accordance with IEC 60034-30:2008. The order numbers will remain unchanged.

This affects all motors that were previously designated with "EFF2" and "EFF1" as well as the motor types that have been added due to the IEC 60034-30:2008 efficiency standard:

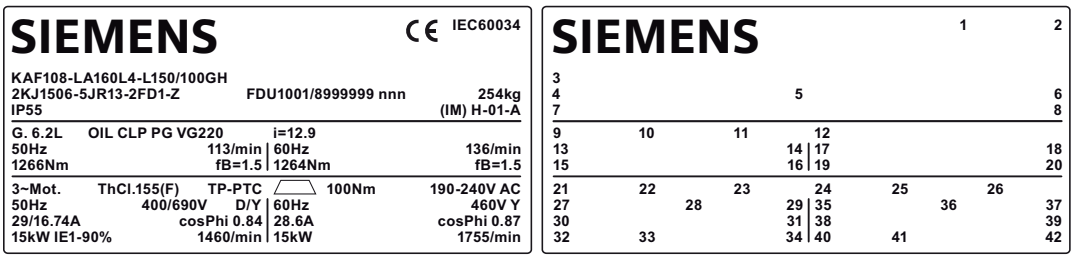
- 2-pole, 4-pole and 6-pole motors (only "single-speed motors", not pole-changing motors and not 8-pole motors)
- Output range from 0.75 kW to 375 kW

A detailed presentation of the affected motors, including their frame sizes, can be found in the overview tables in the separate catalog parts under "Orientation" in the "Selection and ordering data". The changed technical data is also listed here.

Designs in accordance with standards and specifications (continued)

Example of rating plate

Due to the IE changeover, the affected motors will be equipped with new rating plates complete with the new technical data.



1 CE marking or, if required, other marking
2 Standard taken as a basis
3 Type - Type of construction - Size
4 Order No.
5 Serial No.
6 Weight m [kg]
7 Degree of protection acc. to IEC 60034-5 and IEC 60529
8 Mounting position (IM)
9 Oil quantity [l] main gearbox / intermediate gearbox + extruder flange
10 Kind of oil
11 Oil viscosity ISO VG Class acc. to DIN 51519 / ISO 3448
12 Total transmission ratio *i*

Frequency 1
13 Rated frequency *f* [Hz]
14 Speed at the output n_2 [rpm]
15 Torque at the output T_2 [Nm]
16 Service factor f_B

Frequency 2
17 Rated frequency *f* [Hz]
18 Speed at the output n_2 [rpm]
19 Torque at the output T_2 [Nm]
20 Service factor f_B

Motor data
21 Phase number and kind of current of the motor
22 Temperature class Th.Cl.
23 Motor protection (TP)
24 Symbols (IEC 60617-2): = Brake
25 Braking torque T_{br} [Nm]
26 Brake supply voltage *U* [V]

Frequency 1
27 Rated frequency *f* [Hz]
28 Rated voltage / rated voltage range *U* [V]
29 Circuit, graphical symbol acc. to DIN EN 60617 T6 / IEC 60617-6
30 Rated current *I* [A]
31 Power factor cos φ
32 Rated power *P* [kW], operating mode (if ≠ S1)
33 Designation of the efficiency class acc. to IEC 60034-30
34 Rated speed n_1 [rpm]

Frequency 2
35 Rated frequency *f* [Hz]
36 Rated voltage / rated voltage range *U* [V]
37 Rated current *I* [A]
38 Power factor cos φ
39 Circuit, graphical symbol acc. to DIN EN 60617 T6 / IEC 60617-6
40 Rated power *P* [kW], operating mode (if ≠ S1)
41 Designation of the efficiency class
42 Rated speed n_1 [rpm]

Designs in accordance with standards and specifications (continued)

Minimum efficiencies required by law

In 1997, an act was passed in the USA to define minimum efficiencies for low-voltage three-phase AC motors (EPACT = Energy Policy Act). An act is in force in Canada that is largely identical, although it is based on different verification methods. The efficiency is verified for these motors for the USA using IEEE 112, Test Method B and for Canada using CSA-C390. Apart from a few exceptions, all low-voltage three-phase AC motors exported to the USA or Canada must comply with the legal efficiency requirements.

The law demands minimum efficiency levels for motors with a voltage of 230 and 460 V at 60 Hz, in the power range 1 to 200 hp (0.75 to 160 kW) with 2, 4, and 6 poles. Explosion-proof motors must also be included. The EPACT efficiency requirements exclude, for example:

- Motors whose size power classification does not correspond with the standard series according to NEMA MG1-12.
- Flange-mounting motors without feet
- Brake motors
- Inverter-fed motors
- Motors with design letter C and higher.

For more information on EPACT:

www.eren.doe.gov/

Special requirements for the USA: Energy Policy Act

The act lays down that the nominal efficiency at full load and a "CC" number (Compliance Certification) must be included on the rating plate.
The "CC" number is issued by the US Department of Energy (DOE).
The following information is stamped on the rating plate of EPACT motors which must be marked by law:
Nominal efficiency (service factor SF 1.15), design letter, code letter, CONT, CC no. CC 032A (Siemens), and NEMA MG1-12.

Special requirements for Canada: CSA – Energy Efficiency Verification

These motors fulfill the minimum efficiency requirements laid down by the CSA standard C390. These motors can be ordered and feature the CSA-E mark on their rating plates.

NEMA – National Electrical Manufacturing Association

Data on the rating plate:

Rated voltage range, design letter, code letter, CONT, and NEMA MG1-12.

Order code:
Design in accordance with NEMA **N65**

UL-R – Underwriters Laboratories Inc. listing

The motors are listed for up to 600 V by Underwriters Laboratories Inc. ("Recognition Mark" = R/C).

Motor voltages up to 600 V are certified in accordance with UL.

"UL Recognition Mark" is included on the rating plate of the motor.

In addition, the motor is designed to meet the NEMA MG1-12 electrical standard and includes the following data on the rating plate:
Rated voltage, nominal efficiency, design letter, code letter, CONT, and NEMA MG1-12.

Externally or internally mounted components such as:

- Motor protection
- Heating element
- External fan unit
- Brake
- Encoder
- Plug connection

are UL-R/C, CSA, or C-US listed or used by manufacturers in accordance with regulations.

UL-R/C cable glands must be used for cable entry.

Order code:
Design in accordance with UL-R **N37**

Designs in accordance with standards and specifications (continued)

CSA – Canadian Standard Association

Motors are approved for up to 690 V in accordance with the Canadian regulations of the "Canadian Standard Association" (CSA). Externally or internally mounted components which are used are listed by CSA or are used by manufacturers in accordance with regulations. The CSA mark and the rated voltage are included on the rating plate.

When energy-saving motors are ordered, they also include the CSA-E mark on the rating plate.

Order code:
Design in accordance with CSA **N36**

UL-R and CSA approval

UL-R approval and CSA approval can also be ordered together for the motors.

Order code:
Design in accordance with UL-R and CSA **N38**

CCC – China Compulsory Certification

"Small power motors" which are exported to China must be certified up to a rated power of:

2-pole: ≤ 2.2 kW

4-pole: ≤ 1.1 kW

6-pole: ≤ 0.75 kW

8-pole: ≤ 0.55 kW

The **LA motors which must be certified** are certified by the CQC (China Quality Cert. Center). When one of these motors is ordered, the logo "CCC (Safety Mark)" is included on the rating plate and the packaging.

Notes:

Chinese customs checks the need for certification of imported products by means of the commodity code.

The following do not need to be certified:

- Motors imported to China which have already been installed in a machine
- Repair parts

Order code:
Design in accordance with CCC **N67**

CEEL – China Energy Efficiency Label

In June 2008 China introduced mandatory energy efficiency labeling for electric motors.

Since September 1, 2008, when the transition period expired, the applicable electrical motors could only be imported and sold in China with a valid "China Energy Efficiency Label".

The motor must be labeled with the "China Energy Efficiency Label" sticker, which states the efficiency class.

Apart from the Energy Label sticker (dimensions 80 x 54 mm) the efficiency must also be stated on the rating plate.

The labeling requirements apply to 2, 4 and 6-pole motors with a line frequency of 50 Hz and rated voltages of up to 690 V.

Efficiency classes 2 and 3 apply here to motors with a rated power of 0.55 kW to 315 kW and efficiency class 1 applies to motors with a rated power from 3 kW to 315 kW.

Order code:
Design in accordance with China Energy Efficiency Label **K69**

GOST-R conformity

The following gearboxes can be supplied, certified according to GOST-R:

- Helical gearboxes
- Bevel helical gearboxes
- Parallel shaft gearboxes
- Helical worm gearboxes
- Worm gearboxes
- CAVEX worm gearboxes

Order code:
Design in accordance with GOST **N30**

VIK version

For a VIK version, select an IEC motor from Catalog D 81.1 that can be mounted on gearboxes with an input unit K2 or K4.

Explosion protection as per ATEX

In the European market ATEX Directive 94/9/EC applies to all types of equipment used in potentially explosive atmospheres - which include geared motors. It became mandatory on July 1, 2003 and has unrestricted validity for the use of all geared motors within the European Union. Other countries too have now complied with this regulation.

Helical gearboxes, parallel shaft gearboxes, bevel helical gearboxes, and helical worm gearboxes are available to comply with this Directive. A wide range of gearbox and motor designs and sizes are approved for zones 1, 2 (gases) and zones 21 and 22 (dusts).

Ex-atmosphere / Zone		Category	Frequency
G (gas and steam)	D (dust)		
0	20	1	Continuously or long-term
1	21	2	Intermittent
2	22	3	Rarely or briefly

MOTOX geared motors can be provided for categories 2 and 3.

Use in explosive atmospheres caused by gases is permissible for temperature classes T1 to T4. With use in explosive atmospheres caused by dust, the maximum temperature of 120 °C must be taken into consideration for the gearbox. An oil level sensor can be integrated for monitoring in inaccessible areas.

Motors are available in the following protection types: flameproof enclosure (Exd), flameproof enclosure and terminal box with increased safety (Exde), increased safety (Exe), and non sparking (ExnA) as well as motors for dust explosion protection.

The motors are mounted on the gearbox with an input unit K4 or K2.

General technical data

Standards

The motors comply with all applicable international (IEC), European (EN, CENELEC), and national (DIN/VDE) standards:

IEC	EN / HD	DIN / VDE	Title
IEC 60027-4	EN 60027-4	DIN EN 60027-4	Letter symbols for electrical engineering, part 4: Rotating electrical machines
IEC 60034-1	EN 60034-1	DIN EN 60034-1 VDE 0530-1	Rotating electrical machines: - Rating and performance
IEC 60034-2-1	EN 60034-2-1	DIN EN 60034-2-1 VDE 0530-2-1	- Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles) (IEC 60034-2-1:2007); German version EN 60034-2-1:2007
IEC 60034-5	EN 60034-5	DIN EN 60034-5 VDE 0530-5	- Degrees of protection provided by integral design of rotating electrical machines (IP code) - Classification
IEC 60034-6	EN 60034-6	DIN EN 60034-6 VDE 0530-6	- Methods of cooling (IC code)
IEC 60034-7	EN 60034-7	DIN EN 60034-7 VDE 0530-7	- Classification of types of construction, mounting arrangements and terminal box position (IM code)
IEC 60034-8	EN 60034-8	DIN EN 60034-8 VDE 0530-8	- Terminal markings and direction of rotation
IEC 60034-9	EN 60034-9	DIN EN 60034-9 VDE 0530-9	- Noise limits
IEC 60034-12	EN 60034-12	DIN EN 60034-12 VDE 0530-12	- Starting performance of three-phase cage induction motors except for pole-changing motors
IEC 60034-14	EN 60034-14	DIN EN 60034-14 VDE 0530-14	- Mechanical vibration of certain machines with shaft heights 56 mm and higher
IEC TS 60034-17	–	DIN VDE 0530-17	- Cage induction motors when fed from converters - Application guide
IEC 60038	HD 472	DIN IEC 60038	IEC standard voltages
–	EN 50347	DIN EN 50347	General purpose three-phase induction motors having standard dimensions and outputs - Sizes 56 to 315 and flange sizes 65 to 740
IEC 60085	EN 60085	DIN EN 60085	Electrical insulation, thermal evaluation and designation
IEC 60445	EN 60445	DIN EN 60445 VDE 0197	Identification of equipment terminals and conductor terminations
IEC 60529	EN 60529	DIN EN 60529 VDE 0470-1	Degrees of protection provided by enclosures (IP code)
–	EN 50262	DIN EN 50262 VDE 0619	Cable glands for electrical installations
–	–	DIN 42925	Terminal box cable entries for three-phase cage induction motors at rated voltages from 400 V to 690 V

The main dimensions of all gearboxes comply with the following DIN standards:

DIN 747	Shaft heights for machines
DIN 748-1	Cylindrical shaft extensions; dimensions, nominal torques
DIN 42955	Concentricity of shaft extensions, concentricity and axial eccentricity of mounting flange
DIN 6885-1	Drive-type fastenings without taper action; feather key, slots, high format
DIN 332-2	Center holes in shaft ends

Fits

Flange form A, C:

$b1 \leq \varnothing 230$ = j6

$b1 > \varnothing 230$ = h6

Drive-side shaft extension:

$d1 < \varnothing 55$ = k6

$d1 \geq \varnothing 55$ = m6

See the dimension drawings for other fits.

Degrees of protection

The geared motors are supplied with IP55 to standard IEC 60034-5. For higher degrees of protection for motors, see Chapter 8 "Motor degrees of protection".

Direction of rotation of geared motors

The geared motors are configured so the motor shaft rotates clockwise (IEC 60034-8).

The direction of rotation of the gearbox output shaft can be reversed by swapping two external connection wires on the motor.

Specifying the direction of rotation for geared motors and gearboxes with backstop

It is necessary to specify the desired direction of rotation of the output shaft when ordering a gearbox with backstop. The direction of rotation is determined by the front view of the output shaft (shaft end face). With parallel shaft, bevel helical, and helical worm gearboxes, it is again necessary to specify the side on which the output shaft is located, i.e. either "Output side A" or "Output side B". The output side is defined by specifying the mounting position.

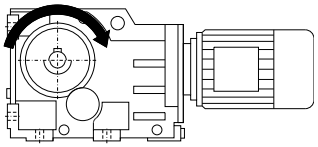
Direction of rotation of the geared motor when viewing the output shaft

Output shaft direction of rotation order codes:

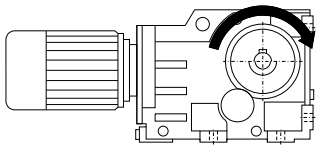
Clockwise **K18**

Counterclockwise **K19**

Clockwise

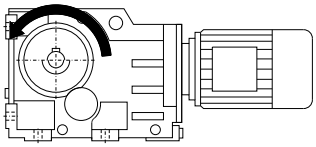


Output side A

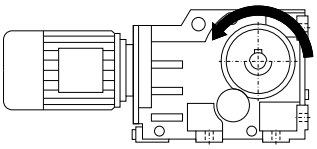


Output side B

Counterclockwise



Output side A



Output side B

Gearbox	Size	Gear stages	Front view	Output shaft direction of rotation	Input shaft direction of rotation
Z	38 ... 188	2	Output shaft	Clockwise	Clockwise
				Counterclockwise	Counterclockwise
D	38 ... 188	3	Output shaft	Clockwise	Counterclockwise
				Counterclockwise	Clockwise
FZ	38B ... 188B, 208	2	Drive end of output shaft	Clockwise	Clockwise
				Counterclockwise	Counterclockwise
FD	38B ... 188B, 208	3	Drive end of output shaft	Clockwise	Counterclockwise
				Counterclockwise	Clockwise
C	38 ... 88	2	Drive end of output shaft	Clockwise	Clockwise
				Counterclockwise	Counterclockwise
B	28 ... 38	2	Drive end of output shaft	Clockwise	Clockwise
				Counterclockwise	Counterclockwise
K	38 ... 88	3	Drive end of output shaft	Clockwise	Counterclockwise
				Counterclockwise	Clockwise
K	108 ... 188	3	Drive end of output shaft	Clockwise	Clockwise
				Counterclockwise	Counterclockwise
K	38 ... 188	3	Non-drive end of output shaft	Clockwise	Counterclockwise
				Counterclockwise	Clockwise

General technical data

Power ratings and torques

The specified power ratings and torques refer to standard versions, mounting positions B3../ B5../H01 and other comparable mounting positions, whereby the first stage is not completely immersed in oil. Normal ambient conditions and standard lubrication are also required.

Speeds

The specified output speeds are guide values, rounded to the first decimal place. You can use the rated motor speed and the gearbox speed to calculate the rated drive speed.

Please note that the actual output speed will depend on the motor load and the power supply conditions.

Noise

Noise emitted by the motors during mains operation

Noise is measured in accordance with ISO 1680 in a dead room. The noise level is specified as A-weighted measuring surface sound pressure level L_{pfA} in dB (A). This value is the spatial average value of the sound pressure levels measured at the measuring surface. The measuring surface is a cube 1 m away from the surface of the motor. The sound power level is also specified as L_{WA} in dB (A).

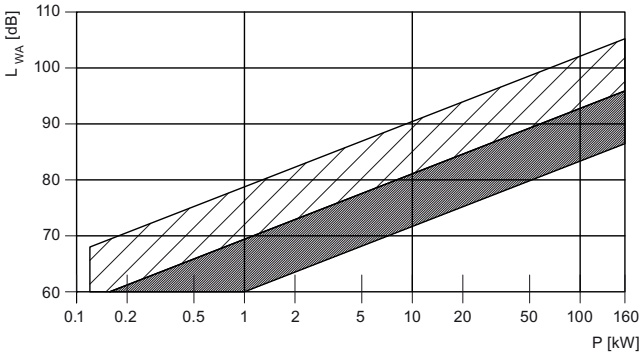
The values specified in the motor selection tables apply to the motor without gearbox at 50 Hz (see the selection and ordering data in the corresponding sections of the catalog).
The tolerance is +3 dB. At 60 Hz, the values are approximately 4 dB (A) higher. Please enquire about noise levels for pole-changing motors, geared motors, and inverter-fed motors.

Noise emitted by the geared motors

The geared motors do not exceed the permissible noise levels defined for gearboxes in VDI guideline 2159 and for motors in IEC 60034-9.
The values L_{pA} and L_S increase in each case by a general average of 3-5 dB (A) for geared motors as compared to motors without gears.

However, there is a strong correlation between noise level and:
- gear design
- speed and transmission ratios
- mounting positions
- other influencing factors

Precise data is available on request.



Weight of geared motors

The weight data contained in the dimension drawings are averaged values and do not take account of oil. The weights vary according to the gearbox design and size. The oil quantity depends on the mounting position.

The exact weight of the drive will be specified on the order confirmation.

Three-phase AC motors

Three-phase AC motors are designed to be perfectly coordinated with the gearbox system and can be supplied with or without a brake.

The motor series covers sizes 63 to 315.

The power ratings of the 2-, 4-, 6-, 8-, 8/2-, 8/4-, and 4/2-pole motors are classified in accordance with IEC. Pole-changing design with pole number 6/4 is available on request.
The housings of motors up to size 160 are made from high-quality aluminum alloy. Housings for sizes 180 and above are made from gray cast iron.

Brakes

The motors can be supplied with spring-operated disk brakes. These are double-disk brakes, which are spring-operated at zero current. (Safety brake)

The torque can be set within certain limits for every brake size.

Lubricants

All gearboxes are filled with lubricant at the factory. The lubricants used meet the requirements of DIN 51502. The gearboxes are filled with varying oil quantities (see operating instructions and rating plate) depending on their mounting position.
If no specifications are made to the contrary, the standard lubricant is used.

Required quality of gear lubricants

The oils used in the MOTOX gearboxes are subject to stringent quality control. For MOTOX gearboxes, only CLP-quality oils are approved which contain ingredients to DIN 51517-3 for improvement of corrosion protection, resistance to ageing, and which reduce wear in mixed-friction areas. The scuffing resistance in the FZG test to DIN 51354-2 must comply with stage 12 or higher under A/8.3/90 test conditions. In the FE-8 rolling bearing test to DIN 51817 rolling element wear must be under 30 mg and cage wear under 100 mg under D-7.5/80-80 test conditions.

In addition, the lubricants must meet the following quality requirements demanded by FLENDER:

- Sufficiently high gray-staining resistance in accordance with FVA 54 gray-staining test
- Low degree of foaming with less than 15 % foam formation in the FLENDER foam test
- Suitable for the elastomer material used in the radial shaft sealing of gearboxes
- Compatible with residues of corrosion-protection agent and run-in oils
- Compatible with the paints used by Siemens in the gearbox interiors
- Compatible with liquid sealing between bolted-joint surfaces.

For a list of approved oils from different manufacturers please refer to the Operating Instructions BA 7300.

Furthermore, for use in worm gearboxes:

Low wear, high pitting resistance, and high efficiency (low temperature) in the cylindrical worm gearbox test.

For a list of approved oils from different manufacturers please refer to the Operating Instructions BA 7303.

Lubricants (continued)

Lubricants for helical gearboxes E / D / Z, parallel shaft gearbox F, bevel helical gearbox K:

Area of application	Ambient temperature [1]	DIN 51 502 designation	Order code
Standard oils			
Standard temperature	-10 … +40 °C	CLP ISO VG220	**K06**
Improved oil service life	-20 … +50 °C	CLP ISO PG VG220	**K07**
High temperature usage	0 … +60 °C	CLP ISO PG VG460	**K08**
Low temperature usage	-40 … +40 °C	CLP ISO PAO VG220	[2]
Lowest temperature usage	-40 … +10 °C	CLP ISO PAO VG68	[2]
Physiologically safe oils (for use in the food industry) in acc. with NSF (USDA)-H1			
Standard temperature	-30 … +40 °C	CLP ISO H1 VG460	**K11**
Biologically degradable oils			
Standard temperature	-20 … +40 °C	CLP ISO E VG220	**K10**

[1] Recommended
[2] On request

Lubricants for bevel helical gearbox B and helical worm gearbox C:

Area of application	Ambient temperature [1]	DIN 51 502 designation	Order code
Standard oils			
Standard temperature	0 … +60 °C	CLP ISO PG VG460	**K08**
Low temperature usage	-20 … +50 °C	CLP ISO PG VG220	**K07**
Lowest temperature usage	-40 … +40 °C	CLP ISO PAO VG220	[2]
Physiologically safe oils (for use in the food industry) in acc. with NSF (USDA)-H1			
Standard temperature	-30 … +40 °C	CLP ISO H1 VG460	**K11**
Biologically degradable oils			
Standard temperature	-20 … +40 °C	CLP ISO E VG220	**K10**

[1] Recommended
[2] On request

Lubricants for worm gearbox S:

Area of application	Ambient temperature [1]	DIN 51 502 designation	Order code
Standard oils			
Standard temperature	0 … +60 °C	CLP ISO PG VG460	**K08**
Lowest temperature usage	-40 … +40 °C	CLP ISO PAO VG 220	[2]
Physiologically safe oils (for use in the food industry) in acc. with NSF (USDA)-H1			
Standard temperature	-30 … +50 °C	CLP ISO H1 VG460	**K11**

[1] Recommended
[2] On request

The ambient temperatures are applicable for gearboxes in standard operation. The data is based on our experience with standard applications. The oil sump temperature is a decisive factor for the service life of the lubricant and depends to a large extent on the gearbox type, gearbox size, transmission ratio, mounting position, input speed, and operating mode.

The standard gearbox version can be used in the range -20 °C to +40°C. Operation outside this range requires a variety of measures. Please contact us.

The data on usage in high, low, and lowest temperature ranges only refers to the lubricant.

It may be necessary to take other design measures. Please contact us.

With low ambient temperatures, critical startup characteristics need to be taken into account.

With higher ambient temperatures (> 40 °C), the permissible oil sump temperature must not be exceeded. Please contact us if you require your drive to be thermally tested.

Long-term preservation

Helical gearboxes, parallel shaft gearboxes, bevel helical gearboxes, and helical worm gearboxes can be delivered with a long-term preservation of up to 36 months. The free shaft extensions, sealing elements, and flanges are coated with a protective layer of grease. The gearbox is completely filled with oil for long-term preservation.

See the operating instructions for information on storage and commissioning.

Order code:
Long-term preservation up to 36 months **K17**

Surface treatment

We offer 5 high-quality paint systems in different hues to protect drives against corrosion and external influences.

Our corrosion protection range is available in accordance with the corrosion categories of the DIN EN ISO 12944-2 standard.

Geared motors of size 38 and above are painted in RAL 5015 (sky blue) as standard according to corrosion category C1. This ensures that they are protected against corrosion for installation in interior areas. Gearboxes of size 08,18 and 28 with an aluminum housing are supplied unpainted as standard.

For transport, the bare parts are coated with anti-corrosion paint which will last for a limited amount of time.

Overview of surface treatment

Corrosion category	Order code	Paint system	Hue	Description
Surface protection for normal environmental stress				
C1	**L02**	1-component water-based coating	Standard: 5015 On request: RAL 1003, 1007, 1012, 1018, 1023, 2000, 2004, 3000, 5007, 5009, 5010, 5012, 6011, 6018, 7001, 7011, 7016, 7030, 7031, 7032, 7035, 9005, 9006, 9010	• Indoor installation • Heated buildings with neutral atmospheres • Resistance to greases and some resistance to mineral oils, aliphatic solvents • Standard paint finish
Surface protection for minimal environmental stress				
C2	**L03**	2-component polyurethane primer 2-component polyurethane top coat	Standard: RAL 7031 On request: RAL 1003, 1012, 1018, 1023, 2004, 3000, 5002, 5007, 5009, 5010, 5012, 5015, 6011, 6018, 7000, 7001, 7011, 7030, 7032, 7035, 9005, 9006, 9010, 9011, 9016	• Indoor and outdoor installation • Unheated buildings with condensation, production areas with low humidity, e. g. warehouses and sports facilities • Atmospheres with little contamination, mostly rural areas • Resistant to greases, mineral oils and sulfuric acid (10 %), caustic soda (10 %) and some resistance to aliphatic solvents
Surface protection for medium environmental stress				
C3	**L04**	2-component polyurethane primer 2-component polyurethane top coat	Standard: RAL 7031 On request: RAL 1003, 1012, 1018, 1023, 2004, 3000, 5002, 5007, 5009, 5010, 5012, 5015, 6011, 6018, 7000, 7001, 7011, 7016, 7030, 7031, 7032, 7035, 9005, 9006, 9010, 9011, 9016	• Indoor and outdoor installation • Production areas with high levels of humidity and some air pollution, e. g. plants for food manufacturing, dairies, laundries and breweries • Urban and industrial atmospheres, moderate contamination from sulfur dioxide, coastal areas with low salt levels • Resistant to greases, mineral oils, aliphatic solvents, sulfuric acid (10 %), caustic soda (10 %)
Surface protection for high environmental stress				
C4	**L20**	2-component epoxy zinc phosphate primer 2-component polyurethane top coat	Standard: RAL 7031 On request: RAL 1003, 1012, 1018, 1023, 2004, 3000, 5002, 5007, 5009, 5010, 5012, 5015, 6011, 6018, 7000, 7001, 7011, 7016, 7030, 7031, 7032, 7035, 9005, 9006, 9010, 9011, 9016	• Indoor and outdoor installation • Chemical plants, swimming pools, wastewater treatment plants, electroplating shops, and boathouses above seawater • Industrial areas and coastal areas with moderate salt levels • Resistant to greases, mineral oils, aliphatic solvents, sulfuric acid (10 %), caustic soda (10 %)
Surface protection for extremely high environmental stress				
C5	**L05**	2-component epoxy zinc phosphate primer 2-component epoxy iron mica 2-component polyurethane top coat	Standard: RAL 7031 On request: RAL 1003, 1012, 1018, 1023, 2004, 3000, 5002, 5007, 5009, 5010, 5012, 5015, 6011, 6018, 7000, 7001, 7011, 7016, 7030, 7031, 7032, 7035, 9005, 9006, 9010, 9011, 9016	• Indoor and outdoor installation • Buildings and areas with almost constant condensation and with heavy pollution, e. g. malt factories and aseptic areas • Industrial areas with high humidity and aggressive atmosphere, coastal areas and offshore environments with high salt levels • Resistant to greases, mineral oils, aliphatic solvents, sulfuric acid (10 %), caustic soda (20 %)

Surface treatment (continued)

Corrosion category	Order code	Paint system	Hue	Description
Primed according to corrosion category C2 G				**Repaintability with *)**
C2 G	**L01**	2-component polyurethane primer		• 2-component polyurethane paint, 2-component epoxide paint and acid hardening paint, 2-component acrylic paint
Primed according to corrosion category C4 G				**Repaintability with *)**
C4 G	**L09**	2-component epoxy zinc phosphate primer		• 2-component polyurethane paint, 2-component epoxide paint and acid hardening paint, 2-component acrylic paint
Unpainted				**Repaintability with *)**
C1 G	**L00**			• Plastic paint, synthetic resin paint, oil paint, 2-component polyurethane paint, 2-component epoxide paint
Special pre-treatment before painting				
	L19			• For special requirements for the surface treatment and priming of drives, especially as a primer and intermediate coating for surface protection under severe environmental stress

* Note:
Information about repaintability is not a guarantee of the quality of the paint product purchased from your supplier. Only the paint manufacturer is liable for the quality and compatibility.

Order codes for RAL colors:

5015 Sky blue (standard)	**L50**
7011 Steel gray	**L51**
7031 Blue gray	**L53**
7035 Light gray	**L54**
7030 Stone gray	**L55**

The colors listed above can be specified using order code Y80 and the RAL color code in plain text.

Example: Reseda green (RAL6011)

Order code: **Y80**

Plain text: **Y80*RAL @ 6011***

Increased protection against humidity and tropical climate

Increased protection against humidity and tropical climate can be supplied as an option for (geared) motors of frame sizes 71 to 200L. This version is designed for humidity in the range from 30 to 60 g water per m^3 air depending on the temperature (see page 8/26). This version comprises a surface treatment for corrosion category C2 (**L03**), increased humidity and acid protection for the winding (**N54**), motor-internal corrosion protection (**N41**) and temperature class (155) F.

Combination with increased acid and alkali protection is not possible.

If function expansions (brakes, backstop, encoder systems) are required on the motor, consultation with the manufacturer is necessary beforehand.

Increased protection against humidity and tropical climate is not possible together with worm geared motors S.

Order code:

Increased protection against humidity and tropical climate **N43**

Increased protection against acid and alkali

Increased protection against acid and alkali can be supplied as an option for (geared) motors of frame sizes 71 to 200L. This version is suitable for city and industrial atmospheres with moderate pollution with sulfur dioxide, coastal areas with low salt levels and aggressive atmospheres with up to 1 % concentrations of acids or alkalis. This version comprises a surface treatment for corrosion category C3 (**L04**), increased humidity and acid protection for the winding (**N54**), motor-internal corrosion protection (**N41**), temperature class (155) F and pressure ventilation in the gearbox (**G45**).

Combination with increased humidity and tropical climate protection is not possible.

If function expansions (brakes, backstop, encoder systems) are required on the motor, consultation with the manufacturer is necessary beforehand.

Increased protection against acid and alkali is not possible together with worm geared motors S.

Order code:

Increased protection against acid and alkali **N44**

Rating plate

The rating plates of the gearboxes or geared motors are made of coated aluminum foil. They are covered by a special adhesive foil which gives them permanent resistance to ultraviolet rays and a variety of other substances (oils, greases, salt water, cleaning agents, etc.).

The adhesives and materials have been specially selected to ensure reliable adhesion and good legibility for the service life of the product, even when it is operated at the boundaries of the permissible temperature range (-40 °C ... +155 °C).

In accordance with DIN EN 60034-1, the total weight (as of approximately 30 kg) is specified on the rating plate for all geared motors.

Rating plate on stainless steel support plate

For geared motors with motors up to and including size 200, the rating plate can also be attached to a stainless steel support plate.

Order code:

Rating plate on stainless steel support plate **K26**

2nd rating plate enclosed separately

An additional rating plate can be supplied as a separately enclosed item for all gearboxes and geared motors.

Order code:

2nd rating plate, enclosed separately **K41**

2nd rating plate mounted

On request, the 2nd rating plate can be supplied mounted to the motor for geared motors with motors up to and including size 200.

Order code:

2nd rating plate, mounted **K68**

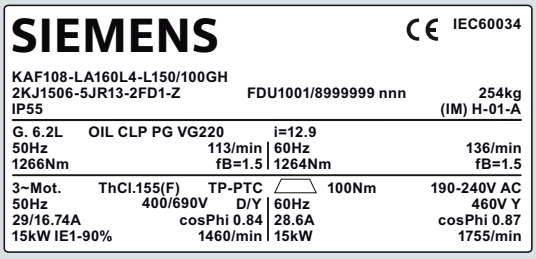
The rating plate is labeled in international format as standard.

For geared motors with motors up to and including size 200, the rating plate is mounted on an aluminum support plate which is attached to the motor.

In the case of gearboxes without motor and geared motors with motor of size 225 to 315, the rating plate is attached to the gearbox housing.

Motors of ≥ size 225 also have a rating plate with the motor data.

Example of a rating plate:



Documentation

The geared motors are supplied with the following documentation as standard:

- Commissioning guide (paper) English/German
- Manual Collection (on CD) with all operating instructions in Czech, Dutch, English, French, German, Italian, Russian, Spanish, and Swedish.

The following documents are optionally available:

- Circuit diagram of motor
- Certificate of compliance with the order EN 10204-2.1 and works test certificate EN 10204-2.2 for the geared motor on request
- Works test certificate EN 10204-2.2 for the material on request
- Works test certificate EN 10204-3.1 for the gearbox, tests carried out on:
  - Output shaft diameter
  - The concentricity of the output shaft
  - The concentricity of input shaft (for solo gearboxes only, input units A and P)
  - The input shaft diameter (for solo gearboxes only, input units A and P)
  - Noise (subjective evaluation) The concentricity of the input shaft (for solo gearboxes only)
- Works test certificate EN 10204-3.1 for motors, tests carried out on:
  - The 3 no-load currents of the 3 phases
  - The power loss during no-load operation
  - The no-load speed.

1

Notes

Helical worm geared motors

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Orientation

Overview

MOTOX helical worm gearboxes are part of the MOTOX modular system. With helical, bevel helical, helical worm, or variable speed gearboxes and three-phase AC motors with or without brakes, this system covers all possible drive combinations, right up to electronic variable speed drives.

MOTOX helical worm gearboxes are designed for continuous duty. The sealed gearbox housings, made from gray cast iron or aluminum, are strong and absorb vibrations. A housing cover is not required for installing toothed components, which means that the housings are extremely rigid. Radial shaft seals with dust-protection lips prevent oil from leaking out of the housing and dust and water from entering it.
The gear wheels of the helical gear stages are milled and their surfaces hardened. The tooth flanks are ground or honed so that they are convex and corrected in terms of the profile.

Overview (continued)

Helical worm gearboxes are designated as follows:

Gearbox type:

C Helical worm gearbox

Transmission stage
(-) Unspecified

Type:

Shaft
(-) Solid shaft
A Hollow shaft

Mounting
(-) Foot-mounted design
F Flange-mounted design (A-type)
Z Housing flange (C-type)
D Torque arm
G Flange (A-type) on opposite side to output shaft

Connections
(-) Feather key
S Shrink disk
T Hollow shaft with splined shaft

Type of intermediate gearbox

(-) Helical gearbox

Transmission stage
Z 2-stage
D 3-stage

Input unit

K2 Coupling lantern with flexible coupling for connecting an IEC motor

K2TC Coupling lantern with flexible coupling for connecting a NEMA motor [1)]

K4 Short coupling lantern with clamp connection for connecting an IEC motor

K5 Short coupling lantern with clamp connection for connecting a NEMA motor [1)]

KQ Lantern for servomotor with feather key and zero-backlash flexible coupling for connecting a servomotor

KQS Lantern for servomotor without feather key and zero-backlash flexible coupling for connecting a servomotor

A Input unit with free input shaft

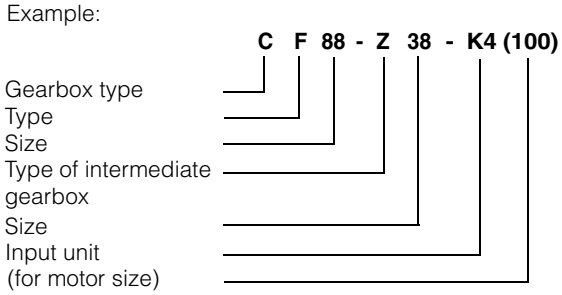
A5 Input unit with free input shaft (NEMA design) [1)]

P Input unit with free input shaft and piggy back for connecting an IEC motor

P5 Input unit with free input shaft and piggy back for connecting a NEMA motor [1)]

PS Input unit with free input shaft and piggy back with protection cover

Example:



The series currently comprises 4 gearbox sizes.

Helical worm gearboxes are available in a 2-stage version.

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[1)] These designs can be selected from our MOTOX Configurator electronic catalog.

Overview (continued)

Worm and wheel sets with CAVEX gearing

CAVEX concave-profile worm and wheel sets are used for size 38 and above. The concave-profile cylindrical worm with its enveloping worm wheel is very much different to conventional designs. The worm threads have a concave profile instead of an involute or convex one.

The concave-profile teeth are subject to only low specific tooth pressure. The retention of a separating oil film between the tooth flanks is facilitated in particular, as the hollow flanks are in contact with convex mating flanks. Therefore, profile contact is much more favorable than in conventional gear teeth systems.

The concave-profile teeth provide a particularly favorable position for the instantaneous axes, which extend mainly at right angles to the sliding direction. This assists the build-up of lubricating pressure, i.e. the generation of an oil film between the tooth flanks.

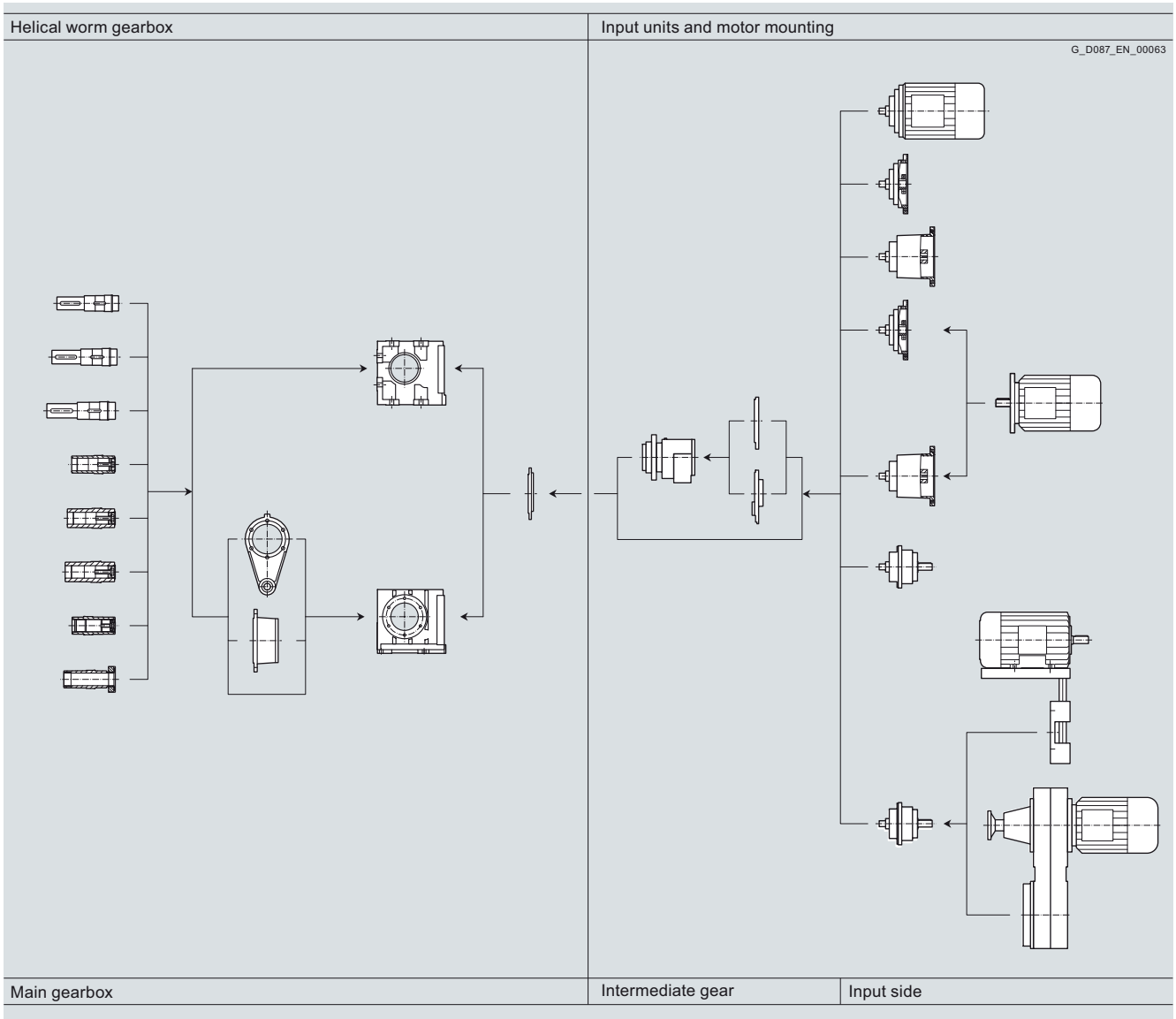
The tooth flanks on new gearboxes will not yet be fully smoothed, meaning that the friction angle will be greater and efficiency lower during initial operation. The smaller the lead angle or, in other words, the higher the transmission ratio, the more pronounced the effect. The run-in procedure should take approximately 24 to 30 hours of operation at full load.

Starting efficiency is never as great as the efficiency at operating speed. This fact should be taken into account when starting a machine at full load, depending on the starting characteristics of the motor.

Attention: In respect of torque driving back from the output shaft, please take into account the reduced gear tooth efficiency $\eta' = 2 - 1/\eta$, particularly with high transmission ratios of the worm gear stage (η = efficiency with driving worm).

Self-locking only occurs at high worm transmission ratios, which are not used for sizes 28 to 88.

Modular system



Use

MOTOX helical worm gearboxes are also ideal in difficult installation conditions. They reach high transmission ratios despite their extremely compact dimensions.

Helical worm gearboxes allow output flanges or torque arms to be attached in accordance with the relevant requirements.

Output shafts are available in different versions and diameters, as solid or hollow shafts.

Helical worm gearboxes are characterized by their very low noise emissions.

Oil quantities

The oil quantities corresponding to the applicable mounting positions are specified in the operating instructions and on the rating plate.

General technical data

Permissible radial force F_{Rperm1}

2-stage helical worm gearbox – standard bearing arrangement

Gearbox type	d mm	l mm	y mm	z mm	a kNmm	F_{Rperm} in N with x = l/2 for output speeds n_2 in rpm: Direction of rotation when viewing the output shaft	≤ 16	≤ 25	≤ 40	≤ 63	≤ 100	≤ 160
CF28	20	40	138	118	64.2	Left	3 210	3 210	3 210	3 210	–	–
						Right	3 210	3 210	3 210	3 210	–	–
CF38	25	50	146	121	152.5	Left	5 240	5 380	4 060	3 440	2 800	2 420
						Right	5 540	5 570	4 560	3 940	3 260	2 800
CF48	30	60	176	146	255.0	Left	8 500	8 500	6 700	5 500	4 730	4 090
						Right	8 500	8 500	7 350	6 010	5 190	4 480
CF68	40	80	213	173	440.0	Left	10 060	7 830	6 660	5 750	4 630	4 670
						Right	10 450	8 650	7 410	6 390	5 330	5 220
CF88	50	100	262	212	845.0	Left	13 980	12 390	10 560	9 040	7 460	6 820
						Right	14 640	13 270	11 300	9 680	8 400	7 620

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2-stage helical worm gearbox – reinforced bearing arrangement

Gearbox type	d mm	l mm	y mm	z mm	a kNmm	F_{Rperm} in N with x = l/2 for output speeds n_2 in rpm: Direction of rotation when viewing the output shaft	≤ 16	≤ 25	≤ 40	≤ 63	≤ 100	≤ 160
CF68	40	80	213	173	440	Left	11 000	11 000	11 000	11 000	11 000	11 000
						Right	11 000	11 000	11 000	11 000	11 000	11 000
CF88	50	100	262	212	845	Left	16 900	16 900	16 900	16 900	16 900	16 900
						Right	16 900	16 900	16 900	16 900	16 900	16 900

The values in the table apply to the worst-case scenario.
The output shaft bearing arrangement can be calculated using our MOTOX Configurator electronic catalog.
See Chapter 1 of the configuring guide for more information on calculating the permissible radial force.

For worm gearboxes, the values are the same whether they refer to a "clockwise" or "counterclockwise" direction of rotation, when viewing the output shaft.

The calculation does not include additional axial forces.
If the direction of rotation of the output shaft and the additional axial forces are known or the values in the table are insufficient, a calculation can be performed on request.

Selection and ordering data

The selection tables show the most common variants and combinations. Other combinations can be selected using our MOTOX Configurator or made available on request.

At an identical power rating and output speed, priority is given in the selection tables to 4-pole geared motors.

At the available transmission ratios, they cover the majority of output speeds.

Due to their prevalence, 4-pole geared motors are easily available, with short delivery times and at a low cost. They also feature a favorable size / power ratio.

Power rating P_{Motor} kW (50 Hz)	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
0.09	**C.48-LA71M8**							
	2.0	241	1.5	320.67	★	**2KJ1602 - ■CE13 - ■■K2**	**P02**	30
	2.2	217	1.7	284.7		**2KJ1602 - ■CE13 - ■■J2**	**P02**	30
	2.5	194	1.9	249.6	★	**2KJ1602 - ■CE13 - ■■H2**	**P02**	30
	C.38-LA71M8							
	2.0	230	0.97	320.67	★	**2KJ1601 - ■CE13 - ■■K2**	**P02**	22
	2.2	207	1.1	284.7		**2KJ1601 - ■CE13 - ■■J2**	**P02**	22
	2.5	185	1.2	249.6	★	**2KJ1601 - ■CE13 - ■■H2**	**P02**	22
	C.38-LA71B6							
	2.8	170	1.3	320.67	★	**2KJ1601 - ■CB13 - ■■K2**	**P01**	22
	3.1	153	1.5	284.7		**2KJ1601 - ■CB13 - ■■J2**	**P01**	22
	3.6	137	1.6	249.6	★	**2KJ1601 - ■CB13 - ■■H2**	**P01**	22
	4.0	125	1.8	223.36		**2KJ1601 - ■CB13 - ■■G2**	**P01**	22
0.12	**C.88-D28-LA71B4**							
	0.21	1 913	0.83	6 722		**2KJ1615 - ■CB13 - ■■A1**		77
	C.88-Z28-LA71B4							
	0.23	1 739	0.91	6 016	★	**2KJ1614 - ■CB13 - ■■B2**		76
	0.26	1 554	1.0	5 342		**2KJ1614 - ■CB13 - ■■A2**		76
	0.30	1 374	1.2	4 683	★	**2KJ1614 - ■CB13 - ■■X1**		76
	0.33	1 239	1.3	4 191		**2KJ1614 - ■CB13 - ■■W1**		76
	0.38	1 109	1.4	3 719	★	**2KJ1614 - ■CB13 - ■■V1**		76
	0.43	983	1.6	3 260		**2KJ1614 - ■CB13 - ■■U1**		76
	0.49	874	1.8	2 866	★	**2KJ1614 - ■CB13 - ■■T1**		76
	0.54	798	2.0	2 589		**2KJ1614 - ■CB13 - ■■S1**		76
	C.68-Z28-LA71B4							
	0.51	846	0.80	2 745		**2KJ1610 - ■CB13 - ■■U1**		49
	0.58	751	0.90	2 414	★	**2KJ1610 - ■CB13 - ■■T1**		49
	0.64	683	0.99	2 180		**2KJ1610 - ■CB13 - ■■S1**		49
	0.74	602	1.1	1 900	★	**2KJ1610 - ■CB13 - ■■R1**		49
	0.82	545	1.2	1 706		**2KJ1610 - ■CB13 - ■■Q1**		49
	0.91	497	1.4	1 541	★	**2KJ1610 - ■CB13 - ■■P1**		49
	1.0	455	1.5	1 397		**2KJ1610 - ■CB13 - ■■N1**		49
	1.1	419	1.6	1 271	★	**2KJ1610 - ■CB13 - ■■M1**		49
	1.2	376	1.8	1 124		**2KJ1610 - ■CB13 - ■■L1**		49
	1.3	350	1.9	1 038	★	**2KJ1610 - ■CB13 - ■■K1**		49
	C.68-LA71MB8							
	1.8	380	1.8	364	★	**2KJ1603 - ■CF13 - ■■U2**	**P02**	47
	2.0	344	2.0	323.7		**2KJ1603 - ■CF13 - ■■T2**	**P02**	47

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
0.12	**C.48-Z28-LA71B4**							
	0.98	432	0.84	1 422		**2KJ1607 - ■CB13 - ■■Q1**		34
	1.1	394	0.93	1 284	★	**2KJ1607 - ■CB13 - ■■P1**		34
	1.2	360	1.0	1 164		**2KJ1607 - ■CB13 - ■■N1**		34
	1.3	331	1.1	1 059	★	**2KJ1607 - ■CB13 - ■■M1**		34
	1.5	297	1.2	937		**2KJ1607 - ■CB13 - ■■L1**		34
	1.6	277	1.3	865	★	**2KJ1607 - ■CB13 - ■■K1**		34
	1.9	243	1.5	745		**2KJ1607 - ■CB13 - ■■J1**		34
	C.48-LA71MB8							
	2.0	315	1.2	320.67	★	**2KJ1602 - ■CF13 - ■■K2**	**P02**	30
	2.3	284	1.3	284.7		**2KJ1602 - ■CF13 - ■■J2**	**P02**	30
	2.6	254	1.4	249.6	★	**2KJ1602 - ■CF13 - ■■H2**	**P02**	30
	C.48-LA71C6							
	2.7	246	1.5	320.67	★	**2KJ1602 - ■CC13 - ■■K2**	**P01**	30
	3.0	223	1.6	284.7		**2KJ1602 - ■CC13 - ■■J2**	**P01**	30
	3.4	200	1.8	249.6	★	**2KJ1602 - ■CC13 - ■■H2**	**P01**	30
	3.9	182	2.0	223.36		**2KJ1602 - ■CC13 - ■■G2**	**P01**	30
	C.38-Z28-LA71B4							
	1.6	264	0.84	865	★	**2KJ1605 - ■CB13 - ■■K1**		25
	1.9	231	0.96	745		**2KJ1605 - ■CB13 - ■■J1**		25
	C.38-LA71MB8							
	2.3	271	0.83	284.7		**2KJ1601 - ■CF13 - ■■J2**	**P02**	22
	2.6	242	0.93	249.6	★	**2KJ1601 - ■CF13 - ■■H2**	**P02**	22
	C.38-LA71C6							
	2.7	234	0.96	320.67	★	**2KJ1601 - ■CC13 - ■■K2**	**P01**	22
	3.0	212	1.1	284.7		**2KJ1601 - ■CC13 - ■■J2**	**P01**	22
	3.4	189	1.2	249.6	★	**2KJ1601 - ■CC13 - ■■H2**	**P01**	22
	3.9	173	1.3	223.36		**2KJ1601 - ■CC13 - ■■G2**	**P01**	22
	C.38-LA71B4							
	4.4	155	1.4	320.67	★	**2KJ1601 - ■CB13 - ■■K2**		22
	4.9	141	1.6	284.7		**2KJ1601 - ■CB13 - ■■J2**		22
	5.6	126	1.8	249.6	★	**2KJ1601 - ■CB13 - ■■H2**		22
	6.3	114	2.0	223.36		**2KJ1601 - ■CB13 - ■■G2**		22
	C.28-LA71B4							
	5.6	134	0.88	248		**2KJ1600 - ■CB13 - ■■M1**		10
	6.9	109	0.91	202.24		**2KJ1600 - ■CB13 - ■■L1**		10
	9.0	94	1.2	155		**2KJ1600 - ■CB13 - ■■K1**		10
	11.1	77	1.2	126.4		**2KJ1600 - ■CB13 - ■■J1**		10
	15.1	63	1.9	93		**2KJ1600 - ■CB13 - ■■H1**		10
	18.5	51	1.9	75.84		**2KJ1600 - ■CB13 - ■■G1**		10
	23	44	2.7	62		**2KJ1600 - ■CB13 - ■■F1**		10
	28	36	2.6	50.56		**2KJ1600 - ■CB13 - ■■E1**		10
	30	34	3.2	46.5		**2KJ1600 - ■CB13 - ■■D1**		10

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
0.12	**C.28-LA71B4**							
	37	28	3.2	37.92		**2KJ1600 - ■CB13 - ■■C1**		10
	45	23	4.3	31		**2KJ1600 - ■CB13 - ■■B1**		10
	55	19	4.3	25.28		**2KJ1600 - ■CB13 - ■■A1**		10
0.18	**C.88-Z28-LA71C4**							
	0.37	1 885	0.84	3 719	★	**2KJ1614 - ■CC13 - ■■V1**		76
	0.42	1 671	0.95	3 260		**2KJ1614 - ■CC13 - ■■U1**		76
	0.48	1 486	1.1	2 866	★	**2KJ1614 - ■CC13 - ■■T1**		76
	0.53	1 356	1.2	2 589		**2KJ1614 - ■CC13 - ■■S1**		76
	0.61	1 199	1.3	2 256	★	**2KJ1614 - ■CC13 - ■■R1**		76
	0.68	1 091	1.5	2 026		**2KJ1614 - ■CC13 - ■■Q1**		76
	0.75	998	1.6	1 829	★	**2KJ1614 - ■CC13 - ■■P1**		76
	0.83	917	1.7	1 659		**2KJ1614 - ■CC13 - ■■N1**		76
	0.91	846	1.9	1 510	★	**2KJ1614 - ■CC13 - ■■M1**		76
	C.68-Z28-LA71C4							
	0.89	845	0.80	1 541	★	**2KJ1610 - ■CC13 - ■■P1**		49
	0.98	774	0.87	1 397		**2KJ1610 - ■CC13 - ■■N1**		49
	1.1	711	0.95	1 271	★	**2KJ1610 - ■CC13 - ■■M1**		49
	1.2	638	1.1	1 124		**2KJ1610 - ■CC13 - ■■L1**		49
	1.3	595	1.1	1 038	★	**2KJ1610 - ■CC13 - ■■K1**		49
	1.5	522	1.3	893		**2KJ1610 - ■CC13 - ■■J1**		49
	1.7	481	1.4	812	★	**2KJ1610 - ■CC13 - ■■H1**		49
	C.68-LA80S8							
	2.1	497	1.4	323.7		**2KJ1603 - ■DB13 - ■■T2**	**P02**	51
	C.68-LA71S6							
	2.3	452	1.5	364	★	**2KJ1603 - ■CD13 - ■■U2**	**P01**	47
	2.6	409	1.7	323.7		**2KJ1603 - ■CD13 - ■■T2**	**P01**	47
	3.0	363	1.9	280.8	★	**2KJ1603 - ■CD13 - ■■S2**	**P01**	47
	3.2	343	2.0	262.36		**2KJ1603 - ■CD13 - ■■R2**	**P01**	47
	C.48-Z28-LA71C4							
	1.8	412	0.89	745		**2KJ1607 - ■CC13 - ■■J1**		34
	C.48-LA80S8							
	2.1	454	0.81	320.67	★	**2KJ1602 - ■DB13 - ■■K2**	**P02**	34
	2.4	410	0.89	284.7		**2KJ1602 - ■DB13 - ■■J2**	**P02**	34
	C.48-LA71S6							
	2.7	373	0.98	320.67	★	**2KJ1602 - ■CD13 - ■■K2**	**P01**	30
	3.0	337	1.1	284.7		**2KJ1602 - ■CD13 - ■■J2**	**P01**	30
	3.4	302	1.2	249.6	★	**2KJ1602 - ■CD13 - ■■H2**	**P01**	30
	3.8	275	1.3	223.36		**2KJ1602 - ■CD13 - ■■G2**	**P01**	30
	C.48-LA71C4							
	4.3	250	1.5	320.67	★	**2KJ1602 - ■CC13 - ■■K2**		30
	4.8	226	1.6	284.7		**2KJ1602 - ■CC13 - ■■J2**		30
	5.5	202	1.8	249.6	★	**2KJ1602 - ■CC13 - ■■H2**		30

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
0.18	**C.48-LA71C4**							
	6.1	184	2.0	223.36		**2KJ1602 - ■CC13 - ■■G2**		30
	C.38-LA71S6							
	3.8	261	0.86	223.36		**2KJ1601 - ■CD13 - ■■G2**	**P01**	22
	C.38-LA71C4							
	4.3	237	0.95	320.67	★	**2KJ1601 - ■CC13 - ■■K2**		22
	4.8	215	1.0	284.7		**2KJ1601 - ■CC13 - ■■J2**		22
	5.5	192	1.2	249.6	★	**2KJ1601 - ■CC13 - ■■H2**		22
	6.1	175	1.3	223.36		**2KJ1601 - ■CC13 - ■■G2**		22
	6.9	158	1.4	198.25	★	**2KJ1601 - ■CC13 - ■■F2**		22
	7.9	140	1.6	173.73		**2KJ1601 - ■CC13 - ■■E2**		22
	9.0	125	1.8	152.75	★	**2KJ1601 - ■CC13 - ■■D2**		22
	9.9	114	2.0	138		**2KJ1601 - ■CC13 - ■■C2**		22
	C.28-LA71C4							
	8.8	144	0.81	155		**2KJ1600 - ■CC13 - ■■K1**		10
	10.8	118	0.8	126.4		**2KJ1600 - ■CC13 - ■■J1**		10
	14.7	96	1.2	93		**2KJ1600 - ■CC13 - ■■H1**		10
	18.1	78	1.2	75.84		**2KJ1600 - ■CC13 - ■■G1**		10
	22	68	1.7	62		**2KJ1600 - ■CC13 - ■■F1**		10
	27	55	1.7	50.56		**2KJ1600 - ■CC13 - ■■E1**		10
	30	52	2.1	46.5		**2KJ1600 - ■CC13 - ■■D1**		10
	36	43	2.1	37.92		**2KJ1600 - ■CC13 - ■■C1**		10
	44	36	2.8	31		**2KJ1600 - ■CC13 - ■■B1**		10
	54	29	2.8	25.28		**2KJ1600 - ■CC13 - ■■A1**		10
0.25	**C.88-Z28-LA71S4**							
	0.60	1 782	0.89	2 256	★	**2KJ1614 - ■CD13 - ■■R1**		76
	0.67	1 621	0.98	2 026		**2KJ1614 - ■CD13 - ■■Q1**		76
	0.74	1 482	1.1	1 829	★	**2KJ1614 - ■CD13 - ■■P1**		76
	0.81	1 362	1.2	1 659		**2KJ1614 - ■CD13 - ■■N1**		76
	0.89	1 257	1.3	1 510	★	**2KJ1614 - ■CD13 - ■■M1**		76
	1.0	1 132	1.4	1 335		**2KJ1614 - ■CD13 - ■■L1**		76
	1.1	1 058	1.5	1 232	★	**2KJ1614 - ■CD13 - ■■K1**		76
	1.3	934	1.7	1 061		**2KJ1614 - ■CD13 - ■■J1**		76
	1.4	863	1.8	964	★	**2KJ1614 - ■CD13 - ■■H1**		76
	1.5	894	1.8	877	★	**2KJ1614 - ■CD13 - ■■G1**		76
	C.88-LA80M8							
	1.6	928	1.6	440.7		**2KJ1604 - ■DC13 - ■■T2**	**P02**	78
	1.8	840	1.9	390	★	**2KJ1604 - ■DC13 - ■■S2**	**P02**	78
	1.9	777	2.0	354.55		**2KJ1604 - ■DC13 - ■■R2**	**P02**	78
	C.88-LA71M6							
	2.0	771	2.0	440.7		**2KJ1604 - ■CE13 - ■■T2**	**P01**	74
	C.68-Z28-LA71S4							
	1.5	775	0.87	893		**2KJ1610 - ■CD13 - ■■J1**		49
	1.7	714	0.95	812	★	**2KJ1610 - ■CD13 - ■■H1**		49

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
0.25	**C.68-LA80M8**							
	2.1	681	0.99	323.7		**2KJ1603 - ■DC13 - ■■T2**	**P02**	51
	C.68-LA71M6							
	2.4	621	1.1	364	★	**2KJ1603 - ■CE13 - ■■U2**	**P01**	47
	2.7	563	1.2	323.7		**2KJ1603 - ■CE13 - ■■T2**	**P01**	47
	3.1	499	1.4	280.8	★	**2KJ1603 - ■CE13 - ■■S2**	**P01**	47
	3.3	472	1.4	262.36		**2KJ1603 - ■CE13 - ■■R2**	**P01**	47
	C.68-LA71S4							
	3.7	425	1.6	364	★	**2KJ1603 - ■CD13 - ■■U2**		47
	4.2	385	1.8	323.7		**2KJ1603 - ■CD13 - ■■T2**		47
	4.8	340	2.0	280.8	★	**2KJ1603 - ■CD13 - ■■S2**		47
	5.1	321	2.1	262.36		**2KJ1603 - ■CD13 - ■■R2**		47
	C.48-LA71M6							
	3.4	416	0.88	249.6	★	**2KJ1602 - ■CE13 - ■■H2**	**P01**	30
	3.9	379	0.97	223.36		**2KJ1602 - ■CE13 - ■■G2**	**P01**	30
	C.48-LA71S4							
	4.2	352	1.0	320.67	★	**2KJ1602 - ■CD13 - ■■K2**		30
	4.7	318	1.2	284.7		**2KJ1602 - ■CD13 - ■■J2**		30
	5.4	285	1.3	249.6	★	**2KJ1602 - ■CD13 - ■■H2**		30
	6.0	259	1.4	223.36		**2KJ1602 - ■CD13 - ■■G2**		30
	6.8	234	1.6	198.25	★	**2KJ1602 - ■CD13 - ■■F2**		30
	7.8	208	1.8	173.73		**2KJ1602 - ■CD13 - ■■E2**		30
	8.8	185	2.0	152.75	★	**2KJ1602 - ■CD13 - ■■D2**		30
	C.38-LA71S4							
	5.4	270	0.83	249.6	★	**2KJ1601 - ■CD13 - ■■H2**		22
	6.0	246	0.92	223.36		**2KJ1601 - ■CD13 - ■■G2**		22
	6.8	222	1.0	198.25	★	**2KJ1601 - ■CD13 - ■■F2**		22
	7.8	198	1.1	173.73		**2KJ1601 - ■CD13 - ■■E2**		22
	8.8	176	1.3	152.75	★	**2KJ1601 - ■CD13 - ■■D2**		22
	9.8	161	1.4	138		**2KJ1601 - ■CD13 - ■■C2**		22
	11.2	141	1.6	120.25	★	**2KJ1601 - ■CD13 - ■■B2**		22
	12.5	128	1.8	108		**2KJ1601 - ■CD13 - ■■A2**		22
	13.8	116	2.0	97.5	★	**2KJ1601 - ■CD13 - ■■X1**		22
	15.3	105	2.1	88.4		**2KJ1601 - ■CD13 - ■■W1**		22
	16.8	96	2.3	80.44	★	**2KJ1601 - ■CD13 - ■■V1**		22
	22	91	2.2	60.3	★	**2KJ1601 - ■CD13 - ■■S1**		22
	C.28-LA71S4							
	14.5	136	0.87	93		**2KJ1600 - ■CD13 - ■■H1**		10
	17.8	111	0.86	75.84		**2KJ1600 - ■CD13 - ■■G1**		10
	22	95	1.2	62		**2KJ1600 - ■CD13 - ■■F1**		10
	27	78	1.2	50.56		**2KJ1600 - ■CD13 - ■■E1**		10
	29	74	1.5	46.5		**2KJ1600 - ■CD13 - ■■D1**		10
	36	60	1.5	37.92		**2KJ1600 - ■CD13 - ■■C1**		10
	44	50	2.0	31		**2KJ1600 - ■CD13 - ■■B1**		10

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
0.25	**C.28-LA71S4**							
	53	41	2.0	25.28		**2KJ1600 - ■CD13 - ■■A1**		10
0.37	**C.88-Z28-LA71M4**							
	0.91	1 918	0.83	1 510	★	**2KJ1614 - ■CE13 - ■■M1**		76
	1.0	1 728	0.92	1 335		**2KJ1614 - ■CE13 - ■■L1**		76
	1.1	1 615	0.98	1 232	★	**2KJ1614 - ■CE13 - ■■K1**		76
	1.3	1 426	1.1	1 061		**2KJ1614 - ■CE13 - ■■J1**		76
	1.4	1 318	1.2	964	★	**2KJ1614 - ■CE13 - ■■H1**		76
	C.88-LA90SA8							
	1.7	1 258	1.3	390	★	**2KJ1604 - ■EB13 - ■■S2**	**P02**	81
	1.9	1 164	1.4	354.55		**2KJ1604 - ■EB13 - ■■R2**	**P02**	81
	C.88-LA80S6							
	2.1	1 079	1.4	440.7		**2KJ1604 - ■DB13 - ■■T2**	**P01**	78
	2.4	976	1.6	390	★	**2KJ1604 - ■DB13 - ■■S2**	**P01**	78
	2.6	902	1.8	354.55		**2KJ1604 - ■DB13 - ■■R2**	**P01**	78
	2.9	824	1.9	318.5	★	**2KJ1604 - ■DB13 - ■■Q2**	**P01**	78
	C.68-LA80S6							
	2.8	787	0.86	323.7		**2KJ1603 - ■DB13 - ■■T2**	**P01**	51
	3.3	698	0.97	280.8	★	**2KJ1603 - ■DB13 - ■■S2**	**P01**	51
	3.5	659	1.0	262.36		**2KJ1603 - ■DB13 - ■■R2**	**P01**	51
	C.68-LA71M4							
	3.8	621	1.1	364	★	**2KJ1603 - ■CE13 - ■■U2**		47
	4.2	562	1.2	323.7		**2KJ1603 - ■CE13 - ■■T2**		47
	4.9	497	1.4	280.8	★	**2KJ1603 - ■CE13 - ■■S2**		47
	5.2	468	1.5	262.36		**2KJ1603 - ■CE13 - ■■R2**		47
	5.9	418	1.6	230.75	★	**2KJ1603 - ■CE13 - ■■Q2**		47
	6.8	370	1.8	202.09		**2KJ1603 - ■CE13 - ■■P2**		47
	7.7	331	2.0	178.75	★	**2KJ1603 - ■CE13 - ■■N2**		47
	8.5	301	2.1	162		**2KJ1603 - ■CE13 - ■■M2**		47
	C.48-LA71M4							
	5.5	416	0.89	249.6	★	**2KJ1602 - ■CE13 - ■■H2**		30
	6.1	378	0.98	223.36		**2KJ1602 - ■CE13 - ■■G2**		30
	6.9	341	1.1	198.25	★	**2KJ1602 - ■CE13 - ■■F2**		30
	7.9	304	1.2	173.73		**2KJ1602 - ■CE13 - ■■E2**		30
	9.0	270	1.4	152.75	★	**2KJ1602 - ■CE13 - ■■D2**		30
	9.9	246	1.5	138		**2KJ1602 - ■CE13 - ■■C2**		30
	11.4	217	1.7	120.25	★	**2KJ1602 - ■CE13 - ■■B2**		30
	12.7	195	1.9	108		**2KJ1602 - ■CE13 - ■■A2**		30
	14.1	177	2.1	97.5	★	**2KJ1602 - ■CE13 - ■■X1**		30
	15.5	161	2.2	88.4		**2KJ1602 - ■CE13 - ■■W1**		30
	17.0	147	2.3	80.44	★	**2KJ1602 - ■CE13 - ■■V1**		30
	C.38-LA71M4							
	9.0	257	0.88	152.75	★	**2KJ1601 - ■CE13 - ■■D2**		22
	9.9	234	0.97	138		**2KJ1601 - ■CE13 - ■■C2**		22

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
0.37	**C.38-LA71M4**							
	11.4	206	1.1	120.25	★	**2KJ1601 - ■CE13 - ■■B2**		22
	12.7	186	1.2	108		**2KJ1601 - ■CE13 - ■■A2**		22
	14.1	169	1.4	97.5	★	**2KJ1601 - ■CE13 - ■■X1**		22
	15.5	154	1.5	88.4		**2KJ1601 - ■CE13 - ■■W1**		22
	17.0	140	1.6	80.44	★	**2KJ1601 - ■CE13 - ■■V1**		22
	19.3	124	1.7	71.12		**2KJ1601 - ■CE13 - ■■U1**		22
	21	115	1.8	65.68	★	**2KJ1601 - ■CE13 - ■■T1**		22
	23	132	1.5	60.3	★	**2KJ1601 - ■CE13 - ■■S1**		22
	26	118	2.0	53.53		**2KJ1601 - ■CE13 - ■■R1**		22
	29	104	2.2	46.93	★	**2KJ1601 - ■CE13 - ■■Q1**		22
	33	94	2.3	42		**2KJ1601 - ■CE13 - ■■P1**		22
	42	74	2.6	32.67		**2KJ1601 - ■CE13 - ■■M1**		22
	C.28-LA71M4							
	22	139	0.84	62		**2KJ1600 - ■CE13 - ■■F1**		10
	27	113	0.83	50.56		**2KJ1600 - ■CE13 - ■■E1**		10
	30	108	1.0	46.5		**2KJ1600 - ■CE13 - ■■D1**		10
	36	88	1.0	37.92		**2KJ1600 - ■CE13 - ■■C1**		10
	44	73	1.4	31		**2KJ1600 - ■CE13 - ■■B1**		10
	54	60	1.4	25.28		**2KJ1600 - ■CE13 - ■■A1**		10
0.55	**C.88-LA90LA8**							
	1.7	1 870	0.85	390	★	**2KJ1604 - ■EE13 - ■■S2**	**P02**	84
	1.9	1 730	0.92	354.55		**2KJ1604 - ■EE13 - ■■R2**	**P02**	84
	C.88-LA80M6							
	2.1	1 618	0.94	440.7		**2KJ1604 - ■DC13 - ■■T2**	**P01**	78
	2.3	1 464	1.1	390	★	**2KJ1604 - ■DC13 - ■■S2**	**P01**	78
	2.6	1 353	1.2	354.55		**2KJ1604 - ■DC13 - ■■R2**	**P01**	78
	2.9	1 236	1.3	318.5	★	**2KJ1604 - ■DC13 - ■■Q2**	**P01**	78
	C.88-LA71ZMP4							
	3.1	1 151	1.4	440.7		**2KJ1604 - ■CG13 - ■■T2**		74
	3.5	1 036	1.5	390	★	**2KJ1604 - ■CG13 - ■■S2**		74
	3.9	953	1.7	354.55		**2KJ1604 - ■CG13 - ■■R2**		74
	4.3	865	1.8	318.5	★	**2KJ1604 - ■CG13 - ■■Q2**		74
	5.0	751	2.0	273		**2KJ1604 - ■CG13 - ■■P2**		74
	5.5	684	2.1	247	★	**2KJ1604 - ■CG13 - ■■N2**		74
	C.68-LA71ZMP4							
	4.2	835	0.81	323.7		**2KJ1603 - ■CG13 - ■■T2**		47
	4.9	739	0.92	280.8	★	**2KJ1603 - ■CG13 - ■■S2**		47
	5.2	696	0.98	262.36		**2KJ1603 - ■CG13 - ■■R2**		47
	5.9	621	1.1	230.75	★	**2KJ1603 - ■CG13 - ■■Q2**		47
	6.8	551	1.2	202.09		**2KJ1603 - ■CG13 - ■■P2**		47
	7.7	492	1.3	178.75	★	**2KJ1603 - ■CG13 - ■■N2**		47
	8.5	448	1.4	162		**2KJ1603 - ■CG13 - ■■M2**		47
	9.6	398	1.5	143	★	**2KJ1603 - ■CG13 - ■■L2**		47

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
0.55	**C.68-LA71ZMP4**							
	10.6	360	1.7	129		**2KJ1603 - ■CG13 - ■■K2**		47
	11.7	327	1.8	117	★	**2KJ1603 - ■CG13 - ■■J2**		47
	12.9	299	1.9	106.6		**2KJ1603 - ■CG13 - ■■H2**		47
	14.1	273	2.0	97.5	★	**2KJ1603 - ■CG13 - ■■G2**		47
	15.2	294	2.1	90	★	**2KJ1603 - ■CG13 - ■■F2**		47
	16.3	276	2.3	84.09		**2KJ1603 - ■CG13 - ■■E2**		47
	C.48-LA71ZMP4							
	7.9	451	0.82	173.73		**2KJ1602 - ■CG13 - ■■E2**		30
	9.0	402	0.93	152.75	★	**2KJ1602 - ■CG13 - ■■D2**		30
	9.9	366	1.0	138		**2KJ1602 - ■CG13 - ■■C2**		30
	11.4	322	1.2	120.25	★	**2KJ1602 - ■CG13 - ■■B2**		30
	12.7	291	1.3	108		**2KJ1602 - ■CG13 - ■■A2**		30
	14.1	263	1.4	97.5	★	**2KJ1602 - ■CG13 - ■■X1**		30
	15.5	239	1.5	88.4		**2KJ1602 - ■CG13 - ■■W1**		30
	17.0	218	1.6	80.44	★	**2KJ1602 - ■CG13 - ■■V1**		30
	19.3	193	1.7	71.12		**2KJ1602 - ■CG13 - ■■U1**		30
	21	178	1.8	65.68	★	**2KJ1602 - ■CG13 - ■■T1**		30
	24	154	2.0	56.55		**2KJ1602 - ■CG13 - ■■S1**		30
	27	140	2.1	51.41	★	**2KJ1602 - ■CG13 - ■■R1**		30
	29	157	1.8	46.93	★	**2KJ1602 - ■CG13 - ■■Q1**		30
	33	141	2.2	42		**2KJ1602 - ■CG13 - ■■P1**		30
	37	126	2.1	37.28	★	**2KJ1602 - ■CG13 - ■■N1**		30
	42	110	2.4	32.67		**2KJ1602 - ■CG13 - ■■M1**		30
	C.38-LA71ZMP4							
	12.7	277	0.83	108		**2KJ1601 - ■CG13 - ■■A2**		22
	14.1	251	0.91	97.5	★	**2KJ1601 - ■CG13 - ■■X1**		22
	15.5	228	0.98	88.4		**2KJ1601 - ■CG13 - ■■W1**		22
	17.0	208	1.0	80.44	★	**2KJ1601 - ■CG13 - ■■V1**		22
	19.3	185	1.1	71.12		**2KJ1601 - ■CG13 - ■■U1**		22
	21	171	1.2	65.68	★	**2KJ1601 - ■CG13 - ■■T1**		22
	23	197	1.0	60.3	★	**2KJ1601 - ■CG13 - ■■S1**		22
	26	176	1.4	53.53		**2KJ1601 - ■CG13 - ■■R1**		22
	29	155	1.5	46.93	★	**2KJ1601 - ■CG13 - ■■Q1**		22
	33	140	1.6	42		**2KJ1601 - ■CG13 - ■■P1**		22
	37	124	1.8	37.28	★	**2KJ1601 - ■CG13 - ■■N1**		22
	42	109	1.7	32.67		**2KJ1601 - ■CG13 - ■■M1**		22
	48	96	2.1	28.72	★	**2KJ1601 - ■CG13 - ■■L1**		22
	53	87	2.3	25.95		**2KJ1601 - ■CG13 - ■■K1**		22
	61	76	2.7	22.61	★	**2KJ1601 - ■CG13 - ■■J1**		22
	68	68	2.8	20.31		**2KJ1601 - ■CG13 - ■■H1**		22
	C.28-LA71ZMP4							
	44	109	0.91	31		**2KJ1600 - ■CG13 - ■■B1**		10
	54	89	0.91	25.28		**2KJ1600 - ■CG13 - ■■A1**		10

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor}	Output speed	Output torque	Service factor	Gearbox ratio		Order No.	Order code	Weight *)
kW	n_2 (50 Hz) rpm	T_2 Nm	f_B	i_{tot}			(No. of poles)	kg
0.75	**C.88-LA90SB6E**							
	2.4	1 969	0.81	390	★	**2KJ1604 - ■ED13 - ■■S2**	**P01**	81
	2.6	1 819	0.87	354.55		**2KJ1604 - ■ED13 - ■■R2**	**P01**	81
	2.9	1 663	0.96	318.5	★	**2KJ1604 - ■ED13 - ■■Q2**	**P01**	81
	C.88-LA80ZMB4E							
	3.2	1 541	1.0	440.7		**2KJ1604 - ■DE13 - ■■T2**		78
	3.6	1 386	1.1	390	★	**2KJ1604 - ■DE13 - ■■S2**		78
	3.9	1 274	1.2	354.55		**2KJ1604 - ■DE13 - ■■R2**		78
	4.4	1 157	1.4	318.5	★	**2KJ1604 - ■DE13 - ■■Q2**		78
	5.1	1 004	1.5	273		**2KJ1604 - ■DE13 - ■■P2**		78
	5.7	914	1.6	247	★	**2KJ1604 - ■DE13 - ■■N2**		78
	6.1	847	1.6	228		**2KJ1604 - ■DE13 - ■■M2**		78
	7.1	740	1.8	198.25	★	**2KJ1604 - ■DE13 - ■■L2**		78
	7.8	673	1.9	180		**2KJ1604 - ■DE13 - ■■K2**		78
	8.5	615	2.0	164.36	★	**2KJ1604 - ■DE13 - ■■J2**		78
	9.3	565	2.1	150.8		**2KJ1604 - ■DE13 - ■■H2**		78
	C.68-LA80ZMB4E							
	6.1	831	0.82	230.75	★	**2KJ1603 - ■DE13 - ■■Q2**		51
	6.9	736	0.93	202.09		**2KJ1603 - ■DE13 - ■■P2**		51
	7.8	657	1.0	178.75	★	**2KJ1603 - ■DE13 - ■■N2**		51
	8.6	599	1.1	162		**2KJ1603 - ■DE13 - ■■M2**		51
	9.8	531	1.2	143	★	**2KJ1603 - ■DE13 - ■■L2**		51
	10.9	481	1.2	129		**2KJ1603 - ■DE13 - ■■K2**		51
	12.0	437	1.3	117	★	**2KJ1603 - ■DE13 - ■■J2**		51
	13.1	399	1.4	106.6		**2KJ1603 - ■DE13 - ■■H2**		51
	14.4	365	1.5	97.5	★	**2KJ1603 - ■DE13 - ■■G2**		51
	15.6	393	1.6	90	★	**2KJ1603 - ■DE13 - ■■F2**		51
	16.6	369	1.7	84.09		**2KJ1603 - ■DE13 - ■■E2**		51
	18.9	326	1.8	73.96	★	**2KJ1603 - ■DE13 - ■■D2**		51
	22	287	2.2	64.77		**2KJ1603 - ■DE13 - ■■C2**		51
	37	172	2.5	38		**2KJ1603 - ■DE13 - ■■V1**		51
	46	138	2.8	30.46		**2KJ1603 - ■DE13 - ■■Q1**		51
	C.48-LA80ZMB4E							
	11.6	430	0.87	120.25	★	**2KJ1602 - ■DE13 - ■■B2**		34
	13.0	388	0.96	108		**2KJ1602 - ■DE13 - ■■A2**		34
	14.4	351	1.0	97.5	★	**2KJ1602 - ■DE13 - ■■X1**		34
	15.8	319	1.1	88.4		**2KJ1602 - ■DE13 - ■■W1**		34
	17.4	291	1.2	80.44	★	**2KJ1602 - ■DE13 - ■■V1**		34
	19.7	258	1.3	71.12		**2KJ1602 - ■DE13 - ■■U1**		34
	21	238	1.3	65.68	★	**2KJ1602 - ■DE13 - ■■T1**		34
	25	205	1.5	56.55		**2KJ1602 - ■DE13 - ■■S1**		34
	27	186	1.6	51.41	★	**2KJ1602 - ■DE13 - ■■R1**		34
	30	210	1.4	46.93	★	**2KJ1602 - ■DE13 - ■■Q1**		34
	33	188	1.7	42		**2KJ1602 - ■DE13 - ■■P1**		34

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
0.75	**C.48-LA80ZMB4E**							
	38	168	1.6	37.28	★	**2KJ1602 - ■DE13 - ■■N1**		34
	43	147	1.8	32.67		**2KJ1602 - ■DE13 - ■■M1**		34
	49	130	2.2	28.72	★	**2KJ1602 - ■DE13 - ■■L1**		34
	54	117	2.3	25.95		**2KJ1602 - ■DE13 - ■■K1**		34
	62	102	2.6	22.61	★	**2KJ1602 - ■DE13 - ■■J1**		34
	69	92	3.0	20.31		**2KJ1602 - ■DE13 - ■■H1**		34
	C.38-LA80ZMB4E							
	19.7	246	0.85	71.12		**2KJ1601 - ■DE13 - ■■U1**		26
	21	228	0.89	65.68	★	**2KJ1601 - ■DE13 - ■■T1**		26
	26	235	1.0	53.53		**2KJ1601 - ■DE13 - ■■R1**		26
	30	207	1.1	46.93	★	**2KJ1601 - ■DE13 - ■■Q1**		26
	33	186	1.2	42		**2KJ1601 - ■DE13 - ■■P1**		26
	38	166	1.4	37.28	★	**2KJ1601 - ■DE13 - ■■N1**		26
	43	146	1.3	32.67		**2KJ1601 - ■DE13 - ■■M1**		26
	49	129	1.6	28.72	★	**2KJ1601 - ■DE13 - ■■L1**		26
	54	117	1.8	25.95		**2KJ1601 - ■DE13 - ■■K1**		26
	62	102	2.0	22.61	★	**2KJ1601 - ■DE13 - ■■J1**		26
	69	91	2.1	20.31		**2KJ1601 - ■DE13 - ■■H1**		26
	76	83	2.5	18.33	★	**2KJ1601 - ■DE13 - ■■G1**		26
	84	75	2.6	16.62		**2KJ1601 - ■DE13 - ■■F1**		26
	92	68	2.7	15.13	★	**2KJ1601 - ■DE13 - ■■E1**		26
	105	60	2.7	13.37		**2KJ1601 - ■DE13 - ■■D1**		26
	113	56	3.0	12.35	★	**2KJ1601 - ■DE13 - ■■C1**		26
	132	48	3.6	10.63		**2KJ1601 - ■DE13 - ■■B1**		26
	145	44	3.8	9.67	★	**2KJ1601 - ■DE13 - ■■A1**		26
1.1	**C.88-LA90SB4E**							
	3.7	1 983	0.80	390	★	**2KJ1604 - ■EM13 - ■■S2**		81
	4.1	1 822	0.87	354.55		**2KJ1604 - ■EM13 - ■■R2**		81
	4.5	1 654	0.95	318.5	★	**2KJ1604 - ■EM13 - ■■Q2**		81
	5.3	1 434	1.0	273		**2KJ1604 - ■EM13 - ■■P2**		81
	5.8	1 305	1.1	247	★	**2KJ1604 - ■EM13 - ■■N2**		81
	6.3	1 209	1.1	228		**2KJ1604 - ■EM13 - ■■M2**		81
	7.3	1 056	1.2	198.25	★	**2KJ1604 - ■EM13 - ■■L2**		81
	8.0	960	1.3	180		**2KJ1604 - ■EM13 - ■■K2**		81
	8.8	878	1.4	164.36	★	**2KJ1604 - ■EM13 - ■■J2**		81
	9.5	806	1.5	150.8		**2KJ1604 - ■EM13 - ■■H2**		81
	10.4	743	1.6	138.94	★	**2KJ1604 - ■EM13 - ■■G2**		81
	11.4	675	1.7	126.18		**2KJ1604 - ■EM13 - ■■F2**		81
	12.5	615	1.8	114.95	★	**2KJ1604 - ■EM13 - ■■E2**		81
	13.3	672	2.0	108.5		**2KJ1604 - ■EM13 - ■■D2**		81
	15.9	564	2.2	90.62		**2KJ1604 - ■EM13 - ■■B2**		81
	C.68-LA90SB4E							
	10.1	758	0.80	143	★	**2KJ1603 - ■EM13 - ■■L2**		54

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor}	Output speed	Output torque	Service factor	Gearbox ratio		Order No.	Order code	Weight *)
kW	n_2 (50 Hz) rpm	T_2 Nm	f_B	i_{tot}			(No. of poles)	kg
1.1	**C.68-LA90SB4E**							
	11.2	686	0.86	129		**2KJ1603 - ■EM13 - ■■K2**		54
	12.3	623	0.91	117	★	**2KJ1603 - ■EM13 - ■■J2**		54
	13.5	569	0.97	106.6		**2KJ1603 - ■EM13 - ■■H2**		54
	14.8	520	1.0	97.5	★	**2KJ1603 - ■EM13 - ■■G2**		54
	16.0	562	1.1	90	★	**2KJ1603 - ■EM13 - ■■F2**		54
	17.1	526	1.2	84.09		**2KJ1603 - ■EM13 - ■■E2**		54
	19.5	465	1.3	73.96	★	**2KJ1603 - ■EM13 - ■■D2**		54
	22	409	1.5	64.77		**2KJ1603 - ■EM13 - ■■C2**		54
	25	363	1.8	57.29	★	**2KJ1603 - ■EM13 - ■■B2**		54
	28	329	1.9	51.92		**2KJ1603 - ■EM13 - ■■A2**		54
	31	291	2.1	45.83	★	**2KJ1603 - ■EM13 - ■■X1**		54
	35	263	2.2	41.35		**2KJ1603 - ■EM13 - ■■W1**		54
	38	238	2.4	37.5	★	**2KJ1603 - ■EM13 - ■■U1**		54
	38	245	1.8	38		**2KJ1603 - ■EM13 - ■■V1**		54
	42	217	2.5	34.17		**2KJ1603 - ■EM13 - ■■T1**		54
	43	217	2.0	33.61	★	**2KJ1603 - ■EM13 - ■■S1**		54
	46	199	2.7	31.25	★	**2KJ1603 - ■EM13 - ■■R1**		54
	47	197	2.0	30.46		**2KJ1603 - ■EM13 - ■■Q1**		54
	52	178	2.9	27.94		**2KJ1603 - ■EM13 - ■■P1**		54
	54	174	2.3	26.89	★	**2KJ1603 - ■EM13 - ■■N1**		54
	59	157	2.5	24.26		**2KJ1603 - ■EM13 - ■■L1**		54
	66	142	3.0	22	★	**2KJ1603 - ■EM13 - ■■J1**		54
	C.48-LA90SB4E							
	17.9	415	0.82	80.44	★	**2KJ1602 - ■EM13 - ■■V1**		37
	20	367	0.89	71.12		**2KJ1602 - ■EM13 - ■■U1**		37
	22	339	0.93	65.68	★	**2KJ1602 - ■EM13 - ■■T1**		37
	26	292	1.0	56.55		**2KJ1602 - ■EM13 - ■■S1**		37
	28	266	1.1	51.41	★	**2KJ1602 - ■EM13 - ■■R1**		37
	31	300	0.96	46.93	★	**2KJ1602 - ■EM13 - ■■Q1**		37
	34	269	1.2	42		**2KJ1602 - ■EM13 - ■■P1**		37
	39	239	1.1	37.28	★	**2KJ1602 - ■EM13 - ■■N1**		37
	44	210	1.2	32.67		**2KJ1602 - ■EM13 - ■■M1**		37
	50	185	1.5	28.72	★	**2KJ1602 - ■EM13 - ■■L1**		37
	56	167	1.6	25.95		**2KJ1602 - ■EM13 - ■■K1**		37
	64	146	1.8	22.61	★	**2KJ1602 - ■EM13 - ■■J1**		37
	71	131	2.1	20.31		**2KJ1602 - ■EM13 - ■■H1**		37
	79	118	2.5	18.33	★	**2KJ1602 - ■EM13 - ■■G1**		37
	87	107	2.7	16.62		**2KJ1602 - ■EM13 - ■■F1**		37
	95	98	2.7	15.13	★	**2KJ1602 - ■EM13 - ■■E1**		37
	108	86	2.7	13.37		**2KJ1602 - ■EM13 - ■■D1**		37
	117	80	3.1	12.35	★	**2KJ1602 - ■EM13 - ■■C1**		37
	135	69	3.6	10.63		**2KJ1602 - ■EM13 - ■■B1**		37
	149	62	3.8	9.67	★	**2KJ1602 - ■EM13 - ■■A1**		37

★ Preferred transmission ratio

Shaft designs, see page 5/45 — 1 to 9
Frequency and voltage, see page 8/20 — 1 to 9
Gearbox housing mounting position, see page 5/47 — A, D, F or H

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
1.1	**C.38-LA90SB4E**							
	34	266	0.82	42		**2KJ1601 - ■EM13 - ■■P1**		29
	39	237	0.96	37.28	★	**2KJ1601 - ■EM13 - ■■N1**		29
	44	209	0.90	32.67		**2KJ1601 - ■EM13 - ■■M1**		29
	50	184	1.1	28.72	★	**2KJ1601 - ■EM13 - ■■L1**		29
	56	166	1.2	25.95		**2KJ1601 - ■EM13 - ■■K1**		29
	64	145	1.4	22.61	★	**2KJ1601 - ■EM13 - ■■J1**		29
	71	130	1.5	20.31		**2KJ1601 - ■EM13 - ■■H1**		29
	79	118	1.7	18.33	★	**2KJ1601 - ■EM13 - ■■G1**		29
	87	107	1.8	16.62		**2KJ1601 - ■EM13 - ■■F1**		29
	95	97	1.9	15.13	★	**2KJ1601 - ■EM13 - ■■E1**		29
	108	86	1.9	13.37		**2KJ1601 - ■EM13 - ■■D1**		29
	117	79	2.1	12.35	★	**2KJ1601 - ■EM13 - ■■C1**		29
	135	68	2.5	10.63		**2KJ1601 - ■EM13 - ■■B1**		29
	149	62	2.7	9.67	★	**2KJ1601 - ■EM13 - ■■A1**		29
1.5	**C.88-LA90ZLB4E**							
	5.8	1 779	0.80	247	★	**2KJ1604 - ■EQ13 - ■■N2**		84
	6.3	1 648	0.84	228		**2KJ1604 - ■EQ13 - ■■M2**		84
	7.3	1 439	0.92	198.25	★	**2KJ1604 - ■EQ13 - ■■L2**		84
	8.0	1 309	0.98	180		**2KJ1604 - ■EQ13 - ■■K2**		84
	8.8	1 197	1.0	164.36	★	**2KJ1604 - ■EQ13 - ■■J2**		84
	9.5	1 099	1.1	150.8		**2KJ1604 - ■EQ13 - ■■H2**		84
	10.4	1 013	1.2	138.94	★	**2KJ1604 - ■EQ13 - ■■G2**		84
	11.4	920	1.2	126.18		**2KJ1604 - ■EQ13 - ■■F2**		84
	12.5	839	1.3	114.95	★	**2KJ1604 - ■EQ13 - ■■E2**		84
	13.3	917	1.4	108.5		**2KJ1604 - ■EQ13 - ■■D2**		84
	14.7	831	1.7	98.17	★	**2KJ1604 - ■EQ13 - ■■C2**		84
	15.9	769	1.6	90.62		**2KJ1604 - ■EQ13 - ■■B2**		84
	18.3	669	1.9	78.79	★	**2KJ1604 - ■EQ13 - ■■A2**		84
	20	608	2.1	71.54		**2KJ1604 - ■EQ13 - ■■X1**		84
	22	556	2.2	65.32	★	**2KJ1604 - ■EQ13 - ■■W1**		84
	24	510	2.3	59.93		**2KJ1604 - ■EQ13 - ■■V1**		84
	42	305	2.6	33.85		**2KJ1604 - ■EQ13 - ■■P1**		84
	C.68-LA90ZLB4E							
	16.0	766	0.80	90	★	**2KJ1603 - ■EQ13 - ■■F2**		57
	17.1	718	0.87	84.09		**2KJ1603 - ■EQ13 - ■■E2**		57
	19.5	635	0.94	73.96	★	**2KJ1603 - ■EQ13 - ■■D2**		57
	22	558	1.1	64.77		**2KJ1603 - ■EQ13 - ■■C2**		57
	25	495	1.3	57.29	★	**2KJ1603 - ■EQ13 - ■■B2**		57
	28	449	1.4	51.92		**2KJ1603 - ■EQ13 - ■■A2**		57
	31	397	1.5	45.83	★	**2KJ1603 - ■EQ13 - ■■X1**		57
	35	358	1.6	41.35		**2KJ1603 - ■EQ13 - ■■W1**		57
	38	325	1.7	37.5	★	**2KJ1603 - ■EQ13 - ■■U1**		57
	38	334	1.3	38		**2KJ1603 - ■EQ13 - ■■V1**		57

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor}	Output speed	Output torque	Service factor	Gearbox ratio		Order No.	Order code	Weight *)
kW	n_2 (50 Hz) rpm	T_2 Nm	f_B	i_{tot}			(No. of poles)	kg
1.5	**C.68-LA90ZLB4E**							
	42	296	1.9	34.17		**2KJ1603 - ■EQ13 - ■■T1**		57
	43	296	1.4	33.61	★	**2KJ1603 - ■EQ13 - ■■S1**		57
	46	271	2.0	31.25	★	**2KJ1603 - ■EQ13 - ■■R1**		57
	47	268	1.4	30.46		**2KJ1603 - ■EQ13 - ■■Q1**		57
	52	242	2.1	27.94		**2KJ1603 - ■EQ13 - ■■P1**		57
	54	237	1.7	26.89	★	**2KJ1603 - ■EQ13 - ■■N1**		57
	56	223	2.3	25.66	★	**2KJ1603 - ■EQ13 - ■■M1**		57
	59	214	1.8	24.26		**2KJ1603 - ■EQ13 - ■■L1**		57
	62	201	2.4	23.13		**2KJ1603 - ■EQ13 - ■■K1**		57
	66	194	2.2	22	★	**2KJ1603 - ■EQ13 - ■■J1**		57
	72	173	2.7	19.89	★	**2KJ1603 - ■EQ13 - ■■G1**		57
	72	177	2.4	20.04		**2KJ1603 - ■EQ13 - ■■H1**		57
	79	161	2.6	18.33	★	**2KJ1603 - ■EQ13 - ■■F1**		57
	88	144	2.7	16.39		**2KJ1603 - ■EQ13 - ■■E1**		57
	96	133	3.0	15.05	★	**2KJ1603 - ■EQ13 - ■■D1**		57
	106	120	3.5	13.57		**2KJ1603 - ■EQ13 - ■■C1**		57
	123	103	3.6	11.67	★	**2KJ1603 - ■EQ13 - ■■B1**		57
	C.48-LA90ZLB4E							
	28	363	0.81	51.41	★	**2KJ1602 - ■EQ13 - ■■R1**		40
	34	367	0.85	42		**2KJ1602 - ■EQ13 - ■■P1**		40
	39	327	0.80	37.28	★	**2KJ1602 - ■EQ13 - ■■N1**		40
	44	287	0.91	32.67		**2KJ1602 - ■EQ13 - ■■M1**		40
	50	252	1.1	28.72	★	**2KJ1602 - ■EQ13 - ■■L1**		40
	56	228	1.2	25.95		**2KJ1602 - ■EQ13 - ■■K1**		40
	64	199	1.3	22.61	★	**2KJ1602 - ■EQ13 - ■■J1**		40
	71	179	1.5	20.31		**2KJ1602 - ■EQ13 - ■■H1**		40
	79	161	1.8	18.33	★	**2KJ1602 - ■EQ13 - ■■G1**		40
	87	146	2.0	16.62		**2KJ1602 - ■EQ13 - ■■F1**		40
	95	133	2.0	15.13	★	**2KJ1602 - ■EQ13 - ■■E1**		40
	108	118	2.0	13.37		**2KJ1602 - ■EQ13 - ■■D1**		40
	117	109	2.3	12.35	★	**2KJ1602 - ■EQ13 - ■■C1**		40
	135	94	2.7	10.63		**2KJ1602 - ■EQ13 - ■■B1**		40
	149	85	2.8	9.67	★	**2KJ1602 - ■EQ13 - ■■A1**		40
	C.38-LA90ZLB4E							
	50	251	0.81	28.72	★	**2KJ1601 - ■EQ13 - ■■L1**		32
	56	227	0.90	25.95		**2KJ1601 - ■EQ13 - ■■K1**		32
	64	198	1.0	22.61	★	**2KJ1601 - ■EQ13 - ■■J1**		32
	71	178	1.1	20.31		**2KJ1601 - ■EQ13 - ■■H1**		32
	79	161	1.3	18.33	★	**2KJ1601 - ■EQ13 - ■■G1**		32
	87	146	1.3	16.62		**2KJ1601 - ■EQ13 - ■■F1**		32
	95	133	1.4	15.13	★	**2KJ1601 - ■EQ13 - ■■E1**		32
	108	117	1.4	13.37		**2KJ1601 - ■EQ13 - ■■D1**		32
	117	108	1.6	12.35	★	**2KJ1601 - ■EQ13 - ■■C1**		32

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
1.5	**C.38-LA90ZLB4E**							
	135	93	1.8	10.63		**2KJ1601 - ■EQ13 - ■■B1**		32
	149	85	2.0	9.67	★	**2KJ1601 - ■EQ13 - ■■A1**		32
2.2	**C.88-LA100ZLP4E**							
	11.4	1 355	0.84	126.18		**2KJ1604 - ■FM13 - ■■F2**		92
	12.5	1 234	0.89	114.95	★	**2KJ1604 - ■FM13 - ■■E2**		92
	13.2	1 349	0.98	108.5		**2KJ1604 - ■FM13 - ■■D2**		92
	14.6	1 224	1.1	98.17	★	**2KJ1604 - ■FM13 - ■■C2**		92
	15.8	1 131	1.1	90.62		**2KJ1604 - ■FM13 - ■■B2**		92
	18.2	985	1.3	78.79	★	**2KJ1604 - ■FM13 - ■■A2**		92
	20	895	1.4	71.54		**2KJ1604 - ■FM13 - ■■X1**		92
	22	818	1.5	65.32	★	**2KJ1604 - ■FM13 - ■■W1**		92
	24	751	1.6	59.93		**2KJ1604 - ■FM13 - ■■V1**		92
	26	692	1.7	55.22	★	**2KJ1604 - ■FM13 - ■■U1**		92
	29	628	1.8	50.15		**2KJ1604 - ■FM13 - ■■T1**		92
	31	572	1.9	45.68	★	**2KJ1604 - ■FM13 - ■■S1**		92
	34	524	2.0	41.85		**2KJ1604 - ■FM13 - ■■R1**		92
	38	468	2.2	37.34	★	**2KJ1604 - ■FM13 - ■■Q1**		92
	42	448	1.8	33.85		**2KJ1604 - ■FM13 - ■■P1**		92
	43	418	2.3	33.33		**2KJ1604 - ■FM13 - ■■N1**		92
	46	409	2.0	30.9	★	**2KJ1604 - ■FM13 - ■■M1**		92
	51	355	2.6	28.3		**2KJ1604 - ■FM13 - ■■K1**		92
	51	376	2.1	28.36		**2KJ1604 - ■FM13 - ■■L1**		92
	55	346	2.3	26.13	★	**2KJ1604 - ■FM13 - ■■J1**		92
	60	314	2.4	23.73		**2KJ1604 - ■FM13 - ■■H1**		92
	61	295	2.9	23.56	★	**2KJ1604 - ■FM13 - ■■G1**		92
	66	286	2.8	21.61	★	**2KJ1604 - ■FM13 - ■■F1**		92
	72	262	3.0	19.8		**2KJ1604 - ■FM13 - ■■E1**		92
	81	234	3.3	17.67	★	**2KJ1604 - ■FM13 - ■■D1**		92
	C.68-LA100ZLP4E							
	25	728	0.89	57.29	★	**2KJ1603 - ■FM13 - ■■B2**		65
	28	661	0.95	51.92		**2KJ1603 - ■FM13 - ■■A2**		65
	31	584	1.0	45.83	★	**2KJ1603 - ■FM13 - ■■X1**		65
	35	527	1.1	41.35		**2KJ1603 - ■FM13 - ■■W1**		65
	38	479	1.2	37.5	★	**2KJ1603 - ■FM13 - ■■U1**		65
	38	492	0.87	38		**2KJ1603 - ■FM13 - ■■V1**		65
	42	436	1.3	34.17		**2KJ1603 - ■FM13 - ■■T1**		65
	43	435	0.98	33.61	★	**2KJ1603 - ■FM13 - ■■S1**		65
	46	399	1.3	31.25	★	**2KJ1603 - ■FM13 - ■■R1**		65
	47	395	0.98	30.46		**2KJ1603 - ■FM13 - ■■Q1**		65
	51	357	1.5	27.94		**2KJ1603 - ■FM13 - ■■P1**		65
	53	348	1.1	26.89	★	**2KJ1603 - ■FM13 - ■■N1**		65
	56	328	1.5	25.66	★	**2KJ1603 - ■FM13 - ■■M1**		65
	59	314	1.3	24.26		**2KJ1603 - ■FM13 - ■■L1**		65

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
2.2	**C.68-LA100ZLP4E**							
	62	295	1.7	23.13		**2KJ1603 - ■FM13 - ■■K1**		65
	65	285	1.5	22	★	**2KJ1603 - ■FM13 - ■■J1**		65
	72	254	1.8	19.89	★	**2KJ1603 - ■FM13 - ■■G1**		65
	72	260	1.6	20.04		**2KJ1603 - ■FM13 - ■■H1**		65
	78	238	1.7	18.33	★	**2KJ1603 - ■FM13 - ■■F1**		65
	88	212	1.9	16.39		**2KJ1603 - ■FM13 - ■■E1**		65
	95	195	2.0	15.05	★	**2KJ1603 - ■FM13 - ■■D1**		65
	106	176	2.3	13.57		**2KJ1603 - ■FM13 - ■■C1**		65
	123	151	2.5	11.67	★	**2KJ1603 - ■FM13 - ■■B1**		65
	C.48-LA100ZLP4E							
	78	238	1.2	18.33	★	**2KJ1602 - ■FM13 - ■■G1**		48
	86	215	1.3	16.62		**2KJ1602 - ■FM13 - ■■F1**		48
	95	196	1.3	15.13	★	**2KJ1602 - ■FM13 - ■■E1**		48
	107	173	1.3	13.37		**2KJ1602 - ■FM13 - ■■D1**		48
	116	160	1.5	12.35	★	**2KJ1602 - ■FM13 - ■■C1**		48
	135	138	1.8	10.63		**2KJ1602 - ■FM13 - ■■B1**		48
	148	125	1.9	9.67	★	**2KJ1602 - ■FM13 - ■■A1**		48
	C.38-LA100ZLP4E							
	78	236	0.86	18.33	★	**2KJ1601 - ■FM13 - ■■G1**		40
	86	214	0.90	16.62		**2KJ1601 - ■FM13 - ■■F1**		40
	95	195	0.94	15.13	★	**2KJ1601 - ■FM13 - ■■E1**		40
	107	172	0.94	13.37		**2KJ1601 - ■FM13 - ■■D1**		40
	116	159	1.1	12.35	★	**2KJ1601 - ■FM13 - ■■C1**		40
	135	137	1.2	10.63		**2KJ1601 - ■FM13 - ■■B1**		40
	148	125	1.3	9.67	★	**2KJ1601 - ■FM13 - ■■A1**		40
3	**C.88-LA100ZLD4E**							
	14.6	1 668	0.84	98.17	★	**2KJ1604 - ■FP13 - ■■C2**		92
	15.8	1 542	0.80	90.62		**2KJ1604 - ■FP13 - ■■B2**		92
	18.2	1 344	0.97	78.79	★	**2KJ1604 - ■FP13 - ■■A2**		92
	20	1 221	1.0	71.54		**2KJ1604 - ■FP13 - ■■X1**		92
	22	1 115	1.1	65.32	★	**2KJ1604 - ■FP13 - ■■W1**		92
	24	1 023	1.2	59.93		**2KJ1604 - ■FP13 - ■■V1**		92
	26	943	1.2	55.22	★	**2KJ1604 - ■FP13 - ■■U1**		92
	29	857	1.3	50.15		**2KJ1604 - ■FP13 - ■■T1**		92
	31	780	1.4	45.68	★	**2KJ1604 - ■FP13 - ■■S1**		92
	34	715	1.5	41.85		**2KJ1604 - ■FP13 - ■■R1**		92
	38	638	1.6	37.34	★	**2KJ1604 - ■FP13 - ■■Q1**		92
	42	611	1.3	33.85		**2KJ1604 - ■FP13 - ■■P1**		92
	43	569	1.7	33.33		**2KJ1604 - ■FP13 - ■■N1**		92
	46	558	1.4	30.9	★	**2KJ1604 - ■FP13 - ■■M1**		92
	51	483	1.9	28.3		**2KJ1604 - ■FP13 - ■■K1**		92
	51	512	1.6	28.36		**2KJ1604 - ■FP13 - ■■L1**		92
	55	472	1.7	26.13	★	**2KJ1604 - ■FP13 - ■■J1**		92

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
3	**C.88-LA100ZLD4E**							
	60	429	1.8	23.73		**2KJ1604 - ■FP13 - ■■H1**		92
	61	403	2.2	23.56	★	**2KJ1604 - ■FP13 - ■■G1**		92
	66	390	2.1	21.61	★	**2KJ1604 - ■FP13 - ■■F1**		92
	72	358	2.2	19.8		**2KJ1604 - ■FP13 - ■■E1**		92
	81	319	2.5	17.67	★	**2KJ1604 - ■FP13 - ■■D1**		92
	91	285	2.7	15.77		**2KJ1604 - ■FP13 - ■■C1**		92
	107	242	3.2	13.39		**2KJ1604 - ■FP13 - ■■B1**		92
	129	201	3.3	11.15	★	**2KJ1604 - ■FP13 - ■■A1**		92
	C.68-LA100ZLD4E							
	35	719	0.82	41.35		**2KJ1603 - ■FP13 - ■■W1**		65
	38	653	0.87	37.5	★	**2KJ1603 - ■FP13 - ■■U1**		65
	42	595	0.93	34.17		**2KJ1603 - ■FP13 - ■■T1**		65
	46	544	0.99	31.25	★	**2KJ1603 - ■FP13 - ■■R1**		65
	51	486	1.1	27.94		**2KJ1603 - ■FP13 - ■■P1**		65
	53	475	0.84	26.89	★	**2KJ1603 - ■FP13 - ■■N1**		65
	56	447	1.1	25.66	★	**2KJ1603 - ■FP13 - ■■M1**		65
	59	429	0.92	24.26		**2KJ1603 - ■FP13 - ■■L1**		65
	62	403	1.2	23.13		**2KJ1603 - ■FP13 - ■■K1**		65
	65	389	1.1	22	★	**2KJ1603 - ■FP13 - ■■J1**		65
	72	346	1.4	19.89	★	**2KJ1603 - ■FP13 - ■■G1**		65
	72	354	1.2	20.04		**2KJ1603 - ■FP13 - ■■H1**		65
	78	324	1.3	18.33	★	**2KJ1603 - ■FP13 - ■■F1**		65
	88	290	1.4	16.39		**2KJ1603 - ■FP13 - ■■E1**		65
	95	266	1.5	15.05	★	**2KJ1603 - ■FP13 - ■■D1**		65
	106	240	1.7	13.57		**2KJ1603 - ■FP13 - ■■C1**		65
	123	206	1.8	11.67	★	**2KJ1603 - ■FP13 - ■■B1**		65
	C.48-LA100ZLD4E							
	78	324	0.91	18.33	★	**2KJ1602 - ■FP13 - ■■G1**		48
	86	294	0.98	16.62		**2KJ1602 - ■FP13 - ■■F1**		48
	95	267	0.98	15.13	★	**2KJ1602 - ■FP13 - ■■E1**		48
	107	236	0.98	13.37		**2KJ1602 - ■FP13 - ■■D1**		48
	116	218	1.1	12.35	★	**2KJ1602 - ■FP13 - ■■C1**		48
	135	188	1.3	10.63		**2KJ1602 - ■FP13 - ■■B1**		48
	148	171	1.4	9.67	★	**2KJ1602 - ■FP13 - ■■A1**		48
	C.38-LA100ZLD4E							
	135	187	0.91	10.63		**2KJ1601 - ■FP13 - ■■B1**		40
	148	170	0.97	9.67	★	**2KJ1601 - ■FP13 - ■■A1**		40
4	**C.88-LA112ZMP4E**							
	22	1 482	0.82	65.32	★	**2KJ1604 - ■GJ13 - ■■W1**		99
	24	1 360	0.87	59.93		**2KJ1604 - ■GJ13 - ■■V1**		99
	26	1 253	0.92	55.22	★	**2KJ1604 - ■GJ13 - ■■U1**		99
	29	1 138	0.98	50.15		**2KJ1604 - ■GJ13 - ■■T1**		99
	32	1 037	1.0	45.68	★	**2KJ1604 - ■GJ13 - ■■S1**		99

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
4	**C.88-LA112ZMP4E**							
	34	950	1.1	41.85		**2KJ1604 - ■GJ13 - ■■R1**		99
	39	848	1.2	37.34	★	**2KJ1604 - ■GJ13 - ■■Q1**		99
	42	812	0.99	33.85		**2KJ1604 - ■GJ13 - ■■P1**		99
	43	757	1.3	33.33		**2KJ1604 - ■GJ13 - ■■N1**		99
	47	742	1.1	30.9	★	**2KJ1604 - ■GJ13 - ■■M1**		99
	51	642	1.4	28.3		**2KJ1604 - ■GJ13 - ■■K1**		99
	51	681	1.2	28.36		**2KJ1604 - ■GJ13 - ■■L1**		99
	55	627	1.3	26.13	★	**2KJ1604 - ■GJ13 - ■■J1**		99
	61	535	1.6	23.56	★	**2KJ1604 - ■GJ13 - ■■G1**		99
	61	570	1.3	23.73		**2KJ1604 - ■GJ13 - ■■H1**		99
	67	519	1.5	21.61	★	**2KJ1604 - ■GJ13 - ■■F1**		99
	73	475	1.7	19.8		**2KJ1604 - ■GJ13 - ■■E1**		99
	82	424	1.8	17.67	★	**2KJ1604 - ■GJ13 - ■■D1**		99
	91	379	2.0	15.77		**2KJ1604 - ■GJ13 - ■■C1**		99
	108	321	2.4	13.39		**2KJ1604 - ■GJ13 - ■■B1**		99
	129	268	2.5	11.15	★	**2KJ1604 - ■GJ13 - ■■A1**		99
	C.68-LA112ZMP4E							
	52	646	0.80	27.94		**2KJ1603 - ■GJ13 - ■■P1**		72
	56	594	0.85	25.66	★	**2KJ1603 - ■GJ13 - ■■M1**		72
	62	535	0.91	23.13		**2KJ1603 - ■GJ13 - ■■K1**		72
	66	517	0.81	22	★	**2KJ1603 - ■GJ13 - ■■J1**		72
	72	460	1.0	19.89	★	**2KJ1603 - ■GJ13 - ■■G1**		72
	72	471	0.90	20.04		**2KJ1603 - ■GJ13 - ■■H1**		72
	79	431	0.97	18.33	★	**2KJ1603 - ■GJ13 - ■■F1**		72
	88	385	1.0	16.39		**2KJ1603 - ■GJ13 - ■■E1**		72
	96	353	1.1	15.05	★	**2KJ1603 - ■GJ13 - ■■D1**		72
	106	319	1.3	13.57		**2KJ1603 - ■GJ13 - ■■C1**		72
	123	274	1.4	11.67	★	**2KJ1603 - ■GJ13 - ■■B1**		72
	C.48-LA112ZMP4E							
	117	290	0.84	12.35	★	**2KJ1602 - ■GJ13 - ■■C1**		55
	135	250	1	10.63		**2KJ1602 - ■GJ13 - ■■B1**		55
	149	227	1.1	9.67	★	**2KJ1602 - ■GJ13 - ■■A1**		55
5.5	**C.88-LA132SP4E**							
	34	1 302	0.81	41.85		**2KJ1604 - ■HG13 - ■■R1**		117
	39	1 161	0.87	37.34	★	**2KJ1604 - ■HG13 - ■■Q1**		117
	43	1 037	0.94	33.33		**2KJ1604 - ■HG13 - ■■N1**		117
	51	880	1.1	28.3		**2KJ1604 - ■HG13 - ■■K1**		117
	51	933	0.86	28.36		**2KJ1604 - ■HG13 - ■■L1**		117
	55	859	0.93	26.13	★	**2KJ1604 - ■HG13 - ■■J1**		117
	61	733	1.2	23.56	★	**2KJ1604 - ■HG13 - ■■G1**		117
	61	781	0.96	23.73		**2KJ1604 - ■HG13 - ■■H1**		117
	67	711	1.1	21.61	★	**2KJ1604 - ■HG13 - ■■F1**		117
	73	651	1.2	19.8		**2KJ1604 - ■HG13 - ■■E1**		117

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data (continued)

Power rating P_{Motor} kW	Output speed n_2 (50 Hz) rpm	Output torque T_2 Nm	Service factor f_B	Gearbox ratio i_{tot}		Order No.	Order code (No. of poles)	Weight *) kg
5.5	**C.88-LA132SP4E**							
	82	581	1.3	17.67	★	**2KJ1604 - ■HG13 - ■■D1**		117
	92	519	1.5	15.77		**2KJ1604 - ■HG13 - ■■C1**		117
	108	440	1.7	13.39		**2KJ1604 - ■HG13 - ■■B1**		117
	130	367	1.8	11.15	★	**2KJ1604 - ■HG13 - ■■A1**		117
	C.68-LA132SP4E							
	96	484	0.81	15.05	★	**2KJ1603 - ■HG13 - ■■D1**		90
	106	437	0.95	13.57		**2KJ1603 - ■HG13 - ■■C1**		90
	124	376	0.99	11.67	★	**2KJ1603 - ■HG13 - ■■B1**		90
7.5	**C.88-LA132ZMP4E**							
	62	992	0.87	23.56	★	**2KJ1604 - ■HK13 - ■■G1**		117
	67	963	0.83	21.61	★	**2KJ1604 - ■HK13 - ■■F1**		117
	74	882	0.9	19.8		**2KJ1604 - ■HK13 - ■■E1**		117
	82	787	1.0	17.67	★	**2KJ1604 - ■HK13 - ■■D1**		117
	92	702	1.1	15.77		**2KJ1604 - ■HK13 - ■■C1**		117
	109	596	1.3	13.39		**2KJ1604 - ■HK13 - ■■B1**		117
	130	497	1.4	11.15	★	**2KJ1604 - ■HK13 - ■■A1**		117
9.2	**C.88-LA160MB4E**							
	109	732	1.0	13.39		**2KJ1604 - ■JP13 - ■■B1**		141
	130	609	1.1	11.15	★	**2KJ1604 - ■JP13 - ■■A1**		141
11	**C.88-LA160MB4E**							
	109	872	0.87	13.39		**2KJ1604 - ■JQ13 - ■■B1**		141
	131	726	0.92	11.15	★	**2KJ1604 - ■JQ13 - ■■A1**		141

★ Preferred transmission ratio

Shaft designs, see page 5/45 — **1 to 9**

Frequency and voltage, see page 8/20 — **1 to 9**

Gearbox housing mounting position, see page 5/47 — **A, D, F or H**

*) For mounting type B3

Selection and ordering data

Efficiency table C.28

Transmission ratio	Ratio code	Output speed n_{mot} = 2 500 rpm				Output speed n_{mot} = 1750 rpm				Output speed n_{mot} = 1 450 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2	T_2	P_{mot}	h	n_2	T_2	P_{mot}	h	n_2	T_2	P_{mot}	h								
		rpm	Nm	kW	%	rpm	Nm	kW	%	rpm	Nm	kW	%	63	71	80	90	100	112	132	160
372.00	**P1**	6.7	119	0.15	56	4.7	119	0.10	56	3.9	118	0.09	56		•						
303.36	**N1**	8.2	109	0.17	56	5.8	109	0.12	56	4.8	108	0.10	56		•						
248.00	**M1**	10.1	118	0.19	66	7.1	118	0.13	66	5.8	118	0.11	66		•						
202.24	**L1**	12.4	100	0.20	66	8.7	100	0.14	66	7.2	100	0.11	66		•						
155.00	**K1**	16.1	116	0.26	74	11.3	116	0.19	74	9.4	116	0.15	74		•						
126.40	**J1**	19.8	94	0.26	74	13.8	95	0.18	74	11.5	95	0.15	74		•						
93.00	**H1**	27.0	118	0.40	83	18.8	118	0.28	83	15.6	118	0.23	83		•						
75.84	**G1**	33.0	96	0.40	83	23.0	96	0.28	83	19.1	96	0.23	83		•						
62.00	**F1**	40.0	117	0.57	87	28.0	117	0.40	87	23.0	117	0.32	87		•						
50.56	**E1**	49.0	94	0.56	87	35.0	95	0.40	87	29.0	95	0.33	87		•						
46.50	**D1**	54.0	110	0.70	90	38.0	110	0.49	90	31.0	110	0.40	90		•						
37.92	**C1**	66.0	90	0.69	90	46.0	90	0.48	90	38.0	90	0.40	90		•						
31.00	**B1**	81.0	99	0.92	92	56.0	100	0.64	92	47.0	99	0.53	92		•						
25.28	**A1**	99.0	81	0.91	92	69.0	81	0.64	92	57.0	81	0.53	92		•						

★ Preferred transmission ratio
In the case of gearboxes of size 28, only possible with integrated motor or input unit KQ and KQS.

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Efficiency table C.28

Transmission ratio	Ratio code	Output speed n_{mot} = 1 150 rpm				Output speed n_{mot} = 950 rpm				Size for motor and input units								
i_{tot}	Order No. 15th and 16th position	n_2	T_2	P_{mot}	h	n_2	T_2	P_{mot}	h									
		rpm	Nm	kW	%	rpm	Nm	kW	%	63	71	80	90	100	112	132	160	
372.00	**P1**	3.1	117	0.07	55	2.6	116	0.06	55		•							
303.36	**N1**	3.8	108	0.08	55	3.1	107	0.06	55		•							
248.00	**M1**	4.6	118	0.09	66	3.8	117	0.07	65		•							
202.24	**L1**	5.7	99	0.09	66	4.7	99	0.07	65		•							
155.00	**K1**	7.4	116	0.12	74	6.1	116	0.10	74		•							
126.40	**J1**	9.1	94	0.12	74	7.5	94	0.10	74		•							
93.00	**H1**	12.4	118	0.19	83	10.2	118	0.15	82		•							
75.84	**G1**	15.2	95	0.18	83	12.5	95	0.15	82		•							
62.00	**F1**	18.5	117	0.26	87	15.3	117	0.22	87		•							
50.56	**E1**	23.0	94	0.26	87	18.8	94	0.21	87		•							
46.50	**D1**	25.0	110	0.32	90	20.0	110	0.26	89		•							
37.92	**C1**	30.0	90	0.31	90	25.0	89	0.26	89		•							
31.00	**B1**	37.0	99	0.42	92	31.0	99	0.35	92		•							
25.28	**A1**	45.0	81	0.42	92	38.0	81	0.35	92		•							

★ Preferred transmission ratio
In the case of gearboxes of size 28, only possible with integrated motor or input unit KQ and KQS.

Transmission ratios and maximum torques

Selection and ordering data (continued)

Efficiency table C.28

Transmission ratio	Ratio code	Output speed n_{mot} = 850 rpm				Output speed n_{mot} = 700 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
372.00	**P1**	2.3	116	0.05	54	1.9	114	<0.05	54		•						
303.36	**N1**	2.8	106	0.06	54	2.3	104	<0.05	54		•						
248.00	**M1**	3.4	117	0.06	65	2.8	116	0.05	65		•						
202.24	**L1**	4.2	98	0.07	65	3.5	97	0.06	65		•						
155.00	**K1**	5.5	115	0.09	73	4.5	115	0.07	73		•						
126.40	**J1**	6.7	94	0.09	73	5.5	93	0.07	73		•						
93.00	**H1**	9.1	118	0.14	82	7.5	117	0.11	82		•						
75.84	**G1**	11.2	95	0.14	82	9.2	95	0.11	82		•						
62.00	**F1**	13.7	117	0.19	87	11.3	117	0.16	86		•						
50.56	**E1**	16.8	94	0.19	87	13.8	94	0.16	86		•						
46.50	**D1**	18.3	110	0.24	89	15.1	110	0.19	89		•						
37.92	**C1**	22.0	89	0.23	89	18.5	89	0.19	89		•						
31.00	**B1**	27.0	99	0.31	91	23.0	99	0.26	91		•						
25.28	**A1**	34.0	81	0.31	91	28.0	80	0.26	91		•						

★ Preferred transmission ratio
In the case of gearboxes of size 28, only possible with integrated motor or input unit KQ and KQS.

Selection and ordering data (continued)

Efficiency table C.38-D/Z28

Transmission ratio	Ratio code	Output speed n_{mot} = 1 750 rpm				Output speed n_{mot} = 1 450 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
23 503	**N1**	0.07	222	<0.06	45	0.06	222	<0.06	45		•						
20 276	**M1**	0.09	222	<0.06	45	0.07	222	<0.06	45		•						
17 420	**L1**	0.10	222	<0.06	45	0.08	222	<0.06	45		•						
16 037	**K1**	0.11	222	<0.06	45	0.09	222	<0.06	45		•						
14 579	**J1**	0.12	222	<0.06	45	0.10	222	<0.06	45		•						
12 904	**H1**	0.14	222	<0.06	45	0.11	222	<0.06	45		•						
10 808	**G1**	0.16	222	<0.06	45	0.13	222	<0.06	45		•						
9 216	**F1**	0.19	222	<0.06	46	0.16	222	<0.06	45		•						
7 833	**E1**	0.22	222	<0.06	46	0.19	222	<0.06	46		•						
6 807	**D1**	0.26	222	<0.06	46	0.21	222	<0.06	46		•						
5 925	**C1**	0.30	222	<0.06	46	0.24	222	<0.06	46		•						
5 345	**B1**	0.33	222	<0.06	46	0.27	222	<0.06	46		•						
4 717	**A1**	0.37	222	<0.06	46	0.31	222	<0.06	46		•						
4 222	**B2**	0.41	222	<0.06	47	0.34	222	<0.06	46		•						
3 749	**A2**	0.47	222	<0.06	47	0.39	222	<0.06	46		•						
3 286	**X1**	0.53	222	<0.06	47	0.44	222	<0.06	47		•						
2 941	**W1**	0.60	222	<0.06	47	0.49	222	<0.06	47		•						
2 610	**V1**	0.67	222	<0.06	48	0.56	222	<0.06	47		•						
2 288	**U1**	0.76	223	<0.06	48	0.63	222	<0.06	47		•						
2 011	**T1**	0.87	223	<0.06	48	0.72	222	<0.06	48		•						
1 817	**S1**	0.96	223	<0.06	49	0.80	223	<0.06	48		•						
1 583	**R1**	1.11	223	<0.06	49	0.92	223	<0.06	49		•						
1 422	**Q1**	1.23	223	<0.06	50	1.02	223	<0.06	49		•						
1 284	**P1**	1.36	223	0.06	50	1.13	223	<0.06	49		•						
1 164	**N1**	1.50	223	0.07	51	1.25	223	<0.06	50		•						
1 059	**M1**	1.65	223	0.08	51	1.37	223	0.06	50		•						
937	**L1**	1.87	223	0.08	52	1.55	223	0.07	51		•						
865	**K1**	2.02	223	0.09	53	1.68	223	0.08	51		•						
745	**J1**	2.35	223	0.10	54	1.95	223	0.09	52		•						
677	**H1**	2.59	224	0.11	54	2.14	223	0.09	53		•						
615	**G1**	2.84	224	0.12	55	2.36	223	0.10	54		•						
558	**F1**	3.14	224	0.13	56	2.60	224	0.11	55		•						
508	**E1**	3.45	224	0.14	57	2.86	224	0.12	55		•						
449	**D1**	3.90	224	0.16	58	3.23	224	0.13	56		•						
414	**C1**	4.22	225	0.17	59	3.50	224	0.14	57		•						
357	**B1**	4.90	225	0.19	60	4.06	225	0.16	58		•						
324	**A1**	5.40	225	0.21	61	4.47	225	0.18	59		•						

★ Preferred transmission ratio
In the case of gearboxes of size 28, only possible with integrated motor or input unit KQ and KQS.

Transmission ratios and maximum torques

Selection and ordering data (continued)

Efficiency table C.38

Transmission ratio		Ratio code	Output speed n_{mot} = 1 750 rpm				Output speed n_{mot} = 1 450 rpm				Output speed n_{mot} = 1 150 rpm				Size for motor and input units							
i_{tot}		Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
320.67	★	**K2**	5.5	225	0.21	62	4.5	225	0.18	60	3.6	224	0.15	58	•	•	•					
284.70		**J2**	6.1	226	0.23	63	5.1	225	0.20	62	4.0	224	0.16	59	•	•	•					
249.60	★	**H2**	7.0	226	0.26	64	5.8	226	0.22	63	4.6	225	0.18	61	•	•	•	•				
223.36		**G2**	7.8	227	0.28	65	6.5	226	0.24	64	5.1	225	0.20	62	•	•	•	•				
198.25	★	**F2**	8.8	227	0.32	66	7.3	226	0.27	65	5.8	225	0.22	63	•	•	•	•				
173.73		**E2**	10.1	228	0.36	67	8.3	227	0.30	66	6.6	226	0.24	64	•	•	•	•				
152.75	★	**D2**	11.5	228	0.41	68	9.5	227	0.34	67	7.5	226	0.27	65	•	•	•	•				
138.00		**C2**	12.7	229	0.45	68	10.5	228	0.37	67	8.3	227	0.30	66	•	•	•	•				
120.25	★	**B2**	14.6	230	0.51	68	12.1	229	0.43	68	9.6	228	0.34	67	•	•	•	•				
108.00		**A2**	16.2	226	0.56	69	13.4	229	0.47	68	10.6	228	0.38	67	•	•	•	•				
97.50	★	**X1**	17.9	219	0.60	69	14.9	230	0.53	68	11.8	229	0.42	68	•	•	•	•	•			
88.40		**W1**	19.8	211	0.64	69	16.4	224	0.56	69	13.0	229	0.46	68	•	•	•	•	•			
80.44	★	**V1**	22.0	203	0.68	69	18.0	217	0.60	69	14.3	230	0.50	68	•	•	•	•	•			
71.12		**U1**	25.0	195	0.74	69	20.0	210	0.64	69	16.2	225	0.56	69	•	•	•	•	•			
65.68	★	**T1**	27.0	191	0.78	69	22.0	204	0.68	69	17.5	220	0.59	69	•	•	•	•	•			
60.30	★	**S1**	29.0	204	0.71	87	24.0	202	0.59	87	19.1	199	0.47	85	•	•	•					
53.53		**R1**	33.0	245	0.96	88	27.0	243	0.79	87	21.0	239	0.61	86	•	•	•					
46.93	★	**Q1**	37.0	232	1.02	88	31.0	231	0.85	88	25.0	228	0.69	87	•	•	•	•				
42.00		**P1**	42.0	222	1.10	89	35.0	220	0.92	88	27.0	218	0.71	87	•	•	•	•				
37.28	★	**N1**	47.0	232	1.28	89	39.0	231	1.07	89	31.0	229	0.85	88	•	•	•	•				
32.67		**M1**	54.0	192	1.22	89	44.0	192	0.99	89	35.0	190	0.79	88	•	•	•	•				
28.72	★	**L1**	61.0	208	1.49	89	50.0	207	1.22	89	40.0	206	0.97	89	•	•	•	•				
25.95		**K1**	67.0	209	1.64	89	56.0	208	1.37	89	44.0	207	1.08	89	•	•	•	•				
22.61	★	**J1**	77.0	206	1.86	89	64.0	206	1.55	89	51.0	205	1.23	89	•	•	•	•				
20.31		**H1**	86.0	196	1.98	89	71.0	196	1.63	89	57.0	196	1.31	89	•	•	•	•				
18.33	★	**G1**	95.0	199	2.21	89	79.0	206	1.91	89	63.0	206	1.52	89	•	•	•	•	•			
16.62		**F1**	105.0	191	2.34	89	87.0	196	2.00	89	69.0	196	1.59	89	•	•	•	•	•			
15.13	★	**E1**	116.0	183	2.49	89	96.0	187	2.10	89	76.0	187	1.66	89	•	•	•	•	•			
13.37		**D1**	131.0	165	2.53	89	108.0	165	2.09	89	86.0	165	1.66	89	•	•	•	•	•			
12.35	★	**C1**	142.0	169	2.81	89	117.0	172	2.36	89	93.0	172	1.88	89	•	•	•	•	•			
10.63		**B1**	165.0	155	3.00	89	136.0	173	2.76	89	108.0	183	2.31	89	•	•	•	•	•			
9.67	★	**A1**	181.0	141	3.00	89	150.0	170	3.00	89	119.0	176	2.46	89	•	•	•	•	•			

★ Preferred transmission ratio
In the case of gearboxes of size 28, only possible with integrated motor or input unit KQ and KQS.

Selection and ordering data (continued)

Efficiency table C.38

Transmission ratio		Ratio code	Output speed n_{mot} = 950 rpm				Output speed n_{mot} = 850 rpm				Output speed n_{mot} = 700 rpm				Size for motor and input units							
i_{tot}		Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
320.67	★	**K2**	3.0	224	0.12	56	2.7	224	0.11	56	2.2	223	0.10	54	•	•	•					
284.70		**J2**	3.3	224	0.13	58	3.0	224	0.12	57	2.5	224	0.11	55	•	•	•					
249.60	★	**H2**	3.8	224	0.15	59	3.4	224	0.14	58	2.8	224	0.12	56	•	•	•	•				
223.36		**G2**	4.3	225	0.17	60	3.8	224	0.15	59	3.1	224	0.13	57	•	•	•	•				
198.25	★	**F2**	4.8	225	0.19	61	4.3	225	0.17	60	3.5	224	0.14	58	•	•	•	•				
173.73		**E2**	5.5	225	0.21	62	4.9	225	0.19	61	4.0	224	0.16	59	•	•	•	•				
152.75	★	**D2**	6.2	226	0.23	63	5.6	225	0.21	62	4.6	225	0.18	61	•	•	•	•				
138.00		**C2**	6.9	226	0.25	64	6.2	226	0.23	63	5.1	225	0.20	62	•	•	•	•				
120.25	★	**B2**	7.9	227	0.29	65	7.1	226	0.26	65	5.8	226	0.22	63	•	•	•	•				
108.00		**A2**	8.8	227	0.32	66	7.9	227	0.29	65	6.5	226	0.24	64	•	•	•	•				
97.50	★	**X1**	9.7	228	0.35	67	8.7	227	0.31	66	7.2	226	0.26	65	•	•	•	•	•			
88.40		**W1**	10.7	228	0.38	67	9.6	228	0.34	67	7.9	227	0.29	65	•	•	•	•	•			
80.44	★	**V1**	11.8	229	0.42	68	10.6	228	0.38	67	8.7	227	0.31	66	•	•	•	•	•			
71.12		**U1**	13.4	229	0.47	68	12.0	229	0.42	68	9.8	228	0.35	67	•	•	•	•	•			
65.68	★	**T1**	14.5	230	0.51	68	12.9	229	0.46	68	10.7	228	0.38	67	•	•	•	•	•			
60.30	★	**S1**	15.8	196	0.39	84	14.1	195	0.34	84	11.6	192	0.28	82	•	•	•					
53.53		**R1**	17.7	236	0.52	85	15.9	234	0.46	84	13.1	231	0.38	83	•	•	•					
46.93	★	**Q1**	20.0	225	0.55	86	18.1	223	0.50	85	14.9	220	0.41	84	•	•	•	•				
42.00		**P1**	23.0	216	0.60	86	20.0	214	0.52	86	16.7	211	0.44	85	•	•	•	•				
37.28	★	**N1**	25.0	227	0.68	87	23.0	225	0.63	86	18.8	222	0.51	85	•	•	•	•				
32.67		**M1**	29.0	189	0.65	87	26.0	188	0.59	87	21.0	185	0.47	86	•	•	•	•				
28.72	★	**L1**	33.0	205	0.80	88	30.0	204	0.73	88	24.0	202	0.58	87	•	•	•	•				
25.95		**K1**	37.0	206	0.90	88	33.0	205	0.81	88	27.0	204	0.66	87	•	•	•	•				
22.61	★	**J1**	42.0	205	1.01	89	38.0	204	0.92	88	31.0	202	0.75	88	•	•	•	•				
20.31		**H1**	47.0	195	1.08	89	42.0	195	0.96	89	34.0	193	0.78	88	•	•	•	•				
18.33	★	**G1**	52.0	206	1.26	89	46.0	205	1.11	89	38.0	204	0.92	88	•	•	•	•	•			
16.62		**F1**	57.0	196	1.31	89	51.0	195	1.17	89	42.0	195	0.96	89	•	•	•	•	•			
15.13	★	**E1**	63.0	186	1.38	89	56.0	186	1.22	89	46.0	186	1.01	89	•	•	•	•	•			
13.37		**D1**	71.0	165	1.37	89	64.0	165	1.24	89	52.0	164	1.00	89	•	•	•	•	•			
12.35	★	**C1**	77.0	172	1.55	89	69.0	172	1.39	89	57.0	172	1.15	89	•	•	•	•	•			
10.63		**B1**	89.0	183	1.90	89	80.0	183	1.71	89	66.0	182	1.41	89	•	•	•	•	•			
9.67	★	**A1**	98.0	176	2.02	89	88.0	176	1.82	89	72.0	176	1.49	89	•	•	•	•	•			

★ Preferred transmission ratio
In the case of gearboxes of size 28, only possible with integrated motor or input unit KQ and KQS.

Transmission ratios and maximum torques

Selection and ordering data (continued)

Efficiency table C.38

Transmission ratio	Ratio code	Output speed n_{mot} = 500 rpm				Output speed n_{mot} = 250 rpm				Output speed n_{mot} = 10 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
320.67 ★	**K2**	1.6	223	0.07	52	0.78	223	<0.05	49	0.031	222	<0.05	46	•	•	•					
284.70	**J2**	1.8	223	0.08	53	0.88	223	<0.05	49	0.035	222	<0.05	46	•	•	•					
249.60 ★	**H2**	2.0	223	0.09	53	1.00	223	<0.05	50	0.040	222	<0.05	46	•	•	•	•				
223.36	**G2**	2.2	223	0.09	54	1.10	223	0.05	50	0.045	222	<0.05	46	•	•	•	•				
198.25 ★	**F2**	2.5	224	0.11	55	1.30	223	0.06	51	0.050	222	<0.05	46	•	•	•	•				
173.73	**E2**	2.9	224	0.12	56	1.40	223	0.06	51	0.058	222	<0.05	46	•	•	•	•				
152.75 ★	**D2**	3.3	224	0.13	57	1.60	223	0.07	52	0.065	222	<0.05	46	•	•	•	•				
138.00	**C2**	3.6	224	0.15	58	1.80	223	0.08	53	0.072	222	<0.05	46	•	•	•	•				
120.25 ★	**B2**	4.2	225	0.17	60	2.10	223	0.09	54	0.083	222	<0.05	46	•	•	•	•				
108.00	**A2**	4.6	225	0.18	61	2.30	223	0.10	54	0.093	222	<0.05	46	•	•	•	•				
97.50 ★	**X1**	5.1	225	0.20	62	2.60	224	0.11	55	0.100	222	<0.05	46	•	•	•	•	•			
88.40	**W1**	5.7	225	0.22	63	2.80	224	0.12	56	0.110	222	<0.05	46	•	•	•	•	•			
80.44 ★	**V1**	6.2	226	0.23	63	3.10	224	0.13	57	0.120	222	<0.05	46	•	•	•	•	•			
71.12	**U1**	7.0	226	0.26	64	3.50	224	0.14	58	0.140	222	<0.05	46	•	•	•	•	•			
65.68 ★	**T1**	7.6	226	0.28	65	3.80	224	0.15	59	0.150	222	<0.05	46	•	•	•	•	•			
60.30 ★	**S1**	8.3	188	0.20	80	4.10	181	0.10	78	0.170	173	<0.05	74	•	•	•					
53.53	**R1**	9.3	226	0.27	81	4.70	217	0.14	78	0.190	206	<0.05	74	•	•	•					
46.93 ★	**Q1**	10.7	215	0.29	82	5.30	206	0.15	78	0.210	194	<0.05	74	•	•	•	•				
42.00	**P1**	11.9	206	0.31	82	6.00	197	0.16	79	0.240	185	<0.05	74	•	•	•	•				
37.28 ★	**N1**	13.4	217	0.37	83	6.70	207	0.18	79	0.270	193	<0.05	74	•	•	•	•				
32.67	**M1**	15.3	181	0.35	84	7.70	173	0.17	80	0.310	160	<0.05	74	•	•	•	•				
28.72 ★	**L1**	17.4	197	0.42	85	8.70	188	0.21	81	0.350	172	<0.05	74	•	•	•	•				
25.95	**K1**	19.3	199	0.47	85	9.60	190	0.23	81	0.390	173	<0.05	74	•	•	•	•				
22.61 ★	**J1**	22.0	199	0.53	86	11.10	189	0.27	82	0.440	171	<0.05	74	•	•	•	•				
20.31	**H1**	25.0	190	0.57	87	12.30	181	0.28	83	0.490	163	<0.05	74	•	•	•	•				
18.33 ★	**G1**	27.0	201	0.65	87	13.60	192	0.33	83	0.550	172	<0.05	74	•	•	•	•	•			
16.62	**F1**	30.0	192	0.69	88	15.00	184	0.34	84	0.600	163	<0.05	74	•	•	•	•	•			
15.13 ★	**E1**	33.0	184	0.72	88	16.50	176	0.36	84	0.660	155	<0.05	74	•	•	•	•	•			
13.37	**D1**	37.0	163	0.71	88	18.70	157	0.36	85	0.750	138	<0.05	75	•	•	•	•	•			
12.35 ★	**C1**	40.0	171	0.81	89	20.00	165	0.40	86	0.810	144	<0.05	75	•	•	•	•	•			
10.63	**B1**	47.0	182	1.00	89	24.00	177	0.51	86	0.940	153	<0.05	75	•	•	•	•	•			
9.67 ★	**A1**	52.0	176	1.07	89	26.00	171	0.54	87	1.000	147	<0.05	75	•	•	•	•	•			

★ Preferred transmission ratio
In the case of gearboxes of size 28, only possible with integrated motor or input unit KQ and KQS.

Selection and ordering data (continued)

Efficiency table C.48-D/Z28

Transmission ratio	Ratio code	Output speed n_{mot} = 1 750 rpm				Output speed n_{mot} = 1 450 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
23 503	**N1**	0.07	364	<0.06	47	0.06	364	<0.06	47		•						
20 276	**M1**	0.09	364	<0.06	47	0.07	364	<0.06	47		•						
17 420	**L1**	0.10	364	<0.06	47	0.08	364	<0.06	47		•						
16 037	**K1**	0.11	364	<0.06	47	0.09	364	<0.06	47		•						
14 579	**J1**	0.12	364	<0.06	47	0.10	364	<0.06	47		•						
12 904	**H1**	0.14	364	<0.06	47	0.11	364	<0.06	47		•						
10 808	**G1**	0.16	364	<0.06	47	0.13	364	<0.06	47		•						
9 216	**F1**	0.19	364	<0.06	47	0.16	364	<0.06	47		•						
7 833	**E1**	0.22	364	<0.06	48	0.19	364	<0.06	47		•						
6 807	**D1**	0.26	364	<0.06	48	0.21	364	<0.06	47		•						
5 925	**C1**	0.30	364	<0.06	48	0.24	364	<0.06	48		•						
5 345	**B1**	0.33	364	<0.06	48	0.27	364	<0.06	48		•						
4 717	**A1**	0.37	364	<0.06	48	0.31	364	<0.06	48		•						
4 222	**B2**	0.41	364	<0.06	48	0.34	364	<0.06	48		•						
3 749	**A2**	0.47	364	<0.06	49	0.39	364	<0.06	48		•						
3 286	**X1**	0.53	364	<0.06	49	0.44	364	<0.06	49		•						
2 941	**W1**	0.60	364	<0.06	49	0.49	364	<0.06	49		•						
2 610	**V1**	0.67	364	<0.06	50	0.56	364	<0.06	49		•						
2 288	**U1**	0.76	365	<0.06	50	0.63	364	<0.06	49		•						
2 011	**T1**	0.87	365	0.07	51	0.72	364	<0.06	50		•						
1 817	**S1**	0.96	365	0.07	51	0.80	365	0.06	50		•						
1 583	**R1**	1.11	365	0.08	52	0.92	365	0.07	51		•						
1 422	**Q1**	1.23	365	0.09	52	1.02	365	0.08	51		•						
1 284	**P1**	1.36	365	0.10	53	1.13	365	0.08	52		•						
1 164	**N1**	1.50	365	0.11	53	1.25	365	0.09	52		•						
1 059	**M1**	1.65	366	0.12	54	1.37	365	0.10	53		•						
937	**L1**	1.87	366	0.13	55	1.55	365	0.11	53		•						
865	**K1**	2.02	366	0.14	55	1.68	366	0.12	54		•						
745	**J1**	2.35	366	0.16	56	1.95	366	0.14	55		•						
677	**H1**	2.59	367	0.17	57	2.14	366	0.15	56		•						
615	**G1**	2.84	367	0.19	58	2.36	366	0.16	57		•						
558	**F1**	3.14	367	0.20	59	2.60	367	0.17	57		•						
508	**E1**	3.45	368	0.22	60	2.86	367	0.19	58		•						
449	**D1**	3.90	368	0.25	61	3.23	367	0.21	59		•						
414	**C1**	4.22	368	0.26	62	3.50	368	0.22	60		•						
357	**B1**	4.90	369	0.30	64	4.06	368	0.25	62		•						
324	**A1**	5.40	370	0.32	64	4.47	369	0.28	63		•						

★ Preferred transmission ratio
In the case of gearboxes of size 28, only possible with integrated motor or input unit KQ and KQS.

Transmission ratios and maximum torques

Selection and ordering data (continued)

Efficiency table C.48

Transmission ratio		Ratio code	Output speed n_{mot} = 1 750 rpm				Output speed n_{mot} = 1 450 rpm				Output speed n_{mot} = 1 150 rpm				Size for motor and input units							
i_{tot}		Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
320.67	★	**K2**	5.5	370	0.32	66	4.5	369	0.27	64	3.6	368	0.23	61	•	•	•					
284.70		**J2**	6.1	370	0.35	67	5.1	369	0.30	65	4.0	368	0.25	63	•	•	•					
249.60	★	**H2**	7.0	371	0.40	68	5.8	370	0.34	66	4.6	369	0.28	64	•	•	•	•				
223.36		**G2**	7.8	372	0.44	69	6.5	371	0.38	67	5.1	369	0.30	65	•	•	•	•				
198.25	★	**F2**	8.8	373	0.49	70	7.3	372	0.42	68	5.8	370	0.34	66	•	•	•	•				
173.73		**E2**	10.1	374	0.56	70	8.3	373	0.47	69	6.6	371	0.38	67	•	•	•	•				
152.75	★	**D2**	11.5	375	0.64	71	9.5	374	0.53	70	7.5	372	0.43	68	•	•	•	•				
138.00		**C2**	12.7	377	0.70	71	10.5	375	0.58	71	8.3	373	0.47	69	•	•	•	•				
120.25	★	**B2**	14.6	363	0.78	72	12.1	376	0.67	71	9.6	374	0.54	70	•	•	•	•				
108.00		**A2**	16.2	350	0.83	72	13.4	377	0.74	71	10.6	375	0.59	71	•	•	•	•				
97.50	★	**X1**	17.9	339	0.88	72	14.9	378	0.82	72	11.8	376	0.65	71	•	•	•	•	•			
88.40		**W1**	19.8	329	0.95	72	16.4	380	0.91	72	13.0	375	0.72	71	•	•	•	•	•			
80.44	★	**V1**	22.0	318	1.02	72	18.0	381	1.00	72	14.3	365	0.76	72	•	•	•	•	•			
71.12		**U1**	25.0	305	1.11	72	20.0	382	1.11	72	16.2	352	0.83	72	•	•	•	•	•			
65.68	★	**T1**	27.0	297	1.17	72	22.0	384	1.23	72	17.5	343	0.87	72	•	•	•	•	•			
56.55	★	**S1**	31.0	285	1.28	72	26.0	386	1.46	72	20.0	329	0.96	72	•	•	•	•	•			
51.41		**R1**	34.0	276	1.37	72	28.0	387	1.58	72	22.0	319	1.02	72	•	•	•	•	•			
46.93	★	**Q1**	37.0	293	1.27	89	31.0	292	1.07	89	25.0	289	0.86	88	•	•	•	•				
42.00		**P1**	42.0	320	1.57	90	35.0	318	1.31	89	27.0	316	1.01	88	•	•	•	•				
37.28	★	**N1**	47.0	267	1.47	90	39.0	267	1.22	89	31.0	265	0.97	89	•	•	•	•				
32.67		**M1**	54.0	267	1.68	90	44.0	266	1.37	90	35.0	265	1.09	89	•	•	•	•				
28.72	★	**L1**	61.0	289	2.05	90	50.0	289	1.68	90	40.0	288	1.35	89	•	•	•	•				
25.95		**K1**	67.0	277	2.17	90	56.0	277	1.81	90	44.0	277	1.42	90	•	•	•	•				
22.61	★	**J1**	77.0	270	2.42	90	64.0	270	2.02	90	51.0	270	1.61	90	•	•	•	•				
20.31		**H1**	86.0	281	2.82	90	71.0	281	2.33	90	57.0	281	1.87	90	•	•	•	•				
18.33	★	**G1**	95.0	300	3.32	90	79.0	300	2.76	90	63.0	300	2.20	90	•	•	•	•	•			
16.62		**F1**	105.0	291	3.56	90	87.0	293	2.97	90	69.0	293	2.35	90	•	•	•	•	•			
15.13	★	**E1**	116.0	266	3.60	90	96.0	266	2.98	90	76.0	266	2.36	90	•	•	•	•	•			
13.37		**D1**	131.0	236	3.60	90	108.0	236	2.96	90	86.0	236	2.36	90	•	•	•	•	•			
12.35	★	**C1**	142.0	242	4.00	90	117.0	249	3.39	90	93.0	249	2.69	90	•	•	•	•	•			
10.63		**B1**	165.0	208	4.00	90	136.0	252	4.00	90	108.0	254	3.20	90	•	•	•	•	•			
9.67	★	**A1**	181.0	189	4.00	90	150.0	229	4.00	90	119.0	243	3.37	90	•	•	•	•	•			

★ Preferred transmission ratio
In the case of gearboxes of size 28, only possible with integrated motor or input unit KQ and KQS.

Selection and ordering data (continued)

Efficiency table C.48

Transmission ratio		Ratio code	Output speed n_{mot} = 950 rpm				Output speed n_{mot} = 850 rpm				Output speed n_{mot} = 750 rpm				Size for motor and input units							
i_{tot}		Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
320.67	★	**K2**	3.0	367	0.19	59	2.7	367	0.18	58	2.2	366	0.15	57	•	•	•					
284.70		**J2**	3.3	367	0.21	61	3.0	367	0.19	59	2.5	366	0.17	58	•	•	•					
249.60	★	**H2**	3.8	368	0.24	62	3.4	368	0.22	61	2.8	367	0.18	59	•	•	•	•				
223.36		**G2**	4.3	368	0.26	63	3.8	368	0.24	62	3.1	367	0.20	60	•	•	•	•				
198.25	★	**F2**	4.8	369	0.29	64	4.3	368	0.26	63	3.5	368	0.22	61	•	•	•	•				
173.73		**E2**	5.5	370	0.32	66	4.9	369	0.29	64	4.0	368	0.25	62	•	•	•	•				
152.75	★	**D2**	6.2	370	0.36	67	5.6	370	0.33	66	4.6	369	0.28	64	•	•	•	•				
138.00		**C2**	6.9	371	0.40	68	6.2	370	0.36	67	5.1	369	0.30	65	•	•	•	•				
120.25	★	**B2**	7.9	372	0.45	69	7.1	371	0.41	68	5.8	370	0.34	66	•	•	•	•				
108.00		**A2**	8.8	373	0.49	70	7.9	372	0.45	69	6.5	371	0.38	67	•	•	•	•				
97.50	★	**X1**	9.7	374	0.54	70	8.7	373	0.49	69	7.2	371	0.41	68	•	•	•	•	•			
88.40		**W1**	10.7	375	0.59	71	9.6	374	0.54	70	7.9	372	0.45	69	•	•	•	•	•			
80.44	★	**V1**	11.8	376	0.65	71	10.6	375	0.59	71	8.7	373	0.49	69	•	•	•	•	•			
71.12		**U1**	13.4	373	0.73	71	12.0	376	0.66	71	9.8	374	0.55	70	•	•	•	•	•			
65.68	★	**T1**	14.5	363	0.77	72	12.9	377	0.71	71	10.7	375	0.59	71	•	•	•	•	•			
56.55	★	**S1**	16.8	348	0.85	72	15.0	361	0.79	72	12.4	376	0.69	71	•	•	•	•	•			
51.41		**R1**	18.5	338	0.91	72	16.5	350	0.84	72	13.6	372	0.74	71	•	•	•	•	•			
46.93	★	**Q1**	20.0	286	0.69	87	18.1	284	0.62	86	14.9	280	0.51	85	•	•	•	•				
42.00		**P1**	23.0	313	0.86	88	20.0	311	0.75	87	16.7	306	0.62	86	•	•	•	•				
37.28	★	**N1**	25.0	263	0.78	88	23.0	261	0.72	90	18.8	258	0.59	87	•	•	•	•				
32.67		**M1**	29.0	263	0.90	89	26.0	262	0.81	88	21.0	259	0.65	87	•	•	•	•				
28.72	★	**L1**	33.0	286	1.11	89	30.0	285	1.01	89	24.0	283	0.81	88	•	•	•	•				
25.95		**K1**	37.0	276	1.20	89	33.0	275	1.07	89	27.0	273	0.87	88	•	•	•	•				
22.61	★	**J1**	42.0	269	1.32	90	38.0	269	1.20	89	31.0	267	0.98	89	•	•	•	•				
20.31		**H1**	47.0	280	1.54	90	42.0	280	1.38	90	34.0	279	1.11	89	•	•	•	•				
18.33	★	**G1**	52.0	299	1.82	90	46.0	299	1.61	90	38.0	298	1.33	89	•	•	•	•	•			
16.62		**F1**	57.0	293	1.94	90	51.0	292	1.74	90	42.0	292	1.43	90	•	•	•	•	•			
15.13	★	**E1**	63.0	266	1.96	90	56.0	266	1.74	90	46.0	266	1.43	90	•	•	•	•	•			
13.37		**D1**	71.0	235	1.95	90	64.0	235	1.76	90	52.0	235	1.43	90	•	•	•	•	•			
12.35	★	**C1**	77.0	249	2.23	90	69.0	249	2.00	90	57.0	248	1.65	90	•	•	•	•	•			
10.63		**B1**	89.0	254	2.64	90	80.0	254	2.37	90	66.0	254	1.95	90	•	•	•	•	•			
9.67	★	**A1**	98.0	243	2.78	90	88.0	243	2.49	90	72.0	243	2.04	90	•	•	•	•	•			

★ Preferred transmission ratio
In the case of gearboxes of size 28, only possible with integrated motor or input unit KQ and KQS.

Transmission ratios and maximum torques

Selection and ordering data (continued)

Efficiency table C.48

Transmission ratio	Ratio code	Output speed n_{mot} = 500 rpm				Output speed n_{mot} = 250 rpm				Output speed n_{mot} = 10 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
320.67 ★	**K2**	1.6	365	0.11	54	0.78	365	0.06	51	0.031	364	<0.05	47	•	•	•					
284.70	**J2**	1.8	366	0.13	55	0.88	365	0.07	51	0.035	364	<0.05	47	•	•	•					
249.60 ★	**H2**	2.0	366	0.14	56	1.00	365	0.07	52	0.040	364	<0.05	47	•	•	•	•				
223.36	**G2**	2.2	366	0.15	57	1.10	365	0.08	52	0.045	364	<0.05	47	•	•	•	•				
198.25 ★	**F2**	2.5	367	0.17	58	1.30	365	0.09	53	0.050	364	<0.05	47	•	•	•	•				
173.73	**E2**	2.9	367	0.19	59	1.40	365	0.10	54	0.058	364	<0.05	47	•	•	•	•				
152.75 ★	**D2**	3.3	367	0.21	60	1.60	366	0.11	55	0.065	364	<0.05	47	•	•	•	•				
138.00	**C2**	3.6	368	0.23	61	1.80	366	0.12	55	0.072	364	<0.05	47	•	•	•	•				
120.25 ★	**B2**	4.2	368	0.26	63	2.10	366	0.14	56	0.083	364	<0.05	48	•	•	•	•				
108.00	**A2**	4.6	369	0.28	64	2.30	366	0.15	57	0.093	364	<0.05	48	•	•	•	•				
97.50 ★	**X1**	5.1	369	0.30	65	2.60	367	0.17	58	0.100	364	<0.05	48	•	•	•	•	•			
88.40	**W1**	5.7	370	0.33	66	2.80	367	0.18	59	0.110	364	<0.05	48	•	•	•	•	•			
80.44 ★	**V1**	6.2	370	0.36	67	3.10	367	0.20	60	0.120	364	<0.05	48	•	•	•	•	•			
71.12	**U1**	7.0	371	0.40	68	3.50	368	0.22	61	0.140	364	<0.05	48	•	•	•	•	•			
65.68 ★	**T1**	7.6	372	0.43	69	3.80	368	0.24	62	0.150	364	<0.05	48	•	•	•	•	•			
56.55 ★	**S1**	8.8	373	0.49	70	4.40	369	0.27	63	0.180	364	<0.05	48	•	•	•	•	•			
51.41	**R1**	9.7	374	0.54	70	4.90	369	0.29	64	0.190	364	<0.05	48	•	•	•	•	•			
46.93 ★	**Q1**	10.7	272	0.37	83	5.30	258	0.18	78	0.210	238	<0.05	72	•	•	•	•				
42.00	**P1**	11.9	298	0.44	84	6.00	282	0.22	79	0.240	259	<0.05	72	•	•	•	•				
37.28 ★	**N1**	13.4	252	0.42	84	6.70	238	0.21	80	0.270	216	<0.05	72	•	•	•	•				
32.67	**M1**	15.3	253	0.48	85	7.70	240	0.24	81	0.310	216	<0.05	73	•	•	•	•				
28.72 ★	**L1**	17.4	277	0.59	86	8.70	262	0.29	81	0.350	234	<0.05	73	•	•	•	•				
25.95	**K1**	19.3	268	0.62	87	9.60	253	0.31	82	0.390	224	<0.05	73	•	•	•	•				
22.61 ★	**J1**	22.0	263	0.69	87	11.10	250	0.35	83	0.440	219	<0.05	73	•	•	•	•				
20.31	**H1**	25.0	275	0.82	88	12.30	262	0.40	84	0.490	228	<0.05	73	•	•	•	•				
18.33 ★	**G1**	27.0	295	0.94	88	13.60	282	0.48	84	0.550	243	<0.05	73	•	•	•	•	•			
16.62	**F1**	30.0	289	1.02	89	15.00	277	0.51	85	0.600	238	<0.05	73	•	•	•	•	•			
15.13 ★	**E1**	33.0	264	1.02	89	16.50	254	0.51	86	0.660	217	<0.05	73	•	•	•	•	•			
13.37	**D1**	37.0	234	1.02	89	18.70	227	0.51	87	0.750	192	<0.05	73	•	•	•	•	•			
12.35 ★	**C1**	40.0	247	1.16	89	20.00	241	0.58	87	0.810	203	<0.05	73	•	•	•	•	•			
10.63	**B1**	47.0	254	1.39	90	24.00	248	0.71	88	0.940	208	<0.05	73	•	•	•	•	•			
9.67 ★	**A1**	52.0	243	1.47	90	26.00	239	0.74	88	1.000	199	<0.05	74	•	•	•	•	•			

★ Preferred transmission ratio
In the case of gearboxes of size 28, only possible with integrated motor or input unit KQ and KQS.

Selection and ordering data (continued)

Efficiency table C.68-D/Z28

Transmission ratio	Ratio code	Output speed n_{mot} = 1 750 rpm				Output speed n_{mot} = 1 450 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
28 203	**N1**	0.06	675	<0.06	49	0.05	675	<0.06	49		•						
24 331	**M1**	0.07	675	<0.06	49	0.06	675	<0.06	49		•						
20 903	**L1**	0.08	675	<0.06	49	0.07	675	<0.06	49		•						
19 244	**K1**	0.09	675	<0.06	49	0.08	675	<0.06	49		•						
17 495	**J1**	0.10	675	<0.06	49	0.08	675	<0.06	49		•						
15 485	**H1**	0.11	675	<0.06	49	0.09	675	<0.06	49		•						
12 970	**G1**	0.13	675	<0.06	49	0.11	675	<0.06	49		•						
11 059	**F1**	0.16	675	<0.06	49	0.13	675	<0.06	49		•						
9 400	**E1**	0.19	675	<0.06	50	0.15	675	<0.06	49		•						
8 169	**D1**	0.21	675	<0.06	50	0.18	675	<0.06	50		•						
7 110	**C1**	0.25	675	<0.06	50	0.20	675	<0.06	50		•						
6 414	**B1**	0.27	675	<0.06	50	0.23	675	<0.06	50		•						
5 661	**A1**	0.31	675	<0.06	50	0.26	675	<0.06	50		•						
5 066	**B2**	0.35	675	<0.06	51	0.29	675	<0.06	50		•						
4 498	**A2**	0.39	675	<0.06	51	0.32	675	< 0.06	51		•						
3 944	**X1**	0.44	675	0.06	51	0.37	675	<0.06	51		•						
3 529	**W1**	0.50	675	0.07	52	0.41	675	<0.06	51		•						
3 132	**V1**	0.56	675	0.08	52	0.46	675	0.06	51		•						
2 745	**U1**	0.64	675	0.09	53	0.53	675	0.07	52		•						
2 414	**T1**	0.73	676	0.10	53	0.60	675	0.08	52		•						
2 180	**S1**	0.80	676	0.11	54	0.67	675	0.09	53		•						
1 900	**R1**	0.92	676	0.12	54	0.76	676	0.10	53		•						
1 706	**Q1**	1.03	676	0.13	55	0.85	676	0.11	54		•						
1 541	**P1**	1.14	676	0.14	56	0.94	676	0.12	54		•						
1 397	**N1**	1.25	676	0.16	56	1.04	676	0.13	55		•						
1 271	**M1**	1.38	677	0.17	57	1.14	676	0.15	56		•						
1 124	**L1**	1.56	677	0.19	58	1.29	676	0.16	56		•						
1 038	**K1**	1.69	677	0.20	58	1.40	677	0.17	57		•						
893	**J1**	1.96	677	0.23	60	1.62	677	0.20	58		•						
812	**H1**	2.15	678	0.25	61	1.79	677	0.22	59		•						
738	**G1**	2.37	678	0.27	61	1.96	677	0.23	60		•						
669	**F1**	2.61	678	0.30	62	2.17	678	0.25	61		•						
609	**E1**	2.87	679	0.32	63	2.38	678	0.27	62		•						
539	**D1**	3.25	679	0.36	65	2.69	679	0.30	63		•						
497	**C1**	3.52	680	0.38	65	2.92	679	0.33	64		•						
428	**B1**	4.09	681	0.43	67	3.39	680	0.37	65		•						
389	**A1**	4.50	681	0.47	68	3.73	680	0.40	66		•						

★ Preferred transmission ratio
In the case of gearboxes of size 18 or 28, only possible with integrated motor or input unit KQ and KQS.

Transmission ratios and maximum torques

Selection and ordering data (continued)

Efficiency table C.68

Transmission ratio	Ratio code	Output speed n_{mot} = 1 750 rpm				Output speed n_{mot} = 1 450 rpm				Output speed n_{mot} = 1 150 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
364.00 ★	**U2**	4.8	682	0.49	70	4.0	680	0.42	68	3.2	679	0.35	65	•	•						
323.70	**T2**	5.4	682	0.55	71	4.5	681	0.47	69	3.6	680	0.38	67	•	•	•					
280.80 ★	**S2**	6.2	684	0.62	72	5.2	682	0.53	70	4.1	681	0.43	68	•	•	•	•				
262.36	**R2**	6.7	684	0.67	72	5.5	683	0.56	71	4.4	681	0.46	69	•	•	•	•				
230.75 ★	**Q2**	7.6	685	0.75	73	6.3	684	0.63	72	5.0	682	0.51	70	•	•	•	•				
202.09	**P2**	8.7	654	0.81	73	7.2	685	0.71	72	5.7	683	0.57	71	•	•	•	•	•			
178.75 ★	**N2**	9.8	627	0.87	74	8.1	662	0.77	73	6.4	684	0.64	72	•	•	•	•	•	•		
162.00	**M2**	10.8	606	0.93	74	9.0	687	0.88	73	7.1	683	0.70	72	•	•	•	•	•	•		
143.00 ★	**L2**	12.2	581	1.00	74	10.1	616	0.88	74	8.0	659	0.76	73	•	•	•	•	•	•		
129.00	**K2**	13.6	560	1.07	74	11.2	595	0.94	74	8.9	638	0.81	73	•	•	•	•	•	•		
117.00 ★	**J2**	15.0	542	1.15	74	12.4	691	1.21	74	9.8	619	0.86	74	•	•	•	•	•	•		
106.60	**H2**	16.4	526	1.21	74	13.6	559	1.07	74	10.8	601	0.92	74	•	•	•	•	•	•		
97.50 ★	**G2**	17.9	511	1.29	74	14.9	694	1.46	74	11.8	585	0.98	74	•	•	•	•	•	•		
90.00 ★	**F2**	19.4	347	0.80	88	16.1	344	0.67	87	12.8	339	0.53	86	•	•	•	•				
84.09	**E2**	21.0	531	1.33	88	17.2	528	1.09	87	13.7	521	0.87	86	•	•	•	•				
73.96 ★	**D2**	24.0	547	1.56	88	19.6	544	1.28	88	15.5	539	1.01	87	•	•	•	•				
64.77	**C2**	27.0	640	2.05	88	22.0	638	1.67	88	17.8	633	1.35	87	•	•	•	•	•			
57.29 ★	**B2**	31.0	617	2.27	88	25.0	661	1.96	88	20.0	709	1.69	88	•	•	•	•	•	•		
51.92	**A2**	34.0	599	2.41	88	28.0	660	2.19	88	22.0	657	1.72	88	•	•	•	•	•	•		
45.83 ★	**X1**	38.0	578	2.60	88	32.0	681	2.58	88	25.0	661	1.96	88	•	•	•	•	•	•		
41.35	**W1**	42.0	559	2.78	89	35.0	594	2.46	88	28.0	639	2.12	88	•	•	•	•	•	•		
37.50 ★	**U1**	47.0	540	3.00	89	39.0	645	2.98	88	31.0	619	2.27	88	•	•	•	•	•	•		
34.17	**T1**	51.0	526	3.17	89	42.0	561	2.79	89	34.0	601	2.42	88	•	•	•	•	•	•		
31.25 ★	**R1**	56.0	511	3.38	89	46.0	545	2.97	89	37.0	586	2.57	88	•	•	•	•	•	•		
27.94	**P1**	63.0	493	3.67	89	52.0	593	3.65	89	41.0	569	2.76	89	•	•	•	•	•	•		
25.66 ★	**M1**	68.0	480	3.86	89	57.0	571	3.85	89	45.0	550	2.93	89	•	•	•	•	•	•		
23.13	**K1**	76.0	464	4.17	89	63.0	557	4.15	89	50.0	534	3.16	89	•	•	•	•	•	•		
19.89 ★	**G1**	88.0	444	4.63	89	73.0	534	4.61	89	58.0	511	3.50	89	•	•	•	•	•	•		
38.00	**V1**	46.0	437	2.34	90	38.0	436	1.94	90	30.0	435	1.53	89	•	•	•	•	•			
33.61 ★	**S1**	52.0	435	2.64	90	43.0	435	2.18	90	34.0	434	1.72	90	•	•	•	•	•	•		
30.46	**Q1**	57.0	394	2.62	90	48.0	394	2.20	90	38.0	393	1.75	90	•	•	•	•	•	•		
26.89 ★	**N1**	65.0	406	3.07	90	54.0	406	2.55	90	43.0	406	2.03	90	•	•	•	•	•	•		
24.26	**L1**	72.0	401	3.36	90	60.0	401	2.80	90	47.0	401	2.20	90	•	•	•	•	•	•		
22.00 ★	**J1**	80.0	427	3.98	90	66.0	427	3.28	90	52.0	427	2.59	90	•	•	•	•	•	•		
20.04	**H1**	87.0	432	4.38	90	72.0	432	3.63	90	57.0	432	2.87	90	•	•	•	•	•	•		
18.33 ★	**F1**	95.0	422	4.67	90	79.0	422	3.88	90	63.0	422	3.10	90	•	•	•	•	•	•		
16.39	**E1**	107.0	401	5.00	90	88.0	401	4.11	90	70.0	401	3.27	90	•	•	•	•	•	•		
15.05 ★	**D1**	116.0	401	5.41	90	96.0	401	4.48	90	76.0	401	3.55	90	•	•	•	•	•	•		
13.57	**C1**	129.0	366	5.50	90	107.0	420	5.23	90	85.0	420	4.15	90	•	•	•	•	•	•		
11.67 ★	**B1**	150.0	315	5.50	90	124.0	378	5.45	90	99.0	378	4.35	90	•	•	•	•	•	•		

★ Preferred transmission ratio
In the case of gearboxes of size 18 or 28, only possible with integrated motor or input unit KQ and KQS.

Selection and ordering data (continued)

Efficiency table C.68

Transmission ratio	Ratio code	Output speed n_{mot} = 950 rpm				Output speed n_{mot} = 850 rpm				Output speed n_{mot} = 700 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
364.00 ★	**U2**	2.6	678	0.29	63	2.3	678	0.26	62	1.9	677	0.22	60	•	•						
323.70	**T2**	2.9	679	0.32	65	2.6	678	0.29	63	2.2	678	0.25	62	•	•	•					
280.80 ★	**S2**	3.4	680	0.37	66	3.0	679	0.33	65	2.5	678	0.28	63	•	•	•	•				
262.36	**R2**	3.6	680	0.38	67	3.2	679	0.35	66	2.7	678	0.30	64	•	•	•	•				
230.75 ★	**Q2**	4.1	681	0.43	68	3.7	680	0.39	67	3.0	679	0.33	65	•	•	•	•				
202.09	**P2**	4.7	681	0.48	69	4.2	681	0.44	68	3.5	680	0.38	66	•	•	•	•	•			
178.75 ★	**N2**	5.3	682	0.54	70	4.8	681	0.49	69	3.9	680	0.41	68	•	•	•	•	•	•		
162.00	**M2**	5.9	683	0.59	71	5.2	682	0.53	70	4.3	681	0.45	69	•	•	•	•	•	•		
143.00 ★	**L2**	6.6	684	0.66	72	5.9	683	0.59	71	4.9	682	0.50	70	•	•	•	•	•	•		
129.00	**K2**	7.4	671	0.72	73	6.6	684	0.66	72	5.4	682	0.55	71	•	•	•	•	•	•		
117.00 ★	**J2**	8.1	654	0.76	73	7.3	672	0.71	73	6.0	683	0.60	71	•	•	•	•	•	•		
106.60	**H2**	8.9	637	0.81	73	8.0	656	0.75	73	6.6	684	0.66	72	•	•	•	•	•	•		
97.50 ★	**G2**	9.7	621	0.86	74	8.7	641	0.80	73	7.2	675	0.70	72	•	•	•	•	•	•		
90.00 ★	**F2**	10.6	335	0.44	85	9.4	332	0.39	84	7.8	326	0.32	82	•	•	•	•				
84.09	**E2**	11.3	515	0.72	85	10.1	510	0.64	84	8.3	502	0.53	83	•	•	•	•				
73.96 ★	**D2**	12.8	533	0.83	86	11.5	529	0.75	85	9.5	521	0.62	84	•	•	•	•				
64.77	**C2**	14.7	627	1.12	86	13.1	623	1.00	86	10.8	614	0.82	85	•	•	•	•	•			
57.29 ★	**B2**	16.6	718	1.43	87	14.8	714	1.28	86	12.2	705	1.05	85	•	•	•	•	•	•		
51.92	**A2**	18.3	653	1.43	87	16.4	650	1.28	87	13.5	643	1.06	86	•	•	•	•	•	•		
45.83 ★	**X1**	21.0	676	1.69	88	18.5	673	1.49	87	15.3	667	1.23	87	•	•	•	•	•	•		
41.35	**W1**	23.0	669	1.83	88	21.0	667	1.67	88	16.9	662	1.35	87	•	•	•	•	•	•		
37.50 ★	**U1**	25.0	663	1.97	88	23.0	680	1.86	88	18.7	708	1.59	87	•	•	•	•	•	•		
34.17	**T1**	28.0	641	2.13	88	25.0	664	1.97	88	20.0	712	1.70	88	•	•	•	•	•	•		
31.25 ★	**R1**	30.0	628	2.23	88	27.0	649	2.08	88	22.0	693	1.81	88	•	•	•	•	•	•		
27.94	**P1**	34.0	605	2.44	88	30.0	630	2.24	88	25.0	668	1.98	88	•	•	•	•	•	•		
25.66 ★	**M1**	37.0	587	2.57	88	33.0	610	2.38	88	27.0	651	2.08	88	•	•	•	•	•	•		
23.13	**K1**	41.0	570	2.77	89	37.0	590	2.58	88	30.0	632	2.25	88	•	•	•	•	•	•		
19.89 ★	**G1**	48.0	544	3.09	89	43.0	564	2.87	89	35.0	604	2.50	88	•	•	•	•	•	•		
38.00	**V1**	25.0	433	1.27	89	22.0	431	1.12	89	18.4	427	0.94	88	•	•	•	•	•			
33.61 ★	**S1**	28.0	432	1.42	89	25.0	431	1.27	89	21.0	428	1.06	88	•	•	•	•	•	•		
30.46	**Q1**	31.0	392	1.42	89	28.0	391	1.29	89	23.0	389	1.06	89	•	•	•	•	•	•		
26.89 ★	**N1**	35.0	405	1.66	90	32.0	404	1.51	89	26.0	402	1.23	89	•	•	•	•	•	•		
24.26	**L1**	39.0	400	1.82	90	35.0	400	1.64	90	29.0,	399	1.36	89	•	•	•	•	•	•		
22.00 ★	**J1**	43.0	427	2.14	90	39.0	426	1.94	90	32.0	425	1.59	89	•	•	•	•	•	•		
20.04	**H1**	47.0	432	2.37	90	42.0	432	2.12	90	35.0	431	1.76	90	•	•	•	•	•	•		
18.33 ★	**F1**	52.0	422	2.56	90	46.0	422	2.26	90	38.0	421	1.87	90	•	•	•	•	•	•		
16.39	**E1**	58.0	401	2.71	90	52.0	401	2.43	90	43.0	400	2.01	90	•	•	•	•	•	•		
15.05 ★	**D1**	63.0	400	2.94	90	56.0	400	2.61	90	47.0	400	2.19	90	•	•	•	•	•	•		
13.57	**C1**	70.0	419	3.42	90	63.0	419	3.08	90	52.0	419	2.54	90	•	•	•	•	•	•		
11.67 ★	**B1**	81.0	378	3.56	90	73.0	378	3.21	90	60.0	377	2.64	90	•	•	•	•	•	•		

★ Preferred transmission ratio
In the case of gearboxes of size 18 or 28, only possible with integrated motor or input unit KQ and KQS.

Transmission ratios and maximum torques

Selection and ordering data (continued)

Efficiency table C.68

Transmission ratio	Ratio code	Output speed n_{mot} = 500 rpm				Output speed n_{mot} = 250 rpm				Output speed n_{mot} = 10 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
364.00 ★	**U2**	1.4	677	0.17	58	0.69	676	0.09	54	0.027	674	<0.05	49	•	•						
323.70	**T2**	1.5	677	0.18	59	0.77	676	0.10	54	0.031	674	<0.05	49	•	•	•					
280.80 ★	**S2**	1.8	677	0.21	60	0.89	676	0.11	55	0.036	610	<0.05	49	•	•	•	•				
262.36	**R2**	1.9	677	0.22	60	0.95	676	0.12	55	0.038	674	<0.05	49	•	•	•	•				
230.75 ★	**Q2**	2.2	678	0.25	62	1.10	676	0.14	56	0.043	675	<0.05	49	•	•	•	•				
202.09	**P2**	2.5	678	0.28	63	1.20	676	0.15	57	0.049	675	<0.05	49	•	•	•	•	•			
178.75 ★	**N2**	2.8	679	0.31	64	1.40	677	0.17	58	0.056	675	<0.05	50	•	•	•	•	•	•		
162.00	**M2**	3.1	679	0.34	65	1.50	677	0.18	59	0.062	675	<0.05	50	•	•	•	•	•	•		
143.00 ★	**L2**	3.5	680	0.38	66	1.70	677	0.20	60	0.070	675	<0.05	50	•	•	•	•	•	•		
129.00	**K2**	3.9	680	0.41	67	1.90	677	0.22	61	0.078	675	<0.05	50	•	•	•	•	•	•		
117.00 ★	**J2**	4.3	681	0.45	68	2.10	678	0.24	61	0.085	675	<0.05	50	•	•	•	•	•	•		
106.60	**H2**	4.7	681	0.48	69	2.30	678	0.26	62	0.094	675	<0.05	50	•	•	•	•	•	•		
97.50 ★	**G2**	5.1	682	0.52	70	2.60	678	0.29	63	0.100	675	<0.05	50	•	•	•	•	•	•		
90.00 ★	**F2**	5.6	317	0.23	80	2.80	300	0.12	76	0.110	279	<0.05	70	•	•	•	•				
84.09	**E2**	5.9	487	0.37	80	3.00	461	0.19	76	0.120	426	<0.05	70	•	•	•	•				
73.96 ★	**D2**	6.8	506	0.44	81	3.40	478	0.22	77	0.140	438	<0.05	70	•	•	•	•				
64.77	**C2**	7.7	598	0.58	82	3.90	563	0.30	78	0.150	511	<0.05	70	•	•	•	•	•			
57.29 ★	**B2**	8.7	687	0.75	83	4.40	647	0.38	78	0.170	582	<0.05	71	•	•	•	•	•	•		
51.92	**A2**	9.6	628	0.75	84	4.80	591	0.38	79	0.190	528	<0.05	71	•	•	•	•	•	•		
45.83 ★	**X1**	10.9	653	0.88	85	5.50	615	0.44	80	0.220	544	<0.05	71	•	•	•	•	•	•		
41.35	**W1**	12.1	650	0.96	85	6.00	613	0.48	81	0.240	538	<0.05	71	•	•	•	•	•	•		
37.50 ★	**U1**	13.3	696	1.13	86	6.70	659	0.57	81	0.270	573	<0.05	71	•	•	•	•	•	•		
34.17	**T1**	14.6	709	1.25	86	7.30	672	0.63	82	0.290	581	<0.05	71	•	•	•	•	•	•		
31.25 ★	**R1**	16.0	695	1.34	87	8.00	661	0.67	83	0.320	567	<0.05	71	•	•	•	•	•	•		
27.94	**P1**	17.9	663	1.42	87	8.90	634	0.71	83	0.360	539	<0.05	71	•	•	•	•	•	•		
25.66 ★	**M1**	19.5	665	1.55	88	9.70	638	0.77	84	0.390	539	<0.05	71	•	•	•	•	•	•		
23.13	**K1**	22.0	696	1.83	88	10.80	674	0.90	85	0.430	566	<0.05	71	•	•	•	•	•	•		
19.89 ★	**G1**	25.0	631	1.87	88	12.60	613	0.94	86	0.500	510	<0.05	71	•	•	•	•	•	•		
38.00	**V1**	13.2	419	0.67	86	6.60	399	0.34	82	0.260	362	<0.05	75	•	•	•	•	•			
33.61 ★	**S1**	14.9	420	0.76	87	7.40	400	0.38	83	0.300	361	<0.05	75	•	•	•	•	•	•		
30.46	**Q1**	16.4	383	0.75	87	8.20	365	0.38	83	0.330	327	<0.05	75	•	•	•	•	•	•		
26.89 ★	**N1**	18.6	397	0.88	88	9.30	380	0.44	84	0.370	337	<0.05	75	•	•	•	•	•	•		
24.26	**L1**	21.0	394	0.98	88	10.30	378	0.48	85	0.410	334	<0.05	75	•	•	•	•	•	•		
22.00 ★	**J1**	23.0	421	1.14	89	11.40	405	0.57	85	0.450	355	<0.05	75	•	•	•	•	•	•		
20.04	**H1**	25.0	428	1.26	89	12.50	413	0.63	86	0.500	360	<0.05	75	•	•	•	•	•	•		
18.33 ★	**F1**	27.0	419	1.33	89	13.60	405	0.67	86	0.550	352	<0.05	75	•	•	•	•	•	•		
16.39	**E1**	31.0	399	1.45	89	15.30	388	0.71	87	0.610	335	<0.05	75	•	•	•	•	•	•		
15.05 ★	**D1**	33.0	399	1.54	90	16.60	389	0.77	87	0.660	335	<0.05	75	•	•	•	•	•	•		
13.57	**C1**	37.0	418	1.81	90	18.40	410	0.90	88	0.740	351	<0.05	75	•	•	•	•	•	•		
11.67 ★	**B1**	43.0	377	1.89	90	21.00	372	0.92	88	0.860	317	<0.05	75	•	•	•	•	•	•		

★ Preferred transmission ratio
In the case of gearboxes of size 18 or 28, only possible with integrated motor or input unit KQ and KQS.

Selection and ordering data (continued)

Efficiency table C.88-D/Z28

Transmission ratio	Ratio code	Output speed n_{mot} = 1 750 rpm				Output speed n_{mot} = 1 450 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
33 491	**N1**	0.05	1 590	<0.06	47	0.04	1 590	<0.06	46		•						
28 893	**M1**	0.06	1 590	<0.06	47	0.05	1 590	<0.06	47		•						
24 823	**L1**	0.07	1 590	<0.06	47	0.06	1 590	<0.06	47		•						
22 853	**K1**	0.08	1 590	<0.06	47	0.06	1 590	<0.06	47		•						
20 775	**J1**	0.08	1 590	<0.06	47	0.07	1 590	<0.06	47		•						
18 389	**H1**	0.10	1 590	<0.06	47	0.08	1 590	<0.06	47		•						
15 402	**G1**	0.11	1 590	<0.06	47	0.09	1 590	<0.06	47		•						
13 132	**F1**	0.13	1 590	<0.06	47	0.11	1 590	<0.06	47		•						
11 162	**E1**	0.16	1 590	<0.06	48	0.13	1 590	<0.06	47		•						
9 701	**D1**	0.18	1 590	0.06	48	0.15	1 590	<0.06	48		•						
8 444	**C1**	0.21	1 590	0.07	48	0.17	1 590	<0.06	48		•						
7 616	**B1**	0.23	1 590	0.08	49	0.19	1 590	0.07	48		•						
6 722	**A1**	0.26	1 590	0.09	49	0.22	1 590	0.07	48		•						
6 016	**B2**	0.29	1 590	0.10	49	0.24	1 590	0.08	49		•						
5 342	**A2**	0.33	1 590	0.11	50	0.27	1 590	0.09	49		•						
4 683	**X1**	0.37	1 590	0.12	50	0.31	1 590	0.10	49		•						
4 191	**W1**	0.42	1 590	0.14	51	0.35	1 590	0.12	50		•						
3 719	**V1**	0.47	1 590	0.15	51	0.39	1 590	0.13	50		•						
3 260	**U1**	0.54	1 590	0.17	52	0.44	1 590	0.15	51		•						
2 866	**T1**	0.61	1 590	0.19	52	0.51	1 590	0.16	51		•						
2 589	**S1**	0.68	1 590	0.21	53	0.56	1 590	0.18	52		•						
2 256	**R1**	0.78	1 590	0.24	54	0.64	1 590	0.20	53		•						
2 026	**Q1**	0.86	1 590	0.26	55	0.72	1 590	0.22	53		•						
1 829	**P1**	0.96	1 590	0.29	56	0.79	1 590	0.24	54		•						
1 659	**N1**	1.05	1 590	0.31	57	0.87	1 590	0.26	55		•						
1 510	**M1**	1.16	1 590	0.34	57	0.96	1 590	0.29	56		•						
1 335	**L1**	1.31	1 590	0.37	59	1.09	1 590	0.32	57		•						
1 232	**K1**	1.42	1 590	0.40	59	1.18	1 590	0.34	58		•						
1 061	**J1**	1.65	1 590	0.45	61	1.37	1 590	0.39	59		•						
964	**H1**	1.81	1 590	0.49	62	1.50	1 590	0.42	60		•						
877	**G1**	2.00	1 590	0.53	63	1.65	1 590	0.45	61		•						
795	**F1**	2.20	1 590	0.57	64	1.82	1 590	0.49	62		•						
723	**E1**	2.42	1 590	0.62	65	2.00	1 590	0.53	63		•						
640	**D1**	2.74	1 590	0.68	67	2.27	1 590	0.58	65		•						
590	**C1**	2.96	1 590	0.73	68	2.46	1 590	0.62	66		•						
508	**B1**	3.44	1 590	0.83	69	2.85	1 590	0.71	67		•						
462	**A1**	3.79	1 590	0.90	70	3.14	1 590	0.77	68		•						

★ Preferred transmission ratio
In the case of gearboxes of size 18 or 28, only possible with integrated motor or input unit KQ and KQS.

Transmission ratios and maximum torques

Selection and ordering data (continued)

Efficiency table C.88

Transmission ratio	Ratio code	Output speed n_{mot} = 1 750 rpm				Output speed n_{mot} = 1 450 rpm				Output speed n_{mot} = 1 150 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
440.70	**T2**	4.0	1 590	0.93	71	3.3	1 590	0.79	70	2.6	1 590	0.64	67	•	•	•					
390.00 ★	**S2**	4.5	1 591	1.04	72	3.7	1 590	0.87	71	2.9	1 590	0.70	69	•	•	•	•				
354.55	**R2**	4.9	1 582	1.11	73	4.1	1 590	0.95	72	3.2	1 590	0.77	70	•	•	•	•				
318.50 ★	**Q2**	5.5	1 517	1.19	73	4.6	1 588	1.06	72	3.6	1 590	0.85	71	•	•	•	•				
273.00	**P2**	6.4	1 427	1.30	74	5.3	1 506	1.14	73	4.2	1 591	0.97	72	•	•	•	•	•			
247.00 ★	**N2**	7.1	1 366	1.37	74	5.9	1 443	1.34	74	4.7	1 534	1.04	72	•	•	•	•	•	•		
228.00	**M2**	7.7	1 317	1.43	74	6.4	1 394	1.44	74	5.0	1 495	1.07	73	•	•	•	•	•	•	•	
198.25 ★	**L2**	8.8	1 260	1.56	74	7.3	1 337	1.38	74	5.8	1 431	1.18	74	•	•	•	•	•	•	•	
180.00	**K2**	9.7	1 219	1.66	74	8.1	1 292	1.82	74	6.4	1 389	1.26	74	•	•	•	•	•	•	•	
164.36 ★	**J2**	10.6	1 182	1.76	74	8.8	1 257	1.56	74	7.0	1 351	1.34	74	•	•	•	•	•	•	•	
150.80	**H2**	11.6	1 146	1.87	74	9.6	1 220	1.65	74	7.6	1 315	1.41	74	•	•	•	•	•	•	•	
138.94 ★	**G2**	12.6	1 114	1.97	74	10.4	1 187	1.74	74	8.3	1 277	1.49	74	•	•	•	•	•	•	•	
126.18	**F2**	13.9	1 077	2.10	74	11.5	1 146	2.49	74	9.1	1 238	1.59	74	•	•	•	•	•	•	•	
114.95 ★	**E2**	15.2	1 042	2.23	74	12.6	1 109	1.97	74	10.0	1 197	1.68	74	•	•	•	•	•			
108.50	**D2**	16.1	1 353	2.63	87	13.4	1 347	2.19	86	10.6	1 336	1.73	85	•	•	•	•	•	•		
98.17 ★	**C2**	17.8	1 339	2.88	87	14.8	1 420	2.56	86	11.7	1 416	2.02	86	•	•	•	•	•	•		
90.62	**B2**	19.3	1 258	2.93	87	16.0	1 255	2.43	87	12.7	1 248	1.93	86	•	•	•	•	•	•	•	
78.79 ★	**A2**	22.0	1 243	3.30	87	18.4	1 318	2.93	87	14.6	1 362	2.41	86	•	•	•	•	•	•	•	
71.54	**X1**	24.0	1 207	3.49	87	20.0	1 282	3.09	87	16.1	1 301	2.53	87	•	•	•	•	•	•	•	
65.32 ★	**W1**	27.0	1 161	3.78	87	22.0	1 242	3.30	87	17.6	1 336	2.84	87	•	•	•	•	•	•	•	
59.93	**V1**	29.0	1 133	3.96	87	24.0	1 206	3.49	87	19.2	1 298	3.01	87	•	•	•	•	•	•	•	
55.22 ★	**U1**	32.0	1 096	4.23	87	26.0	1 174	3.68	87	21.0	1 260	3.19	87	•	•	•	•	•	•	•	
50.15	**T1**	35.0	1 064	4.49	87	29.0	1 132	4.55	87	23.0	1 223	3.39	87	•	•	•	•	•	•	•	
45.68 ★	**S1**	38.0	1 031	4.72	87	32.0	1 092	4.82	87	25.0	1 186	3.57	87	•	•	•	•	•	•	•	
41.85	**R1**	42.0	999	5.06	87	35.0	1 062	5.12	87	27.0	1 158	3.77	87	•	•	•	•	•	•	•	
37.34 ★	**Q1**	47.0	964	5.46	87	39.0	1 026	5.53	87	31.0	1 107	4.14	87	•	•	•	•	•	•	•	
33.33	**N1**	53.0	929	5.94	87	44.0	989	5.99	87	35.0	1 067	4.50	87	•		•	•	•	•	•	
28.30	**K1**	62.0	883	6.60	87	51.0	943	5.80	87	41.0	1 014	5.01	87	•		•	•	•	•	•	
23.56 ★	**G1**	74.0	823	7.34	87	62.0	873	7.48	87	49.0	945	5.58	87	•		•	•	•		•	
33.85	**P1**	52.0	817	4.84	92	43.0	817	4.00	92	34.0	816	3.17	92	•	•	•	•	•	•	•	
30.90 ★	**M1**	57.0	817	5.31	92	47.0	817	4.38	92	37.0	817	3.44	92	•	•	•	•	•	•	•	
28.36	**L1**	62.0	815	5.76	92	51.0	815	4.74	92	41.0	815	3.81	92	•	•	•	•	•	•	•	
26.13 ★	**J1**	67.0	815	6.22	92	56.0	815	5.20	92	44.0	815	4.09	92	•	•	•	•	•	•	•	
23.73	**H1**	74.0	763	6.43	92	61.0	763	5.30	92	48.0	763	4.17	92	•	•	•	•	•	•	•	
21.61 ★	**F1**	81.0	814	7.51	92	67.0	814	6.21	92	53.0	814	4.92	92	•	•	•	•	•	•	•	
19.80	**E1**	88.0	802	8.05	92	73.0	802	6.67	92	58.0	802	5.30	92	•	•	•	•	•	•	•	
17.67 ★	**D1**	99.0	795	8.97	92	82.0	795	7.43	92	65.0	795	5.89	92	•	•	•	•	•	•	•	
15.77	**C1**	111.0	776	9.81	92	92.0	781	8.19	92	73.0	781	6.50	92	•		•	•	•	•	•	
13.39	**B1**	131.0	727	10.86	92	108.0	776	9.55	92	86.0	806	7.90	92	•		•	•	•	•	•	
11.15 ★	**A1**	157.0	656	11.00	92	130.0	681	10.09	92	103.0	681	7.99	92	•		•	•	•	•	•	

★ Preferred transmission ratio
In the case of gearboxes of size 18 or 28, only possible with integrated motor or input unit KQ and KQS.

Selection and ordering data (continued)

Efficiency table C.88

Transmission ratio		Ratio code	Output speed n_{mot} = 950 rpm				Output speed n_{mot} = 850 rpm				Output speed n_{mot} = 700 rpm				Size for motor and input units							
i_{tot}		Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
440.70		**T2**	2.2	1 555	0.55	65	1.9	1 524	0.48	64	1.6	1 471	0.40	62	•	•	•					
390.00	★	**S2**	2.4	1 590	0.60	67	2.2	1 590	0.56	65	1.8	1 590	0.48	63	•	•	•	•				
354.55		**R2**	2.7	1 590	0.67	68	2.4	1 590	0.60	66	2.0	1 590	0.52	64	•	•	•	•				
318.50	★	**Q2**	3.0	1 590	0.73	69	2.7	1 590	0.67	68	2.2	1 590	0.56	65	•	•	•	•				
273.00		**P2**	3.5	1 590	0.83	70	3.1	1 590	0.75	69	2.6	1 590	0.65	67	•	•	•	•	•			
247.00	★	**N2**	3.8	1 590	0.89	71	3.4	1 590	0.81	70	2.8	1 590	0.68	68	•	•	•	•	•	•		
228.00		**M2**	4.2	1 559	0.96	72	3.7	1 590	0.87	71	3.1	1 590	0.75	69	•	•	•	•	•	•	•	
198.25	★	**L2**	4.8	1 506	1.04	73	4.3	1 547	0.97	72	3.5	1 590	0.83	70	•	•	•	•	•	•	•	
180.00		**K2**	5.3	1 466	1.11	73	4.7	1 513	1.03	73	3.9	1 581	0.91	71	•	•	•	•	•	•	•	
164.36	★	**J2**	5.8	1 428	1.18	73	5.2	1 471	1.10	73	4.3	1 543	0.97	72	•	•	•	•	•	•	•	
150.80		**H2**	6.3	1 392	1.24	74	5.6	1 441	1.15	73	4.6	1 518	1.01	72	•	•	•	•	•	•	•	
138.94	★	**G2**	6.8	1 359	1.31	74	6.1	1 404	1.22	74	5.0	1 484	1.07	73	•	•	•	•	•	•	•	
126.18		**F2**	7.5	1 317	1.39	74	6.7	1 363	1.29	74	5.5	1 444	1.13	73	•	•	•	•	•	•	•	
114.95	★	**E2**	8.3	1 271	1.49	74	7.4	1 318	1.38	74	6.1	1 397	1.21	74	•	•	•	•	•			
108.50		**D2**	8.8	1 321	1.44	85	7.8	1 311	1.28	84	6.5	1 290	1.06	83	•	•	•	•	•	•		
98.17	★	**C2**	9.7	1 403	1.68	85	8.7	1 394	1.50	85	7.1	1 373	1.23	83	•	•	•	•	•	•		
90.62		**B2**	10.5	1 239	1.59	85	9.4	1 231	1.43	85	7.7	1 215	1.17	84	•	•	•	•	•	•	•	
78.79	★	**A2**	12.1	1 354	2.00	86	10.8	1 348	1.78	86	8.9	1 334	1.47	85	•	•	•	•	•	•	•	
71.54		**X1**	13.3	1 295	2.09	86	11.9	1 290	1.87	86	9.8	1 279	1.54	85	•	•	•	•	•	•	•	
65.32	★	**W1**	14.5	1 420	2.50	86	13.0	1 469	2.32	86	10.7	1 556	2.04	86	•	•	•	•	•	•	•	
59.93		**V1**	15.9	1 379	2.65	87	14.2	1 429	2.46	86	11.7	1 515	2.16	86	•	•	•	•	•	•	•	
55.22	★	**U1**	17.2	1 344	2.79	87	15.4	1 392	2.60	87	12.7	1 431	2.21	86	•	•	•	•	•	•	•	
50.15		**T1**	18.9	1 304	2.98	87	17.0	1 349	2.77	87	14.0	1 434	2.44	86	•	•	•	•	•	•	•	
45.68	★	**S1**	21.0	1 256	3.18	87	18.6	1 307	2.93	87	15.3	1 391	2.58	87	•	•	•	•	•	•	•	
41.85		**R1**	23.0	1 221	3.39	87	20.0	1 279	3.09	87	16.7	1 355	2.74	87	•	•	•	•	•	•	•	
37.34	★	**Q1**	25.0	1 189	3.58	87	23.0	1 222	3.39	87	18.7	1 308	2.95	87	•	•	•	•	•	•	•	
33.33		**N1**	29.0	1 136	3.97	87	26.0	1 178	3.69	87	21.0	1 264	3.20	87	•		•	•	•	•	•	
28.30		**K1**	34.0	1 079	4.42	87	30.0	1 125	4.07	87	25.0	1 195	3.60	87	•		•	•	•	•	•	
23.56	★	**G1**	40.0	1 011	4.87	87	36.0,	1 047	4.54	87	30.0	1 112	4.02	87	•		•	•	•		•	
33.85		**P1**	28.0	815	2.61	92	25.0	814	2.33	92	21.0	812	1.96	91	•	•	•	•	•	•	•	
30.90	★	**M1**	31.0	816	2.89	92	28.0	815	2.61	92	23.0	813	2.14	91	•	•	•	•	•	•	•	
28.36		**L1**	34.0	814	3.16	92	30.0	814	2.79	92	25.0	812	2.32	92	•	•	•	•	•	•	•	
26.13	★	**J1**	36.0	814	3.34	92	33.0	814	3.06	92	27.0	813	2.51	92	•	•	•	•	•	•	•	
23.73		**H1**	40.0	763	3.48	92	36.0	762	3.13	92	30.0	762	2.61	92	•	•	•	•	•	•	•	
21.61	★	**F1**	44.0	814	4.08	92	39.0	813	3.62	92	32.0	813	2.97	92	•	•	•	•	•	•	•	
19.80		**E1**	48.0	802	4.39	92	43.0	802	3.93	92	35.0	802	3.20	92	•	•	•	•	•	•	•	
17.67	★	**D1**	54.0	795	4.89	92	48.0	795	4.35	92	40.0	795	3.63	92	•	•	•	•	•	•	•	
15.77		**C1**	60.0	781	5.34	92	54.0	781	4.81	92	44.0	781	3.92	92	•		•	•	•	•	•	
13.39		**B1**	71.0	806	6.53	92	63.0	806	5.79	92	52.0	806	4.78	92	•		•	•	•	•	•	
11.15	★	**A1**	85.0	681	6.60	92	76.0	681	5.90	92	63.0	681	4.89	92	•		•	•	•	•	•	

★ Preferred transmission ratio
In the case of gearboxes of size 18 or 28, only possible with integrated motor or input unit KQ and KQS.

Transmission ratios and maximum torques

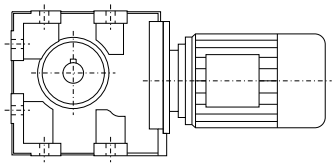
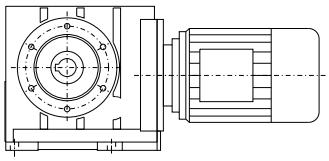
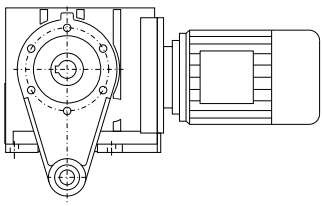
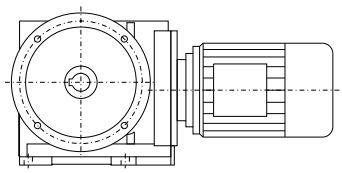
Selection and ordering data (continued)

Efficiency table C.88

Transmission ratio	Ratio code	Output speed n_{mot} = 500 rpm				Output speed n_{mot} = 250 rpm				Output speed n_{mot} = 10 rpm				Size for motor and input units							
i_{tot}	Order No. 15th and 16th position	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	n_2 rpm	T_2 Nm	P_{mot} kW	h %	63	71	80	90	100	112	132	160
440.70	**T2**	1.1	1 387	0.28	58	0.57	1 262	0.14	53	0.023	1 121	<0.05	47	•	•	•					
390.00 ★	**S2**	1.3	1 590	0.37	59	0.64	1 590	0.20	54	0.026	1 450	<0.05	47	•	•	•	•				
354.55	**R2**	1.4	1 590	0.39	60	0.71	1 590	0.22	54	0.028	1 590	<0.05	47	•	•	•	•				
318.50 ★	**Q2**	1.6	1 590	0.43	61	0.78	1 590	0.24	55	0.031	1 459	<0.05	47	•	•	•	•				
273.00	**P2**	1.8	1 590	0.47	63	0.92	1 590	0.27	56	0.037	1 440	<0.05	47	•	•	•	•	•			
247.00 ★	**N2**	2.0	1 590	0.52	64	1.0	1 590	0.29	57	0.040	1 590	<0.05	47	•	•	•	•	•	•		
228.00	**M2**	2.2	1 590	0.56	65	1.1	1 590	0.32	58	0.044	1 506	<0.05	47	•	•	•	•	•	•	•	
198.25 ★	**L2**	2.5	1 590	0.62	67	1.3	1 590	0.37	59	0.05	1 590	<0.05	47	•	•	•	•	•	•	•	
180.00	**K2**	2.8	1 590	0.69	68	1.4	1 590	0.39	60	0.056	1 590	<0.05	47	•	•	•	•	•	•	•	
164.36 ★	**J2**	3.0	1 590	0.72	69	1.5	1 590	0.41	61	0.061	1 590	<0.05	47	•	•	•	•	•	•	•	
150.80	**H2**	3.3	1 590	0.79	70	1.7	1 590	0.46	62	0.066	1 590	<0.05	47	•	•	•	•	•	•	•	
138.94 ★	**G2**	3.6	1 590	0.85	71	1.8	1 590	0.48	63	0.072	1 590	<0.05	47	•	•	•	•	•	•	•	
126.18	**F2**	4.0	1 562	0.92	71	2.0	1 590	0.52	64	0.079	1 590	<0.05	48	•	•	•	•	•	•	•	
114.95 ★	**E2**	4.3	1 535	0.96	72	2.2	1 590	0.56	65	0.087	1590	<0.05	48	•	•	•	•	•			
108.50	**D2**	4.6	1 248	0.75	80	2.3	1 162	0.38	74	0.092	1 034	<0.05	66	•	•	•	•	•	•		
98.17 ★	**C2**	5.1	1 331	0.88	81	2.5	1 239	0.43	75	0.10	1 092	<0.05	66	•	•	•	•	•	•		
90.62	**B2**	5.5	1 179	0.83	81	2.8	1 097	0.43	76	0.11	961	<0.05	66	•	•	•	•	•	•	•	
78.79 ★	**A2**	6.3	1 299	1.04	82	3.2	1 210	0.53	77	0.13	1 045	<0.05	66	•	•	•	•	•	•	•	
71.54	**X1**	7.0	1 249	1.1	83	3.5	1 165	0.55	78	0.14	997	<0.05	66	•	•	•	•	•	•	•	
65.32 ★	**W1**	7.7	1 532	1.47	84	3.8	1 432	0.73	78	0.15	1 215	<0.05	66	•	•	•	•	•	•	•	
59.93	**V1**	8.3	1 580	1.63	84	4.2	1 481	0.82	79	0.17	1 247	<0.05	67	•	•	•	•	•	•	•	
55.22 ★	**U1**	9.1	1 409	1.58	85	4.5	1 325	0.78	80	0.18	1 106	<0.05	67	•	•	•	•	•	•	•	
50.15	**T1**	10.0	1 496	1.84	85	5.0	1 413	0.92	81	0.20	1 170	<0.05	67	•	•	•	•	•	•	•	
45.68 ★	**S1**	10.9	1 541	2.05	86	5.5	1 522	1.08	81	0.22	1 249	<0.05	67	•	•	•	•	•	•	•	
41.85	**R1**	11.9	1 505	2.18	86	6.0	1 513	1.16	82	0.24	1 233	<0.05	67	•	•	•	•	•	•	•	
37.34 ★	**Q1**	13.4	1 454	2.37	86	6.7	1 516	1.28	83	0.27	1 225	0.05	67	•	•	•	•	•	•	•	
33.33	**N1**	15.0	1 409	2.56	86	7.5	1 502	1.41	84	0.30	1 205	0.06	67	•		•	•	•	•	•	
28.30	**K1**	17.7	1 339	2.86	87	8.8	1 570	1.71	85	0.35	1 249	0.07	67	•		•	•	•	•	•	
23.56 ★	**G1**	21.0	1 252	3.17	87	10.6	1 339	1.74	85	0.42	1 059	0.07	68	•		•	•	•		•	
33.85	**P1**	14.8	803	1.38	90	7.4	772	0.69	87	0.30	688	<0.05	77	•	•	•	•	•	•	•	
30.90 ★	**M1**	16.2	806	1.51	91	8.1	777	0.75	87	0.32	688	<0.05	77	•	•	•	•	•	•	•	
28.36	**L1**	17.6	806	1.63	91	8.8	779	0.82	88	0.35	687	<0.05	77	•	•	•	•	•	•	•	
26.13 ★	**J1**	19.1	808	1.77	91	9.6	783	0.89	88	0.38	688	<0.05	78	•	•	•	•	•	•	•	
23.73	**H1**	21.0	758	1.83	91	10.5	738	0.91	89	0.42	644	<0.05	78	•	•	•	•	•	•	•	
21.61 ★	**F1**	23.0	810	2.13	91	11.6	791	1.08	89	0.46	688	<0.05	78	•	•	•	•	•	•	•	
19.80	**E1**	25.0	800	2.29	92	12.6	783	1.15	90	0.51	679	<0.05	78	•	•	•	•	•	•	•	
17.67 ★	**D1**	28.0	794	2.54	92	14.2	781	1.29	90	0.57	674	0.05	78	•	•	•	•	•	•	•	
15.77	**C1**	32.0	780	2.85	92	15.9	770	1.41	91	0.63	663	0.06	78	•		•	•	•	•	•	
13.39	**B1**	37.0	806	3.4	92	18.7	799	1.72	91	0.75	687	0.07	78	•		•	•	•	•	•	
11.15 ★	**A1**	45.0	681	3.49	92	22.0	678	1.71	91	0.90	582	0.07	79	•		•	•	•	•	•	

★ Preferred transmission ratio
In the case of gearboxes of size 18 or 28, only possible with integrated motor or input unit KQ and KQS.

Selection and ordering data

Mounting type	Order No. 14th position	Code in type designation 2nd position for solid shaft, 3rd position for hollow shaft	Representation
Foot-mounted design	**A**	–	
Housing flange (C-type)	**H**	Z	
Design with torque arm	**D**	D	
Flange-mounted design (A-type)	**F**	F	

Selection and ordering data (continued)

Helical worm gearbox with torque arm

The torque arm consists of an arm with an eye; it can be screwed onto the gearbox housing at an angular pitch of 30° in any one of nine positions around the output.

The basic material of the torque arm is natural rubber with 60° Shore A, so it is suitable for all mounting positions and can withstand temperatures of between –45 °C and +70 °C.

See the dimension drawings in the Dimensions section for the torque arm dimensions.

If **D** appears in the **14th position** of the order number, the torque arm will be delivered loose.

The shafts and mounting positions correspond to the design featuring a housing flange.

Order code:
Figure 1 **G09**
Figure 2 **G10**

Figure 1

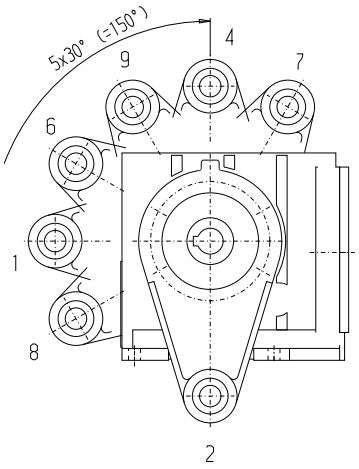
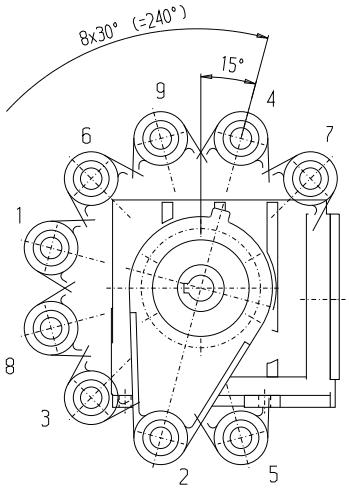


Figure 2



Selection and ordering data

Shaft design	Order No. 8th position	Order No. suffix	Shaft dimensions				
Helical worm gearbox C, foot-mounted design							
Size			**C.28**	**C.38**	**C.48**	**C.68**	**C.88**
Solid shaft with feather key	**1**		V20 x 40 *)	V25 x 50 *)	V30 x 60 *)	V35 x 70 *)	V45 x 90 *)
	3			V35 x 70	V40 x 80	V40 x 80	V50 x 100
	4					V50 x 100	V70 x 140
Hollow shaft	**5**		H20 x 120 *)	H25 x 120 *)	H30 x 150 *)	H40 x 180 *)	H50 x 210 *)
	6		H25 x 120	H30 x 120	H35 x 150	H45 x 180	H60 x 210
	7				H40 x 150		
Hollow shaft with shrink disk	**9**	**H3A**	H20 x 142 *)	H30 x 146 *)	H40 x 177	H50 x 209	H60 x 241
	9	**H3C**			H35 x 177	H40 x 209	H50 x 241
	9	**H3D**				H40/42 x 209	H50/52 x 241
Hollow shaft with splined shaft	**9**	**H4A**		N35x1.25x30x26x 9Hx 120	N40x2x30x18x 9H x 150	N50x2x30x24x 9H x 180	N60x2x30x28x 9H x 210
Helical worm gearbox C with housing flange							
Size			**C.28**	**C.38**	**C.48**	**C.68**	**C.88**
Solid shaft with feather key	**1**		V20 x 40 *)	V25 x 50 *)	V30 x 60 *)	V35 x 70 *)	V45 x 90 *)
	3			V35 x 70	V40 x 80	V40 x 80	V50 x 100
	4					V50 x 100	V70 x 140
Hollow shaft	**5**		H20 x 120 *)	H25 x 120 *)	H30 x 150 *)	H40 x 180 *)	H50 x 210 *)
	6		H25 x 120	H30 x 120	H35 x 150	H45 x 180	H60 x 210
	7				H40 x 150		
Hollow shaft with shrink disk	**9**	**H3A**	H20 x 142 *)	H30 x 146 *)	H40 x 177	H50 x 209	H60 x 241
	9	**H3C**			H35 x 177	H40 x 209	H50 x 241
	9	**H3D**				H40/42 x 209	H50/52 x 241
Hollow shaft with splined shaft	**9**	**H4A**		N35x1.25x30x26x 9Hx 120	N40x2x30x18x 9H x 150	N50x2x30x24x 9H x 180	N60x2x30x28x 9H x 210
Helical worm gearbox C with torque arm							
Size			**C.28**	**C.38**	**C.48**	**C.68**	**C.88**
Hollow shaft	**5**		H20 x 120 *)	H25 x 120 *)	H30 x 150 *)	H40 x 180 *)	H50 x 210 *)
	6		H25 x 120	H30 x 120	H35 x 150	H45 x 180	H60 x 210
	7				H40 x 150		
Hollow shaft with shrink disk	**9**	**H3A**	H20 x 142 *)	H30 x 146 *)	H40 x 177	H50 x 209	H60 x 241
	9	**H3C**			H35 x 177	H40 x 209	H50 x 241
	9	**H3D**				H40/42 x 209	H50/52 x 241
Hollow shaft with splined shaft	**9**	**H4A**		N35x1.25x30x26x 9Hx 120	N40x2x30x18x 9H x 150	N50x2x30x24x 9H x 180	N60x2x30x28x 9H x 210
Helical worm gearbox C, flange-mounted design (A-type)							
Size			**C.28**	**C.38**	**C.48**	**C.68**	**C.88**
Solid shaft with feather key	**2**		V20 x 40 (i2=I) *)	V25 x 50 (i2=I) *)	V30 x 60 (i2=I) *)	V35 x 70 (i2=I) *)	V45 x 90 (i2=I) *)
	7					V40 x 80 (i2=I)	V50 x 100 (i2=I)
Hollow shaft	**5**		H20 x 120 *)	H25 x 120 *)	H30 x 150 *)	H40 x 180 *)	H50 x 210 *)
	6		H25 x 120	H30 x 120	H35 x 150	H45 x 180	H60 x 210
	7				H40 x 150		
Hollow shaft with shrink disk	**9**	**H3A**	H20 x 142 *)	H30 x 146 *)	H40 x 177	H50 x 209	H60 x 241
	9	**H3C**			H35 x 177	H40 x 209	H50 x 241
	9	**H3D**				H40/42 x 209	H50/52 x 241
Hollow shaft with splined shaft	**9**	**H4A**		N35x1.25x30x26x 9Hx 120	N40x2x30x18x 9H x 150	N50x2x30x24x 9H x 180	N60x2x30x28x 9H x 210

*) Preferred series

Flange-mounted designs (A-type)

Selection and ordering data

Order code	Flange diameter				
Size	**C.28**	**C.38**	**C.48**	**C.68**	**C.88**
H02		160		200	250
H03	120		200		300
H04	160			250	
H05					

Selection and ordering data

The mounting type / mounting position must be specified when you place your order to ensure that the gearbox is supplied with the correct quantity of oil.

Please contact customer service to discuss the oil quantity if you wish to use a mounting position which is not shown here.

Position of the terminal box

The terminal box of the motor can be mounted in four different positions. See Chapter 8 for an accurate representation of the terminal box position and the corresponding order codes.

Helical worm gearbox C, foot-mounted design

Oil control valves:

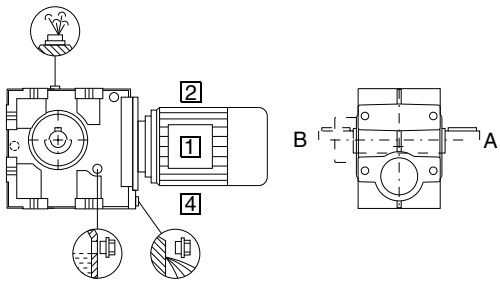
- Size 28: These types are lubricated for life. No ventilation, oil level, or drain plugs are present.
- From size 38 up: Oil level Ventilation Oil drain * On opposite side

A,B position of the customer's solid/plug-in shaft

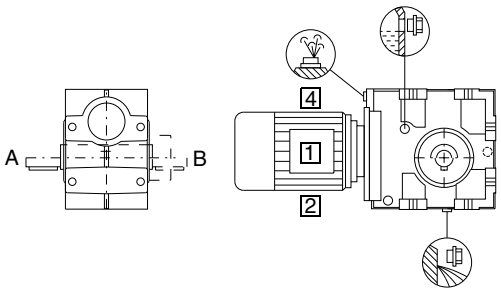
1 ... 4 Position of the terminal box, see Chapter 8

1) Standard mounting type

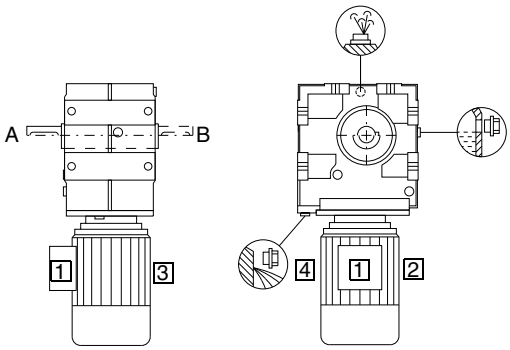
C: B3-00 (IM B3-00) 1)
Order code: Output side A **D06**, output side B **D08**
CA: H-01 1)
Order code: Output side A **D76**, output side B **D77**



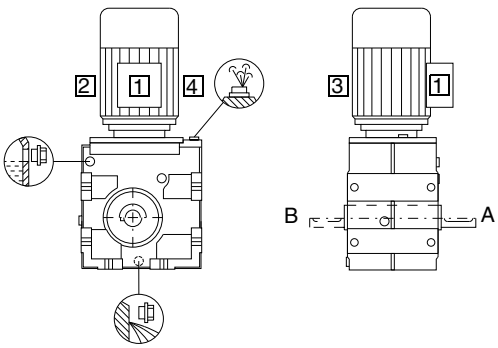
C: B8-00 (IM B8-00)
Order code: Output side A **D68**, output side B **D70**
CA: H-02
Order code: Output side A **D78**, output side B **D79**



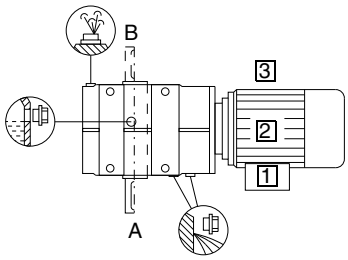
C: B6-00 (IM B6-00)
Order code: Output side A **D38**, output side B **D40**
CA: H-04
Order code: Output side A **D82**, output side B **D83**



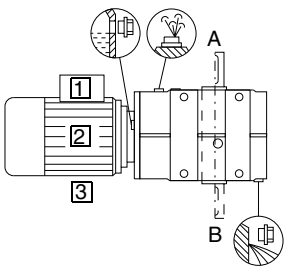
C: B7-00 (IM B7-00)
Order code: Output side A **D59**, output side B **D61**
CA: H-03
Order code: Output side A **D80**, output side B **D81**



C: V5-00 (IM V5-00)
Order code: Output side A **E03**, output side B **E05**
CA: H-05
Order code: Output side A **D84**, output side B **D85**



C: V6-00 (IM V6-00)
Order code: Output side A **E15**, output side B **E17**
CA: H-06
Order code: Output side A **D86**, output side B **D87**



Mounting types and mounting positions

Selection and ordering data (continued)

Helical worm gearbox C, flange-mounted design (C.F), with housing flange (C.Z) or torque arm (C.D)

Oil control valves:

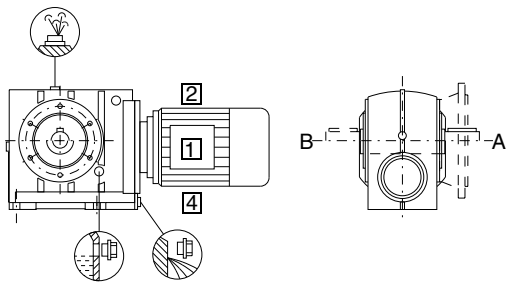
- Size 28: These types are lubricated for life. No ventilation, oil level, or drain plugs are present.
- From size 38 up: Oil level Ventilation Oil drain * On opposite side

A,B position of the customer's solid/plug-in shaft

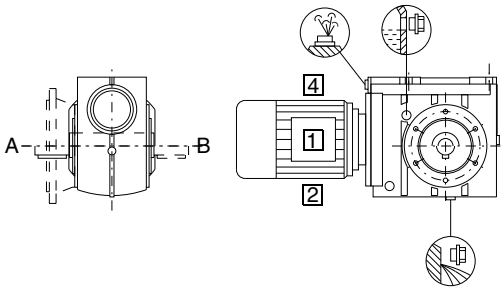
1 ... 4 Position of the terminal box, see Chapter 8

1) Standard mounting type

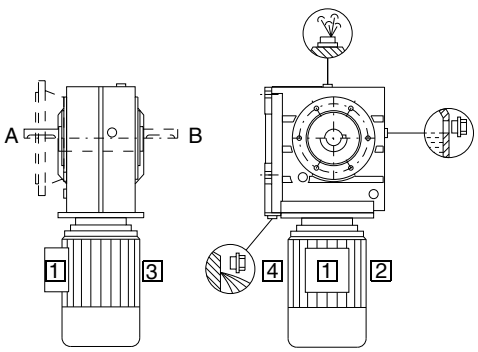
CF: B5-01 (IM B5-01) 1)
Order code: Output side A **D22**, output side B **D24**
CAD, CAF, CAZ: H-01 1)
Order code: Output side A **D76**, output side B **D77**



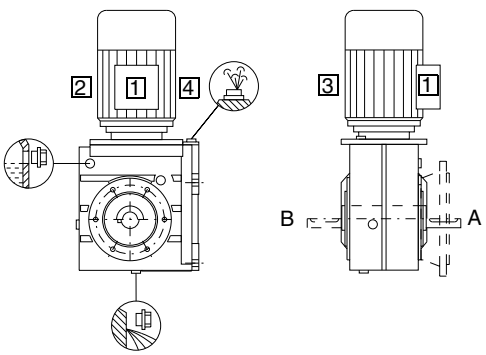
CF: B5-03 (IM B5-03)
Order code: Output side A **D32**, output side B **D34**
CAD, CAF, CAZ: H-02
Order code: Output side A **D78**, output side B **D79**



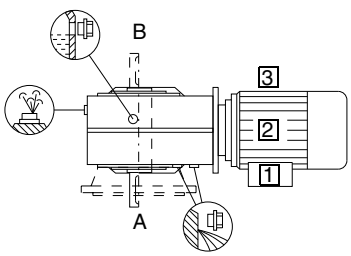
CF: B5-00 (IM B5-00)
Order code: Output side A **D18**, output side B **D20**
CAD, CAF, CAZ: H-04
Order code: Output side A **D82**, output side B **D83**



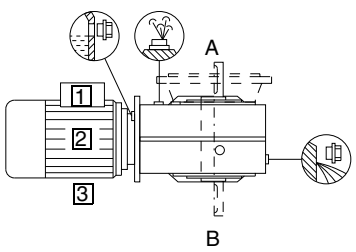
CF: B5-02 (IM B5-02)
Order code: Output side A **D68**, output side B **D29**
CAD, CAF, CAZ: H-03
Order code: Output side A **D80**, output side B **D81**



CF: V1-00 (IM V1-00)
Order code: Output side A **D90**, output side B **D92**
CAD, CAF, CAZ: H-05
Order code: Output side A **D84**, output side B **D85**



CF: V3-00 (IM V3-00)
Order code: Output side A **D98**, output side B **E00**
CAD, CAF, CAZ: H-06
Order code: Output side A **D86**, output side B **D87**



Selection and ordering data (continued)

Helical worm tandem gearbox

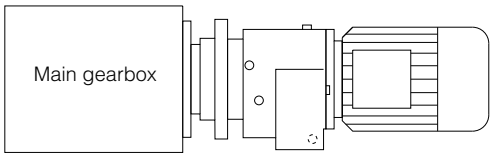
The mounting type / mounting position of the tandem gearbox corresponds to that of the main gearbox.
The figures below are only designed to show the position of the oil control valves of the 2nd gearbox.

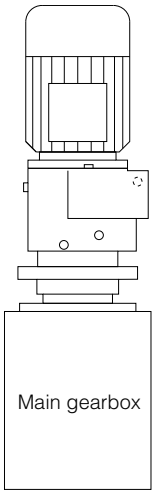
Note:

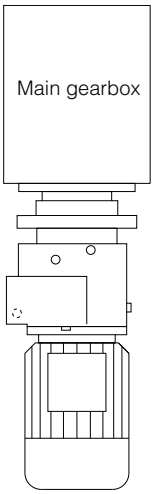
In a horizontal operating position the bulging part of the housing of the 2nd gearbox generally faces vertically downwards.

Oil control valves:

- Size 28: These types are lubricated for life. No ventilation, oil level, or drain plugs are present.







Special versions

Lubricants

Helical worm gearbox C is always filled with synthetic lubricant prior to despatch and is supplied ready for use. The rating plate contains information about the appropriate type of oil (PGLP) and ISO viscosity class.

If the gearbox is to be used in an application with special requirements, the lubricants listed in the table below can be used.

Area of application	Ambient temperature [1]			DIN ISO designation	Order code
Standard oils					
Standard temperature	0	…	+60 °C	CLP ISO PG VG460	**K08**
Low temperature usage	-20	…	+50 °C	CLP ISO PG VG220	**K07**
Lowest temperature usage	-40	…	+40 °C	CLP ISO PAO VG220	[2]
Physiologically safe oils (for use in the food industry) in acc. with NSF(USDA)-H1					
Standard temperature	-30	…	+40 °C	CLP ISO H1 VG460	**K11**
Biologically degradable oils					
Standard temperature	-20	…	+40 °C	CLP ISO E VG220	**K10**

1) Recommendation
2) On request

Size 28 does not feature any ventilation, oil level, or drain plugs. The lubricant does not need to be changed, due to the low thermal load the gearbox is subjected to.

Gearboxes of sizes 38 to 88 are fitted with filler, oil level, and drain plugs as standard. The ventilation and vent filter, which is delivered loose, must be attached in place of the filler plug prior to startup.

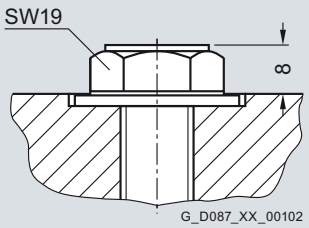
5

Oil level control

Oil sight glass

For size 38 and above, helical worm gearbox C can be equipped with a visual oil level indicator (oil sight glass) for most mounting types and mounting positions.

Order code:
Oil sight glass **G34**



SW = Wrench width

Gearbox	Size
Helical worm gearbox	C.38 … C.88

Electrical oil level monitoring system

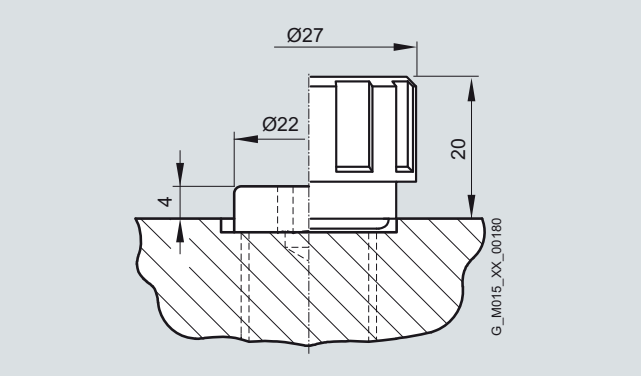
If required, the gearbox can be supplied with an electrical oil level monitoring system, which enables the oil level of the gearbox to be monitored remotely. The oil level is monitored by a capacitive sensor only when the gearbox starts up; it is not measured continuously during operation.

Gearbox ventilation

The positions of the ventilation and ventilation elements can be seen on the mounting position diagrams.

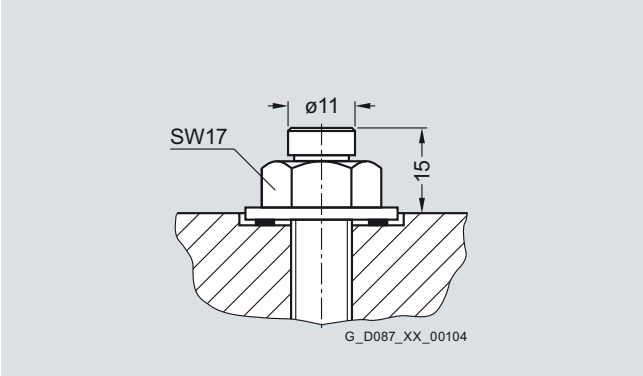
If required, a pressure ventilation valve can be used for helical worm gearbox C, size 38 and above.

Vent filter



Order code:
Vent filter **G44**

Pressure ventilation valve



SW = Wrench width

Order code:
Pressure ventilation valve **G45**

Oil drain

Magnetic oil drain plug

A magnetic oil drain plug for inserting in the oil drainage hole is available for helical worm gearboxes of size 48 and above. This serves to collect any grit contained in the gear lubricant.

Order code:
Magnetic oil drain plug **G53**

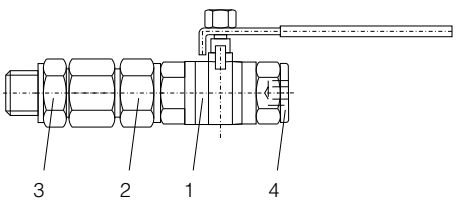
Oil drain valve

An oil drain valve is available for helical worm gearboxes of size 48 and above.

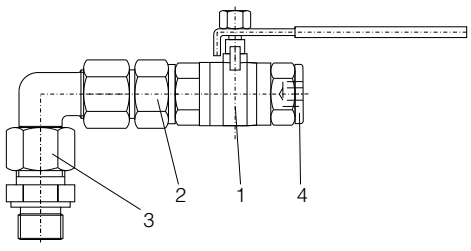
The oil drain valve may be designed as a complete unit featuring a screw plug, depending on the corresponding mounting position.

Order code:
Oil drain valve, straight **G54**

An angled oil drain valve is also available on request.



Item 1 Oil drain valve
Item 2 Screwed connection EGE
Item 3 Screwed connection GE
Item 4 Screw plug



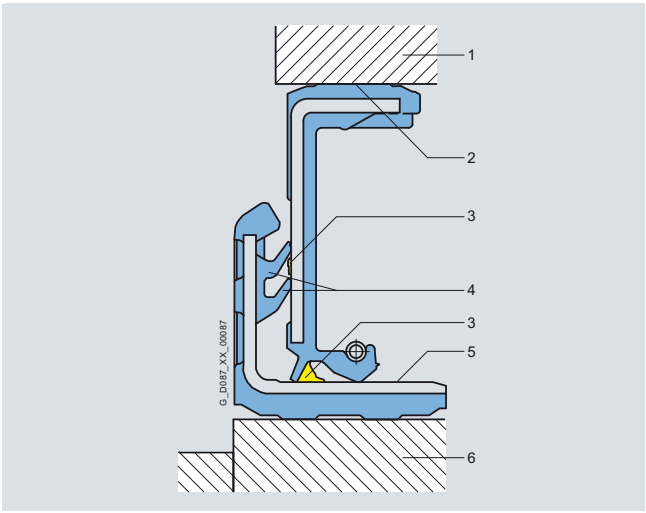
Item 1 Oil drain valve
Item 2 Screwed connection EGE
Item 3 Screwed connection GE
Item 4 Screw plug

Special versions

Sealing

Combination shaft sealing

A combination shaft sealing, which helps to prevent oil from leaking, is available for helical worm gearboxes of sizes 38 to 88.



A combination shaft sealing is particularly well suited to external use.

Order code:
Combination shaft sealing **G24**

1 • Housing
2 • Rubberized inner and outer diameter
3 • Grease filling prevents dry running of the sealing lips
4 • Additional sealing lips to protect against dirt
• Decoupled sealing system prevents scoring of the shaft as a result of corrosion or dirt
5 • Protected running surface for radial shaft sealing ring
• No damage when mounting
6 • Shaft

Double sealing

Double sealing is possible for helical worm gearboxes of size 28. Double sealing is particularly well suited to external use.

Order code:
Double sealing MSS1 (size 28) **G23**

High temperature resistant sealing

High temperature resistant sealing (Viton/fluorinated rubber) for higher operating temperatures of +60 °C and above are available for helical worm gearboxes.

Order code:
High temperature resistant sealing **G25**

Hollow shaft cover (protection cover)

Gearboxes with hollow shafts can be fitted with a fixed protection cover. Gearboxes of size 28 are fitted with a steel protection cover as standard.

The steel protection cover can only be used for gearboxes with hollow shaft and shrink disk.

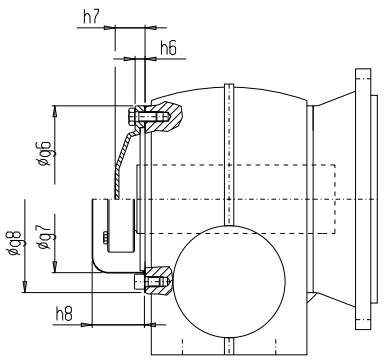
For outdoor applications we recommend the ATEX versions.

Order codes:

Protection cover	**G62**
Protection cover (ATEX)	**G63**
Steel protection cover	**G60**
Steel protection cover (ATEX)	**G61**

Protection cover

Protection cover Steel



Gearbox type	Steel protection cover			Protection cover		
	g7	g8	h8	g6	h6	h7
C.28	58.0	102	36.0	–	–	–
C.38	82.2	115	40.0	120	10	33
C.48	99.0	130	44.0	132	10	33
C.68	115.0	150	62.5	150	10	37
C.88	137.0	190	70.0	190	13	50

CAF, CAZ, CAD, CAFS[1)], CAZS[1)], CADS[1)], CAFT, CAZT, CADT

1) Only a steel protection cover is available for CAFS, CAZS, and CADS

Radially reinforced output shaft bearings

The bearings of the MOTOX gearboxes are dimensioned such that they are strong enough to withstand most application cases.

However, the gearboxes can be fitted with a radially reinforced output shaft bearing arrangement for applications with particularly high radial forces.

Order code:
Radially reinforced output shaft bearings **G20**

2nd output shaft extension

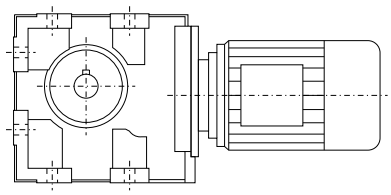
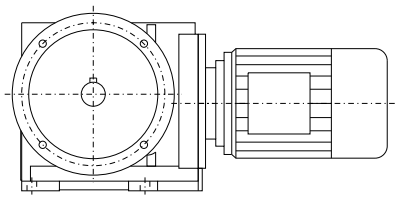
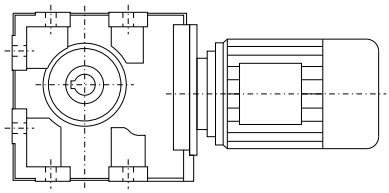
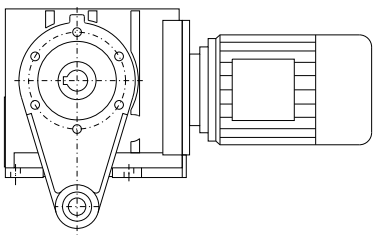
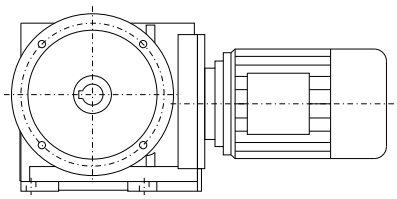
If required, helical worms in a foot-mounted design with solid shaft are available with a 2nd shaft extension.

See the dimension drawings for the corresponding design for the relevant dimensions.

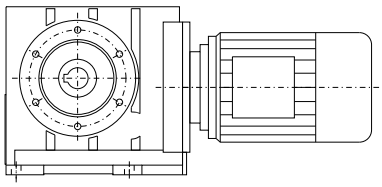
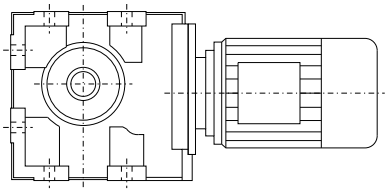
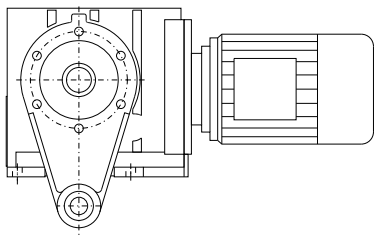
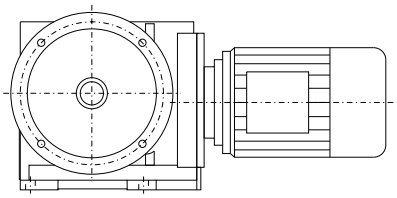
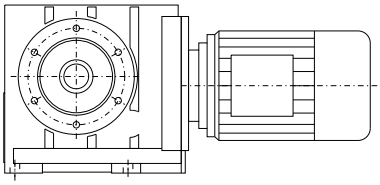
Order code:
2nd output shaft extension **G73**

Dimensions

Dimension drawing overview

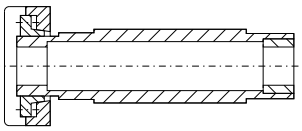
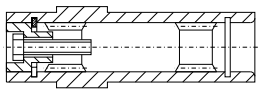
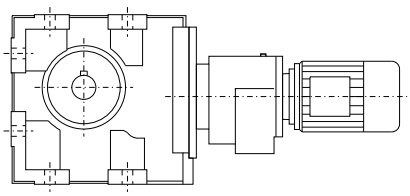
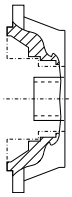
Representation	Gearbox type	Dimension drawing on page
	C28 / CZ28	5/57
	C38	5/65
	C48	5/75
	C68	5/85
	C88	5/95
	CF28	5/58
	CF38	5/66
	CF48	5/76
	CF68	5/86
	CF88	5/96
	CA28 / CAZ28	5/59
	CA38	5/67
	CA48	5/77
	CA68	5/87
	CA88	5/97
	CAD28	5/60
	CAD38	5/68
	CAD48	5/78
	CAD68	5/88
	CAD88	5/98
	CAF28	5/61
	CAF38	5/69
	CAF48	5/79
	CAF68	5/89
	CAF88	5/99

Dimension drawing overview (continued)

Representation	Gearbox type	Dimension drawing on page
	CAZ38	5/70
	CAZ48	5/80
	CAZ68	5/90
	CAZ88	5/100
	CAS28 / CAZS28	5/62
	CAS38	5/71
	CAS48	5/81
	CAS68	5/91
	CAS88	5/101
	CADS28	5/63
	CADS38	5/72
	CADS48	5/82
	CADS68	5/92
	CADS88	5/102
	CAFS28	5/64
	CAFS38	5/73
	CAFS48	5/83
	CAFS68	5/93
	CAFS88	5/103
	CAZS38	5/74
	CAZS48	5/84
	CAZS68	5/94
	CAZS88	5/104

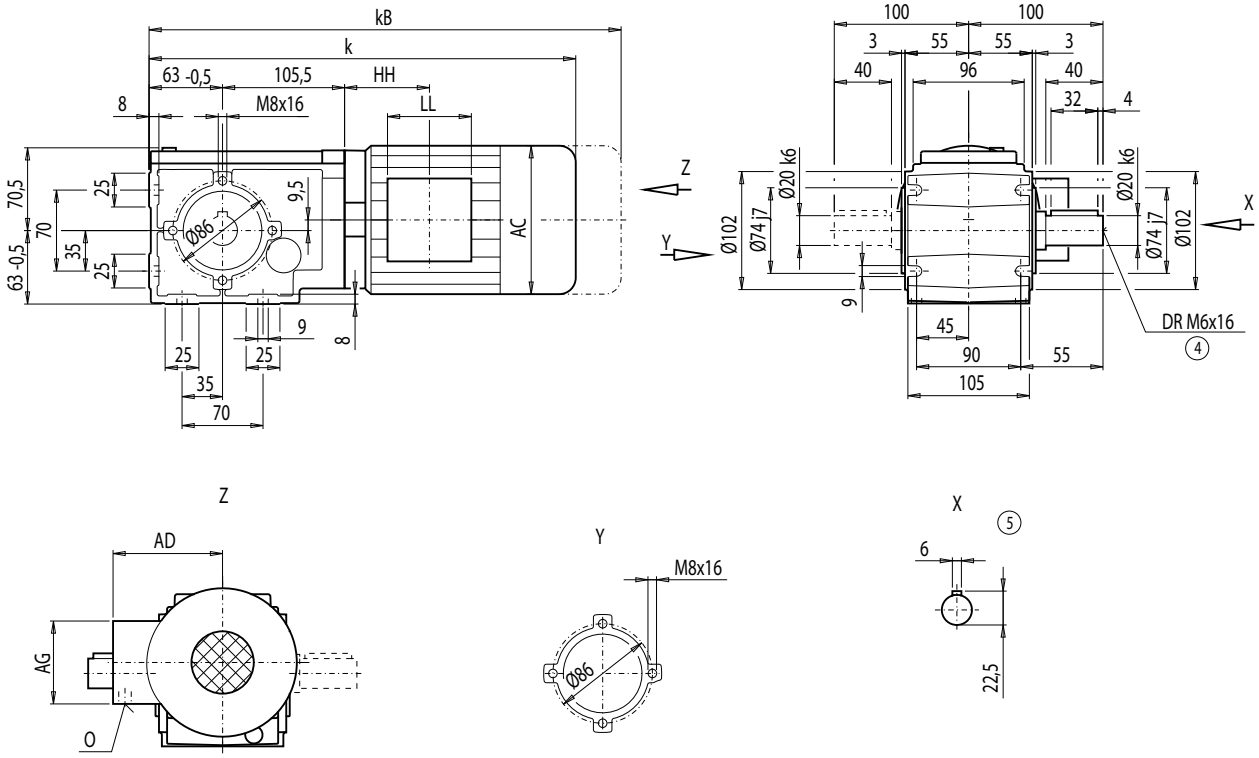
Dimensions

Dimension drawing overview (continued)

Representation	Gearbox type	Dimension drawing on page
	CA.S38 ... CA.S88	5/105
	CA.T38 ... CA.T88	5/106
	C.38-Z28 ... C.88-D/Z38	5/107
	Additional flange-mounted design	5/108

Gearbox C/CZ28, foot- and housing-flange-mounted designs (C-type)

C012
CZ012



Motor	C.28 k	kB	AC	AD	AG	LL	HH	O	Weight C.28
LA71	353	408	139	146	90	90	40.5	M20x1.5/M25x1.5	10
LA71Z	372	427	139	146	90	90	40.5	M20x1.5/M25x1.5	11

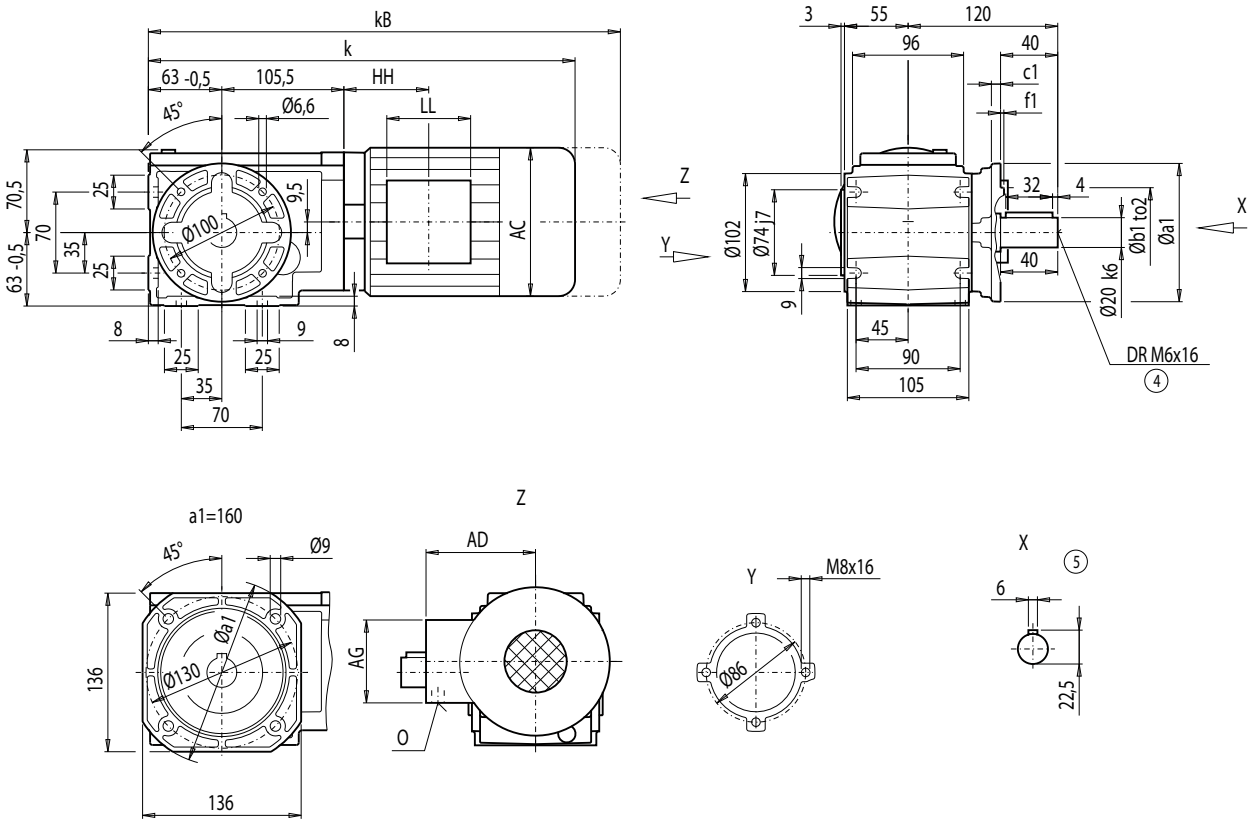
④ DIN 332

⑤ Feather key / keyway DIN 6885

Dimensions

Gearbox CF28, flange-mounted design (A-type)

CF012



Flange	a1	b1	to2	c1	f1
A120	120	80	j6	8	3.0
A160	160	110	j6	9	3.5

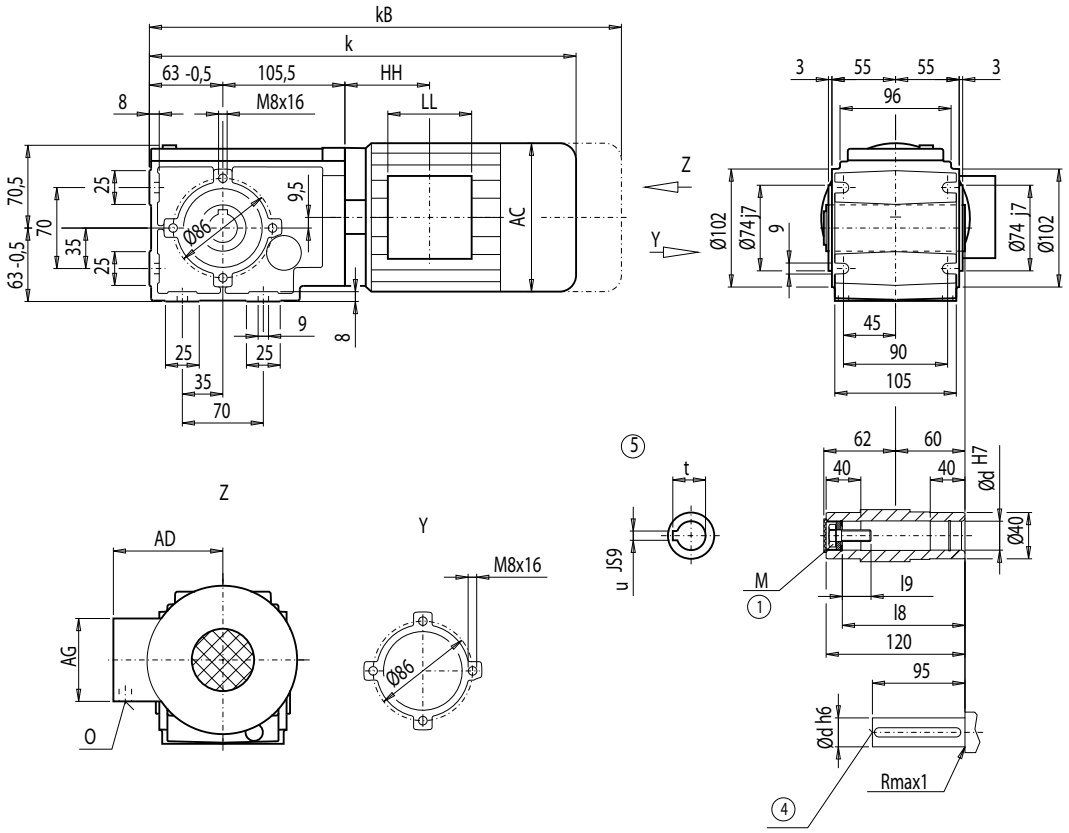
Motor	CF28 k	kB	AC	AD	AG	LL	HH	O	Weight CF28
LA71	353	408	139	146	90	90	40.5	M20x1.5/M25x1.5	12
LA71Z	372	427	139	146	90	90	40.5	M20x1.5/M25x1.5	12

④ DIN 332

⑤ Feather key / keyway DIN 6885

Gearbox CA/CAZ28, housing-flange-mounted design (C-type)

CA012
CAZ012



d	l9	l8	M	t	u
20 *)	23.4	106	M6	22.8	6
25	27.6	105	M10	28.3	8

*) Preferred series

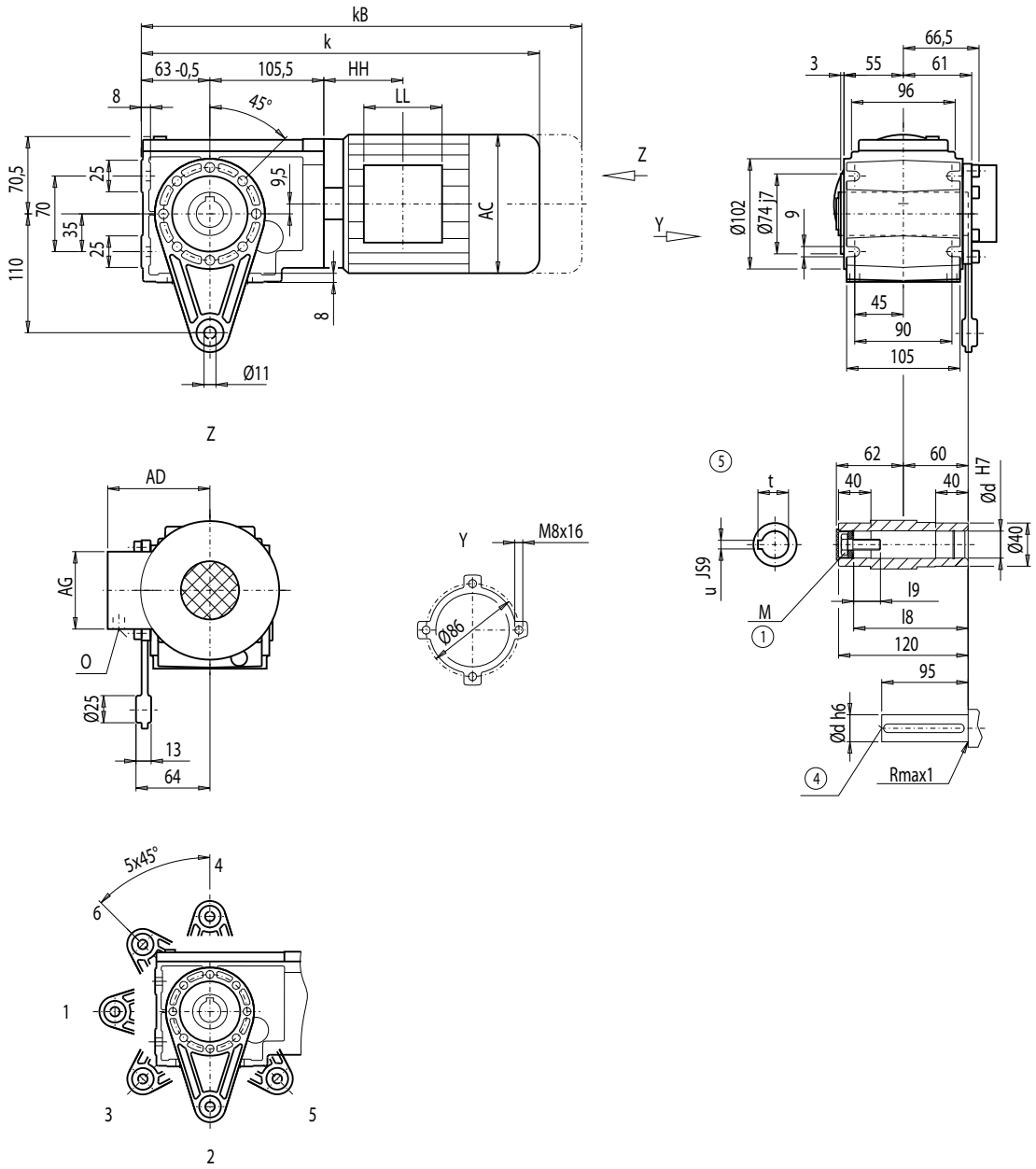
Motor	CA.28 k	kB	AC	AD	AG	LL	HH	O	Weight CA.28
LA71	353	408	139	146	90	90	40.5	M20x1.5/M25x1.5	9
LA71Z	372	427	139	146	90	90	40.5	M20x1.5/M25x1.5	10

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014

Dimensions

Gearbox CAD28, shaft-mounted design with torque arm

CAD012



d	l9	l8	M	t	u
20 *)	23.4	106	M6	22.8	6
25	27.6	105	M10	28.3	8

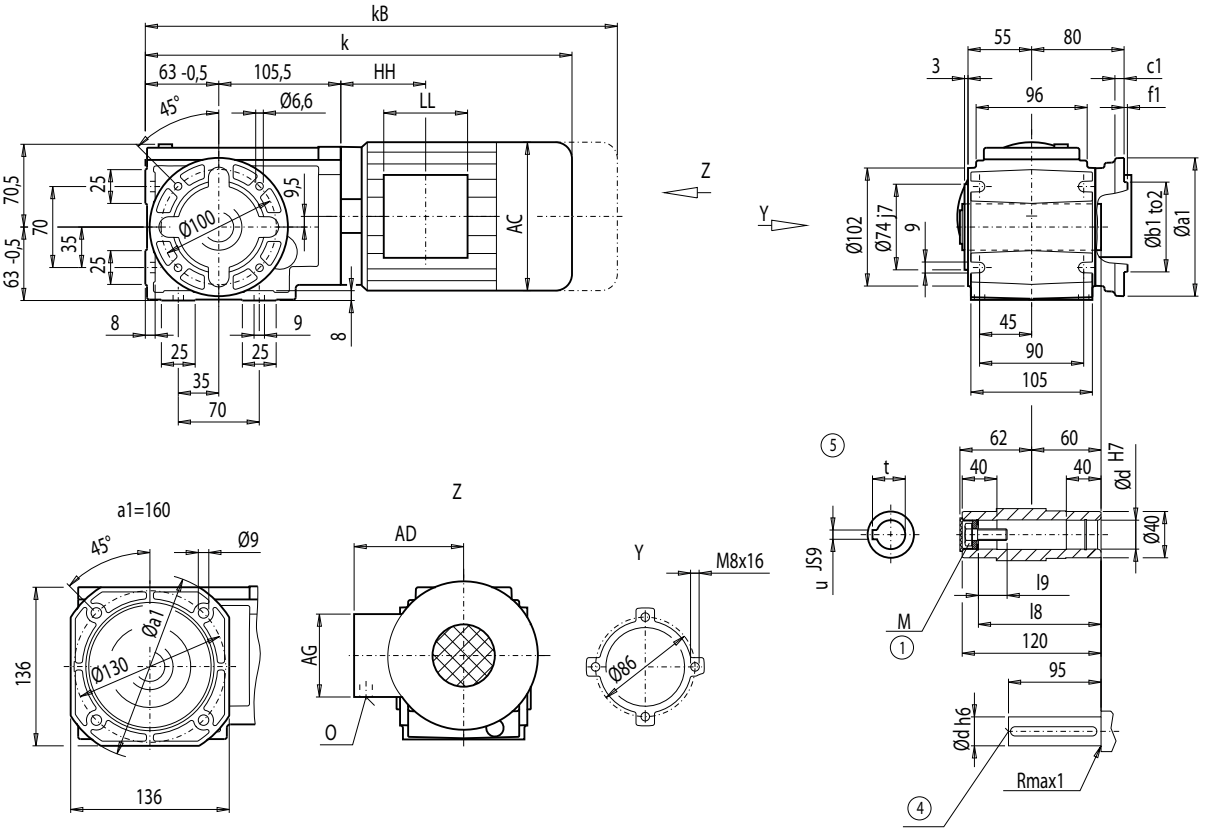
*) Preferred series

	CAD28								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAD28**
LA71	353	408	139	146	90	90	40.5	M20x1.5/M25x1.5	10
LA71Z	372	427	139	146	90	90	40.5	M20x1.5/M25x1.5	11

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014

Gearbox CAF28, flange-mounted design

CAF012



Flange	a1	b1	to2	c1	f1	d	M	l9	l8	t	u
A120	120	80	j6	8	3.0	20 *)	M6	23.4	106	22.8	6
						25	M10	27.6	105	28.3	8
A160	160	110	j6	9	3.5	20 *)	M6	23.4	106	22.8	6
						25	M10	27.6	105	28.3	8

*) Preferred series

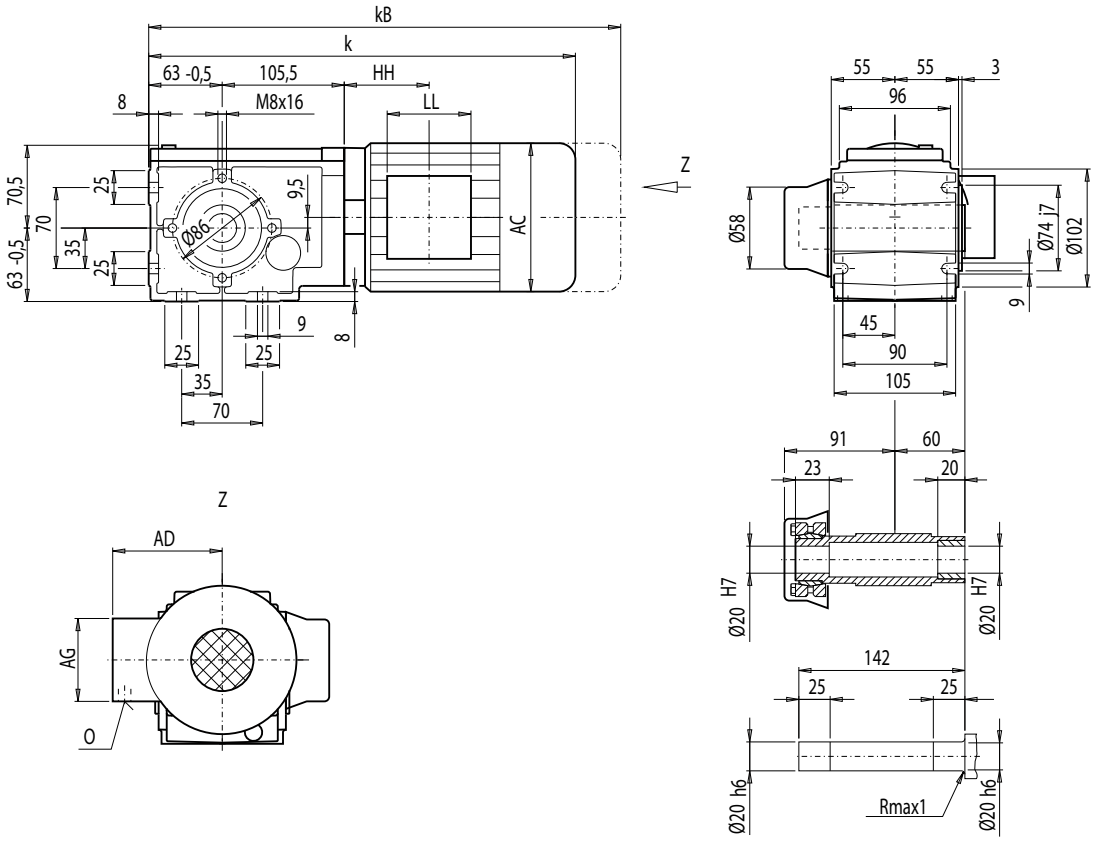
	CAF28								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAF28**
LA71	353	408	139	146	90	90	40.5	M20x1.5/M25x1.5	11
LA71Z	372	427	139	146	90	90	40.5	M20x1.5/M25x1.5	12

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014

Dimensions

Gearbox CAS/CAZS28, shaft-mounted design with housing flange (C-type) and shrink disk

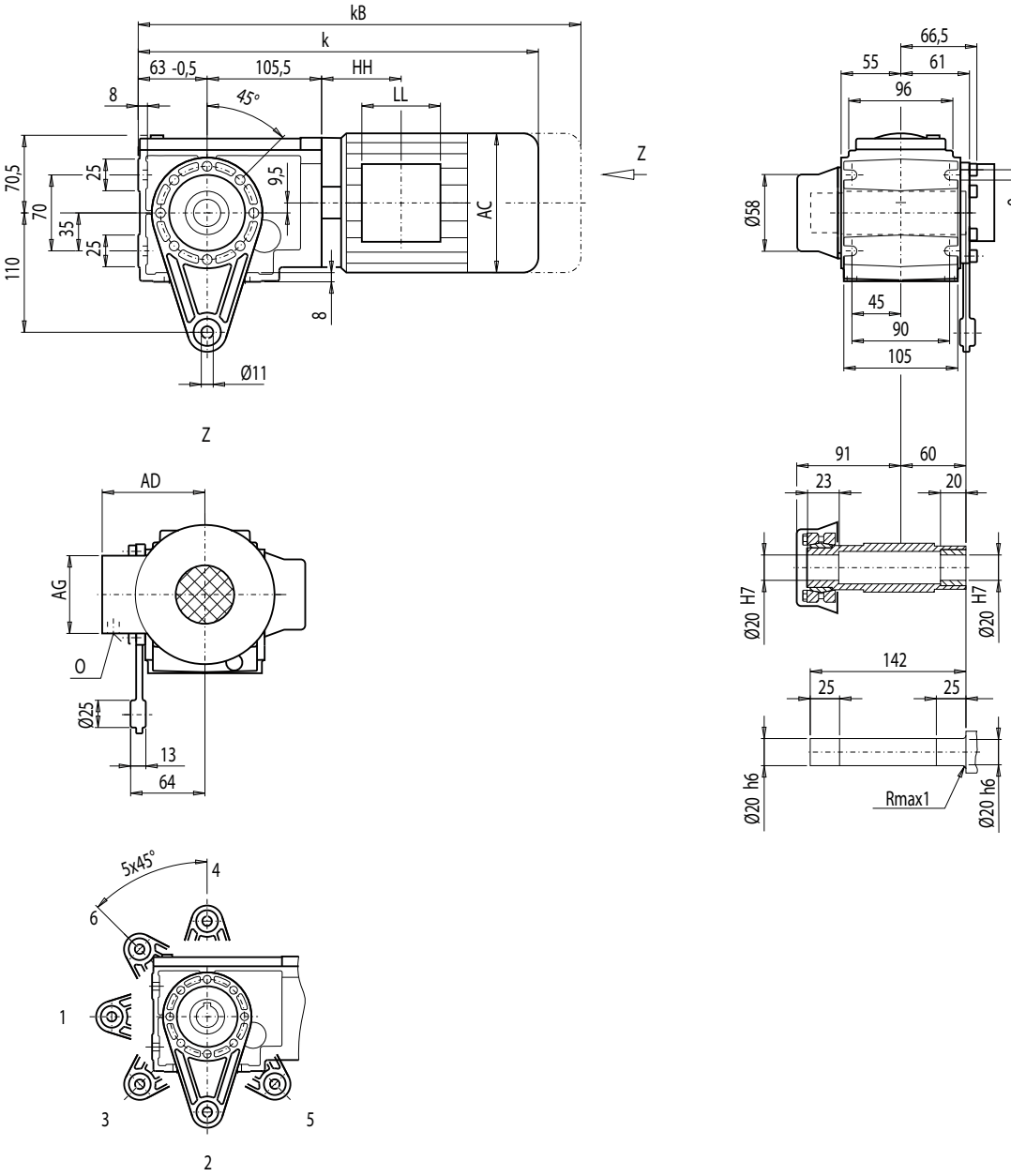
CAS012
CAZS012



Motor	CA.S28 k	kB	AC	AD	AG	LL	HH	O	Weight CA.S28
LA71	353	408	139	146	90	90	40.5	M20x1.5/M25x1.5	9
LA71Z	372	427	139	146	90	90	40.5	M20x1.5/M25x1.5	10

Gearbox CADS28, shaft-mounted design with torque arm and shrink disk

CADS012

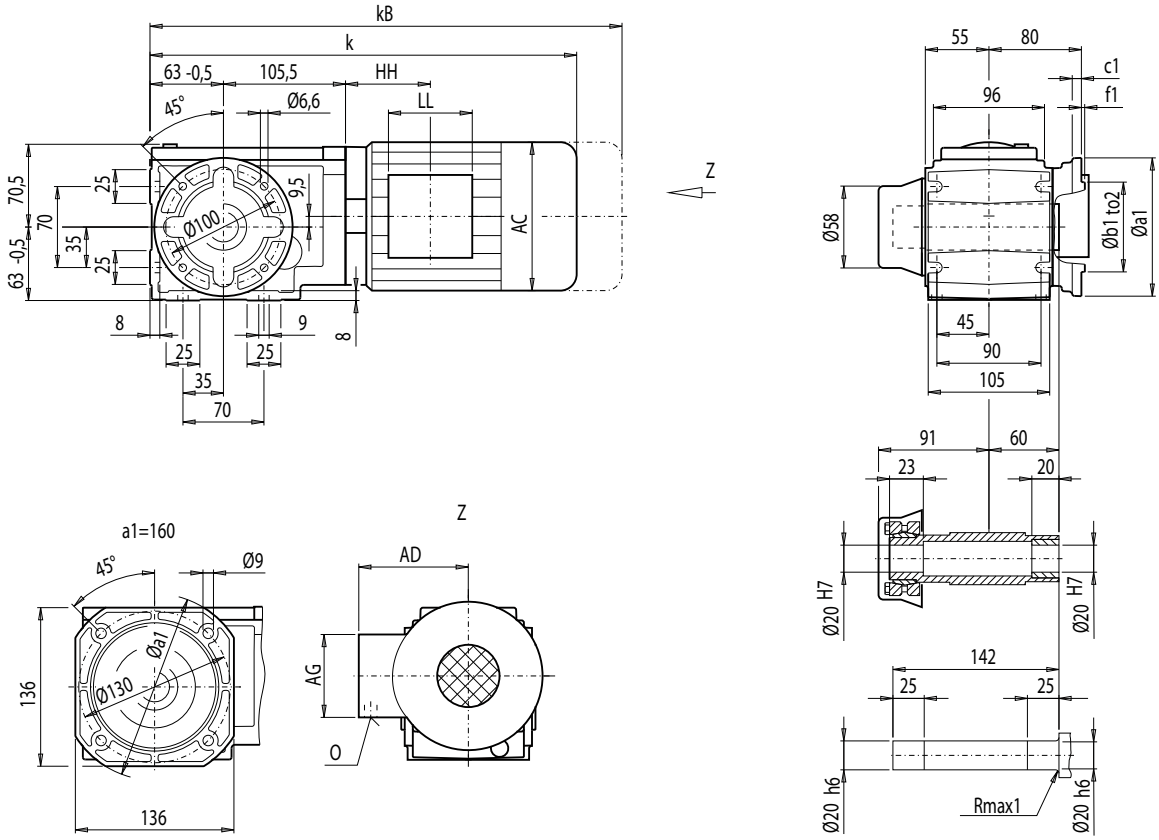


Motor	CADS28 k	kB	AC	AD	AG	LL	HH	O	Weight CADS28
LA71	353	408	139	146	90	90	40.5	M20x1.5/M25x1.5	10
LA71Z	372	427	139	146	90	90	40.5	M20x1.5/M25x1.5	11

Dimensions

Gearbox CAFS28, flange-mounted design and shrink disk

CAFS012

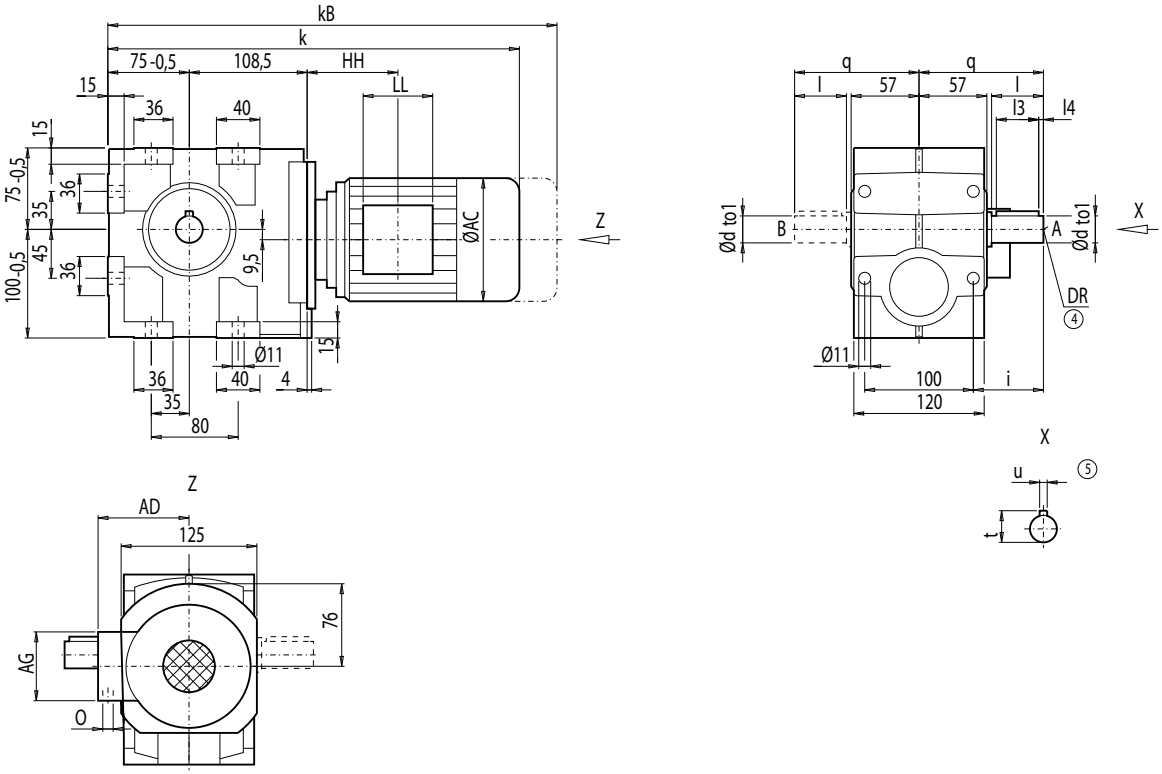


Flange	a1	b1	to2	c1	f1
A120	120	80	j6	8	3.0
A160	160	110	j6	9	3.5

Motor	CAFS28 k	kB	AC	AD	AG	LL	HH	O	Weight CAFS28
LA71	353	408	139	146	90	90	40.5	M20x1.5/M25x1.5	11
LA71Z	372	427	139	146	90	90	40.5	M20x1.5/M25x1.5	12

Gearbox C38, foot- and housing-flange-mounted designs (C-type)

C012



d	to1	l	l3	l4	t	u	i	q	DR
25 *)	k6	50	40	5	28	8	60	110	M10x22
35	k6	70	56	5	38	10	80	130	M12x28

*) Preferred series

	C38								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**C38**
LA71	442.0	497.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	21
LA71Z	461.0	516.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	21
LA80	479.0	542.5	156.5	155	90	90	114.0	M20x1.5/M25x1.5	26
LA80Z	501.5	565.0	156.5	155	90	90	187.0	M20x1.5/M25x1.5	30
LA90S/L	510.0	581.0	174.0	163	90	90	114.0	M20x1.5/M25x1.5	31
LA90ZL	555.0	626.0	174.0	163	90	90	238.0	M20x1.5/M25x1.5	37
LA100L	556.0	637.0	195.0	168	120	120	154.5	2xM32x1.5	40
LA100ZL	626.0	707.0	195.0	168	120	120	286.5	2xM32x1.5	50
LA112M	585.5	666.5	219.0	181	120	120	160.0	2xM32x1.5	50
LA112ZM	613.5	694.5	219.0	181	120	120	264.0	2xM32x1.5	57

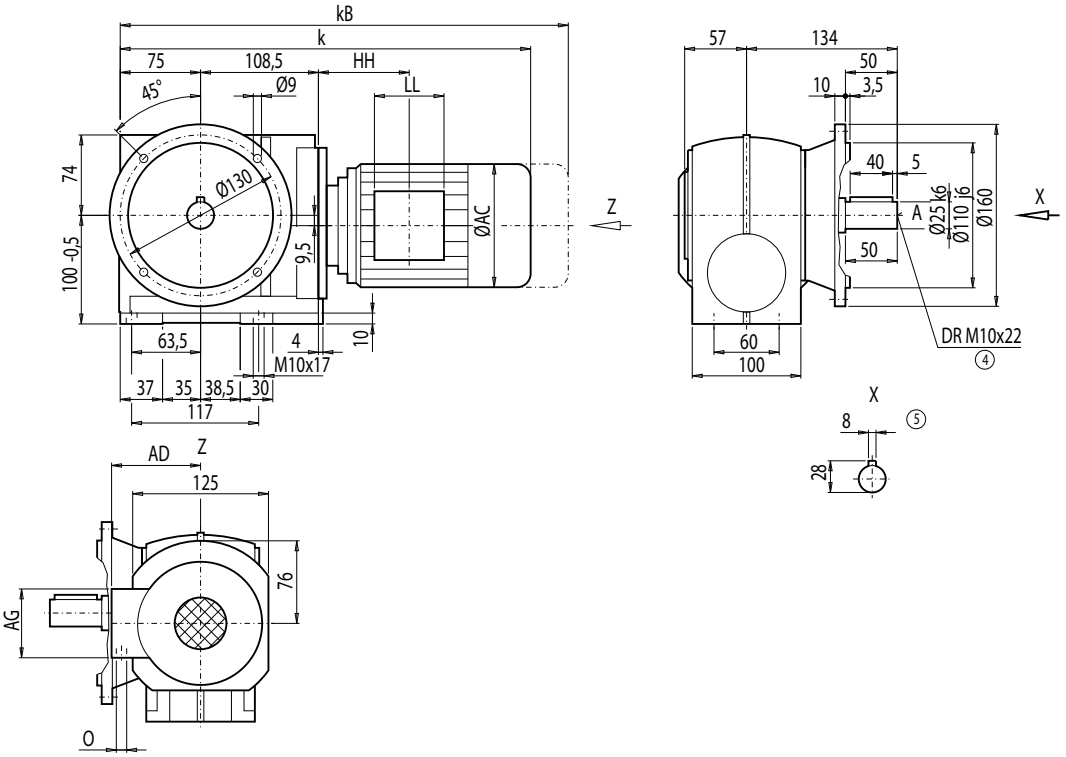
④ DIN 332

⑤ Feather key / keyway DIN 6885

Dimensions

Gearbox CF38, flange-mounted design (A-type)

CF012



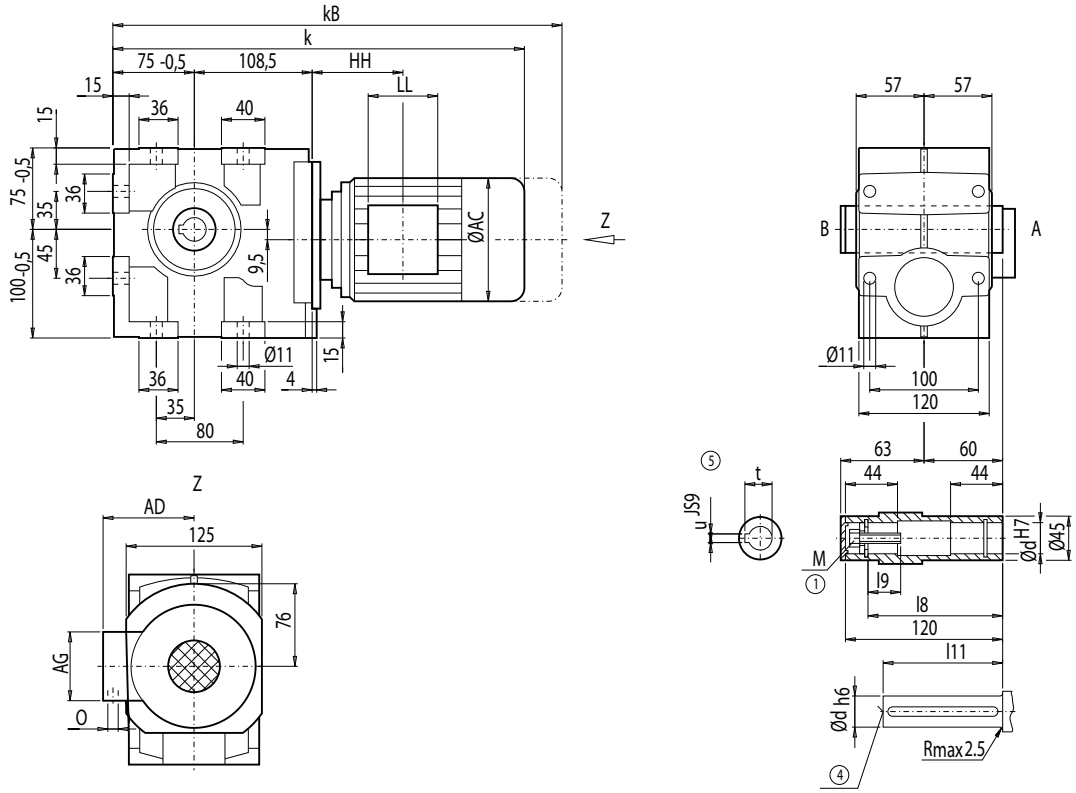
Motor	CF38 k	kB	AC	AD	AG	LL	HH	O	Weight CF38
LA71	442.0	497.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	25
LA71Z	461.0	516.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	25
LA80	479.0	542.5	156.5	155	90	90	114.0	M20x1.5/M25x1.5	30
LA80Z	501.5	565.0	156.5	155	90	90	187.0	M20x1.5/M25x1.5	34
LA90S/L	510.0	581.0	174.0	163	90	90	114.0	M20x1.5/M25x1.5	34
LA90ZL	555.0	626.0	174.0	163	90	90	238.0	M20x1.5/M25x1.5	40
LA100L	556.0	637.0	195.0	168	120	120	154.5	2xM32x1.5	44
LA100ZL	626.0	707.0	195.0	168	120	120	286.5	2xM32x1.5	54
LA112M	585.5	666.5	219.0	181	120	120	160.0	2xM32x1.5	54
LA112ZM	613.5	694.5	219.0	181	120	120	264.0	2xM32x1.5	61

④ DIN 332

⑤ Feather key / keyway DIN 6885

Gearbox CA38, shaft-mounted design

CA012



d	l9	l8	l11	M	t	u
25 *)	17	105	100	M10	28.3	8
30	31	102	90	M10	33.3	8

*) Preferred series

Motor	CA38 k	kB	AC	AD	AG	LL	HH	O	Weight CA38
LA71	442.0	497.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	20
LA71Z	461.0	516.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	20
LA80	479.0	542.5	156.5	155	90	90	114.0	M20x1.5/M25x1.5	25
LA80Z	501.5	565.0	156.5	155	90	90	187.0	M20x1.5/M25x1.5	29
LA90S/L	510.0	581.0	174.0	163	90	90	114.0	M20x1.5/M25x1.5	30
LA90ZL	555.0	626.0	174.0	163	90	90	238.0	M20x1.5/M25x1.5	36
LA100L	556.0	637.0	195.0	168	120	120	154.5	2xM32x1.5	39
LA100ZL	626.0	707.0	195.0	168	120	120	286.5	2xM32x1.5	49
LA112M	585.5	666.5	219.0	181	120	120	160.0	2xM32x1.5	49
LA112ZM	613.5	694.5	219.0	181	120	120	264.0	2xM32x1.5	56

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014

Dimensions

Gearbox CAD38, shaft-mounted design with torque arm

CAD012

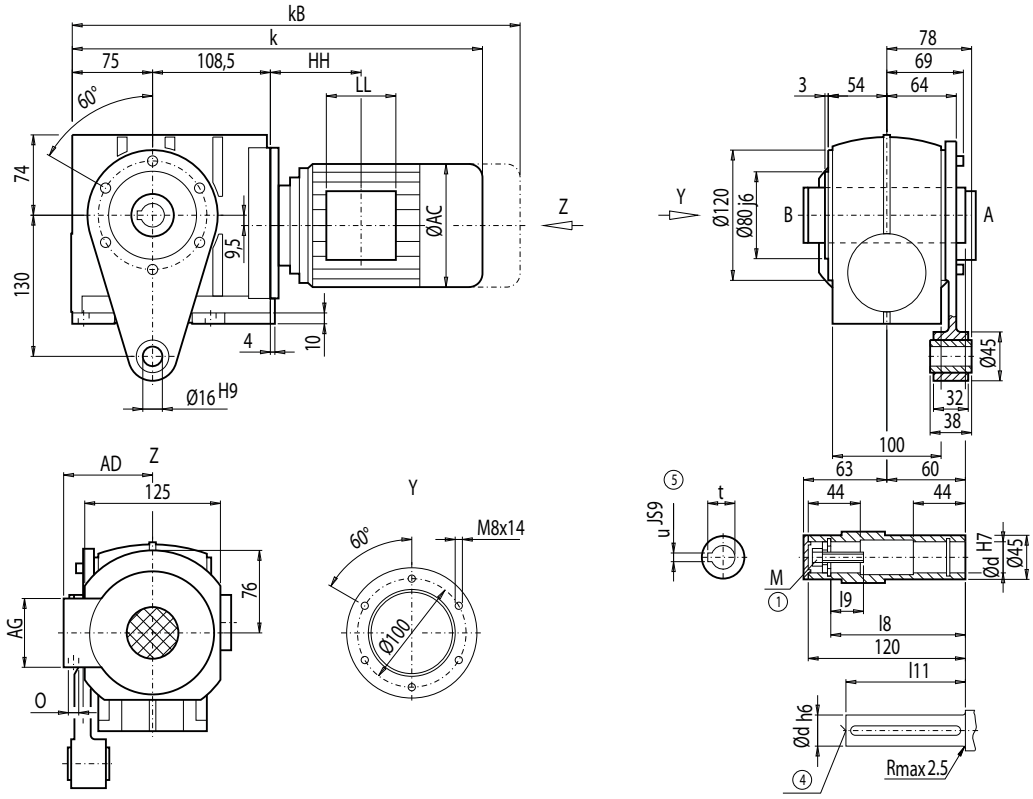


Fig.1

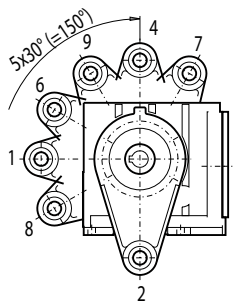
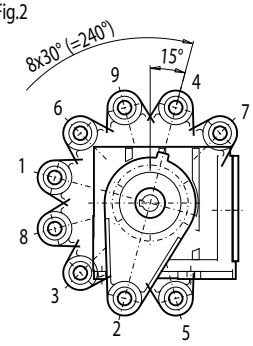


Fig.2



d	l9	l8	l11	M	t	u
25 *)	17	105	100	M10	28.3	8
30	31	102	90	M10	33.3	8

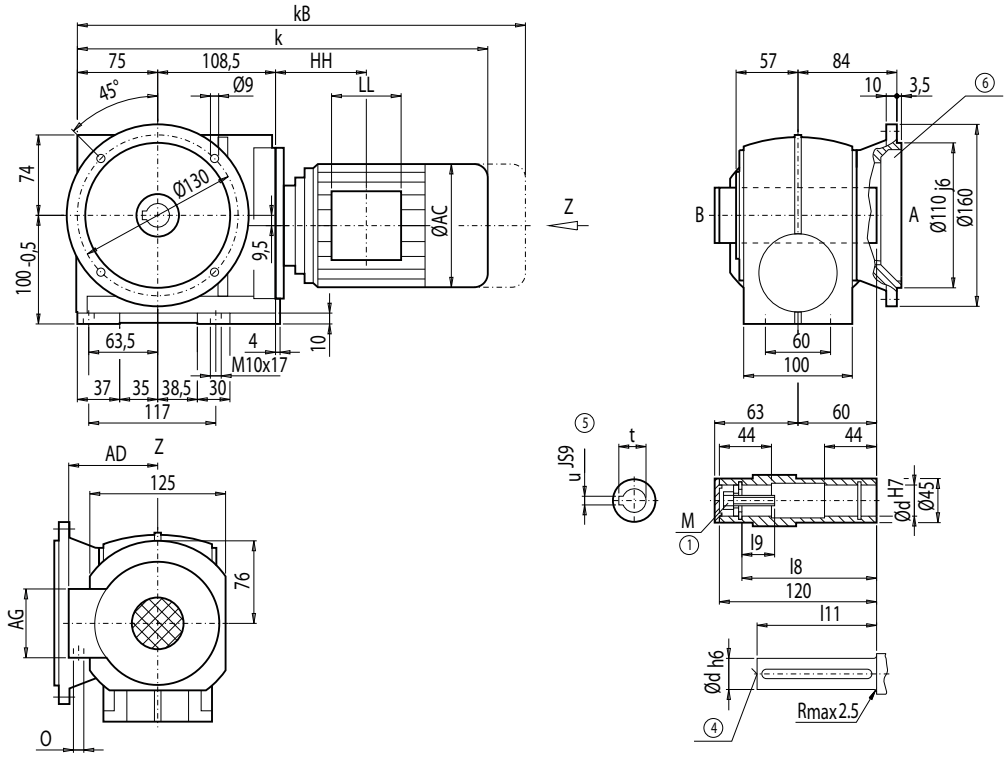
*) Preferred series

	CAD38								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAD38**
LA71	442.0	497.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	23
LA71Z	461.0	516.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	23
LA80	479.0	542.5	156.5	155	90	90	114.0	M20x1.5/M25x1.5	28
LA80Z	501.5	565.0	156.5	155	90	90	187.0	M20x1.5/M25x1.5	32
LA90S/L	510.0	581.0	174.0	163	90	90	114.0	M20x1.5/M25x1.5	32
LA90ZL	555.0	626.0	174.0	163	90	90	238.0	M20x1.5/M25x1.5	38
LA100L	556.0	637.0	195.0	168	120	120	154.5	2xM32x1.5	41
LA100ZL	626.0	707.0	195.0	168	120	120	286.5	2xM32x1.5	51
LA112M	585.5	666.5	219.0	181	120	120	160.0	2xM32x1.5	52
LA112ZM	613.5	694.5	219.0	181	120	120	264.0	2xM32x1.5	59

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014

Gearbox CAF38, flange-mounted design

CAF012



d	l9	l8	l11	M	t	u
25 *)	17	105	100	M10	28.3	8
30	31	102	90	M10	33.3	8

*) Preferred series

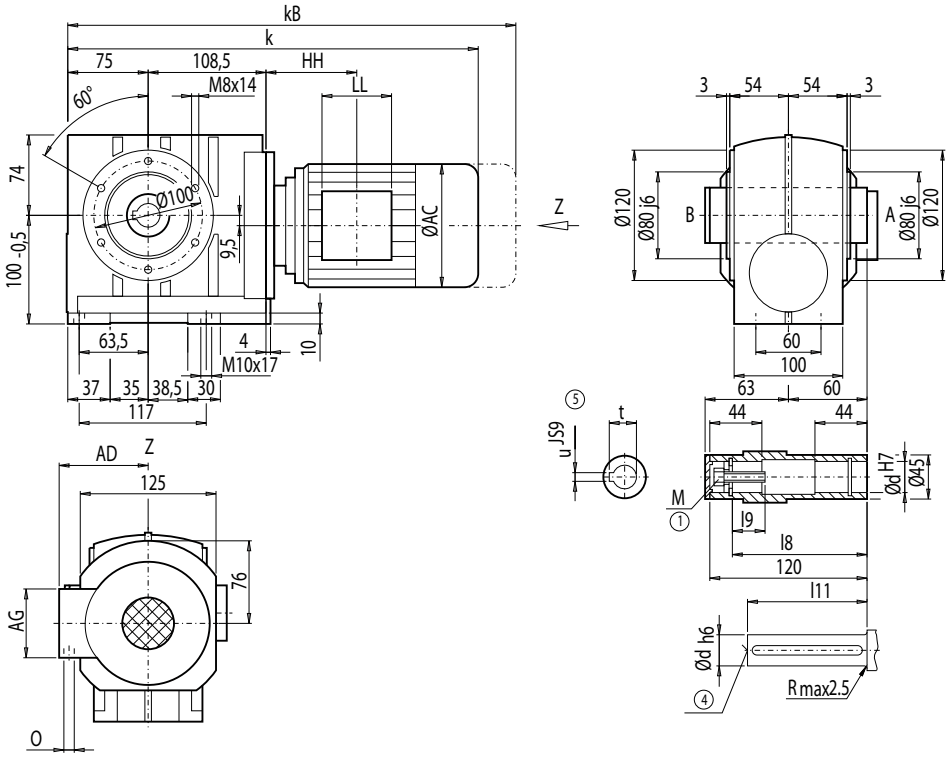
Motor	CAF38 k	kB	AC	AD	AG	LL	HH	O	Weight CAF38
LA71	442.0	497.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	24
LA71Z	461.0	516.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	24
LA80	479.0	542.5	156.5	155	90	90	114.0	M20x1.5/M25x1.5	29
LA80Z	501.5	565.0	156.5	155	90	90	187.0	M20x1.5/M25x1.5	33
LA90S/L	510.0	581.0	174.0	163	90	90	114.0	M20x1.5/M25x1.5	33
LA90ZL	555.0	626.0	174.0	163	90	90	238.0	M20x1.5/M25x1.5	39
LA100L	556.0	637.0	195.0	168	120	120	154.5	2xM32x1.5	42
LA100ZL	626.0	707.0	195.0	168	120	120	286.5	2xM32x1.5	52
LA112M	585.5	666.5	219.0	181	120	120	160.0	2xM32x1.5	53
LA112ZM	613.5	694.5	219.0	181	120	120	264.0	2xM32x1.5	60

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014 ⑥ For note, see page 5/108

Dimensions

Gearbox CAZ38, shaft-mounted design with housing flange (C-type)

CAZ012



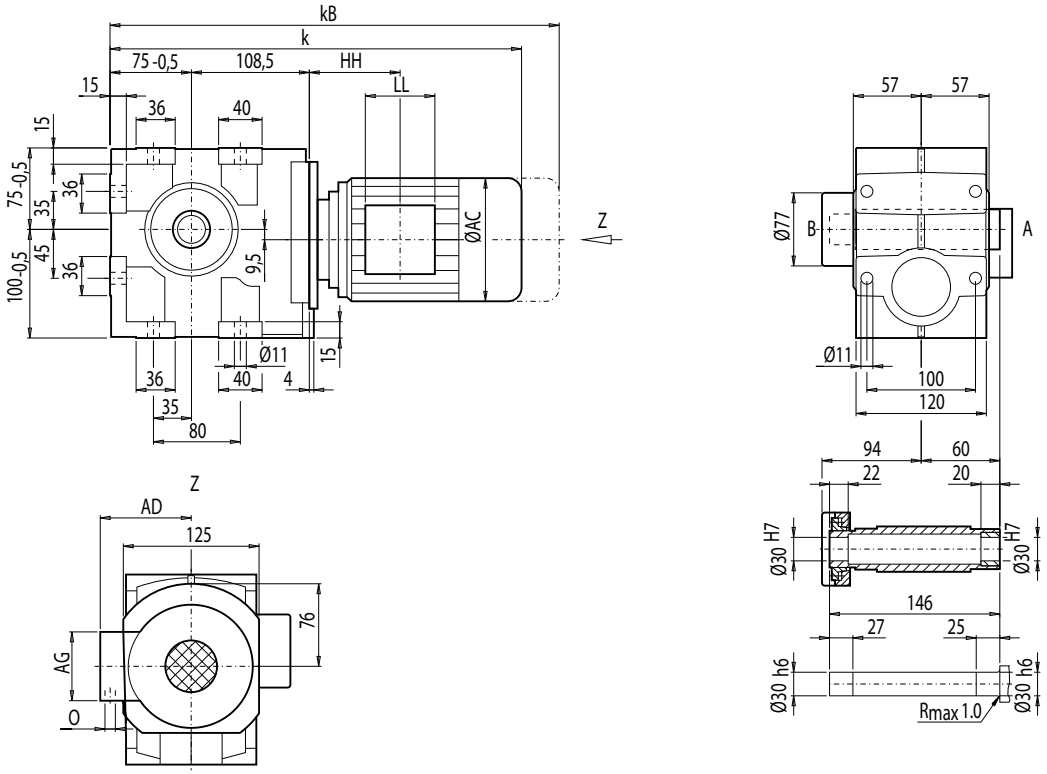
d	l9	l8	l11	M	t	u
25 *)	17	105	100	M10	28.3	8
30	31	102	90	M10	33.3	8

*) Preferred series

Motor	CAZ38 k	kB	AC	AD	AG	LL	HH	O	Weight CAZ38
LA71	442.0	497.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	22
LA71Z	461.0	516.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	22
LA80	479.0	542.5	156.5	155	90	90	114.0	M20x1.5/M25x1.5	27
LA80Z	501.5	565.0	156.5	155	90	90	187.0	M20x1.5/M25x1.5	31
LA90S/L	510.0	581.0	174.0	163	90	90	114.0	M20x1.5/M25x1.5	32
LA90ZL	555.0	626.0	174.0	163	90	90	238.0	M20x1.5/M25x1.5	38
LA100L	556.0	637.0	195.0	168	120	120	154.5	2xM32x1.5	41
LA100ZL	626.0	707.0	195.0	168	120	120	286.5	2xM32x1.5	51
LA112M	585.5	666.5	219.0	181	120	120	160.0	2xM32x1.5	51
LA112ZM	613.5	694.5	219.0	181	120	120	264.0	2xM32x1.5	58

Gearbox CAS38, shaft-mounted design with shrink disk

CAS012



Motor	CAS38 k	kB	AC	AD	AG	LL	HH	O	Weight CAS38
LA71	442.0	497.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	21
LA71Z	461.0	516.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	21
LA80	479.0	542.5	156.5	155	90	90	114.0	M20x1.5/M25x1.5	25
LA80Z	501.5	565.0	156.5	155	90	90	187.0	M20x1.5/M25x1.5	29
LA90S/L	510.0	581.0	174.0	163	90	90	114.0	M20x1.5/M25x1.5	30
LA90ZL	555.0	626.0	174.0	163	90	90	238.0	M20x1.5/M25x1.5	26
LA100L	556.0	637.0	195.0	168	120	120	154.5	2xM32x1.5	39
LA100ZL	626.0	707.0	195.0	168	120	120	286.5	2xM32x1.5	49
LA112M	585.5	666.5	219.0	181	120	120	160.0	2xM32x1.5	50
LA112ZM	613.5	694.5	219.0	181	120	120	264.0	2xM32x1.5	57

Dimensions

Gearbox CADS38, shaft-mounted design with torque arm and shrink disk

CADS012

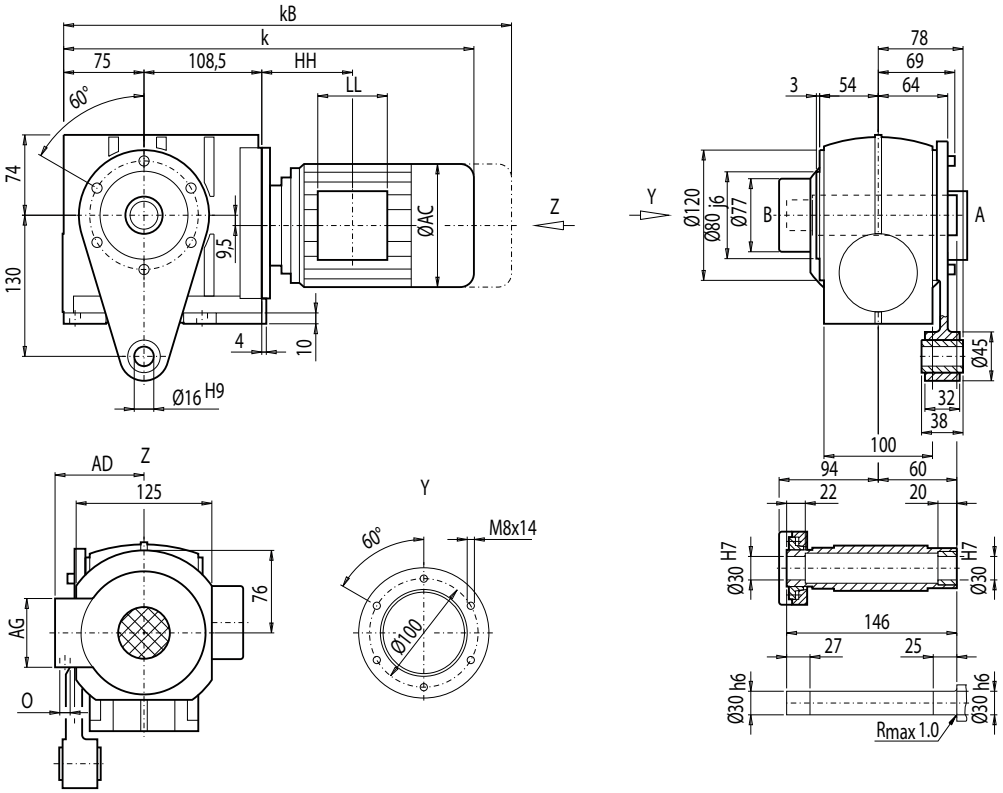


Fig.1

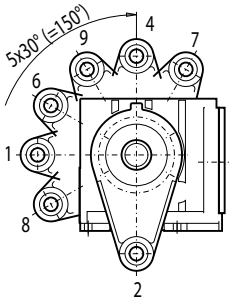
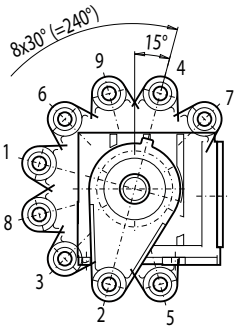


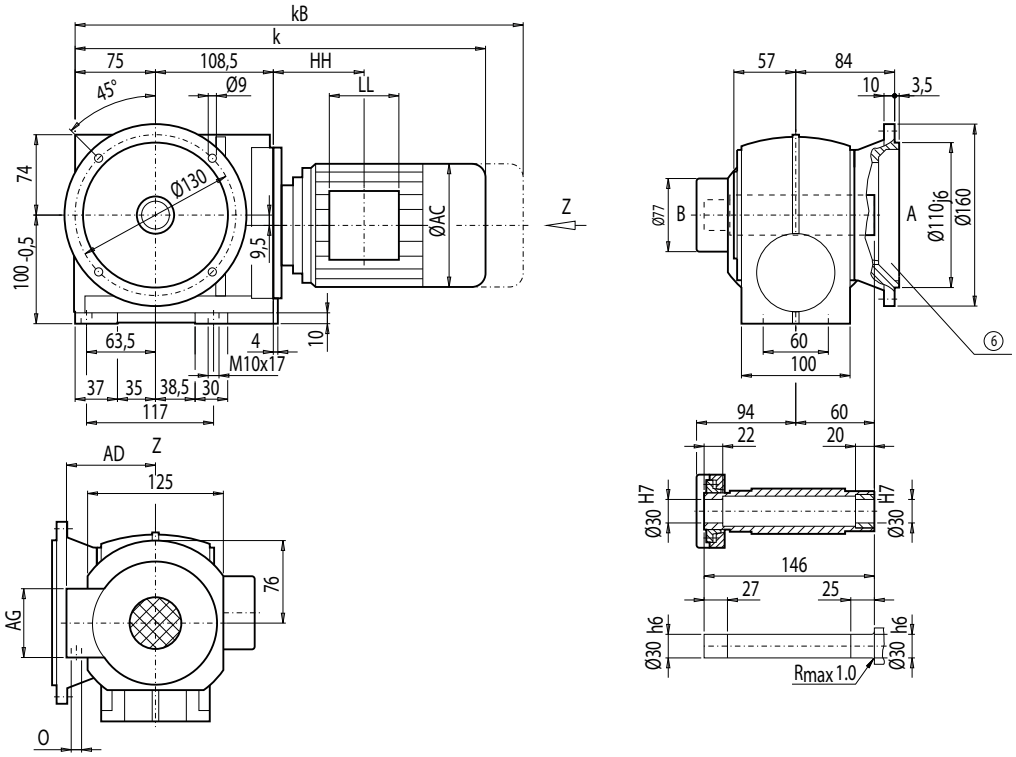
Fig.2



	CADS38								Weight
Motor	k	kB	AC	AD	AG	LL	HH	O	CADS38
LA71	442.0	497.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	23
LA71Z	461.0	516.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	23
LA80	479.0	542.5	156.5	155	90	90	114.0	M20x1.5/M25x1.5	28
LA80Z	501.5	565.0	156.5	155	90	90	187.0	M20x1.5/M25x1.5	32
LA90S/L	510.0	581.0	174.0	163	90	90	114.0	M20x1.5/M25x1.5	33
LA90ZL	555.0	626.0	174.0	163	90	90	238.0	M20x1.5/M25x1.5	39
LA100L	556.0	637.0	195.0	168	120	120	154.5	2xM32x1.5	42
LA100ZL	626.0	707.0	195.0	168	120	120	286.5	2xM32x1.5	52
LA112M	585.5	666.5	219.0	181	120	120	160.0	2xM32x1.5	52
LA112ZM	613.5	694.5	219.0	181	120	120	264.0	2xM32x1.5	59

Gearbox CAFS38, flange-mounted design and shrink disk

CAFS012



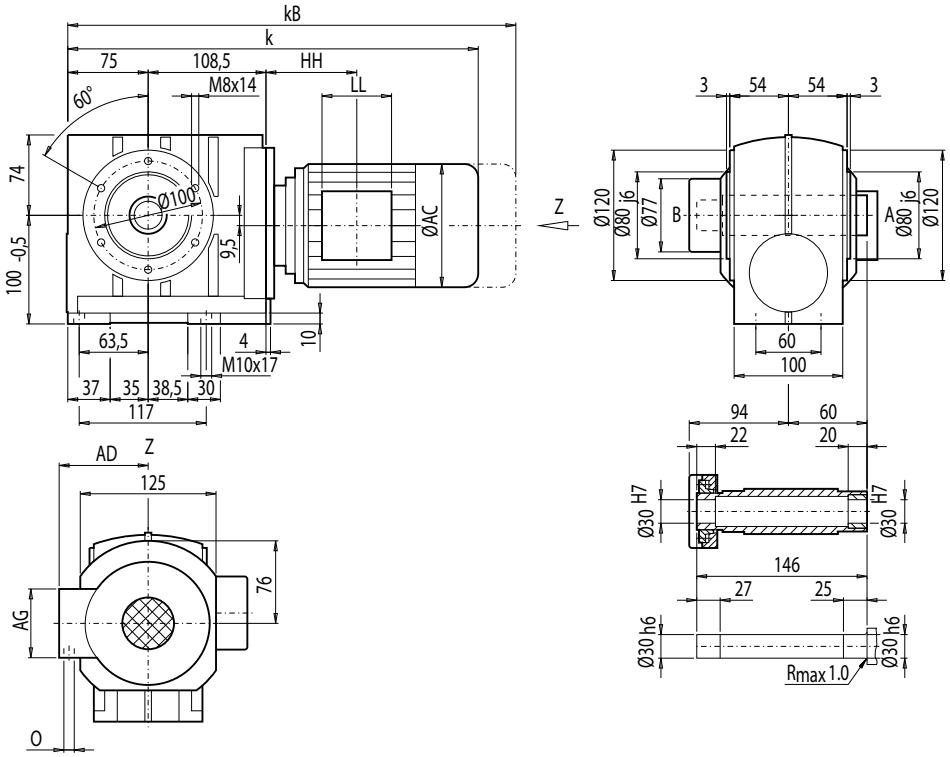
Motor	CAFS38 k	kB	AC	AD	AG	LL	HH	O	Weight CAFS38
LA71	442.0	497.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	24
LA71Z	461.0	516.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	24
LA80	479.0	542.5	156.5	155	90	90	114.0	M20x1.5/M25x1.5	29
LA80Z	501.5	565.0	156.5	155	90	90	187.0	M20x1.5/M25x1.5	33
LA90S/L	510.0	581.0	174.0	163	90	90	114.0	M20x1.5/M25x1.5	34
LA90ZL	555.0	626.0	174.0	163	90	90	238.0	M20x1.5/M25x1.5	40
LA100L	556.0	637.0	195.0	168	120	120	154.5	2xM32x1.5	43
LA100ZL	626.0	707.0	195.0	168	120	120	286.5	2xM32x1.5	53
LA112M	585.5	666.5	219.0	181	120	120	160.0	2xM32x1.5	53
LA112ZM	613.5	694.5	219.0	181	120	120	264.0	2xM32x1.5	60

⑥ For note, see page 5/108

Dimensions

Gearbox CAZS38, shaft-mounted design with housing flange (C-type) and shrink disk

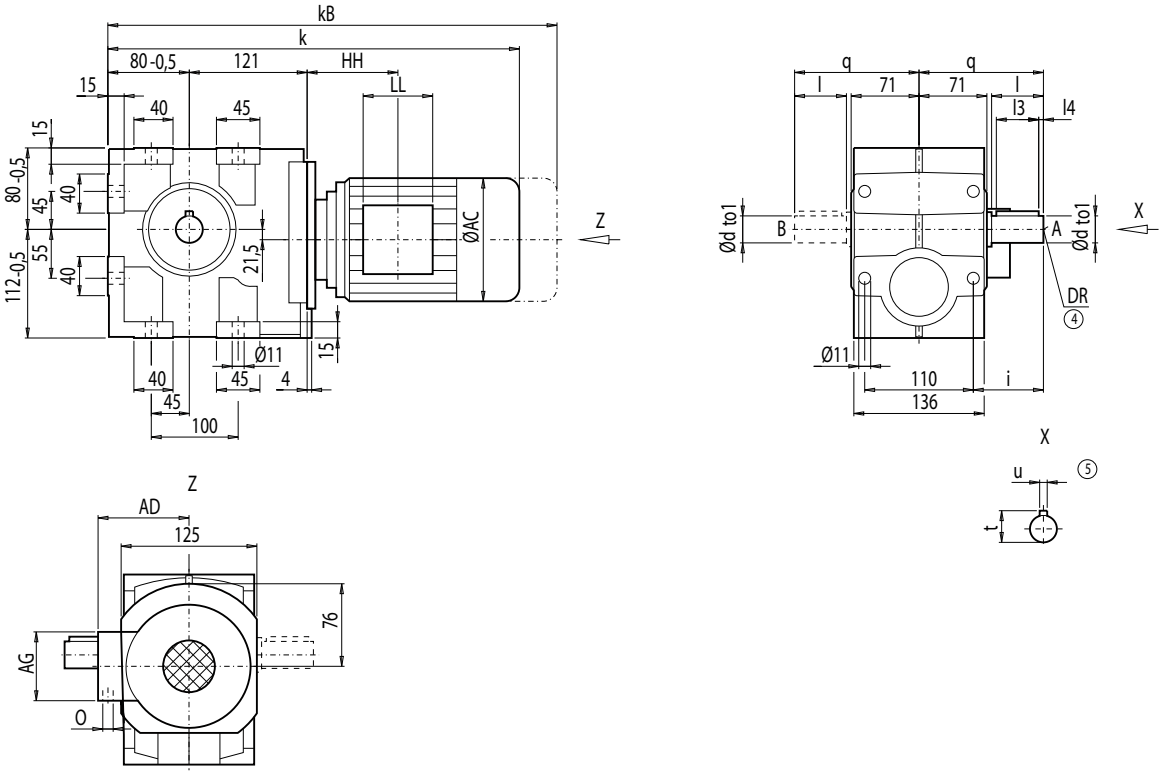
CAZS012



Motor	CAZS38 k	kB	AC	AD	AG	LL	HH	O	Weight CAZS38
LA71	442.0	497.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	23
LA71Z	461.0	516.0	139.0	146	90	90	114.5	M20x1.5/M25x1.5	23
LA80	479.0	542.5	156.5	155	90	90	114.0	M20x1.5/M25x1.5	27
LA80Z	501.5	565.0	156.5	155	90	90	187.0	M20x1.5/M25x1.5	31
LA90S/L	510.0	581.0	174.0	163	90	90	114.0	M20x1.5/M25x1.5	32
LA90ZL	555.0	626.0	174.0	163	90	90	238.0	M20x1.5/M25x1.5	38
LA100L	556.0	637.0	195.0	168	120	120	154.5	2xM32x1.5	41
LA100ZL	626.0	707.0	195.0	168	120	120	286.5	2xM32x1.5	51
LA112M	585.5	666.5	219.0	181	120	120	160.0	2xM32x1.5	52
LA112ZM	613.5	694.5	219.0	181	120	120	264.0	2xM32x1.5	59

Gearbox C48, foot- and housing-flange-mounted designs (C-type)

C012



d	to1	l	l3	l4	t	u	i	q	DR
30 *)	k6	60	50	3.5	33	8	80	135	M10x22
40	k6	80	70	5.0	43	12	100	155	M16x36

*) Preferred series

	C48								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**C48**
LA71	459.5	514.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	30
LA71Z	478.5	533.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	30
LA80	496.5	560.0	156.5	155	90	90	114.0	M20x1.5/M25x1.5	34
LA80Z	519.0	582.5	156.5	155	90	90	187.0	M20x1.5/M25x1.5	38
LA90S/L	527.5	598.5	174.0	163	90	90	114.0	M20x1.5/M25x1.5	39
LA90ZL	572.5	643.5	174.0	163	90	90	238.0	M20x1.5/M25x1.5	45
LA100L	573.5	654.5	195.0	168	120	120	154.5	2xM32x1.5	48
LA100ZL	643.5	724.5	195.0	168	120	120	286.5	2xM32x1.5	58
LA112M	603.0	684.0	219.0	181	120	120	160.0	2xM32x1.5	59
LA112ZM	631.0	712.0	219.0	181	120	120	264.0	2xM32x1.5	66

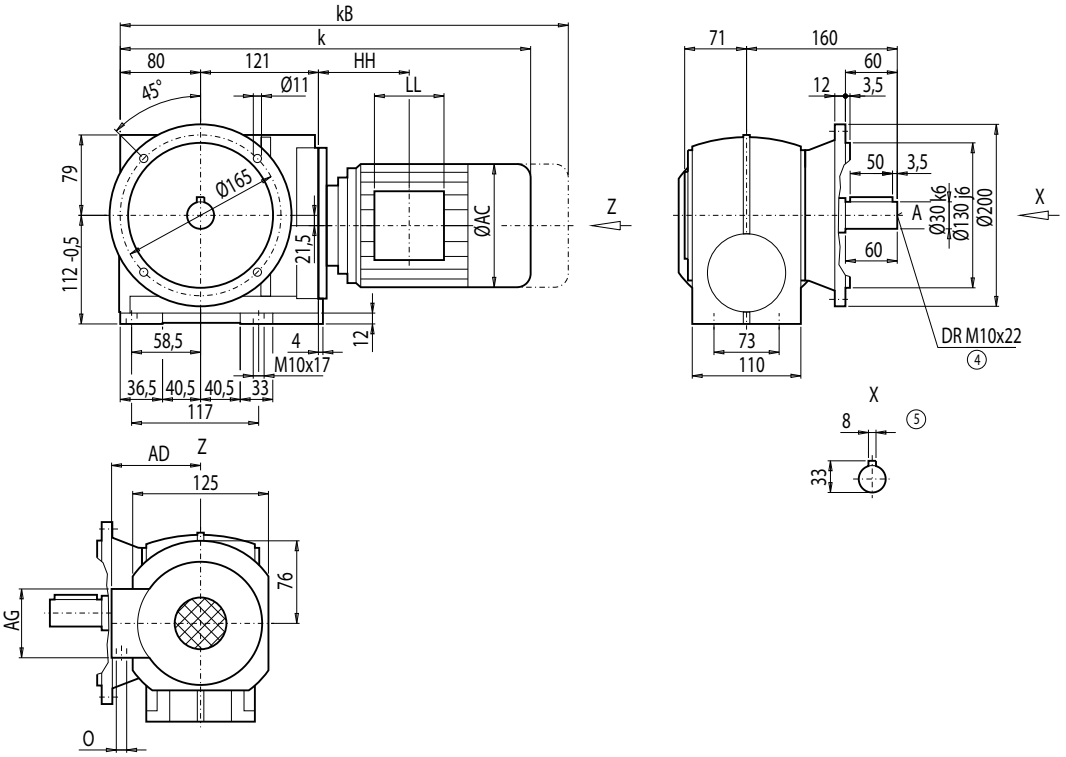
④ DIN 332

⑤ Feather key / keyway DIN 6885

Dimensions

Gearbox CF48, flange-mounted design (A-type)

CF012



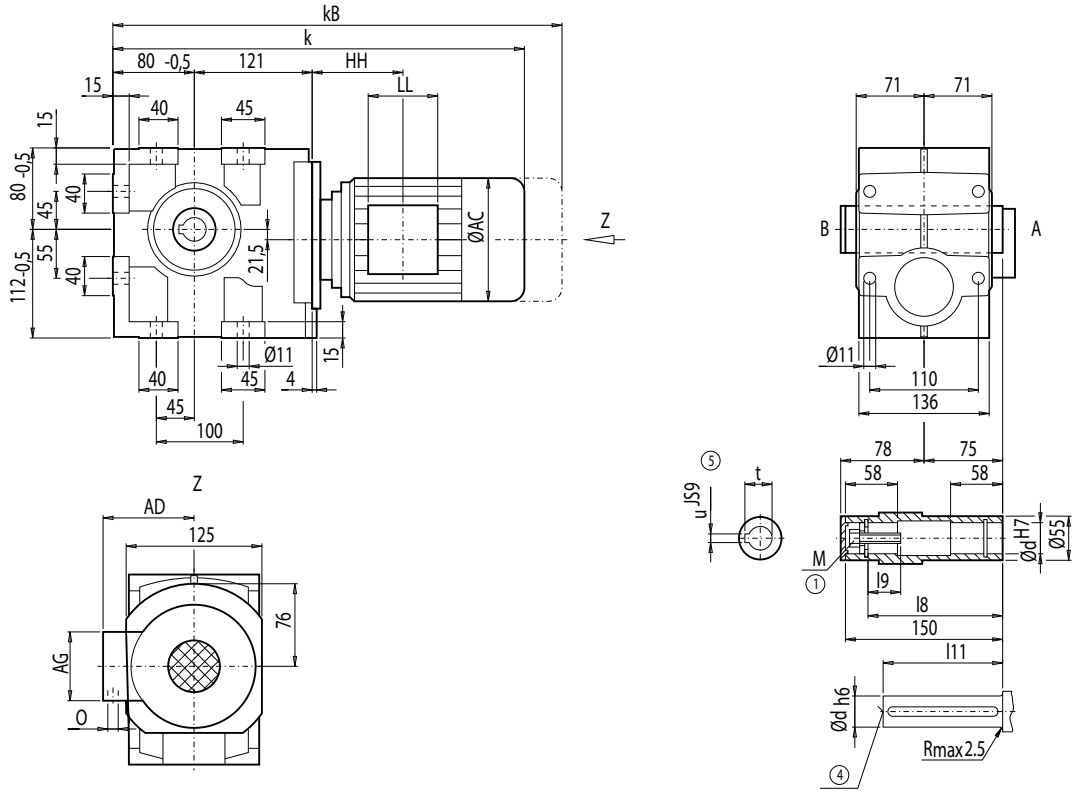
Motor	CF48 k	kB	AC	AD	AG	LL	HH	O	Weight CF48
LA71	459.5	514.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	34
LA71Z	478.5	533.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	34
LA80	496.5	560.0	156.5	155	90	90	114.0	M20x1.5/M25x1.5	39
LA80Z	519.0	582.5	156.5	155	90	90	187.0	M20x1.5/M25x1.5	43
LA90S/L	527.5	598.5	174.0	163	90	90	114.0	M20x1.5/M25x1.5	43
LA90ZL	572.5	643.5	174.0	163	90	90	238.0	M20x1.5/M25x1.5	49
LA100L	573.5	654.5	195.0	168	120	120	154.5	2xM32x1.5	52
LA100ZL	643.5	724.5	195.0	168	120	120	286.5	2xM32x1.5	62
LA112M	603.0	684.0	219.0	181	120	120	160.0	2xM32x1.5	63
LA112ZM	631.0	712.0	219.0	181	120	120	264.0	2xM32x1.5	70

④ DIN 332

⑤ Feather key / keyway DIN 6885

Gearbox CA48, shaft-mounted design

CA012



d	l9	l8	l11	M	t	u
30 *)	17	132	127	M10	33.3	8
35	40	128	115	M12	38.3	10
40	48	128	115	M16	43.3	12

*) Preferred series

	CA48								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CA48**
LA71	459.5	514.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	28
LA71Z	478.5	533.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	28
LA80	496.5	560.0	156.5	155	90	90	114.0	M20x1.5/M25x1.5	33
LA80Z	519.0	582.5	156.5	155	90	90	187.0	M20x1.5/M25x1.5	37
LA90S/L	527.5	598.5	174.0	163	90	90	114.0	M20x1.5/M25x1.5	38
LA90ZL	572.5	643.5	174.0	163	90	90	238.0	M20x1.5/M25x1.5	44
LA100L	573.5	654.5	195.0	168	120	120	154.5	2xM32x1.5	47
LA100ZL	643.5	724.5	195.0	168	120	120	286.5	2xM32x1.5	57
LA112M	603.0	684.0	219.0	181	120	120	160.0	2xM32x1.5	57
LA112ZM	631.0	712.0	219.0	181	120	120	264.0	2xM32x1.5	64

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014

Dimensions

Gearbox CAD48, shaft-mounted design with torque arm

CAD012

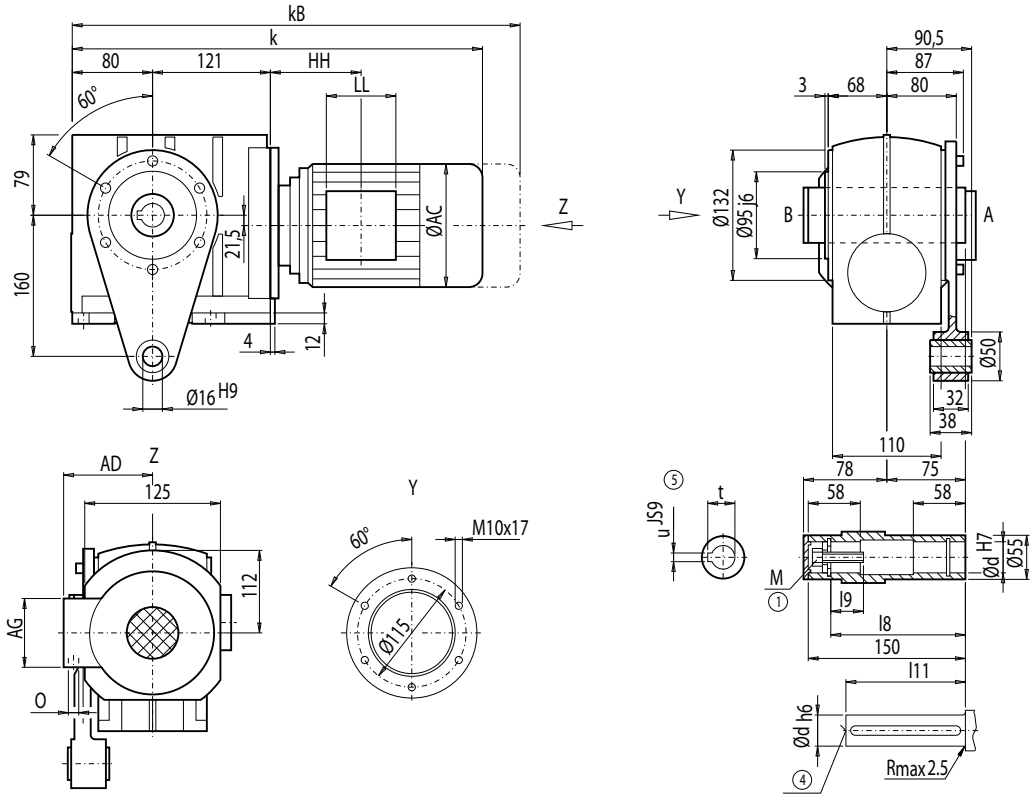


Fig.1

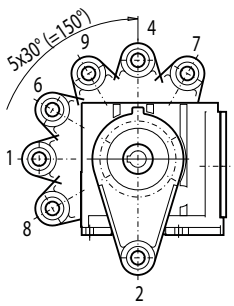
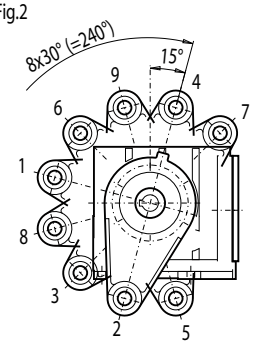


Fig.2



d	l9	l8	l11	M	t	u
30 *)	17	132	127	M10	33.3	8
35	40	128	115	M12	38.3	10
40	48	128	115	M16	43.3	12

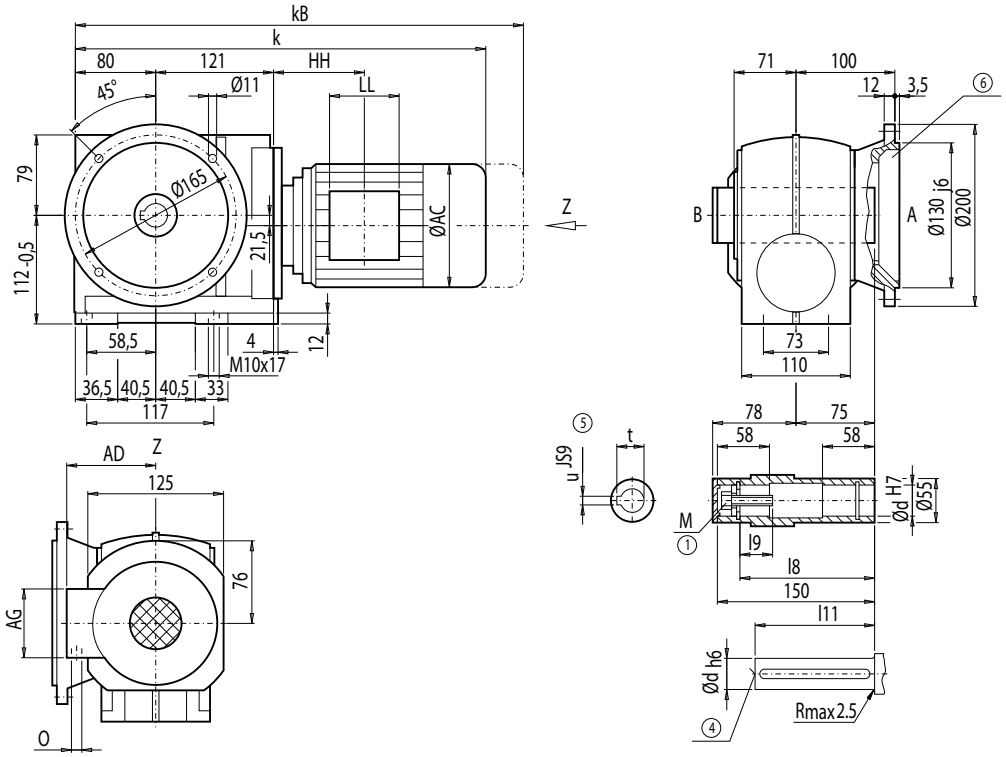
*) Preferred series

	CAD48								Weight
Motor	k	kB	AC	AD	AG	LL	HH	O	CAD48
LA71	459.5	514.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	31
LA71Z	478.5	533.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	31
LA80	496.5	560.0	156.5	155	90	90	114.0	M20x1.5/M25x1.5	36
LA80Z	519.0	582.5	156.5	155	90	90	187.0	M20x1.5/M25x1.5	40
LA90S/L	527.5	598.5	174.0	163	90	90	114.0	M20x1.5/M25x1.5	40
LA90ZL	572.5	643.5	174.0	163	90	90	238.0	M20x1.5/M25x1.5	46
LA100L	573.5	654.5	195.0	168	120	120	154.5	2xM32x1.5	49
LA100ZL	643.5	724.5	195.0	168	120	120	286.5	2xM32x1.5	59
LA112M	603.0	684.0	219.0	181	120	120	160.0	2xM32x1.5	60
LA112ZM	631.0	712.0	219.0	181	120	120	264.0	2xM32x1.5	67

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014

Gearbox CAF48, flange-mounted design

CAF012



d	l9	l8	l11	M	t	u
30 *)	17	132	127	M10	33.3	8
35	40	128	115	M12	38.3	10
40	48	128	115	M16	43.3	12

*) Preferred series

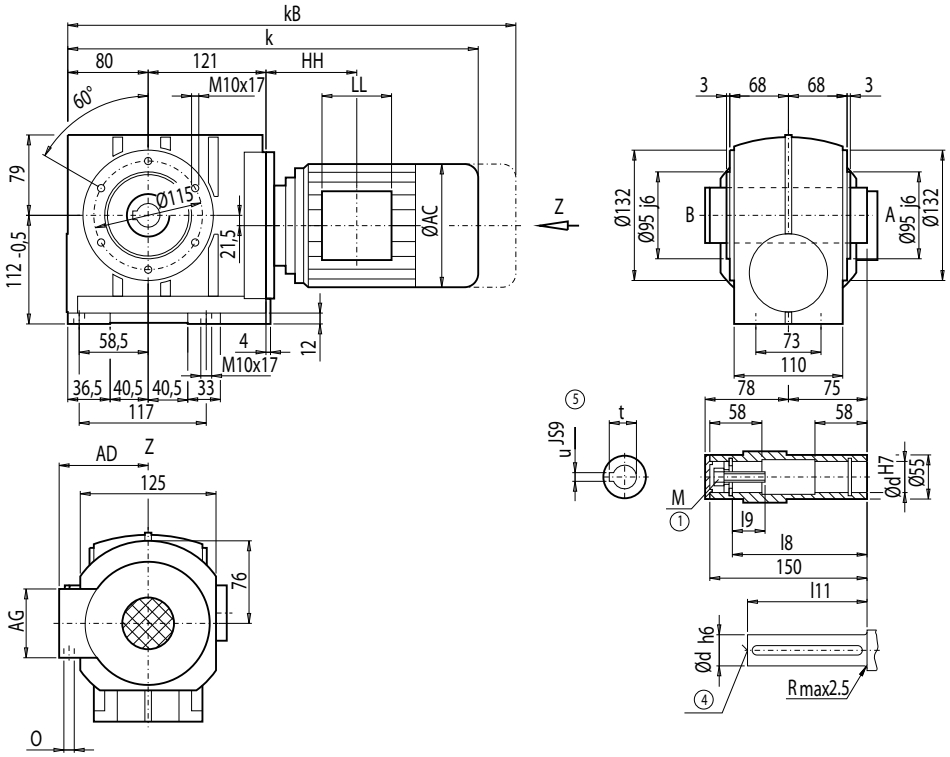
	CAF48								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAF48**
LA71	459.5	514.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	32
LA71Z	478.5	533.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	32
LA80	496.5	560.0	156.5	155	90	90	114.0	M20x1.5/M25x1.5	37
LA80Z	519.0	582.5	156.5	155	90	90	187.0	M20x1.5/M25x1.5	41
LA90S/L	527.5	598.5	174.0	163	90	90	114.0	M20x1.5/M25x1.5	42
LA90ZL	572.5	643.5	174.0	163	90	90	238.0	M20x1.5/M25x1.5	48
LA100L	573.5	654.5	195.0	168	120	120	154.5	2xM32x1.5	51
LA100ZL	643.5	724.5	195.0	168	120	120	286.5	2xM32x1.5	61
LA112M	603.0	684.0	219.0	181	120	120	160.0	2xM32x1.5	61
LA112ZM	631.0	712.0	219.0	181	120	120	264.0	2xM32x1.5	68

① EN ISO 4014 ④ DIN 332 ⑤ Feather key / keyway DIN 6885 ⑥ For note, see page 5/108

Dimensions

Gearbox CAZ48, shaft-mounted design with housing flange (C-type)

CAZ012



d	l9	l8	l11	M	t	u
30 *)	17	132	127	M10	33.3	8
35	40	128	115	M12	38.3	10
40	48	128	115	M16	43.3	12

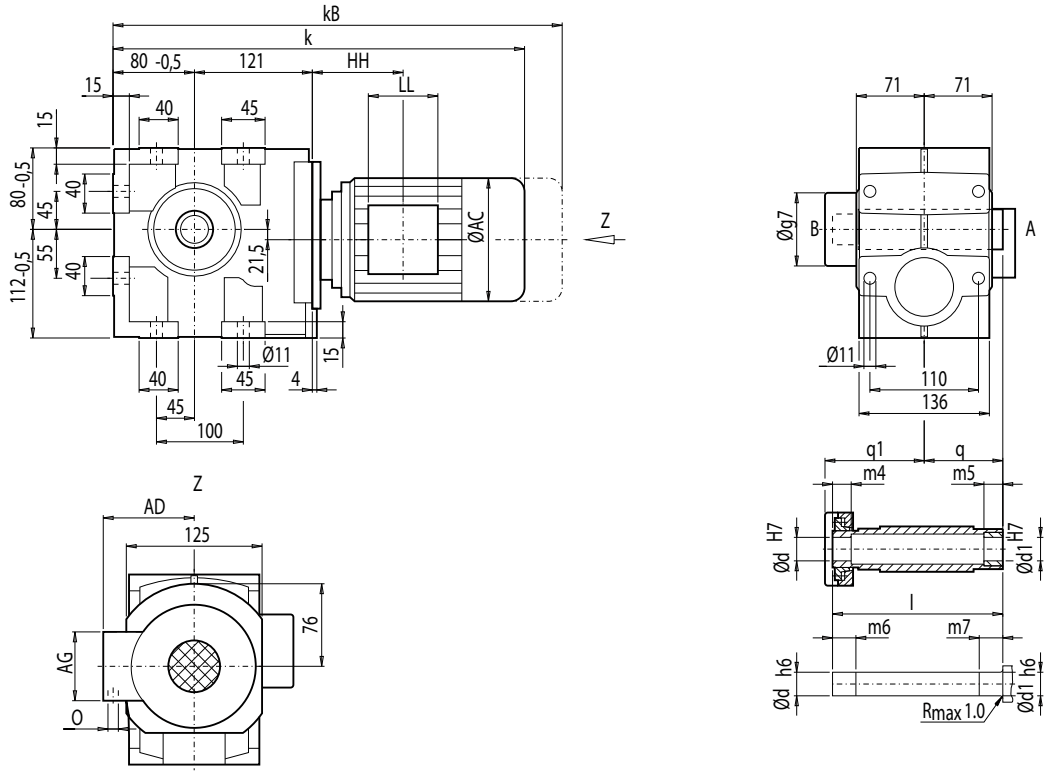
*) Preferred series

	CAZ48								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAZ48**
LA71	459.5	514.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	30
LA71Z	478.5	533.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	30
LA80	496.5	560.0	156.5	155	90	90	114.0	M20x1.5/M25x1.5	34
LA80Z	519.0	582.5	156.5	155	90	90	187.0	M20x1.5/M25x1.5	38
LA90S/L	527.5	598.5	174.0	163	90	90	114.0	M20x1.5/M25x1.5	39
LA90ZL	572.5	643.5	174.0	163	90	90	238.0	M20x1.5/M25x1.5	45
LA100L	573.5	654.5	195.0	168	120	120	154.5	2xM32x1.5	48
LA100ZL	643.5	724.5	195.0	168	120	120	286.5	2xM32x1.5	58
LA112M	603.0	684.0	219.0	181	120	120	160.0	2xM32x1.5	59
LA112ZM	631.0	712.0	219.0	181	120	120	264.0	2xM32x1.5	66

① EN ISO 4014 ④ DIN 332 ⑤ Feather key / keyway DIN 6885

Gearbox CAS48, shaft-mounted design with shrink disk

CAS012



d	d1	l	m4	m5	m6	m7	q1	q	g7
35 *)	35	177	32	20	37	25	109	75	93
40	40	177	25	20	30	25	109	75	93

*) Preferred series

Motor	CAS48 k	kB	AC	AD	AG	LL	HH	O	Weight CAS48
LA71	459.5	514.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	29
LA71Z	478.5	533.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	29
LA80	496.5	560.0	156.5	155	90	90	114.0	M20x1.5/M25x1.5	34
LA80Z	519.0	582.5	156.5	155	90	90	187.0	M20x1.5/M25x1.5	38
LA90S/L	527.5	598.5	174.0	163	90	90	114.0	M20x1.5/M25x1.5	38
LA90ZL	572.5	643.5	174.0	163	90	90	238.0	M20x1.5/M25x1.5	44
LA100L	573.5	654.5	195.0	168	120	120	154.5	2xM32x1.5	47
LA100ZL	643.5	724.5	195.0	168	120	120	286.5	2xM32x1.5	57
LA112M	603.0	684.0	219.0	181	120	120	160.0	2xM32x1.5	58
LA112ZM	631.0	712.0	219.0	181	120	120	264.0	2xM32x1.5	65

Dimensions

Gearbox CADS48, shaft-mounted design with torque arm and shrink disk

CADS012

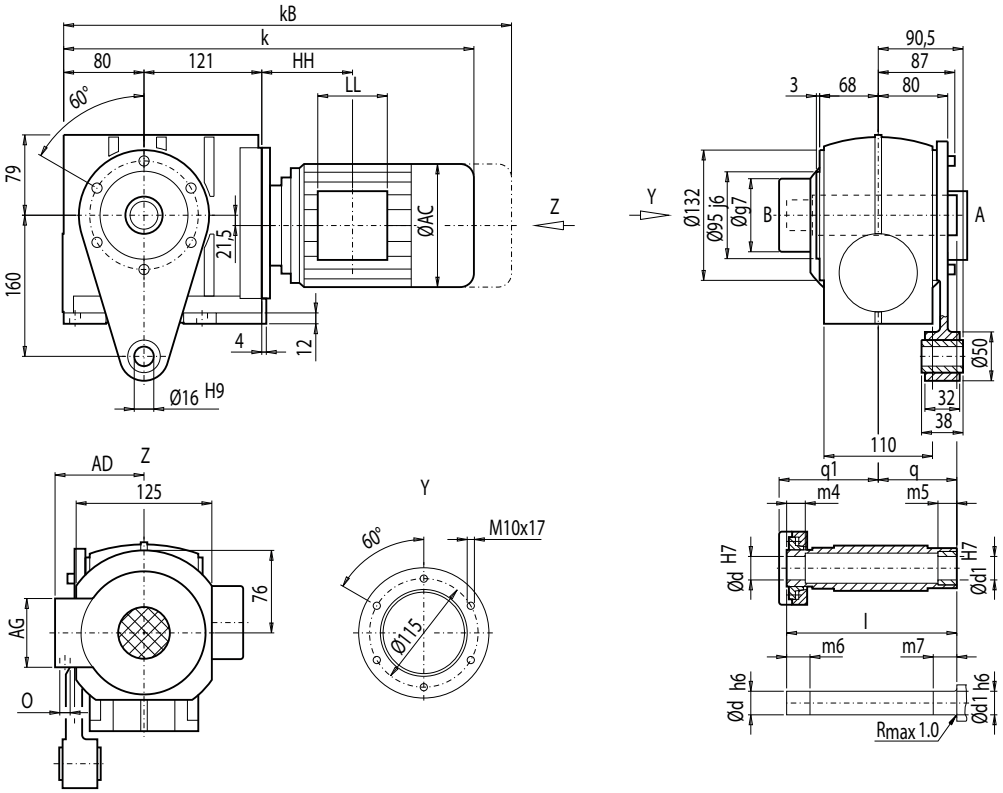


Fig.1

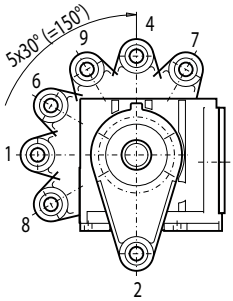
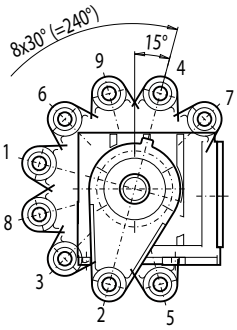


Fig.2



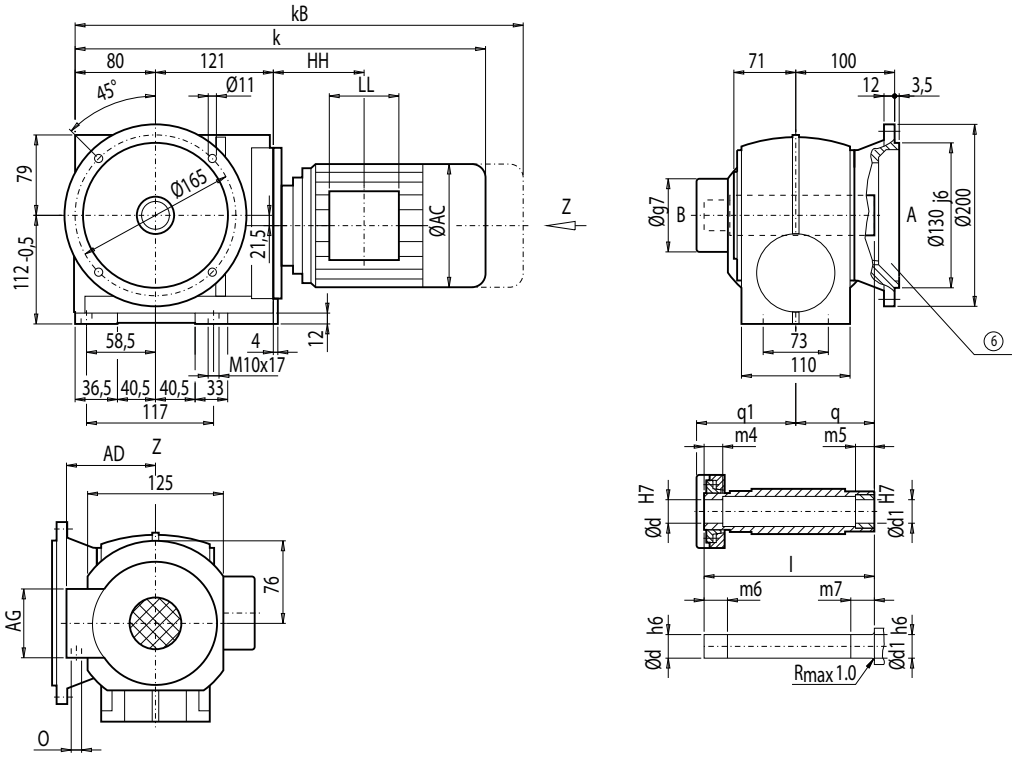
d	d1	l	m4	m5	m6	m7	q1	q	g7
35 *)	35	177	32	20	37	25	109	75	93
40	40	177	25	20	30	25	109	75	93

*) Preferred series

	CADS48								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CADS48**
LA71	459.5	514.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	32
LA71Z	478.5	533.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	32
LA80	496.5	560.0	156.5	155	90	90	114.0	M20x1.5/M25x1.5	37
LA80Z	519.0	582.5	156.5	155	90	90	187.0	M20x1.5/M25x1.5	41
LA90S/L	527.5	598.5	174.0	163	90	90	114.0	M20x1.5/M25x1.5	41
LA90ZL	572.5	643.5	174.0	163	90	90	238.0	M20x1.5/M25x1.5	47
LA100L	573.5	654.5	195.0	168	120	120	154.5	2xM32x1.5	50
LA100ZL	643.5	724.5	195.0	168	120	120	286.5	2xM32x1.5	60
LA112M	603.0	684.0	219.0	181	120	120	160.0	2xM32x1.5	61
LA112ZM	631.0	712.0	219.0	181	120	120	264.0	2xM32x1.5	68

Gearbox CAFS48, flange-mounted design and shrink disk

CAFS012



d	d1	l	m4	m5	m6	m7	q1	q	g7
35 *)	35	177	32	20	37	25	109	75	93
40	40	177	25	20	30	25	109	75	93

*) Preferred series

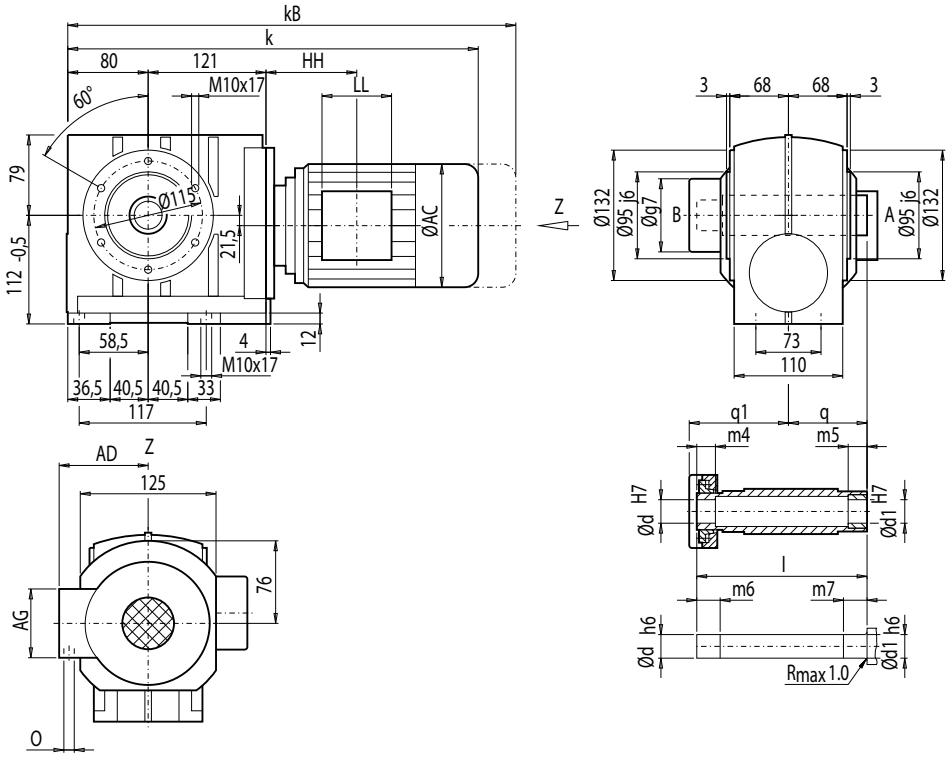
	CAFS48								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAFS48**
LA71	459.5	514.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	33
LA71Z	478.5	533.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	33
LA80	496.5	560.0	156.5	155	90	90	114.0	M20x1.5/M25x1.5	38
LA80Z	519.0	582.5	156.5	155	90	90	187.0	M20x1.5/M25x1.5	42
LA90S/L	527.5	598.5	174.0	163	90	90	114.0	M20x1.5/M25x1.5	42
LA90ZL	572.5	643.5	174.0	163	90	90	238.0	M20x1.5/M25x1.5	48
LA100L	573.5	654.5	195.0	168	120	120	154.5	2xM32x1.5	52
LA100ZL	643.5	724.5	195.0	168	120	120	286.5	2xM32x1.5	62
LA112M	603.0	684.0	219.0	181	120	120	160.0	2xM32x1.5	62
LA112ZM	631.0	712.0	219.0	181	120	120	264.0	2xM32x1.5	69

⑥ For note, see page 5/108

Dimensions

Gearbox CAZS48, shaft-mounted design with housing flange (C-type) and shrink disk

CAZS012



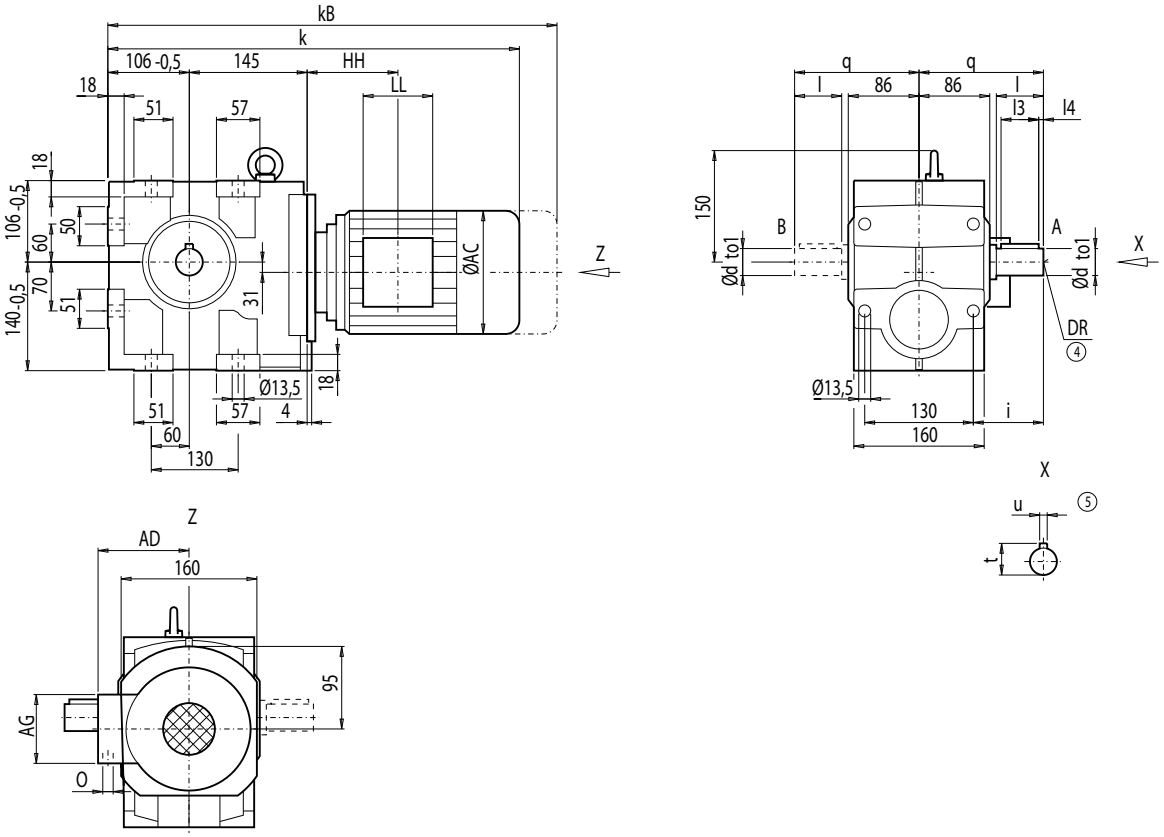
d	d1	l	m4	m5	m6	m7	q1	q	g7
35 *)	35	177	32	20	37	25	109	75	93
40	40	177	25	20	30	25	109	75	93

*) Preferred series

	CAZS48								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAZS48**
LA71	459.5	514.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	30
LA71Z	478.5	533.5	139.0	146	90	90	114.5	M20x1.5/M25x1.5	30
LA80	496.5	560.0	156.5	155	90	90	114.0	M20x1.5/M25x1.5	35
LA80Z	519.0	582.5	156.5	155	90	90	187.0	M20x1.5/M25x1.5	39
LA90S/L	527.5	598.5	174.0	163	90	90	114.0	M20x1.5/M25x1.5	40
LA90ZL	572.5	643.5	174.0	163	90	90	238.0	M20x1.5/M25x1.5	46
LA100L	573.5	654.5	195.0	168	120	120	154.5	2xM32x1.5	49
LA100ZL	643.5	724.5	195.0	168	120	120	286.5	2xM32x1.5	59
LA112M	603.0	684.0	219.0	181	120	120	160.0	2xM32x1.5	60
LA112ZM	631.0	712.0	219.0	181	120	120	264.0	2xM32x1.5	67

Gearbox C68, foot- and housing-flange-mounted designs (C-type)

C012



d	to1	l	l3	l4	t	u	i	q	DR
35 *)	k6	70	56	5	38.0	10	95	160	M12x28
40	k6	80	70	5	43.0	12	105	170	M16x36
50	k6	100	80	10	53.5	14	125	190	M16x36

*) Preferred series

	C68								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**C68**
LA71	504.0	559.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	46
LA71Z	523.0	578.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	46
LA80	541.0	604.5	156.5	155	90	90	108.5	M20x1.5/M25x1.5	51
LA80Z	563.5	627.0	156.5	155	90	90	181.5	M20x1.5/M25x1.5	55
LA90S/L	572.0	643.0	174.0	163	90	90	108.5	M20x1.5/M25x1.5	56
LA90ZL	617.0	688.0	174.0	163	90	90	232.5	M20x1.5/M25x1.5	62
LA100L	618.0	699.0	195.0	168	120	120	149.0	2xM32x1.5	65
LA100ZL	688.0	769.0	195.0	168	120	120	281.0	2xM32x1.5	75
LA112M	647.0	728.0	219.0	181	120	120	154.0	2xM32x1.5	76
LA112ZM	675.0	756.0	219.0	181	120	120	258.0	2xM32x1.5	83
LA132S/M	709.0	811.0	259.0	195	140	140	196.5	2xM32x1.5	86
LA132ZM	755.0	857.0	259.0	195	140	140	304.5	2xM32x1.5	107

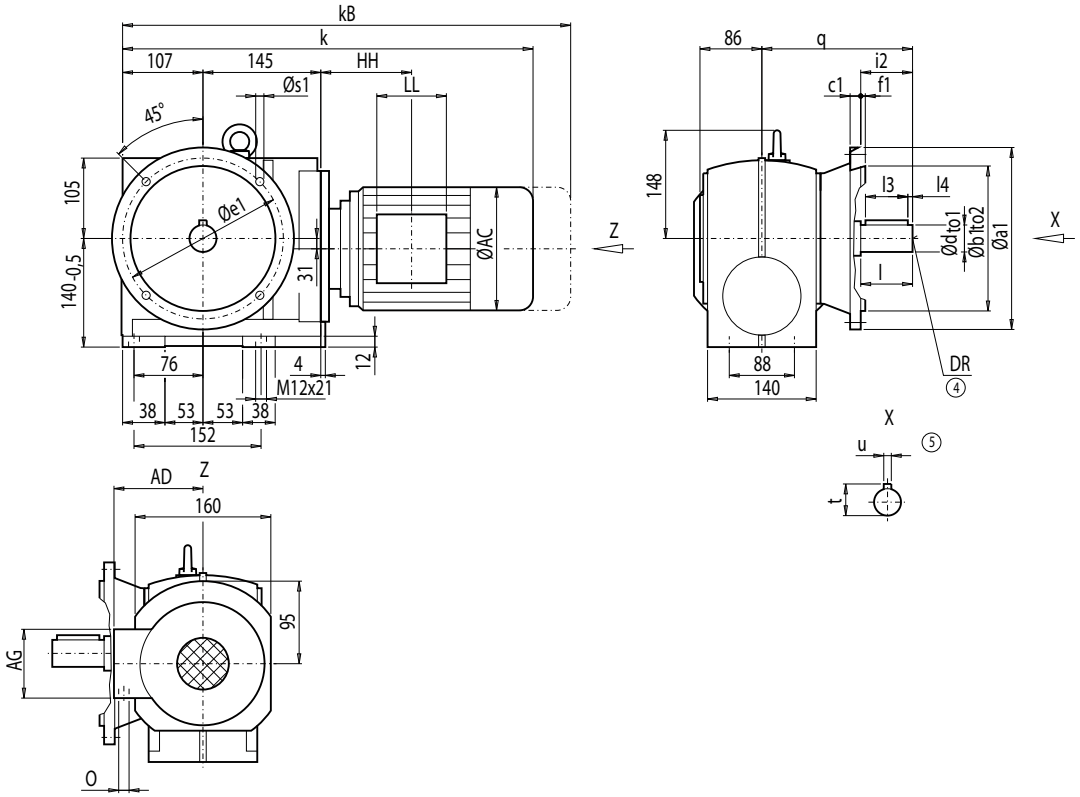
④ DIN 332

⑤ Feather key / keyway DIN 6885

Dimensions

Gearbox CF68, flange-mounted design (A-type)

CF012



Flange	a1	b1	to2	c1	e1	f1	s1	d	to1	l	l3	l4	t	u	i2	q	DR
A200	200	130	j6	12	165	4	11.0	35 *)	k6	70	56	5	38	10	70	202.5	M12x28
A250	250	180	j6	15	215	4	13.5	40	k6	80	70	5	43	12	80	193.0	M16x36

*) Preferred series

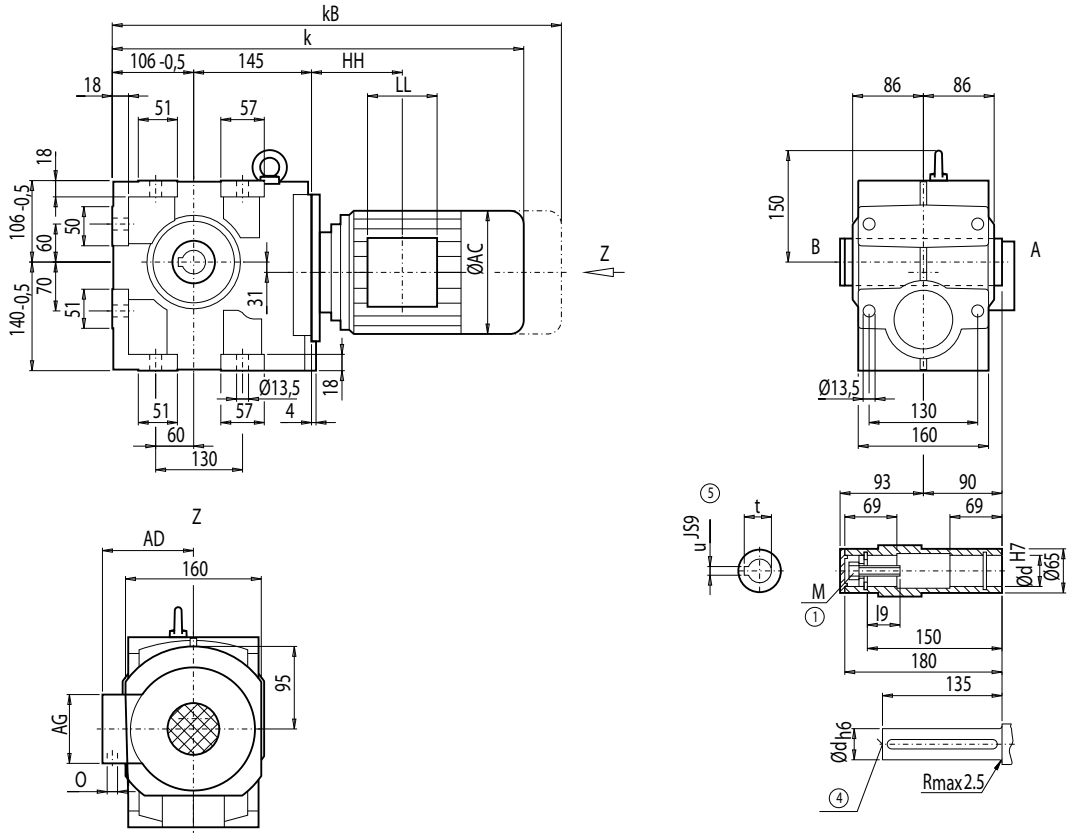
	CF68								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CF68**
LA71	505.0	560.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	55
LA71Z	524.0	579.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	55
LA80	542.0	605.5	156.5	155	90	90	108.5	M20x1.5/M25x1.5	60
LA80Z	564.5	628.0	156.5	155	90	90	181.5	M20x1.5/M25x1.5	64
LA90S/L	573.0	644.0	174.0	163	90	90	108.5	M20x1.5/M25x1.5	65
LA90ZL	618.0	689.0	174.0	163	90	90	232.5	M20x1.5/M25x1.5	71
LA100L	619.0	700.0	195.0	168	120	120	149.0	2xM32x1.5	74
LA100ZL	689.0	770.0	195.0	168	120	120	281.0	2xM32x1.5	84
LA112M	648.0	729.0	219.0	181	120	120	154.0	2xM32x1.5	85
LA112ZM	676.0	757.0	219.0	181	120	120	258.0	2xM32x1.5	92
LA132S/M	710.5	812.5	259.0	195	140	140	196.5	2xM32x1.5	95
LA132ZM	756.5	858.5	259.0	195	140	140	304.5	2xM32x1.5	116

④ DIN 332

⑤ Feather key / keyway DIN 6885

Gearbox CA68, shaft-mounted design

CA012



d	l9	M	t	u
40 *)	48	M16	43.3	12
45	47	M16	48.3	14

*) Preferred series

Motor	CA68 k	kB	AC	AD	AG	LL	HH	O	Weight CA68
LA71	504.0	559.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	43
LA71Z	523.0	578.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	43
LA80	541.0	604.5	156.5	155	90	90	108.5	M20x1.5/M25x1.5	48
LA80Z	563.5	627.0	156.5	155	90	90	181.5	M20x1.5/M25x1.5	52
LA90S/L	572.0	643.0	174.0	163	90	90	108.5	M20x1.5/M25x1.5	52
LA90ZL	617.0	688.0	174.0	163	90	90	232.5	M20x1.5/M25x1.5	58
LA100L	618.0	699.0	195.0	168	120	120	149.0	2xM32x1.5	61
LA100ZL	688.0	769.0	195.0	168	120	120	281.0	2xM32x1.5	71
LA112M	647.0	728.0	219.0	181	120	120	154.0	2xM32x1.5	73
LA112ZM	675.0	756.0	219.0	181	120	120	258.0	2xM32x1.5	80
LA132S/M	709.0	811.0	259.0	195	140	140	196.5	2xM32x1.5	83
LA132ZM	755.0	857.0	259.0	195	140	140	304.5	2xM32x1.5	104

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014

Dimensions

Gearbox CAD68, shaft-mounted design with torque arm

CAD012

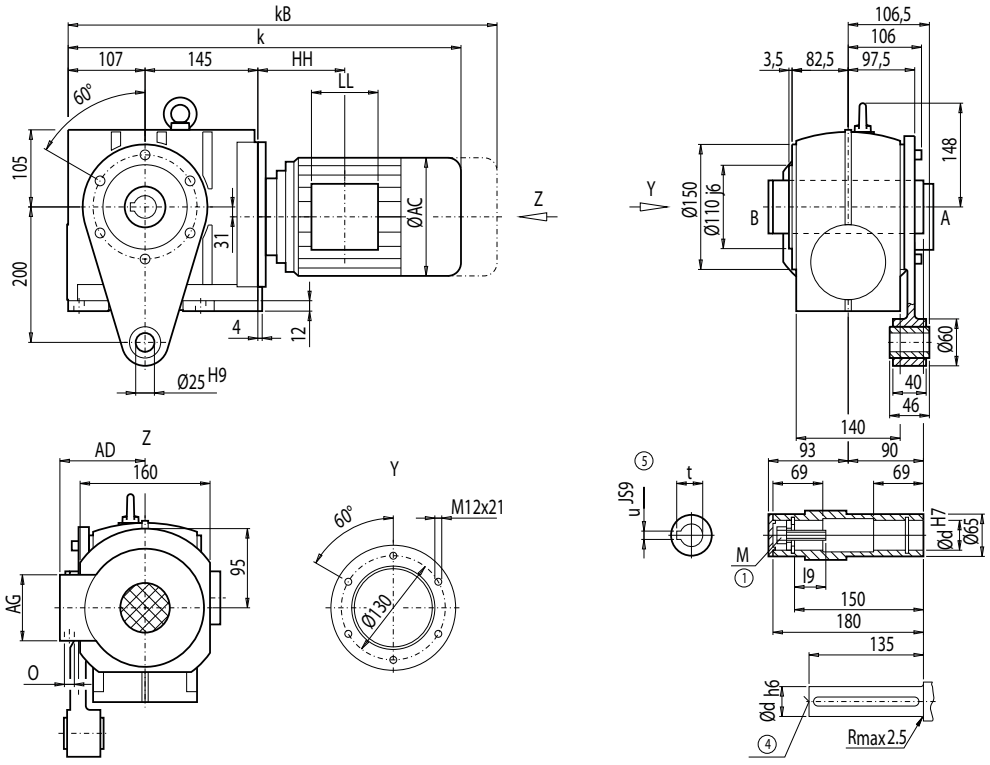


Fig.1

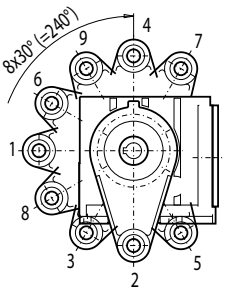
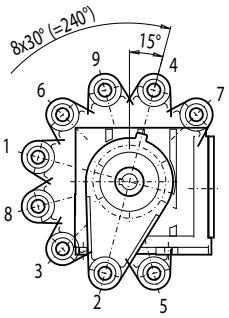


Fig.2



d	l9	M	t	u
40 *)	48	M16	43.3	12
45	47	M16	48.3	14

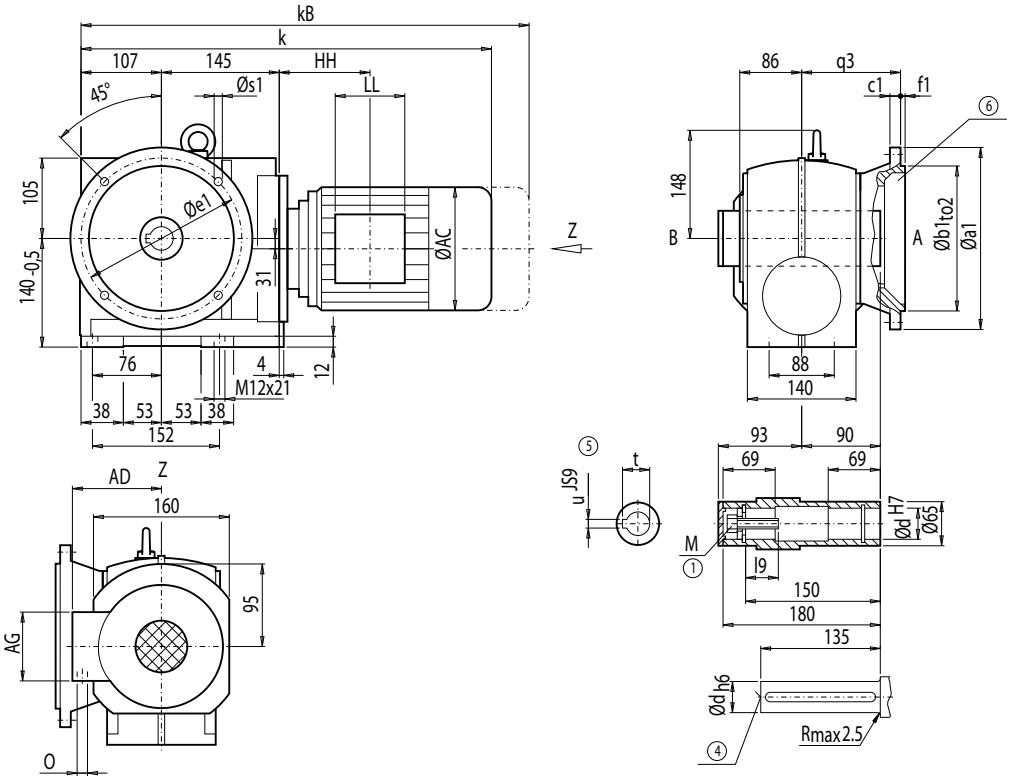
*) Preferred series

Motor	CAD68 k	kB	AC	AD	AG	LL	HH	O	Weight CAD68
LA71	505.0	560.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	48
LA71Z	524.0	579.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	48
LA80	542.0	605.5	156.5	155	90	90	108.5	M20x1.5/M25x1.5	53
LA80Z	564.5	628.0	156.5	155	90	90	181.5	M20x1.5/M25x1.5	57
LA90S/L	573.0	644.0	174.0	163	90	90	108.5	M20x1.5/M25x1.5	57
LA90ZL	618.0	689.0	174.0	163	90	90	232.5	M20x1.5/M25x1.5	63
LA100L	619.0	700.0	195.0	168	120	120	149.0	2xM32x1.5	67
LA100ZL	689.0	770.0	195.0	168	120	120	281.0	2xM32x1.5	77
LA112M	648.0	729.0	219.0	181	120	120	154.0	2xM32x1.5	78
LA112ZM	676.0	757.0	219.0	181	120	120	258.0	2xM32x1.5	85
LA132S/M	710.5	812.5	259.0	195	140	140	196.5	2xM32x1.5	88
LA132ZM	756.5	858.5	259.0	195	140	140	304.5	2xM32x1.5	109

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014

Gearbox CAF68, flange-mounted design

CAF012



Flange	a1	b1	to2	c1	e1	f1	s1	q3	d	l9	M	t	u
A200	200	130	j6	12	165	4	11.0	132.5	40 *)	48	M16	43.3	12
									45	47	M16	48.3	14
A250	250	180	j6	15	215	4	13.5	113.0	40 *)	48	M16	43.3	12
									45	47	M16	48.3	14

*) Preferred series

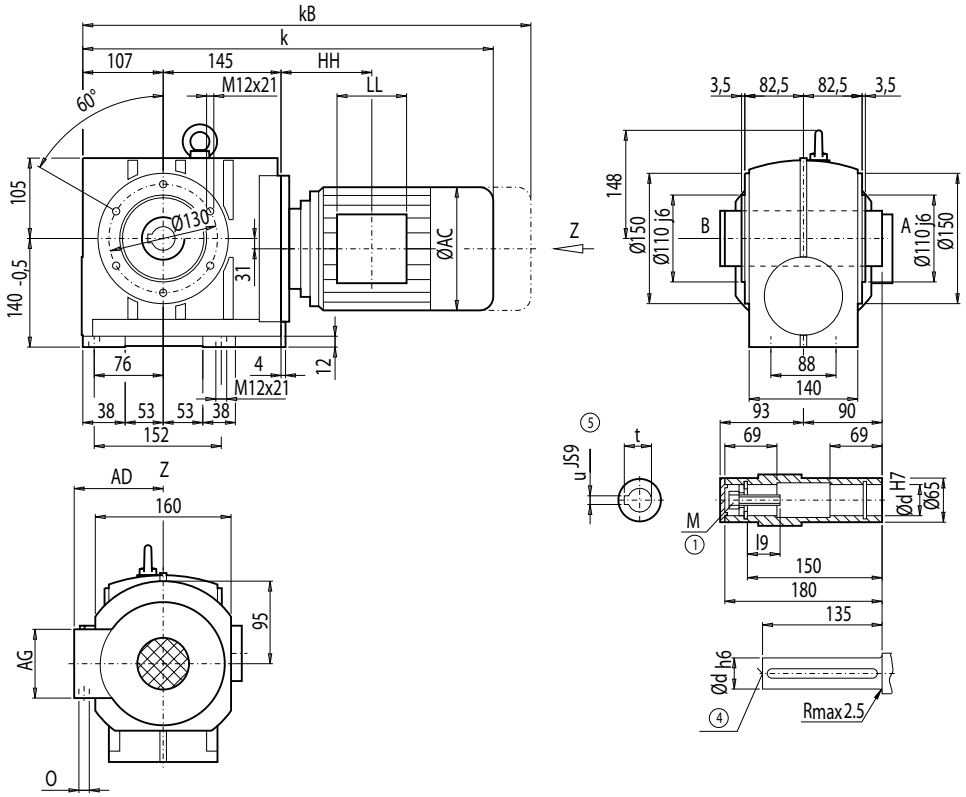
	CAF68								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAF68**
LA71	505.0	560.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	52
LA71Z	524.0	579.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	52
LA80	542.0	605.5	156.5	155	90	90	108.5	M20x1.5/M25x1.5	57
LA80Z	564.5	628.0	156.5	155	90	90	181.5	M20x1.5/M25x1.5	61
LA90S/L	573.0	644.0	174.0	163	90	90	108.5	M20x1.5/M25x1.5	61
LA90ZL	618.0	689.0	174.0	163	90	90	232.5	M20x1.5/M25x1.5	68
LA100L	619.0	700.0	195.0	168	120	120	149.0	2xM32x1.5	70
LA100ZL	689.0	770.0	195.0	168	120	120	281.0	2xM32x1.5	80
LA112M	648.0	729.0	219.0	181	120	120	154.0	2xM32x1.5	82
LA112ZM	676.0	757.0	219.0	181	120	120	258.0	2xM32x1.5	89
LA132S/M	710.5	812.5	259.0	195	140	140	196.5	2xM32x1.5	92
LA132ZM	756.5	858.5	259.0	195	140	140	304.5	2xM32x1.5	113

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014 ⑥ For note, see page 5/108

Dimensions

Gearbox CAZ68, shaft-mounted design with housing flange (C-type)

CAZ012



d	l9	M	t	u
40 *)	48	M16	43.3	12
45	47	M16	48.3	14

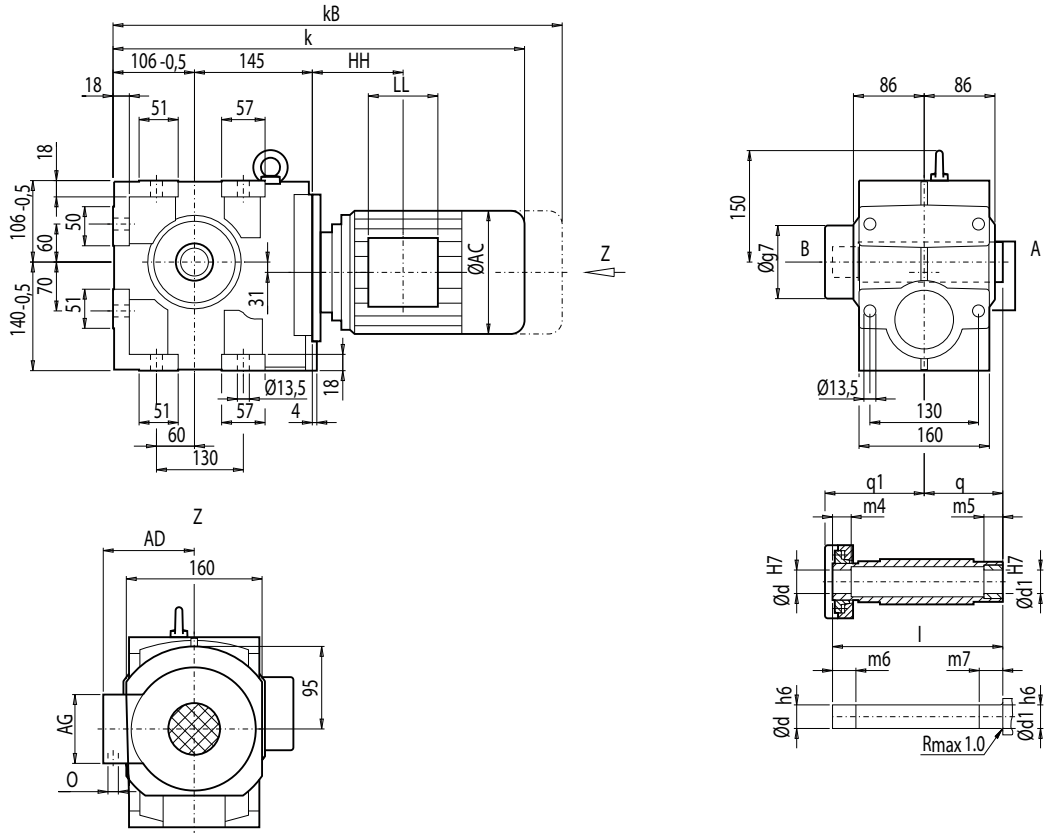
*) Preferred series

Motor	CAZ68 k	kB	AC	AD	AG	LL	HH	O	Weight CAZ68
LA71	505.0	560.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	47
LA71Z	524.0	579.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	47
LA80	542.0	605.5	156.5	155	90	90	108.5	M20x1.5/M25x1.5	52
LA80Z	564.5	628.0	156.5	155	90	90	181.5	M20x1.5/M25x1.5	56
LA90S/L	573.0	644.0	174.0	163	90	90	108.5	M20x1.5/M25x1.5	57
LA90ZL	618.0	689.0	174.0	163	90	90	232.5	M20x1.5/M25x1.5	63
LA100L	619.0	700.0	195.0	168	120	120	149.0	2xM32x1.5	66
LA100ZL	689.0	770.0	195.0	168	120	120	281.0	2xM32x1.5	76
LA112M	648.0	729.0	219.0	181	120	120	154.0	2xM32x1.5	77
LA112ZM	676.0	757.0	219.0	181	120	120	258.0	2xM32x1.5	84
LA132S/M	710.5	812.5	259.0	195	140	140	196.5	2xM32x1.5	87
LA132ZM	756.5	858.5	259.0	195	140	140	304.5	2xM32x1.5	108

① EN ISO 4014 ④ DIN 332 ⑤ Feather key / keyway DIN 6885

Gearbox CAS68, shaft-mounted design with shrink disk

CAS012



d	d1	l	m4	m5	m6	m7	q1	q	g7
40 *)	40	209	35	20	40	25	126	90	112
50	50	209	27	20	32	25	126	90	112

*) Preferred series

	CAS68								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAS68**
LA71	505.0	560.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	44
LA71Z	524.0	579.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	44
LA80	542.0	605.5	156.5	155	90	90	108.5	M20x1.5/M25x1.5	49
LA80Z	564.5	628.0	156.5	155	90	90	181.5	M20x1.5/M25x1.5	53
LA90S/L	573.0	644.0	174.0	163	90	90	108.5	M20x1.5/M25x1.5	54
LA90ZL	618.0	689.0	174.0	163	90	90	232.5	M20x1.5/M25x1.5	60
LA100L	619.0	700.0	195.0	168	120	120	149.0	2xM32x1.5	63
LA100ZL	689.0	770.0	195.0	168	120	120	281.0	2xM32x1.5	73
LA112M	648.0	729.0	219.0	181	120	120	154.0	2xM32x1.5	74
LA112ZM	676.0	757.0	219.0	181	120	120	258.0	2xM32x1.5	81
LA132S/M	710.5	812.5	259.0	195	140	140	196.5	2xM32x1.5	84
LA132ZM	756.5	858.5	259.0	195	140	140	304.5	2xM32x1.5	105

Dimensions

Gearbox CADS68, shaft-mounted design with torque arm and shrink disk

CADS012

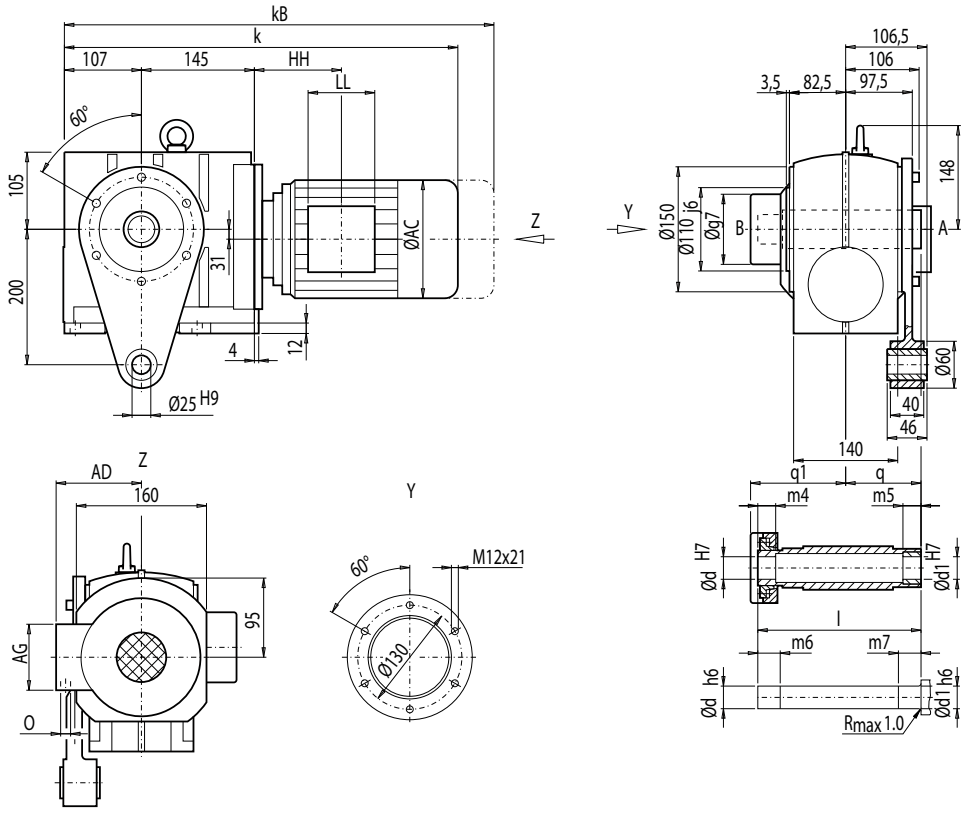


Fig.1

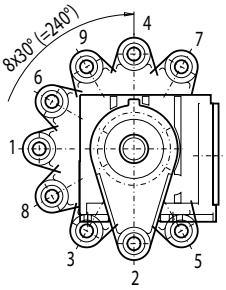
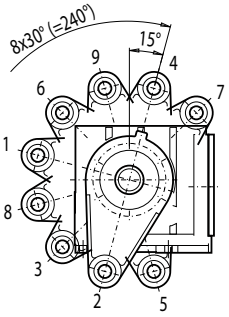


Fig.2



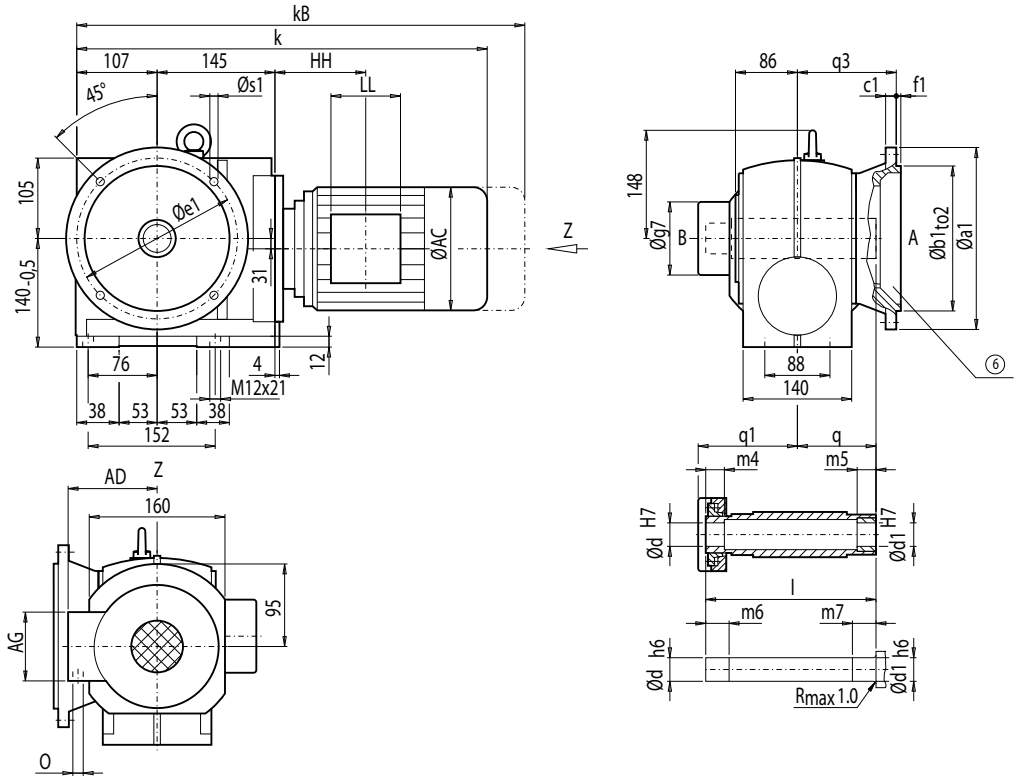
d	d1	l	m4	m5	m6	m7	q1	q	g7
40 *)	40	209	35	20	40	25	126	90	112
50	50	209	27	20	32	25	126	90	112

*) Preferred series

Motor	CADS68 k	kB	AC	AD	AG	LL	HH	O	Weight CADS68
LA71	505.0	560.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	50
LA71Z	524.0	579.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	50
LA80	542.0	605.5	156.5	155	90	90	108.5	M20x1.5/M25x1.5	55
LA80Z	564.5	628.0	156.5	155	90	90	181.5	M20x1.5/M25x1.5	59
LA90S/L	573.0	644.0	174.0	163	90	90	108.5	M20x1.5/M25x1.5	60
LA90ZL	618.0	689.0	174.0	163	90	90	232.5	M20x1.5/M25x1.5	66
LA100L	619.0	700.0	195.0	168	120	120	149.0	2xM32x1.5	69
LA100ZL	689.0	770.0	195.0	168	120	120	281.0	2xM32x1.5	79
LA112M	648.0	729.0	219.0	181	120	120	154.0	2xM32x1.5	80
LA112ZM	676.0	757.0	219.0	181	120	120	258.0	2xM32x1.5	87
LA132S/M	710.5	812.5	259.0	195	140	140	196.5	2xM32x1.5	90
LA132ZM	756.5	858.5	259.0	195	140	140	304.5	2xM32x1.5	111

Gearbox CAFS68, flange-mounted design and shrink disk

CAFS012



Flange	a1	b1	to2	c1	e1	f1	s1	q3	d	d1	l	m4	m5	m6	m7	q1	q	g7
A200	200	130	j6	12	165	4	11.0	132.5	40 *)	40	209	35	20	40	25	126	90	112
									50	50	209	27	20	32	25	126	90	112
A250	250	180	j6	15	215	4	13.5	113.0	40 *)	40	209	35	20	40	25	126	90	112
									50	50	209	27	20	32	25	126	90	112

*) Preferred series

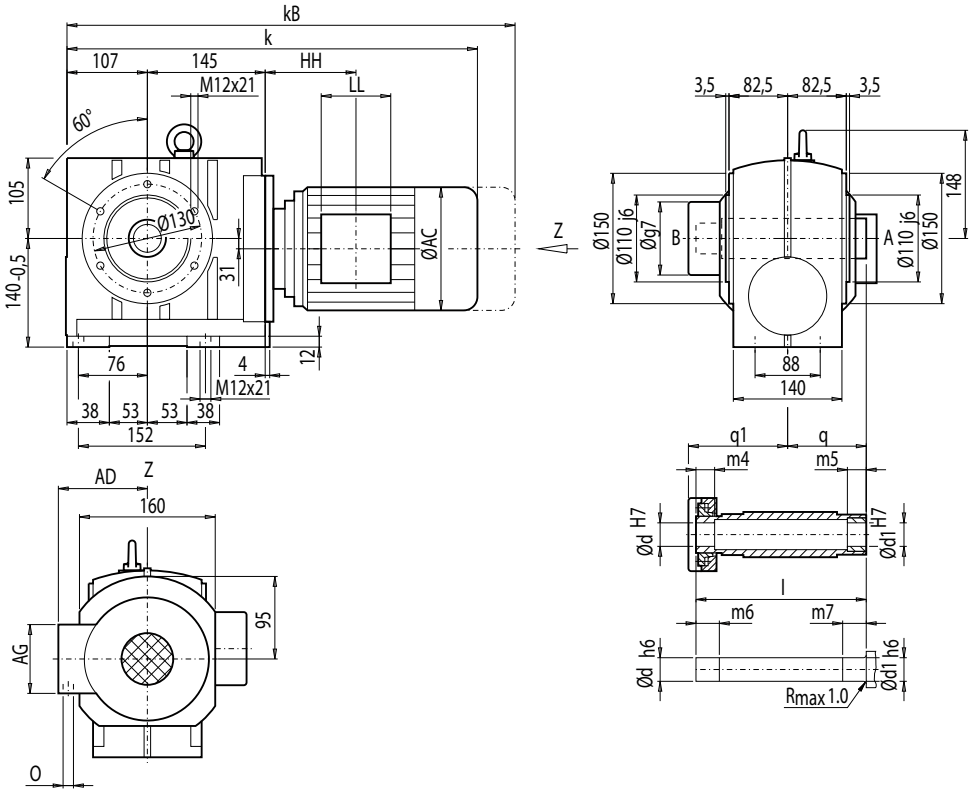
	CAFS68								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAFS68**
LA71	505.0	560.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	53
LA71Z	524.0	579.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	53
LA80	542.0	605.5	156.5	155	90	90	108.5	M20x1.5/M25x1.5	58
LA80Z	564.5	628.0	156.5	155	90	90	181.5	M20x1.5/M25x1.5	62
LA90S/L	573.0	644.0	174.0	163	90	90	108.5	M20x1.5/M25x1.5	63
LA90ZL	618.0	689.0	174.0	163	90	90	232.5	M20x1.5/M25x1.5	69
LA100L	619.0	700.0	195.0	168	120	120	149.0	2xM32x1.5	72
LA100ZL	689.0	770.0	195.0	168	120	120	281.0	2xM32x1.5	82
LA112M	648.0	729.0	219.0	181	120	120	154.0	2xM32x1.5	83
LA112ZM	676.0	757.0	219.0	181	120	120	258.0	2xM32x1.5	90
LA132S/M	710.5	812.5	259.0	195	140	140	196.5	2xM32x1.5	93
LA132ZM	756.5	858.5	259.0	195	140	140	304.5	2xM32x1.5	114

⑥ For note, see page 5/108

Dimensions

Gearbox CAZS68, shaft-mounted design with housing flange (C-type) and shrink disk

CAZS012



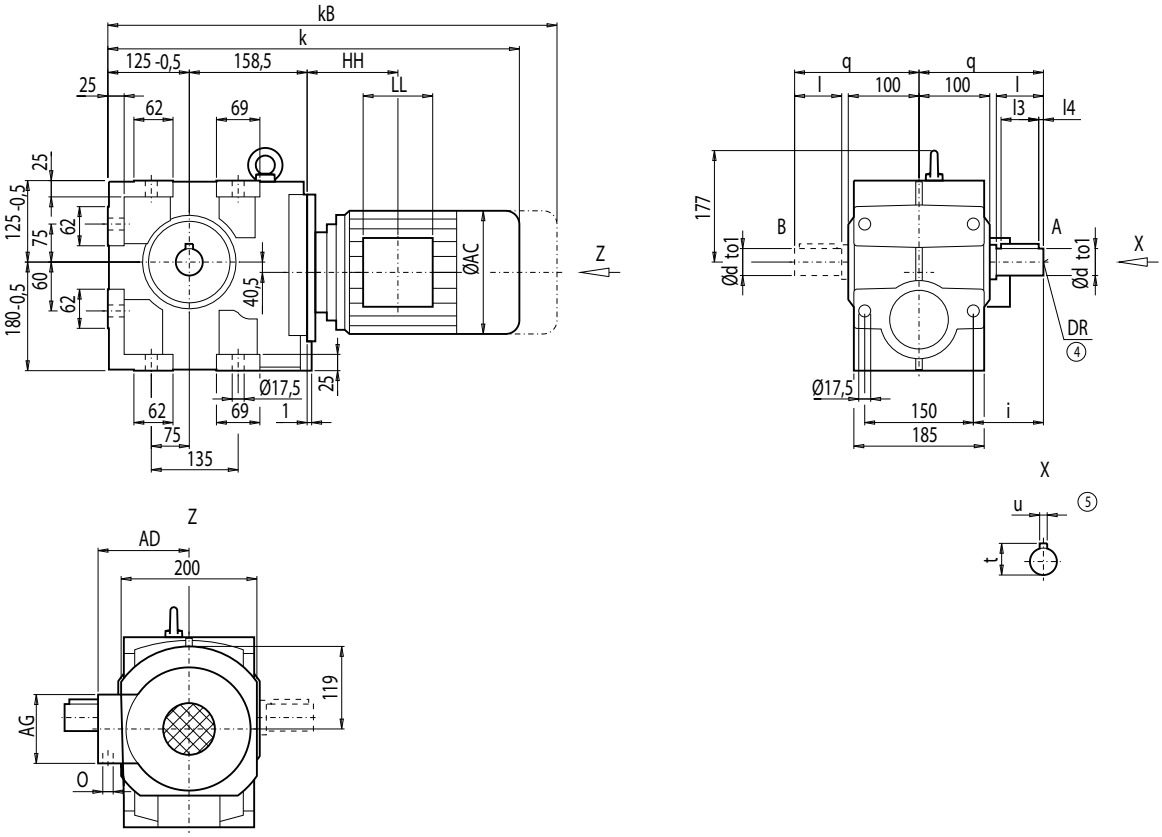
d	d1	l	m4	m5	m6	m7	q1	q	g7
40 *)	40	209	35	20	40	25	126	90	112
50	50	209	27	20	32	25	126	90	112

*) Preferred series

	CAZS68								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAZS68**
LA71	505.0	560.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	49
LA71Z	524.0	579.0	139.0	146	90	90	109.0	M20x1.5/M25x1.5	49
LA80	542.0	605.5	156.5	155	90	90	108.5	M20x1.5/M25x1.5	53
LA80Z	564.5	628.0	156.5	155	90	90	181.5	M20x1.5/M25x1.5	57
LA90S/L	573.0	644.0	174.0	163	90	90	108.5	M20x1.5/M25x1.5	58
LA90ZL	618.0	689.0	174.0	163	90	90	232.5	M20x1.5/M25x1.5	64
LA100L	619.0	700.0	195.0	168	120	120	149.0	2xM32x1.5	67
LA100ZL	689.0	770.0	195.0	168	120	120	281.0	2xM32x1.5	77
LA112M	648.0	729.0	219.0	181	120	120	154.0	2xM32x1.5	79
LA112ZM	676.0	757.0	219.0	181	120	120	258.0	2xM32x1.5	86
LA132S/M	710.5	812.5	259.0	195	140	140	196.5	2xM32x1.5	89
LA132ZM	756.5	858.5	259.0	195	140	140	304.5	2xM32x1.5	110

Gearbox C88, foot- and housing-flange-mounted designs (C-type)

C012



d	to1	l	l3	l4	t	u	i	q	DR
45 *)	k6	90	80	2.5	48.0	14	120	195	M16x36
50	k6	100	80	10.0	53.5	14	130	205	M16x36
70	m6	140	110	15.0	74.5	20	170	245	M20x42

*) Preferred series

	C88								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**C88**
LA71	530.5	585.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	74
LA71Z	549.5	604.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	74
LA80	567.5	631.0	156.5	155	90	90	102.5	M20x1.5/M25x1.5	78
LA80Z	590.0	653.5	156.5	155	90	90	175.5	M20x1.5/M25x1.5	82
LA90S/L	598.5	669.5	174.0	163	90	90	102.5	M20x1.5/M25x1.5	83
LA90ZL	643.5	714.5	174.0	163	90	90	226.5	M20x1.5/M25x1.5	89
LA100L	644.5	725.5	195.0	168	120	120	143.0	2xM32x1.5	92
LA100ZL	714.5	795.5	195.0	168	120	120	275.0	2xM32x1.5	102
LA112M	671.5	752.5	219.0	181	120	120	146.0	2xM32x1.5	104
LA112ZM	699.5	780.5	219.0	181	120	120	250.0	2xM32x1.5	111
LA132S/M	731.5	833.5	259.0	195	140	140	186.5	2xM32x1.5	117
LA132ZM	777.5	879.5	259.0	195	140	140	294.5	2xM32x1.5	138
LA160M/L	834.0	952.5	313.5	227	165	165	212.0	2xM40x1.5	150
LA160ZL	882.0	1 000.5	313.5	227	165	165	365.0	2xM40x1.5	189

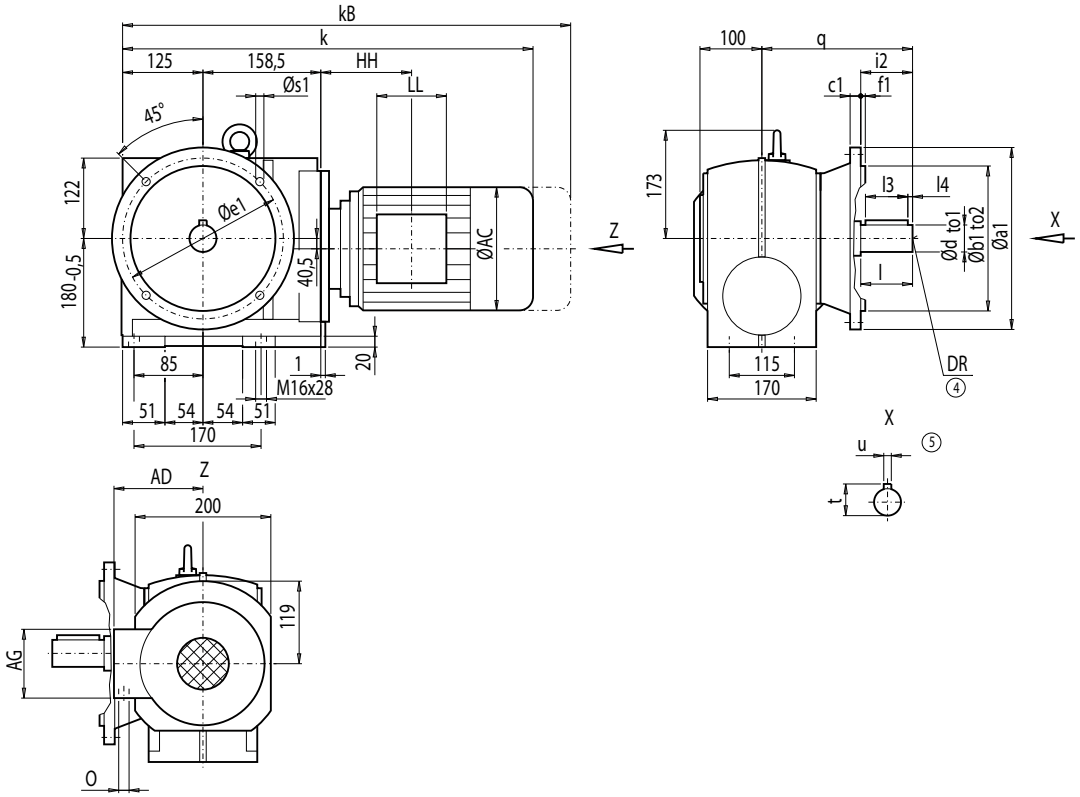
④ DIN 332

⑤ Feather key / keyway DIN 6885

Dimensions

Gearbox CF88, flange-mounted design (A-type)

CF012



Flange	a1	b1	to2	c1	e1	f1	s1	d	to1	l	l3	l4	t	u	i2	q	DR
A250	250	180	j6	15	215	4	13.5	45 *)	k6	90	80	2.5	48.0	14	90	240.5	M16x36
A300	300	230	j6	16	265	4	13.5	50	k6	100	80	10.0	53.5	14	100	242.0	M16x36

*) Preferred series

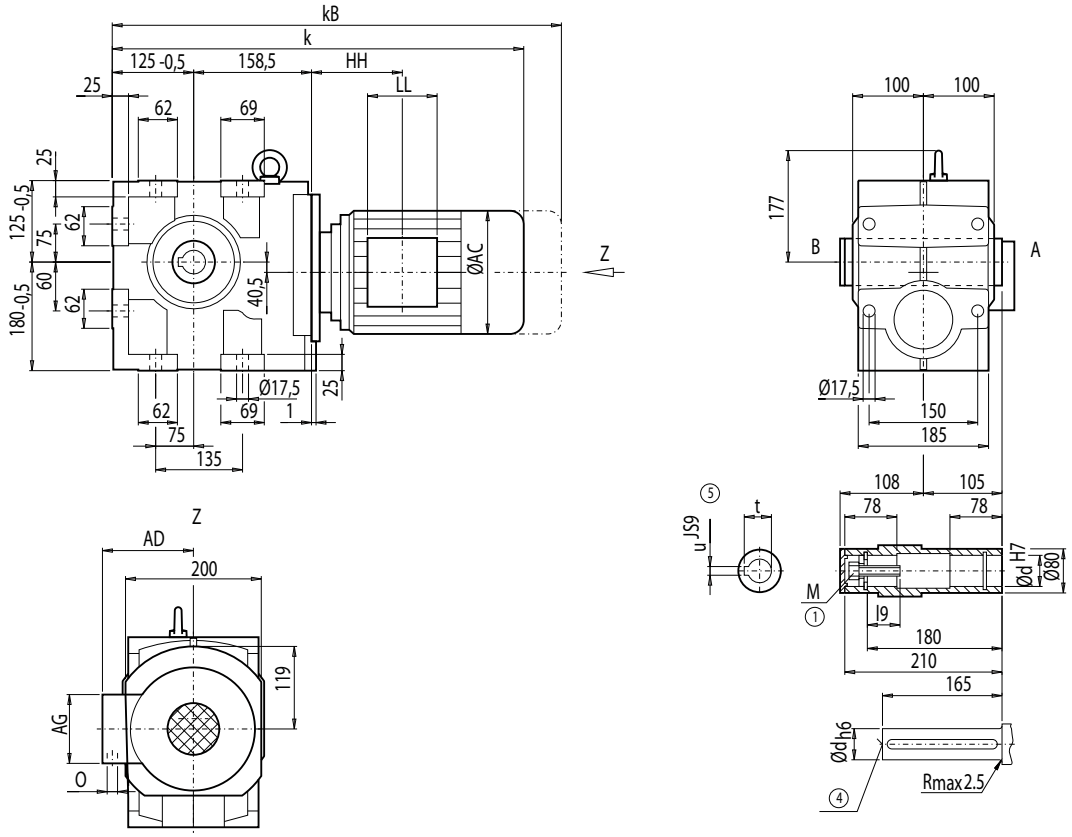
	CF88								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CF88**
LA71	530.5	585.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	87
LA71Z	549.5	604.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	87
LA80	567.5	631.0	156.5	155	90	90	102.5	M20x1.5/M25x1.5	92
LA80Z	590.0	653.5	156.5	155	90	90	175.5	M20x1.5/M25x1.5	96
LA90S/L	598.5	669.5	174.0	163	90	90	102.5	M20x1.5/M25x1.5	97
LA90ZL	643.5	714.5	174.0	163	90	90	226.5	M20x1.5/M25x1.5	103
LA100L	644.5	725.5	195.0	168	120	120	143.0	2xM32x1.5	106
LA100ZL	714.5	795.5	195.0	168	120	120	275.0	2xM32x1.5	116
LA112M	671.5	752.5	219.0	181	120	120	146.0	2xM32x1.5	118
LA112ZM	699.5	780.5	219.0	181	120	120	250.0	2xM32x1.5	125
LA132S/M	731.5	833.5	259.0	195	140	140	186.5	2xM32x1.5	131
LA132ZM	777.5	879.5	259.0	195	140	140	294.5	2xM32x1.5	152
LA160M/L	834.0	952.5	313.5	227	165	165	212.0	2xM40x1.5	164
LA160ZL	882.0	1 000.5	313.5	227	165	165	365.0	2xM40x1.5	203

④ DIN 332

⑤ Feather key / keyway DIN 6885

Gearbox CA88, shaft-mounted design

CA012



d	l9	M	t	u
50 *)	44.5	M16	53.8	14
60	54.0	M20	64.4	18

*) Preferred series

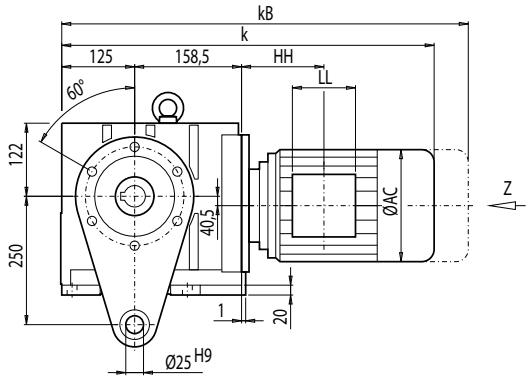
Motor	CA88 k	kB	AC	AD	AG	LL	HH	O	Weight CA88
LA71	530.5	585.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	65
LA71Z	549.5	604.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	65
LA80	567.5	631.0	156.5	155	90	90	102.5	M20x1.5/M25x1.5	70
LA80Z	590.0	653.5	156.5	155	90	90	175.5	M20x1.5/M25x1.5	74
LA90S/L	598.5	669.5	174.0	163	90	90	102.5	M20x1.5/M25x1.5	75
LA90ZL	643.5	714.5	174.0	163	90	90	226.5	M20x1.5/M25x1.5	81
LA100L	644.5	725.5	195.0	168	120	120	143.0	2xM32x1.5	84
LA100ZL	714.5	795.5	195.0	168	120	120	275.0	2xM32x1.5	94
LA112M	671.5	752.5	219.0	181	120	120	146.0	2xM32x1.5	96
LA112ZM	699.5	780.5	219.0	181	120	120	250.0	2xM32x1.5	103
LA132S/M	731.5	833.5	259.0	195	140	140	186.5	2xM32x1.5	109
LA132ZM	777.5	879.5	259.0	195	140	140	294.5	2xM32x1.5	130
LA160M/L	834.0	952.5	313.5	227	165	165	212.0	2xM40x1.5	142
LA160ZL	882.0	1 000.5	313.5	227	165	165	365.0	2xM40x1.5	181

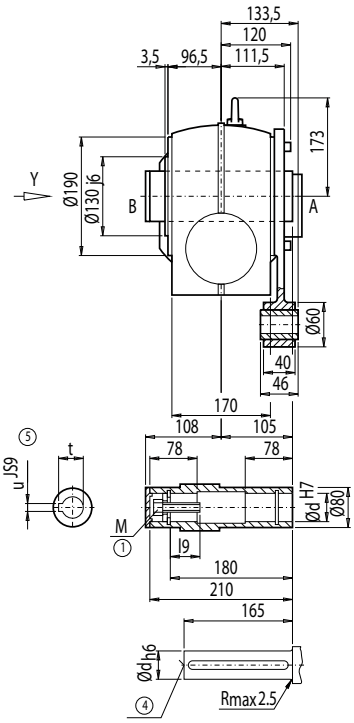
④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014

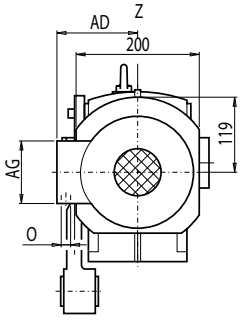
Dimensions

Gearbox CAD88, shaft-mounted design with torque arm

CAD012







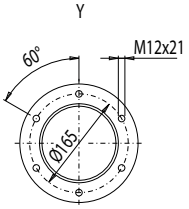


Fig.1

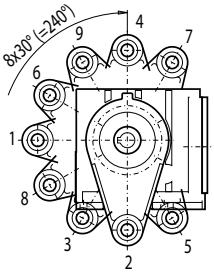
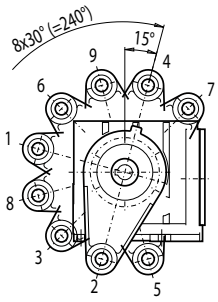


Fig.2



d	l9	M	t	u
50 *)	44.5	M16	53.8	14
60	54.0	M20	64.4	18

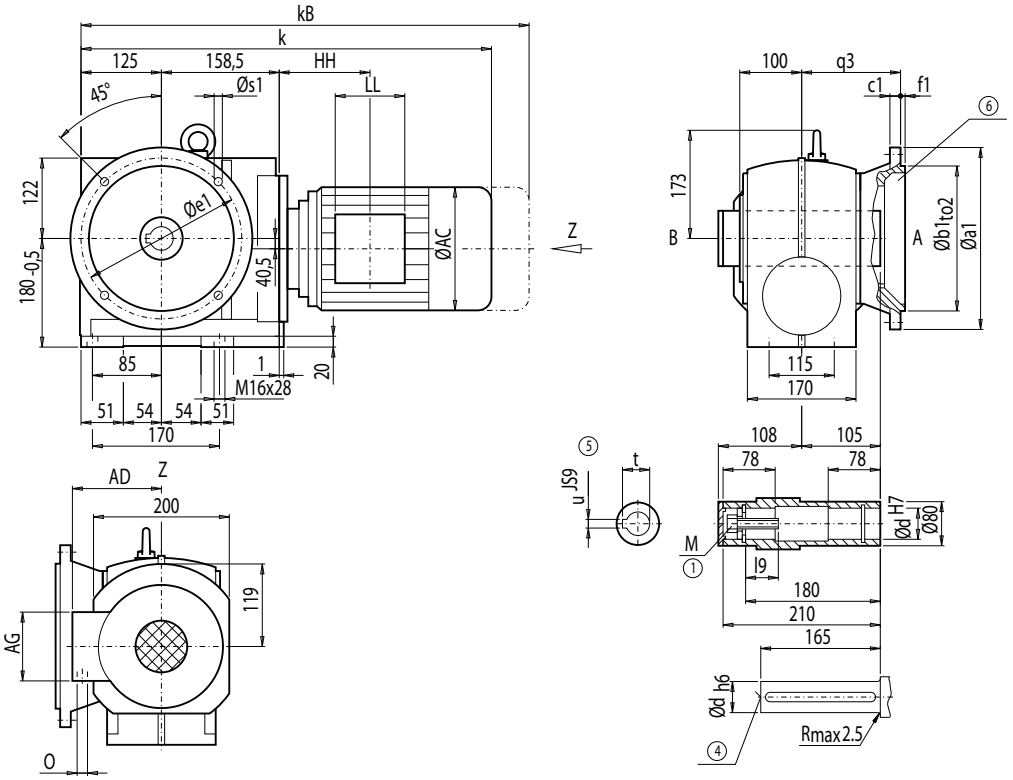
*) Preferred series

Motor	CAD88 k	kB	AC	AD	AG	LL	HH	O	Weight CAD88
LA71	530.5	585.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	75
LA71Z	549.5	604.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	75
LA80	567.5	631.0	156.5	155	90	90	102.5	M20x1.5/M25x1.5	80
LA80Z	590.0	653.5	156.5	155	90	90	175.5	M20x1.5/M25x1.5	84
LA90S/L	598.5	669.5	174.0	163	90	90	102.5	M20x1.5/M25x1.5	85
LA90ZL	643.5	714.5	174.0	163	90	90	226.5	M20x1.5/M25x1.5	91
LA100L	644.5	725.5	195.0	168	120	120	143.0	2xM32x1.5	94
LA100ZL	714.5	795.5	195.0	168	120	120	275.0	2xM32x1.5	104
LA112M	671.5	752.5	219.0	181	120	120	146.0	2xM32x1.5	106
LA112ZM	699.5	780.5	219.0	181	120	120	250.0	2xM32x1.5	113
LA132S/M	731.5	833.5	259.0	195	140	140	186.5	2xM32x1.5	119
LA132ZM	777.5	879.5	259.0	195	140	140	294.5	2xM32x1.5	140
LA160M/L	834.0	952.5	313.5	227	165	165	212.0	2xM40x1.5	151
LA160ZL	882.0	1 000.5	313.5	227	165	165	365.0	2xM40x1.5	190

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014

Gearbox CAF88, flange-mounted design

CAF012



Flange	a1	b1	to2	c1	e1	f1	q3	s1	d	l9	M	t	u
A250	250	180	j6	15	215	4	150.5	13.5	50 *)	44.5	M16	53.8	14
									60	54.0	M20	64.4	18
A300	300	230	j6	16	265	4	142.0	13.5	50*)	44.5	M16	53.8	14
									60	54.0	M20	64.4	18

*) Preferred series

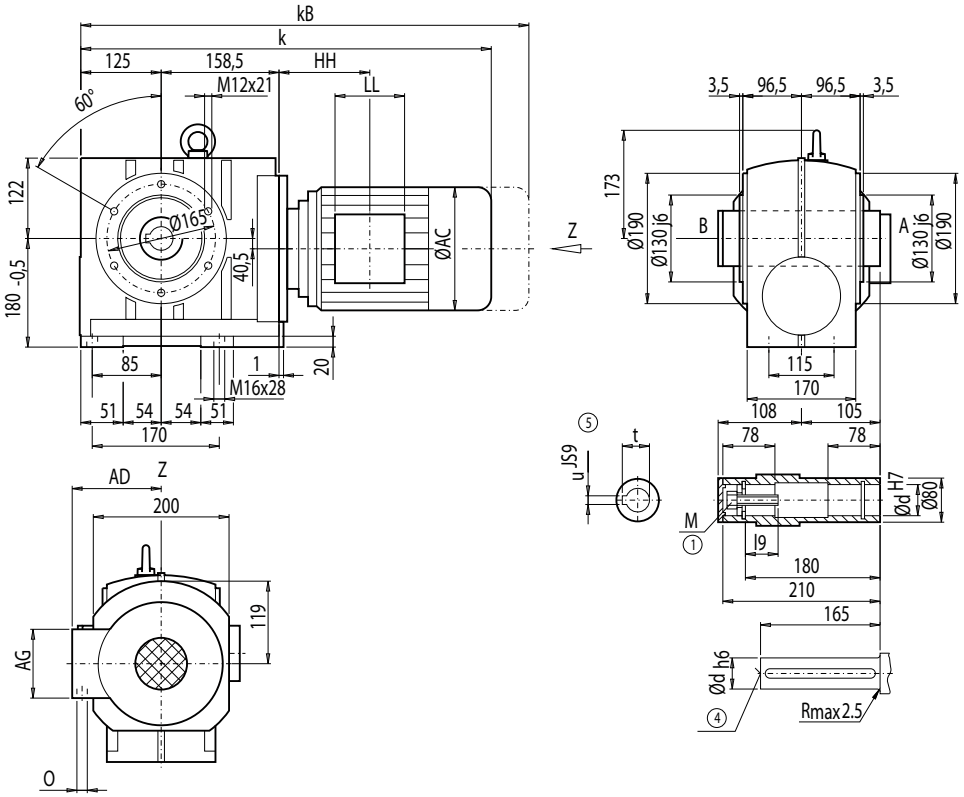
	CAF88								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAF88**
LA71	530.5	585.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	79
LA71Z	549.5	604.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	79
LA80	567.5	631.0	156.5	155	90	90	102.5	M20x1.5/M25x1.5	84
LA80Z	590.0	653.5	156.5	155	90	90	175.5	M20x1.5/M25x1.5	88
LA90S/L	598.5	669.5	174.0	163	90	90	102.5	M20x1.5/M25x1.5	89
LA90ZL	643.5	714.5	174.0	163	90	90	226.5	M20x1.5/M25x1.5	95
LA100L	644.5	725.5	195.0	168	120	120	143.0	2xM32x1.5	98
LA100ZL	714.5	795.5	195.0	168	120	120	275.0	2xM32x1.5	108
LA112M	671.5	752.5	219.0	181	120	120	146.0	2xM32x1.5	110
LA112ZM	699.5	780.5	219.0	181	120	120	250.0	2xM32x1.5	117
LA132S/M	731.5	833.5	259.0	195	140	140	186.5	2xM32x1.5	123
LA132ZM	777.5	879.5	259.0	195	140	140	294.5	2xM32x1.5	144
LA160M/L	834.0	952.5	313.5	227	165	165	212.0	2xM40x1.5	155
LA160ZL	882.0	1 000.5	313.5	227	165	165	365.0	2xM40x1.5	194

④ DIN 332 ⑤ Feather key / keyway DIN 6885 ① EN ISO 4014 ⑥ For note, see page 5/108

Dimensions

Gearbox CAZ88, shaft-mounted design with housing flange (C-type)

CAZ012



d	l9	M	t	u
50 *)	44.5	M16	53.8	14
60	54.0	M20	64.4	18

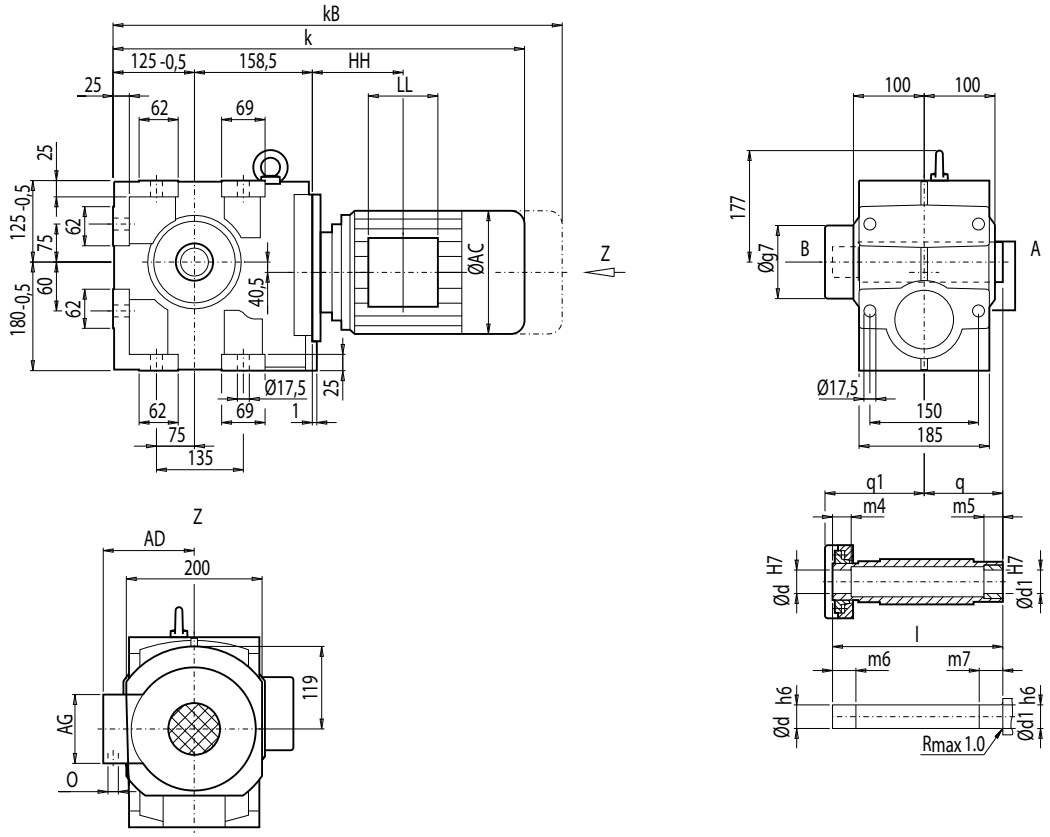
*) Preferred series

Motor	CAZ88 k	kB	AC	AD	AG	LL	HH	O	Weight CAZ88
LA71	530.5	585.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	72
LA71Z	549.5	604.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	72
LA80	567.5	631.0	156.5	155	90	90	102.5	M20x1.5/M25x1.5	77
LA80Z	590.0	653.5	156.5	155	90	90	175.5	M20x1.5/M25x1.5	81
LA90S/L	598.5	669.5	174.0	163	90	90	102.5	M20x1.5/M25x1.5	82
LA90ZL	643.5	714.5	174.0	163	90	90	226.5	M20x1.5/M25x1.5	88
LA100L	644.5	725.5	195.0	168	120	120	143.0	2xM32x1.5	91
LA100ZL	714.5	795.5	195.0	168	120	120	275.0	2xM32x1.5	101
LA112M	671.5	752.5	219.0	181	120	120	146.0	2xM32x1.5	103
LA112ZM	699.5	780.5	219.0	181	120	120	250.0	2xM32x1.5	110
LA132S/M	731.5	833.5	259.0	195	140	140	186.5	2xM32x1.5	116
LA132ZM	777.5	879.5	259.0	195	140	140	294.5	2xM32x1.5	137
LA160M/L	834.0	952.5	313.5	227	165	165	212.0	2xM40x1.5	149
LA160ZL	882.0	1 000.5	313.5	227	165	165	365.0	2xM40x1.5	188

① EN ISO 4014 ④ DIN 332 ⑤ Feather key / keyway DIN 6885

Gearbox CAS88, shaft-mounted design with shrink disk

CAS012



d	d1	l	m4	m5	m6	m7	q1	q	g7
50 *)	50	241	29	30	34	35	144	105	132
60	60	241	29	30	34	35	144	105	132

*) Preferred series

	CAS88								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAS88**
LA71	530.5	585.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	67
LA71Z	549.5	604.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	67
LA80	567.5	631.0	156.5	155	90	90	102.5	M20x1.5/M25x1.5	72
LA80Z	590.0	653.5	156.5	155	90	90	175.5	M20x1.5/M25x1.5	76
LA90S/L	598.5	669.5	174.0	163	90	90	102.5	M20x1.5/M25x1.5	77
LA90ZL	643.5	714.5	174.0	163	90	90	226.5	M20x1.5/M25x1.5	83
LA100L	644.5	725.5	195.0	168	120	120	143.0	2xM32x1.5	86
LA100ZL	714.5	795.5	195.0	168	120	120	275.0	2xM32x1.5	96
LA112M	671.5	752.5	219.0	181	120	120	146.0	2xM32x1.5	98
LA112ZM	699.5	780.5	219.0	181	120	120	250.0	2xM32x1.5	105
LA132S/M	731.5	833.5	259.0	195	140	140	186.5	2xM32x1.5	111
LA132ZM	777.5	879.5	259.0	195	140	140	294.5	2xM32x1.5	132
LA160M/L	834.0	952.5	313.5	227	165	165	212.0	2xM40x1.5	143
LA160ZL	882.0	1 000.5	313.5	227	165	165	365.0	2xM40x1.5	182

Dimensions

Gearbox CADS88, shaft-mounted design with torque arm and shrink disk

CADS012

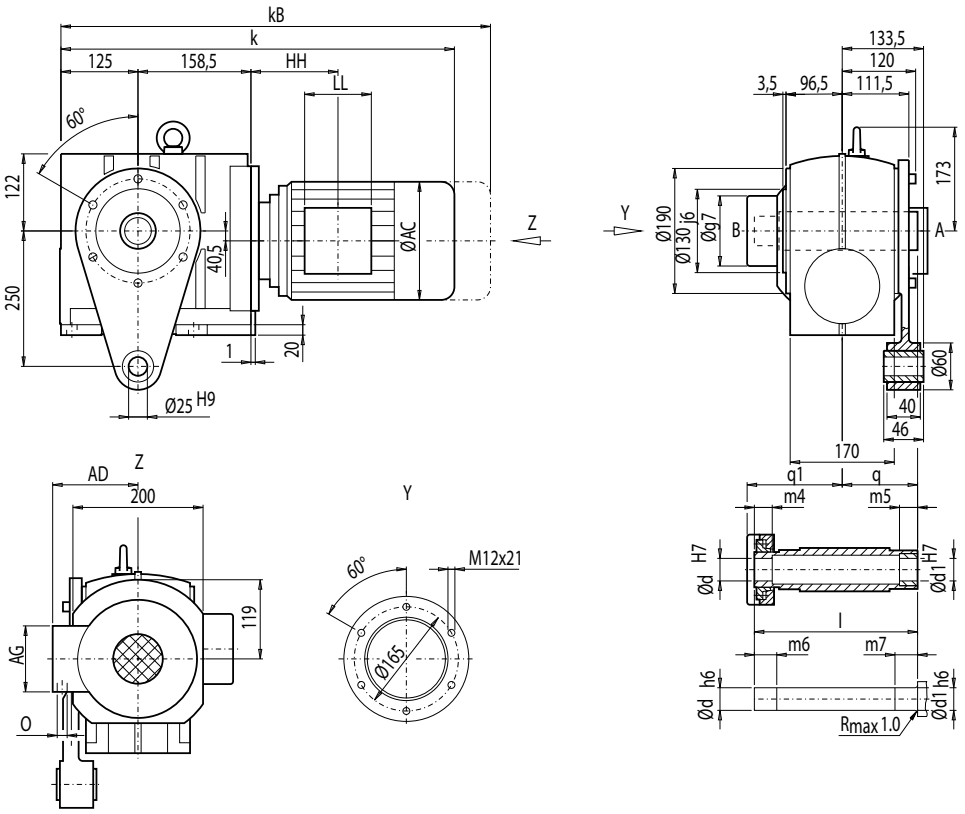


Fig.1

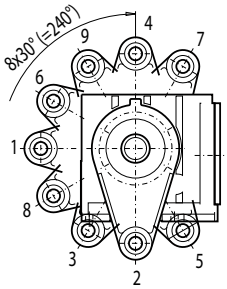
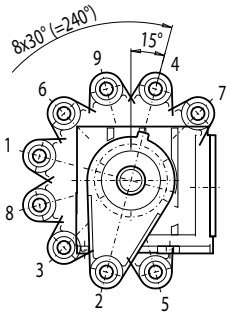


Fig.2



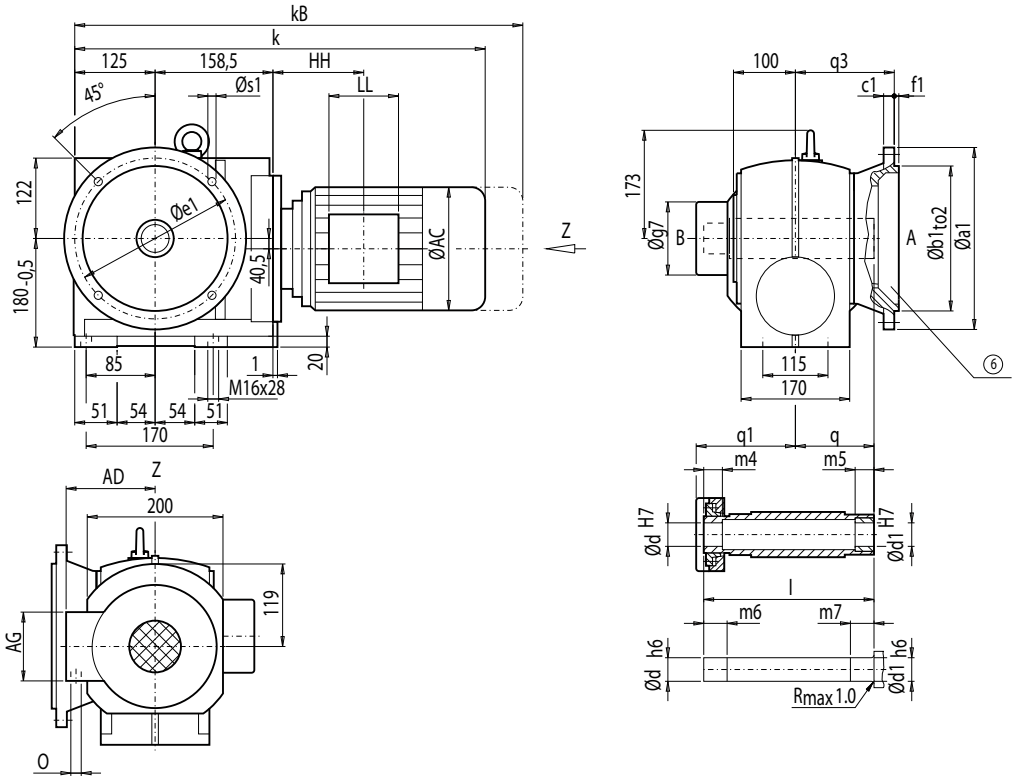
d	d1	l	m4	m5	m6	m7	q1	q	g7
50 *)	50	241	29	30	34	35	144	105	132
60	60	241	29	30	34	35	144	105	132

*) Preferred series

Motor	CADS88 k	kB	AC	AD	AG	LL	HH	O	Weight CADS88
LA71	530.5	585.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	77
LA71Z	549.5	604.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	77
LA80	567.5	631.0	156.5	155	90	90	102.5	M20x1.5/M25x1.5	82
LA80Z	590.0	653.5	156.5	155	90	90	175.5	M20x1.5/M25x1.5	86
LA90S/L	598.5	669.5	174.0	163	90	90	102.5	M20x1.5/M25x1.5	87
LA90ZL	643.5	714.5	174.0	163	90	90	226.5	M20x1.5/M25x1.5	93
LA100L	644.5	725.5	195.0	168	120	120	143.0	2xM32x1.5	96
LA100ZL	714.5	795.5	195.0	168	120	120	275.0	2xM32x1.5	106
LA112M	671.5	752.5	219.0	181	120	120	146.0	2xM32x1.5	108
LA112ZM	699.5	780.5	219.0	181	120	120	250.0	2xM32x1.5	115
LA132S/M	731.5	833.5	259.0	195	140	140	186.5	2xM32x1.5	121
LA132ZM	777.5	879.5	259.0	195	140	140	294.5	2xM32x1.5	142
LA160M/L	834.0	952.5	313.5	227	165	165	212.0	2xM40x1.5	153
LA160ZL	882.0	1 000.5	313.5	227	165	165	365.0	2xM40x1.5	192

Gearbox CAFS88, flange-mounted design and shrink disk

CAFS012



Flange	a1	b1	to2	c1	e1	f1	s1	q3	d	d1	l	m4	m5	m6	m7	q1	q	g7
A250	250	180	j6	15	215	4	13.5	150.5	50 *)	50	241	29	30	34	35	144	105	132
									60	60	241	29	30	34	35	144	105	132
A300	300	230	j6	16	265	4	13.5	142.0	50 *)	50	241	29	30	34	35	144	105	132
									60	60	241	29	30	34	35	144	105	132

*) Preferred series

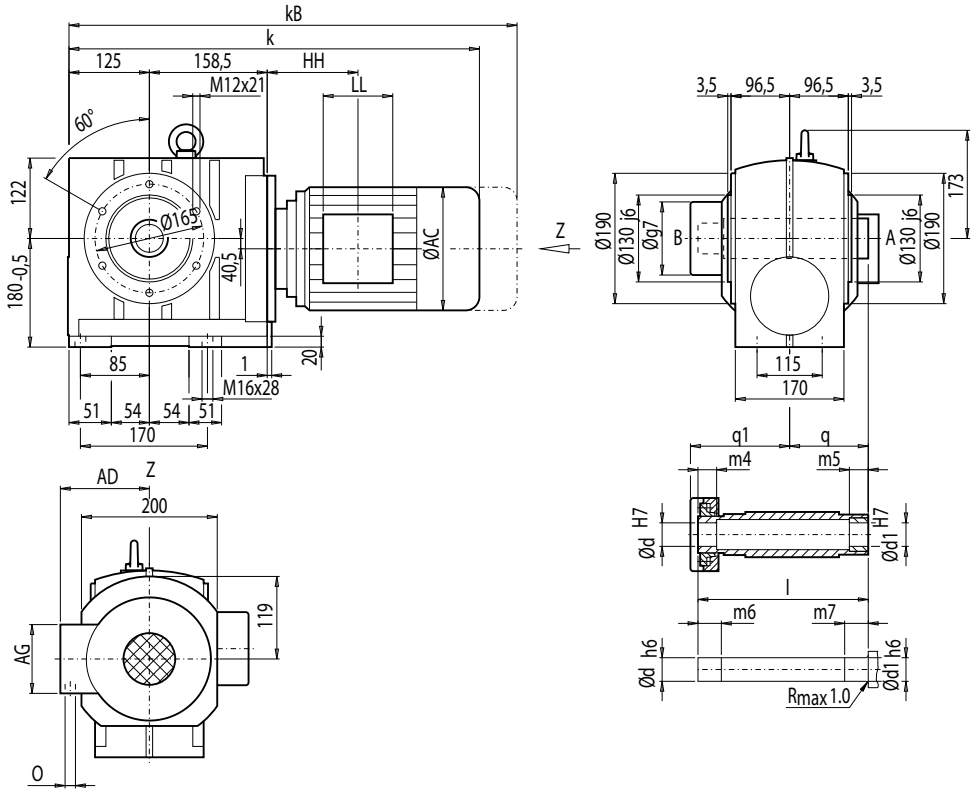
	CAFS88								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAFS88**
LA71	530.5	585.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	81
LA71Z	549.5	604.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	81
LA80	567.5	631.0	156.5	155	90	90	102.5	M20x1.5/M25x1.5	86
LA80Z	590.0	653.5	156.5	155	90	90	175.5	M20x1.5/M25x1.5	90
LA90S/L	598.5	669.5	174.0	163	90	90	102.5	M20x1.5/M25x1.5	91
LA90ZL	643.5	714.5	174.0	163	90	90	226.5	M20x1.5/M25x1.5	97
LA100L	644.5	725.5	195.0	168	120	120	143.0	2xM32x1.5	100
LA100ZL	714.5	795.5	195.0	168	120	120	275.0	2xM32x1.5	110
LA112M	671.5	752.5	219.0	181	120	120	146.0	2xM32x1.5	112
LA112ZM	699.5	780.5	219.0	181	120	120	250.0	2xM32x1.5	119
LA132S/M	731.5	833.5	259.0	195	140	140	186.5	2xM32x1.5	125
LA132ZM	777.5	879.5	259.0	195	140	140	294.5	2xM32x1.5	146
LA160M/L	834.0	952.5	313.5	227	165	165	212.0	2xM40x1.5	157
LA160ZL	882.0	1 000.5	313.5	227	165	165	365.0	2xM40x1.5	196

⑥ For note, see page 5/108

Dimensions

Gearbox CAZS88, shaft-mounted design with housing flange (C-type) and shrink disk

CAZS012



d	d1	l	m4	m5	m6	m7	q1	q	g7
50 *)	50	241	29	30	34	35	144	105	132
60	60	241	29	30	34	35	144	105	132

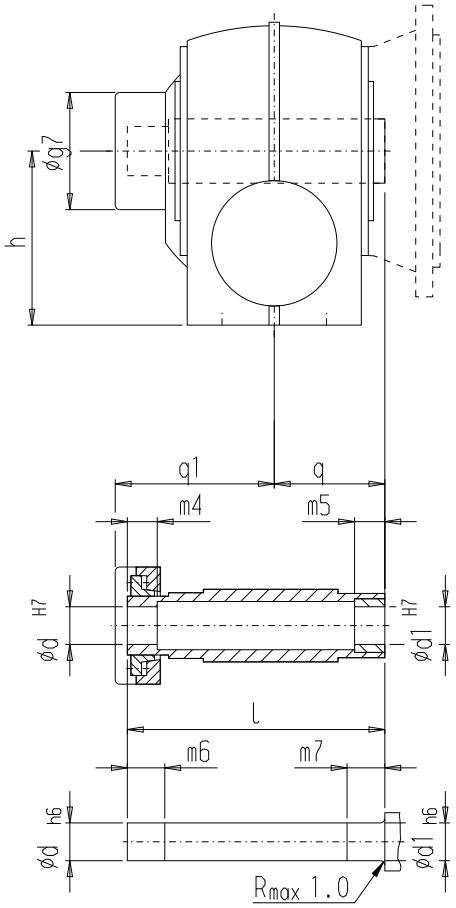
*) Preferred series

	CAZS88								Weight
Motor	**k**	**kB**	**AC**	**AD**	**AG**	**LL**	**HH**	**O**	**CAZS88**
LA71	530.5	585.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	74
LA71Z	549.5	604.5	139.0	146	90	90	103.0	M20x1.5/M25x1.5	74
LA80	567.5	631.0	156.5	155	90	90	102.5	M20x1.5/M25x1.5	79
LA80Z	590.0	653.5	156.5	155	90	90	175.5	M20x1.5/M25x1.5	83
LA90S/L	598.5	669.5	174.0	163	90	90	102.5	M20x1.5/M25x1.5	84
LA90ZL	643.5	714.5	174.0	163	90	90	226.5	M20x1.5/M25x1.5	90
LA100L	644.5	725.5	195.0	168	120	120	143.0	2xM32x1.5	93
LA100ZL	714.5	795.5	195.0	168	120	120	275.0	2xM32x1.5	103
LA112M	671.5	752.5	219.0	181	120	120	146.0	2xM32x1.5	105
LA112ZM	699.5	780.5	219.0	181	120	120	250.0	2xM32x1.5	112
LA132S/M	731.5	833.5	259.0	195	140	140	186.5	2xM32x1.5	118
LA132ZM	777.5	879.5	259.0	195	140	140	294.5	2xM32x1.5	139
LA160M/L	834.0	952.5	313.5	227	165	165	212.0	2xM40x1.5	150
LA160ZL	882.0	1 000.5	313.5	227	165	165	365.0	2xM40x1.5	189

Offset hollow shafts with shrink disk

Optional hollow shafts for helical worm gearbox with shrink disk.

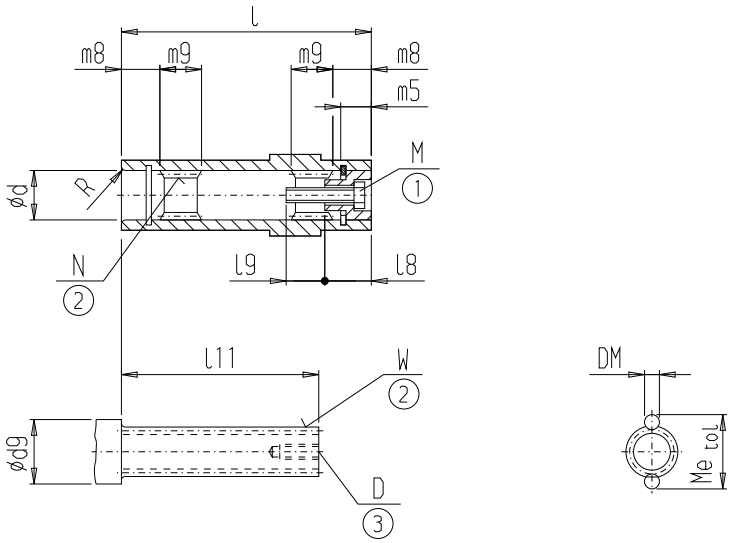
CA.S



Gearbox	d	d1	l	m4	m5	m6	m7	q1	q	g7	h
CAS/CAFS38	30	31	146	22	20	27	25	94	60	77	100
CAS/CAFS48	40	41	177	25	20	30	25	109	75	93	112
CAS/CAFS68	40	42	209	35	20	40	25	126	90	112	140
	50	51	209	27	20	32	25	126	90	112	140
CAS/CAFS88	50	52	241	29	30	34	35	144	105	132	180
	60	61	241	29	30	34	35	144	105	132	180

Dimensions

Shaft-mounted design with splined shaft in acc. with DIN 5480

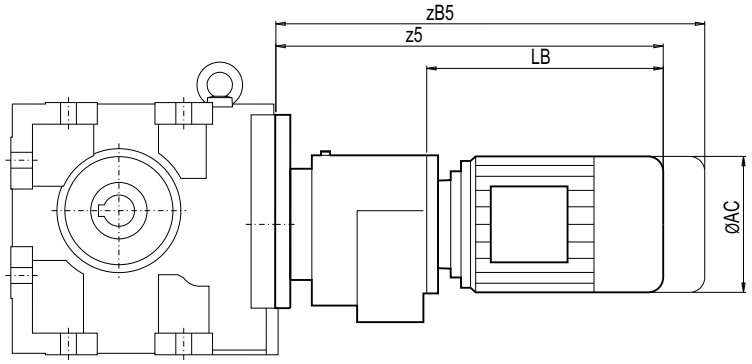


Gearbox type	d	l	d9 min.	l11	W	D	R	m8	m9
CA.T38	35	120	45	95	W35x1.25x30x26 8f	M10	R2	17.0	27
CA.T48	40	150	52	120	W40x2x30x18 8f	M12	R3	22.0	34
CA.T68	55	180	65	142	W50x2x30x24 8f	M16	R2	21.0	40
CA.T88	65	210	80	172	W60x2x30x28 8f	M16	R2	22.5	49

Gearbox type	N	m5	l8	l9	M	DM	Me	tol
CA.T38	N35x1.25x30x26 9H	12.0	18	27.0	M10x35	2.5	37.423	- 0.041
CA.T48	N40x2x30x18 9H	14.0	20	37.0	M12x45	4.5	45.083	- 0.043
CA.T68	N50x2x30x24 9H	16.0	23	49.5	M16x55	4.0	54.156	- 0.049
CA.T88	N60x2x30x28 9H	16.5	26	46.5	M16x55	4.0	63.918	- 0.053

① DIN 912 ② DIN 5480 ③ DIN 332-D

Helical worm tandem gearbox



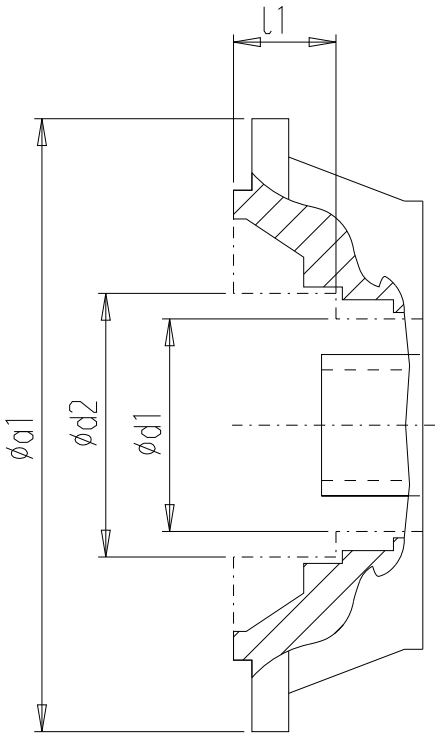
Gearbox	Motor	AC	z5	zB5	LB
C.38-Z28	LA71	139.0	363.0	418.0	202.5
	LA71Z	139.0	382.0	437.0	221.5
	LA80	156.5	465.0	528.5	304.5
	LA80Z	156.5	487.5	551.0	327.0
	LA90S/L	174.0	460.0	531.0	299.5
	LA90ZL	174.0	505.0	576.0	344.5
	LA100L	195.0	542.0	623.0	381.5
	LA100ZL	195.0	612.0	693.0	451.5
C.38-D28	LA71	139.0	363.0	418.0	202.5
	LA71Z	139.0	382.0	437.0	221.5
	LA80	156.5	465.0	528.5	304.5
	LA80Z	156.5	487.5	551.0	327.0
	LA90S/L	174.0	460.0	531.0	299.5
	LA90ZL	174.0	505.0	576.0	344.5
C_48-Z28	LA71	139.0	363.0	418.0	202.5
	LA71Z	139.0	382.0	437.0	221.5
	LA80	156.5	465.0	528.5	304.5
	LA80Z	156.5	487.5	551.0	327.0
	LA90S/L	174.0	460.0	531.0	299.5
	LA90ZL	174.0	505.0	576.0	344.5
	LA100L	195.0	542.0	623.0	381.5
	LA100ZL	195.0	612.0	693.0	451.5
C.48-D28	LA71	139.0	363.0	418.0	202.5
	LA71Z	139.0	382.0	437.0	221.5
	LA80	156.5	465.0	528.5	304.5
	LA80Z	156.5	487.5	551.0	327.0
	LA90S/L	174.0	460.0	531.0	299.5
	LA90ZL	174.0	505.0	576.0	344.5

Gearbox	Motor	AC	z5	zB5	LB
C.68-Z28	LA71	139.0	357.5	412.5	202.5
	LA71Z	139.0	376.5	431.5	221.5
	LA80	156.5	459.5	523.0	304.5
	LA80Z	156.5	482.0	545.5	327.0
	LA90S/L	174.0	454.5	525.5	299.5
	LA90ZL	174.0	499.5	570.5	344.5
	LA100L	195.0	536.5	617.5	381.5
	LA100ZL	195.0	606.5	687.5	451.5
C.68-D28	LA71	139.0	357.5	412.5	202.5
	LA71Z	139.0	376.5	431.5	221.5
	LA80	156.5	459.5	523.0	304.5
	LA80Z	156.5	482.0	545.5	327.0
	LA90S/L	174.0	454.5	525.5	299.5
	LA90ZL	174.0	499.5	570.5	344.5
C.88-Z28	LA71	139.0	351.5	406.5	202.5
	LA71Z	139.0	370.5	425.5	221.5
	LA80	156.5	453.5	517.0	304.5
	LA80Z	156.5	476.0	539.5	327.0
	LA90S/L	174.0	448.5	519.5	299.5
	LA90ZL	174.0	493.5	564.5	344.5
	LA100L	195.0	530.5	611.5	381.5
	LA100ZL	195.0	600.5	681.5	451.5
C.88-D28	LA71	139.0	351.5	406.5	202.5
	LA71Z	139.0	370.5	425.5	221.5
	LA80	156.5	453.5	517.0	304.5
	LA80Z	156.5	476.0	539.5	327.0
	LA90S/L	174.0	448.5	519.5	299.5
	LA90ZL	174.0	493.5	564.5	344.5

Dimensions

Inside contour of the flange-mounted design (A-type)

Design notes for the customer's interface, e.g. plug-in shaft for hollow shaft design



Gearbox	a1	d1	d2	l1
CAF.28	120	70	72	24.0
CAF.28	160	70	103	8.5
CAF.38	160	70	77	20.0
CAF.48	200	84	90	22.5
CAF.68	200	100	100	–
CAF.68	250	96	96	–
CAF.88	250	124	124	–
CAF.88	300	126	138	31.0

Input units

7

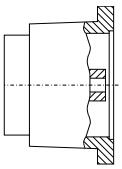
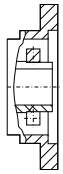
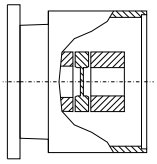
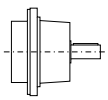
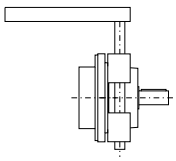
Input units

Orientation

Overview

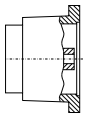
For most applications, it is best to mount the motor so that it is integrated on the gearbox. This provides an optimum solution in terms of a short overall length and the least weight.

On request, the gearboxes can also be fitted with an input unit for mounting standard motors.

Input unit	Description	Flexible coupling	Zero-backlash flexible coupling	Clamping hub	Backstop	Friction clutch	Speed encoder	Protective belt cover, optional
 **K2**	Coupling lantern with flexible coupling for connecting an IEC motor	✔			✔	✔	✔	
 **K4**	Short coupling lantern with clamp connection for connecting an IEC motor			✔				
 **KQ KQS**	Lantern for servomotor with zero-backlash flexible coupling for connecting a servomotor		✔	✔				
 **A**	Input unit with free input shaft				✔			
 **P**	Input unit with free input shaft and piggy back for connecting an IEC motor				✔			✔

Overview (continued)

Input unit K2 (coupling lantern)



This input unit for motors in IEC sizes is suitable for general applications with all load types. The input unit contains a torsionally flexible cam coupling which can compensate for axial movement.

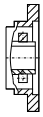
Input unit K2 is also available in an ATEX version.

Please refer to the Operating Instructions for information on mounting.

For additional options, see "Special versions".

Order codes:
Input unit K2 **A03**
Flexible coupling **A16**

Input unit K4 (short coupling lantern)



This input unit is designed for mounting situations that call for an extremely short overall length. The input units are suitable for connecting IEC standard motors within the context of general applications.

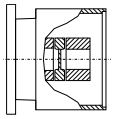
The connection between the shafts is rigid and there is no axial compensation. Therefore, we recommend using motors with a fixed bearing on the drive side for optimum service life. It is preferable to use K2 input units in situations involving a high mass inertia and a high number of starting operations in particular. With a class III load classification, you should use input unit K2 or contact us for more information.

Input unit K4 is also available in an ATEX version.

Please refer to the Operating Instructions for information on mounting.

Order code:
Input unit K4 **A04**

Input unit KQ / KQS (lantern for servomotor)



This input unit enables servomotors with a square mounting flange to be mounted on the gearbox. This provides the geared motor with a solid and attractive design. The input unit features a zero-backlash, torsionally flexible cam coupling which compensates for axial movement.

Input unit KQ is designed for motor shafts with feather key.

Input unit KQS is designed for motor shafts without feather key.

Order codes:
Input unit KQ **A07**
Input unit KQS **A08**

Size index	Order code
71.2	**N61**
80.3	**N62**
90.4	**N63**
112.3	**N62**
132.3	**N62**

Input unit A with free input shaft

Input unit A has a free solid input shaft and is designed for general solutions where the motor is mounted separately from the gearbox. It is also suitable for solutions that call for manual operation of the input shaft.

Order code:
Input unit A **A00**

Input unit P with free input shaft and piggy back

Input unit P has a free solid input shaft as well as a piggy back. A foot-mounted standard motor can be piggy backed onto the unit and connected to the gearbox input shaft by means of a V belt. A protective belt cover (PS version) is available on request.

Pulley and belt are not included in the scope of delivery.

Order codes:
Input unit P **A09**
Input unit PS **A10**

General technical data

Permissible radial forces and torques

Permissible torques for input units K, A and P

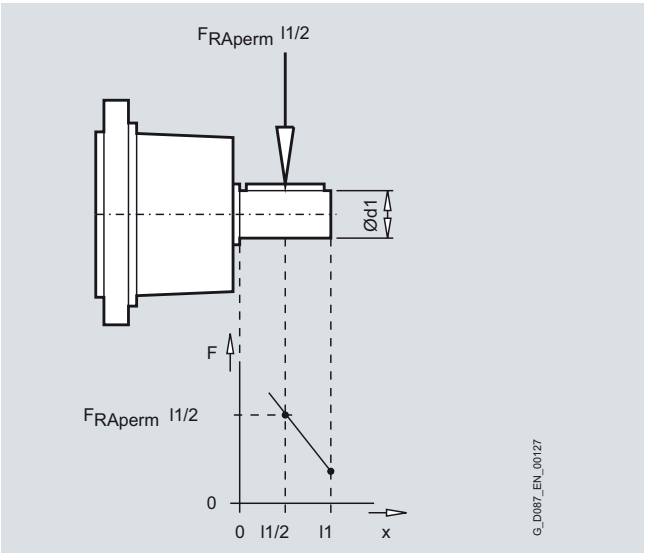
Size	Permissible input torque T_1 [1]
	Nm
71	3
80	5
90	10
100	20
112	26
132	61
160	98
180	198
200	198
225	291
250	356
280	580
315 [2]	1 290

[1] 2.5x the value is permissible for a brief period (e.g. motor starting torque)
[2] only for K2

Permissible radial force for input units A and P

Size	d1	l1	Permissible radial force F_{RAperm} l1/2 at 0.5xl1 [1]
	mm	mm	N
71	16	40	240
80	19	40	240
90	24	50	620
100	28	60	840
112	28	60	1 000
132	38	80	1 700
160	42	110	1 800
180	55	110	3 000
200	55	110	3 000
225	60	140	3 450
250	65	140	3 900
280	70	140	5 150
315	–	–	–

[1] based on 1 450 rpm with input units A, P



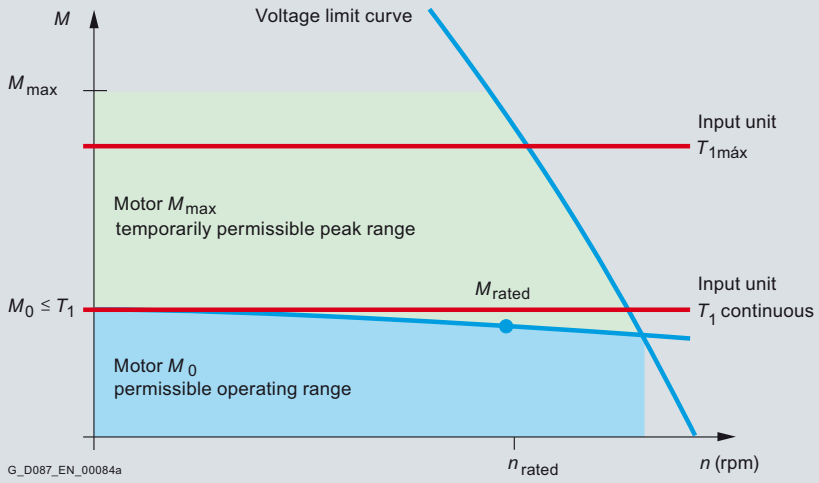
Permissible radial forces and torques (continued)

Permissible torque with input unit KQ (S)

Input unit KQ / KQS	Transmitted torques		Max. speed
	T_1	T_{1max}	n_{1max}
	Nm	Nm	rpm
71.2	3.0	7.5	3 600
80.3	5.0	12.5	3 600
90.4	10.0	25.0	3 600
112.3	26.0	65.0	3 600
132.3	61.0	152.5	3 600

T_1 = max. torque transmitted with continuous duty

T_{1max} = max. permissible peak torque



Speed-torque characteristic for servomotors and with S1 duty

Explanation of servomotor characteristic values

Abbreviation	Name	Explanation
M_0	Permanent static torque	Permanent torque acting on motor shaft at speed n = 0
M_{rated}	Rated torque	Permanent torque at rated speed
M_{max}	Maximum torque	Maximum transient torque
n_{rated}	Rated speed	Motor speed specified by manufacturer

General technical data

Maximum motor weight

Geared motors with an input unit should be designed to be as short as possible.

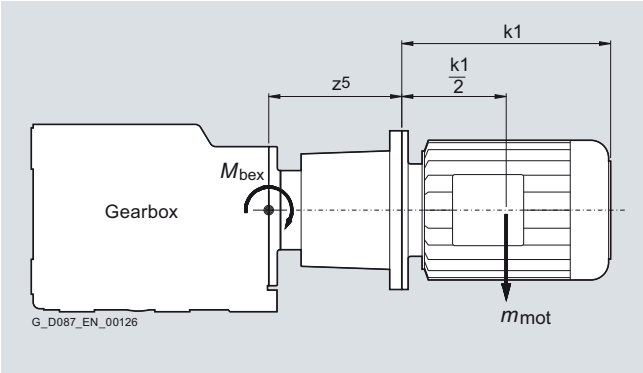
The prevailing bending moment can be calculated on the basis of the formulae below. If the permissible bending moment is exceeded, it means that a shorter design is required or that the motor requires additional support.

This particularly applies in the case of the following drive scenarios:

- Any geared motors that are not listed in this catalog
- Any motors that are mounted on the gearbox using a K2, K4 or KQ / KQS input unit
- Any gearboxes, particularly tandem gearboxes with input units that are exposed to high levels of impact and vibration.

However, if a connection to the input unit is necessary, the motor must be supported independently of the gearbox. Within this context, it is important to ensure that no additional forces are induced in the gearbox as a result of this support.

In the case of extremely long designs, you will need to contact us.



Code	Description	Unit
z5	For dimensions, see Chapter 7 "Input units"	mm
k1/2	Motor length	mm
m_{mot}	Motor weight force	N
M_{bex}	Prevailing bending moment	

IEC size	71	80	90	100	112	132	160	180	200	225	250	280	315
Permiss. bending moment M_{bperm} Nm	159	159	159	159	441	765	2 289	6 105	6 105	6 010	5 894	18 000	22 000

The prevailing bending moment M_{bex} is calculated as follows:

$$M_{bex} = m_{mot} \cdot \{z5 + (k1/2)\}$$

In the case of applications that involve powerful impacts or vibrations M_{bex} must be multiplied by 2.

The following condition applies here in respect of M_{bex}:

$$M_{bex} < M_{bperm}$$

Selection and ordering data

Gearboxes with K2 input units can be supplied as solo gearboxes or with an IEC standard motor. For possible gearbox ratios, see "Gearbox ratios and maximum torques" in the gearbox sections.

When selecting a solo gearbox configuration, remember to insert an **A** in the **10th position** of the order number, and a **0** in the **11th** to **13th positions**.

Order code:
Input unit K2 **A03**

Size Gearbox	Order No. Gearbox	IEC size, input unit													
		63	71	80	90	100	112	132	160	180	200	225	250	280	315
		Order No. 9th position													
		B	C	D	E	F	G	H	J	K	L	M	N	P	Q
1-stage helical gearbox E															
E38	**2KJ1001 - ■■■■■ - ■■■■**			✓	✓	✓									
E48	**2KJ1002 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓							
E68	**2KJ1003 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓							
E88	**2KJ1004 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓						
E108	**2KJ1005 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓	✓	✓				
E128	**2KJ1006 - ■■■■■ - ■■■■**					✓	✓	✓	✓	✓	✓	✓			
E148	**2KJ1007 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓	✓	
2-stage helical gearbox Z															
Z38	**2KJ1102 - ■■■■■ - ■■■■**			✓	✓	✓									
Z48	**2KJ1103 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓							
Z68	**2KJ1104 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓							
Z88	**2KJ1105 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓						
Z108	**2KJ1106 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓	✓	✓				
Z128	**2KJ1107 - ■■■■■ - ■■■■**					✓	✓	✓	✓	✓	✓	✓			
Z148	**2KJ1108 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓	✓	
Z168	**2KJ1110 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓	✓	
Z188	**2KJ1111 - ■■■■■ - ■■■■**								✓	✓	✓	✓	✓	✓	✓
3-stage helical gearbox D															
D38	**2KJ1202 - ■■■■■ - ■■■■**			✓	✓										
D48	**2KJ1203 - ■■■■■ - ■■■■**			✓	✓	✓									
D68	**2KJ1204 - ■■■■■ - ■■■■**			✓	✓	✓									
D88	**2KJ1205 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓							
D108	**2KJ1206 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓						
D128	**2KJ1207 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓	✓	✓				
D148	**2KJ1208 - ■■■■■ - ■■■■**					✓	✓	✓	✓	✓	✓	✓			
D168	**2KJ1210 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓			
D188	**2KJ1211 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓		

Selection and ordering data (continued)

Size Gearbox	Order No. Gearbox	IEC size, input unit													
		63	71	80	90	100	112	132	160	180	200	225	250	280	315
		Order No. 9th position													
		B	C	D	E	F	G	H	J	K	L	M	N	P	Q
2-stage parallel-shaft gearbox FZ															
FZ38B	2KJ1301 - ■■■■■ - ■■■■			✓	✓	✓									
FZ48B	2KJ1302 - ■■■■■ - ■■■■			✓	✓	✓									
FZ68B	2KJ1303 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							
FZ88B	2KJ1304 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							
FZ108B	2KJ1305 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓						
FZ128B	2KJ1306 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓	✓	✓				
FZ148B	2KJ1307 - ■■■■■ - ■■■■					✓	✓	✓	✓	✓	✓	✓			
FZ168B	2KJ1308 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
FZ188B	2KJ1310 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	✓
FZ208	2KJ1311 - ■■■■■ - ■■■■								✓	✓	✓	✓	✓	✓	✓
3-stage parallel-shaft gearbox FD															
FD38B	2KJ1401 - ■■■■■ - ■■■■			✓	✓	✓									
FD48B	2KJ1402 - ■■■■■ - ■■■■			✓	✓	✓									
FD68B	2KJ1403 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							
FD88B	2KJ1404 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							
FD108B	2KJ1405 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓						
FD128B	2KJ1406 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓	✓	✓				
FD148B	2KJ1407 - ■■■■■ - ■■■■					✓	✓	✓	✓	✓	✓	✓			
FD168B	2KJ1408 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
FD188B	2KJ1410 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
FD208	2KJ1411 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	✓
Bevel helical gearbox B															
B38	2KJ1501 - ■■■■■ - ■■■■			✓	✓	✓									
Bevel helical gearbox K															
K38	2KJ1502 - ■■■■■ - ■■■■			✓	✓	✓									
K48	2KJ1503 - ■■■■■ - ■■■■			✓	✓	✓									
K68	2KJ1504 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							
K88	2KJ1505 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							
K108	2KJ1506 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓						
K128	2KJ1507 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓	✓	✓				
K148	2KJ1508 - ■■■■■ - ■■■■					✓	✓	✓	✓	✓	✓	✓			
K168	2KJ1510 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
K188	2KJ1511 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	✓
Helical worm gearbox C															
C38	2KJ1601 - ■■■■■ - ■■■■			✓	✓	✓									
C48	2KJ1602 - ■■■■■ - ■■■■			✓	✓	✓									
C68	2KJ1603 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							
C88	2KJ1604 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							

Selection and ordering data

Gearboxes with K4 input units can be supplied as solo gearboxes or with an IEC standard motor. For possible gearbox ratios, see "Gearbox ratios and maximum torques" in the gearbox sections.

When selecting a solo gearbox configuration, remember to insert an **A** in the **10th position** of the order number, and a **0** in the **11th** to **13th positions**.

Order code:
Input unit K4 **A04**

Size Gearbox	Order No. Gearbox	IEC size, input unit													
		63	71	80	90	100	112	132	160	180	200	225	250	280	315
		Order No. 9th position													
		B	C	D	E	F	G	H	J	K	L	M	N	P	Q
1-stage helical gearbox E															
E38	**2KJ1001 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓									
E48	**2KJ1002 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓	✓	✓							
E68	**2KJ1003 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓	✓	✓	✓						
E88	**2KJ1004 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓	✓					
E108	**2KJ1005 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓	✓	✓	✓			
E128	**2KJ1006 - ■■■■■ - ■■■■**					✓	✓	✓	✓	✓	✓	✓	✓		
E148	**2KJ1007 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓	✓	
2-stage helical gearbox Z															
Z38	**2KJ1102 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓	✓								
Z48	**2KJ1103 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓	✓	✓							
Z68	**2KJ1104 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓	✓	✓	✓						
Z88	**2KJ1105 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓	✓					
Z108	**2KJ1106 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓	✓	✓	✓			
Z128	**2KJ1107 - ■■■■■ - ■■■■**					✓	✓	✓	✓	✓	✓	✓	✓		
Z148	**2KJ1108 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓	✓	
Z168	**2KJ1110 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓	✓	
Z188	**2KJ1111 - ■■■■■ - ■■■■**								✓	✓	✓	✓	✓	✓	
3-stage helical gearbox D															
D38	**2KJ1202 - ■■■■■ - ■■■■**	✓	✓	✓	✓										
D48	**2KJ1203 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓									
D68	**2KJ1204 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓									
D88	**2KJ1205 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓	✓	✓							
D108	**2KJ1206 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓						
D128	**2KJ1207 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓	✓	✓				
D148	**2KJ1208 - ■■■■■ - ■■■■**					✓	✓	✓	✓	✓	✓	✓			
D168	**2KJ1210 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓			
D188	**2KJ1211 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓	✓	

Selection and ordering data (continued)

Size Gearbox	Order No. Gearbox	IEC size, input unit													
		63	71	80	90	100	112	132	160	180	200	225	250	280	315
		Order No. 9th position													
		B	C	D	E	F	G	H	J	K	L	M	N	P	Q
2-stage parallel-shaft gearbox FZ															
FZ38B	2KJ1301 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓									
FZ48B	2KJ1302 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓								
FZ68B	2KJ1303 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓	✓							
FZ88B	2KJ1304 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓	✓	✓						
FZ108B	2KJ1305 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓	✓					
FZ128B	2KJ1306 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓	✓	✓	✓			
FZ148B	2KJ1307 - ■■■■■ - ■■■■					✓	✓	✓	✓	✓	✓	✓	✓		
FZ168B	2KJ1308 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
FZ188B	2KJ1310 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
FZ208	2KJ1311 - ■■■■■ - ■■■■								✓	✓	✓	✓	✓	✓	
3-stage parallel-shaft gearbox FD															
FD38B	2KJ1401 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓									
FD48B	2KJ1402 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓								
FD68B	2KJ1403 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓	✓							
FD88B	2KJ1404 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓	✓	✓						
FD108B	2KJ1405 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓	✓					
FD128B	2KJ1406 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓	✓	✓	✓			
FD148B	2KJ1407 - ■■■■■ - ■■■■					✓	✓	✓	✓	✓	✓	✓	✓		
FD168B	2KJ1408 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
FD188B	2KJ1410 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
FD208	2KJ1411 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
Bevel helical gearbox B															
B38	2KJ1501 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓									
Bevel helical gearbox K															
K38	2KJ1502 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓								
K48	2KJ1503 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓								
K68	2KJ1504 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓	✓							
K88	2KJ1505 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓	✓	✓						
K108	2KJ1506 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓	✓					
K128	2KJ1507 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓	✓	✓	✓			
K148	2KJ1508 - ■■■■■ - ■■■■					✓	✓	✓	✓	✓	✓	✓	✓		
K168	2KJ1510 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
K188	2KJ1511 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
Helical worm gearbox C															
C38	2KJ1601 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓								
C48	2KJ1602 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓								
C68	2KJ1603 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓	✓							
C88	2KJ1604 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓	✓	✓	✓						

Selection and ordering data

For possible gearbox ratios, see "Gearbox ratios and maximum torques" in the gearbox sections.

Order code:
Input unit KQ **A07**
Input unit KQS **A08**

Size Gearbox	Order No. Gearbox	Size index				
		71.2	80.3	90.4	112.3	132.3
		Order code for size index				
		N61	N62	N63	N62	N62
		Order No. 9th position				
		C	D	E	G	H
1-stage helical gearbox E						
E38	**2KJ1001 - ■■■■■ - ■■■■**	✓	✓	✓		
E48	**2KJ1002 - ■■■■■ - ■■■■**	✓	✓	✓	✓	
E68	**2KJ1003 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓
E88	**2KJ1004 - ■■■■■ - ■■■■**		✓	✓	✓	✓
E108	**2KJ1005 - ■■■■■ - ■■■■**			✓	✓	✓
E128	**2KJ1006 - ■■■■■ - ■■■■**				✓	✓
E148	**2KJ1007 - ■■■■■ - ■■■■**					✓
2-stage helical gearbox Z						
Z28	**2KJ1101 - ■■■■■ - ■■■■**	✓	✓	✓		
Z38	**2KJ1102 - ■■■■■ - ■■■■**	✓	✓	✓		
Z48	**2KJ1103 - ■■■■■ - ■■■■**	✓	✓	✓	✓	
Z68	**2KJ1104 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓
Z88	**2KJ1105 - ■■■■■ - ■■■■**		✓	✓	✓	✓
Z108	**2KJ1106 - ■■■■■ - ■■■■**			✓	✓	✓
Z128	**2KJ1107 - ■■■■■ - ■■■■**				✓	✓
Z148	**2KJ1108 - ■■■■■ - ■■■■**					✓
Z168	**2KJ1110 - ■■■■■ - ■■■■**					✓
Z188	**2KJ1111 - ■■■■■ - ■■■■**					✓
3-stage helical gearbox D						
D28	**2KJ1202 - ■■■■■ - ■■■■**	✓	✓	✓		
D38	**2KJ1202 - ■■■■■ - ■■■■**	✓	✓	✓		
D48	**2KJ1203 - ■■■■■ - ■■■■**	✓	✓	✓		
D68	**2KJ1204 - ■■■■■ - ■■■■**	✓	✓	✓		
D88	**2KJ1205 - ■■■■■ - ■■■■**	✓	✓	✓	✓	✓
D108	**2KJ1206 - ■■■■■ - ■■■■**		✓	✓	✓	✓
D128	**2KJ1207 - ■■■■■ - ■■■■**			✓	✓	✓
D148	**2KJ1208 - ■■■■■ - ■■■■**				✓	✓
D168	**2KJ1210 - ■■■■■ - ■■■■**					✓
D188	**2KJ1211 - ■■■■■ - ■■■■**					✓

Selection and ordering data (continued)

Size Gearbox	Order No. Gearbox	Size index				
		71.2	80.3	90.4	112.3	132.3
		Order code for size index				
		N61	N62	N63	N62	N62
		Order No. 9th position				
		C	D	E	G	H
2-stage parallel-shaft gearbox FZ						
FZ28	2KJ1300 - ■■■■■ - ■■■■	✓	✓	✓		
FZ38B	2KJ1301 - ■■■■■ - ■■■■	✓	✓	✓		
FZ48B	2KJ1302 - ■■■■■ - ■■■■	✓	✓	✓		
FZ68B	2KJ1303 - ■■■■■ - ■■■■	✓	✓	✓	✓	
FZ88B	2KJ1304 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓
FZ108B	2KJ1305 - ■■■■■ - ■■■■		✓	✓	✓	✓
FZ128B	2KJ1306 - ■■■■■ - ■■■■			✓	✓	✓
FZ148B	2KJ1307 - ■■■■■ - ■■■■				✓	✓
FZ168B	2KJ1308 - ■■■■■ - ■■■■					✓
3-stage parallel-shaft gearbox FD						
FD28	2KJ1400 - ■■■■■ - ■■■■	✓	✓	✓		
FD38B	2KJ1401 - ■■■■■ - ■■■■	✓	✓	✓		
FD48B	2KJ1402 - ■■■■■ - ■■■■	✓	✓	✓		
FD68B	2KJ1403 - ■■■■■ - ■■■■	✓	✓	✓	✓	
FD88B	2KJ1404 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓
FD108B	2KJ1405 - ■■■■■ - ■■■■		✓	✓	✓	✓
FD128B	2KJ1406 - ■■■■■ - ■■■■			✓	✓	✓
FD148B	2KJ1407 - ■■■■■ - ■■■■				✓	✓
FD168B	2KJ1408 - ■■■■■ - ■■■■					✓
FD188B	2KJ1410 - ■■■■■ - ■■■■					✓
Bevel helical gearbox B						
B28	2KJ1500 - ■■■■■ - ■■■■	✓	✓	✓		
B38	2KJ1501 - ■■■■■ - ■■■■	✓	✓	✓		
Bevel helical gearbox K						
K38	2KJ1502 - ■■■■■ - ■■■■	✓	✓	✓		
K48	2KJ1503 - ■■■■■ - ■■■■	✓	✓	✓		
K68	2KJ1504 - ■■■■■ - ■■■■	✓	✓	✓	✓	
K88	2KJ1505 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓
K108	2KJ1506 - ■■■■■ - ■■■■		✓	✓	✓	✓
K128	2KJ1507 - ■■■■■ - ■■■■			✓	✓	✓
K148	2KJ1508 - ■■■■■ - ■■■■				✓	✓
K168	2KJ1510 - ■■■■■ - ■■■■					✓
K188	2KJ1511 - ■■■■■ - ■■■■					✓
Helical worm gearbox C						
C38	2KJ1601 - ■■■■■ - ■■■■	✓	✓	✓		
C48	2KJ1602 - ■■■■■ - ■■■■	✓	✓	✓		
C68	2KJ1603 - ■■■■■ - ■■■■	✓	✓	✓	✓	
C88	2KJ1604 - ■■■■■ - ■■■■	✓	✓	✓	✓	✓

Selection and ordering data

For possible gearbox ratios, see "Gearbox ratios and maximum torques" in the gearbox sections.

Order code:
Input unit A **A00**

Size Gearbox	Order No. Gearbox	Size, input unit													
		63	71	80	90	100	112	132	160	180	200	225	250	280	315
		Order No. 9th position													
		B	C	D	E	F	G	H	J	K	L	M	N	P	Q
1-stage helical gearbox E															
E38	**2KJ1001 - ■■■■■ - ■■■■**		✓	✓	✓	✓									
E48	**2KJ1002 - ■■■■■ - ■■■■**		✓	✓	✓	✓	✓								
E68	**2KJ1003 - ■■■■■ - ■■■■**		✓	✓	✓	✓	✓	✓							
E88	**2KJ1004 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓						
E108	**2KJ1005 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓		✓				
E128	**2KJ1006 - ■■■■■ - ■■■■**					✓	✓	✓	✓		✓	✓			
E148	**2KJ1007 - ■■■■■ - ■■■■**							✓	✓		✓	✓	✓	✓	
2-stage helical gearbox Z															
Z38	**2KJ1102 - ■■■■■ - ■■■■**		✓	✓	✓	✓									
Z48	**2KJ1103 - ■■■■■ - ■■■■**		✓	✓	✓	✓	✓								
Z68	**2KJ1104 - ■■■■■ - ■■■■**		✓	✓	✓	✓	✓	✓							
Z88	**2KJ1105 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓						
Z108	**2KJ1106 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓		✓				
Z128	**2KJ1107 - ■■■■■ - ■■■■**					✓	✓	✓	✓		✓	✓			
Z148	**2KJ1108 - ■■■■■ - ■■■■**							✓	✓		✓	✓	✓	✓	
Z168	**2KJ1110 - ■■■■■ - ■■■■**							✓	✓		✓	✓	✓	✓	
Z188	**2KJ1111 - ■■■■■ - ■■■■**								✓		✓	✓	✓	✓	
3-stage helical gearbox D															
D38	**2KJ1202 - ■■■■■ - ■■■■**		✓	✓	✓										
D48	**2KJ1203 - ■■■■■ - ■■■■**		✓	✓	✓	✓									
D68	**2KJ1204 - ■■■■■ - ■■■■**		✓	✓	✓	✓									
D88	**2KJ1205 - ■■■■■ - ■■■■**		✓	✓	✓	✓	✓	✓							
D108	**2KJ1206 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓						
D128	**2KJ1207 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓		✓				
D148	**2KJ1208 - ■■■■■ - ■■■■**					✓	✓	✓	✓		✓	✓			
D168	**2KJ1210 - ■■■■■ - ■■■■**							✓	✓		✓	✓			
D188	**2KJ1211 - ■■■■■ - ■■■■**							✓	✓		✓	✓	✓	✓	

Input unit A

Selection and ordering data (continued)

Size Gearbox	Order No. Gearbox	Size, input unit													
		63	71	80	90	100	112	132	160	180	200	225	250	280	315
		Order No. 9th position													
		B	C	D	E	F	G	H	J	K	L	M	N	P	Q
2-stage parallel-shaft gearbox FZ															
FZ38B	2KJ1301 - ■■■■■ - ■■■■		✓	✓	✓	✓									
FZ48B	2KJ1302 - ■■■■■ - ■■■■		✓	✓	✓	✓									
FZ68B	2KJ1303 - ■■■■■ - ■■■■		✓	✓	✓	✓	✓								
FZ88B	2KJ1304 - ■■■■■ - ■■■■		✓	✓	✓	✓	✓	✓							
FZ108B	2KJ1305 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓						
FZ128B	2KJ1306 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓		✓				
FZ148B	2KJ1307 - ■■■■■ - ■■■■					✓	✓	✓	✓		✓	✓			
FZ168B	2KJ1308 - ■■■■■ - ■■■■							✓	✓		✓	✓	✓	✓	
FZ188B	2KJ1310 - ■■■■■ - ■■■■							✓	✓		✓	✓	✓	✓	
FZ208	2KJ1311 - ■■■■■ - ■■■■								✓		✓	✓	✓	✓	
3-stage parallel-shaft gearbox FD															
FD38B	2KJ1401 - ■■■■■ - ■■■■		✓	✓	✓	✓									
FD48B	2KJ1402 - ■■■■■ - ■■■■		✓	✓	✓	✓									
FD68B	2KJ1403 - ■■■■■ - ■■■■		✓	✓	✓	✓	✓								
FD88B	2KJ1404 - ■■■■■ - ■■■■		✓	✓	✓	✓	✓	✓							
FD108B	2KJ1405 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓						
FD128B	2KJ1406 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓		✓				
FD148B	2KJ1407 - ■■■■■ - ■■■■					✓	✓	✓	✓		✓	✓			
FD168B	2KJ1408 - ■■■■■ - ■■■■							✓	✓		✓	✓	✓	✓	
FD188B	2KJ1410 - ■■■■■ - ■■■■							✓	✓		✓	✓	✓	✓	
FD208	2KJ1411 - ■■■■■ - ■■■■							✓	✓		✓	✓	✓	✓	
Bevel helical gearbox B															
B38	2KJ1501 - ■■■■■ - ■■■■		✓	✓	✓	✓									
Bevel helical gearbox K															
K38	2KJ1502 - ■■■■■ - ■■■■		✓	✓	✓	✓									
K48	2KJ1503 - ■■■■■ - ■■■■		✓	✓	✓	✓									
K68	2KJ1504 - ■■■■■ - ■■■■		✓	✓	✓	✓	✓								
K88	2KJ1505 - ■■■■■ - ■■■■		✓	✓	✓	✓	✓	✓							
K108	2KJ1506 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓						
K128	2KJ1507 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓		✓				
K148	2KJ1508 - ■■■■■ - ■■■■					✓	✓	✓	✓		✓	✓			
K168	2KJ1510 - ■■■■■ - ■■■■							✓	✓		✓	✓	✓	✓	
K188	2KJ1511 - ■■■■■ - ■■■■							✓	✓		✓	✓	✓	✓	
Helical worm gearbox C															
C38	2KJ1601 - ■■■■■ - ■■■■		✓	✓	✓	✓									
C48	2KJ1602 - ■■■■■ - ■■■■		✓	✓	✓	✓									
C68	2KJ1603 - ■■■■■ - ■■■■		✓	✓	✓	✓	✓								
C88	2KJ1604 - ■■■■■ - ■■■■		✓	✓	✓	✓	✓	✓							

Selection and ordering data

For possible gearbox ratios, see "Gearbox ratios and maximum torques" in the gearbox sections.

Order code:
Input unit P **A09**

Size Gearbox	Order No. Gearbox	Size, input unit													
		63	71	80	90	100	112	132	160	180	200	225	250	280	315
		Order No. 9th position													
		B	C	D	E	F	G	H	J	K	L	M	N	P	Q
1-stage helical gearbox E															
E38	**2KJ1001 - ■■■■■ - ■■■■**			✓	✓	✓									
E48	**2KJ1002 - ■■■■■ - ■■■■**			✓	✓	✓	✓								
E68	**2KJ1003 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓							
E88	**2KJ1004 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓						
E108	**2KJ1005 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓	✓	✓				
E128	**2KJ1006 - ■■■■■ - ■■■■**					✓	✓	✓	✓	✓	✓	✓			
E148	**2KJ1007 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓	✓	
2-stage helical gearbox Z															
Z38	**2KJ1102 - ■■■■■ - ■■■■**			✓	✓	✓									
Z48	**2KJ1103 - ■■■■■ - ■■■■**			✓	✓	✓	✓								
Z68	**2KJ1104 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓							
Z88	**2KJ1105 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓						
Z108	**2KJ1106 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓	✓	✓				
Z128	**2KJ1107 - ■■■■■ - ■■■■**					✓	✓	✓	✓	✓	✓	✓			
Z148	**2KJ1108 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓	✓	
Z168	**2KJ1110 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓	✓	
Z188	**2KJ1111 - ■■■■■ - ■■■■**								✓	✓	✓	✓	✓	✓	
3-stage helical gearbox D															
D38	**2KJ1202 - ■■■■■ - ■■■■**			✓	✓										
D48	**2KJ1203 - ■■■■■ - ■■■■**			✓	✓	✓									
D68	**2KJ1204 - ■■■■■ - ■■■■**			✓	✓	✓									
D88	**2KJ1205 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓							
D108	**2KJ1206 - ■■■■■ - ■■■■**			✓	✓	✓	✓	✓	✓						
D128	**2KJ1207 - ■■■■■ - ■■■■**				✓	✓	✓	✓	✓	✓	✓				
D148	**2KJ1208 - ■■■■■ - ■■■■**					✓	✓	✓	✓	✓	✓	✓			
D168	**2KJ1210 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓			
D188	**2KJ1211 - ■■■■■ - ■■■■**							✓	✓	✓	✓	✓	✓	✓	

Input unit P

Selection and ordering data (continued)

Size Gearbox	Order No. Gearbox	Size, input unit													
		63	71	80	90	100	112	132	160	180	200	225	250	280	315
		Order No. 9th position													
		B	C	D	E	F	G	H	J	K	L	M	N	P	Q
2-stage parallel-shaft gearbox FZ															
FZ38B	2KJ1301 - ■■■■■ - ■■■■			✓	✓	✓									
FZ48B	2KJ1302 - ■■■■■ - ■■■■			✓	✓	✓									
FZ68B	2KJ1303 - ■■■■■ - ■■■■			✓	✓	✓	✓								
FZ88B	2KJ1304 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							
FZ108B	2KJ1305 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓						
FZ128B	2KJ1306 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓	✓	✓				
FZ148B	2KJ1307 - ■■■■■ - ■■■■					✓	✓	✓	✓	✓	✓	✓			
FZ168B	2KJ1308 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
FZ188B	2KJ1310 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
3-stage parallel-shaft gearbox FD															
FD38B	2KJ1401 - ■■■■■ - ■■■■			✓	✓	✓									
FD48B	2KJ1402 - ■■■■■ - ■■■■			✓	✓	✓									
FD68B	2KJ1403 - ■■■■■ - ■■■■			✓	✓	✓	✓								
FD88B	2KJ1404 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							
FD108B	2KJ1405 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓						
FD128B	2KJ1406 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓	✓	✓				
FD148B	2KJ1407 - ■■■■■ - ■■■■					✓	✓	✓	✓	✓	✓	✓			
FD168B	2KJ1408 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
FD188B	2KJ1410 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
Bevel helical gearbox B															
B38	2KJ1501 - ■■■■■ - ■■■■			✓	✓	✓									
Bevel helical gearbox K															
K38	2KJ1502 - ■■■■■ - ■■■■			✓	✓	✓									
K48	2KJ1503 - ■■■■■ - ■■■■			✓	✓	✓									
K68	2KJ1504 - ■■■■■ - ■■■■			✓	✓	✓	✓								
K88	2KJ1505 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							
K108	2KJ1506 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓	✓						
K128	2KJ1507 - ■■■■■ - ■■■■				✓	✓	✓	✓	✓	✓	✓				
K148	2KJ1508 - ■■■■■ - ■■■■					✓	✓	✓	✓	✓	✓	✓			
K168	2KJ1510 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
K188	2KJ1511 - ■■■■■ - ■■■■							✓	✓	✓	✓	✓	✓	✓	
Helical worm gearbox C															
C38	2KJ1601 - ■■■■■ - ■■■■			✓	✓	✓									
C48	2KJ1602 - ■■■■■ - ■■■■			✓	✓	✓									
C68	2KJ1603 - ■■■■■ - ■■■■			✓	✓	✓	✓								
C88	2KJ1604 - ■■■■■ - ■■■■			✓	✓	✓	✓	✓							

Input units with backstop K2X, AX, PX

For applications that only require one permissible direction of rotation, input units K2, A and P can be supplied with a backstop feature. In this case, an **X** needs to be added to the input unit code.

The backstops have centrifugal sprags and are suitable for use up to a maximum speed of 3600 rpm.

The backstops have been designed to offer a long service life, provided that they are used at a higher speed than the minimum specified in the table. Once this speed is reached and exceeded, the sprags lift off so that the backstop is not subject to wear and is maintenance-free.

All backstops are integrated into the input units and have no impact on the dimensions.

Note:

It is necessary to specify the desired direction of rotation of the output shaft when ordering a gearbox with backstop. The direction of rotation is determined by front view of the output shaft. See also "Direction of rotation of geared motors", Page 1/43.

With parallel shaft gearboxes, bevel helical gearboxes and helical worm gearboxes, it is again necessary to specify the side on which the output shaft is located, i.e. either "Output side A" or "Output side B". The output side is defined by specifying the mounting position. See also "Mounting types and mounting positions", Pages 3/92, 4/87 and 5/47.

K2, A, P													
IEC size		**71**	**80**	**90**	**100**	**112**	**132**	**160**	**180**	**200**	**225**	**250**	**280**
Minimum speed	[rpm]	890	820	820	750	750	670	670	610	610	610	610	400
Max. backstop starting torque	[Nm]	12.3	12.3	25	49	66	151	247	305	494	741	906	1 482

Gearbox	Size	Gear stages	View in relation to the output shaft	Output shaft direction of rotation	Input shaft direction of rotation
Z	38 ... 188	2	Facing output shaft	Clockwise	Clockwise
Z	38 ... 188	2	Facing output shaft	Counterclockwise	Counterclockwise
D	38 ... 188	3	Facing output shaft	Clockwise	Counterclockwise
D	38 ... 188	3	Facing output shaft	Counterclockwise	Clockwise
FZ	38 ... 188B	2	Facing drive end of output shaft	Clockwise	Clockwise
FZ	38 ... 188B	2	Facing drive end of output shaft	Counterclockwise	Counterclockwise
FD	38 ... 188B	3	Facing drive end of output shaft	Clockwise	Counterclockwise
FD	38 ... 188B	3	Facing drive end of output shaft	Counterclockwise	Clockwise
C	38 ... 88	2	Facing drive end of output shaft	Clockwise	Clockwise
C	38 ... 88	2	Facing drive end of output shaft	Counterclockwise	Counterclockwise
B	28 ... 38	2	Facing drive end of output shaft	Clockwise	Clockwise
B	28 ... 38	2	Facing drive end of output shaft	Counterclockwise	Counterclockwise
K	38 ... 88	3	Facing drive end of output shaft	Clockwise	Counterclockwise
K	38 ... 88	3	Facing drive end of output shaft	Counterclockwise	Clockwise
K	108 ... 188	3	Facing drive end of output shaft	Clockwise	Clockwise
K	108 ... 188	3	Facing drive end of output shaft	Counterclockwise	Counterclockwise
K	38 ... 188	3	Facing non-drive end of output shaft	Clockwise	Counterclockwise
K	38 ... 188	3	Facing non-drive end of output shaft	Counterclockwise	Clockwise

Input units with backstop K2X, AX, PX (continued)

Example:

K 108 - 188

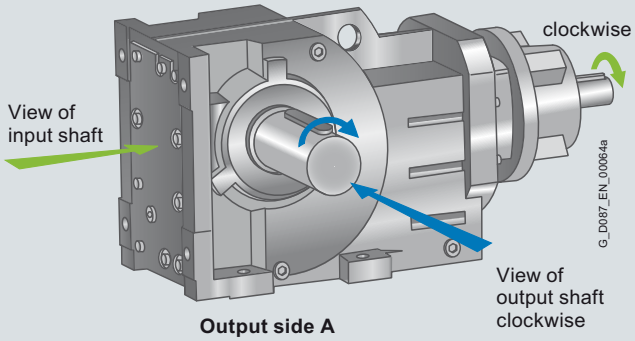
Facing drive end of output shaft

Output shaft direction of rotation = clockwise

Input shaft direction of rotation = clockwise

Additional order codes:
Backstop (X) **A15**

Output shaft direction of rotation:
Clockwise **K18**
Counterclockwise **K19**



Friction clutch

Gearboxes and geared motors with a K2 input unit can be fitted with a friction clutch as an option. The friction clutch creates a friction-locked connection between the motor output shaft and the gearbox input shaft until a set torque value is achieved. Once this torque is exceeded the clutch will slip.
Friction clutches are used when there is a risk of the geared motor sustaining damage as a result of stalling.

A torque setting can be specified in plain text for the friction clutch.

Order code:
Friction clutch **A17**
Set torque **Y00**
Plain text: **Y00*RKD(a) ....***

Example: required torque 125 Nm

Plain text: Y00*RKD(a)125*

Speed monitoring

For monitoring speed deviations, a speed monitor can be used in coupling lantern K2 together with a friction clutch (order code **A17**).

The complete speed monitor system consists of proximity switch and speed monitor. The proximity switch operates contact-free according to the sampling method and emits one signal per coupling rotation which is evaluated by the speed monitor.

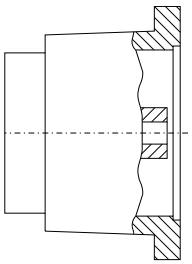
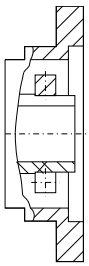
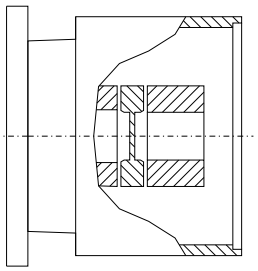
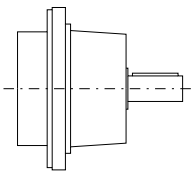
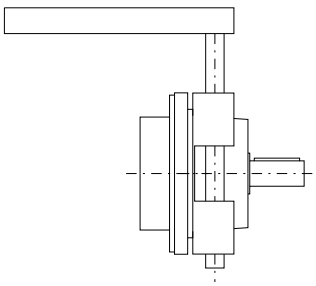
The signal sequence sent by the proximity switch is compared in the speed monitor with the set setpoint speed. If the speed is below or above the configured setpoint speed, a relay is actuated (depending on the function setting) via an output stage.

Both components can also be obtained separately.

Order code:

Proximity switch **A18**
Speed monitor **A19**

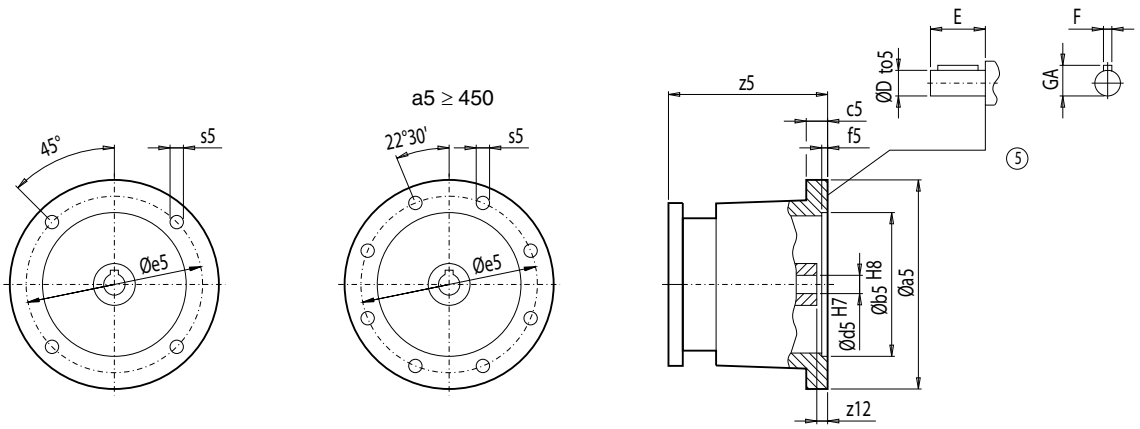
Dimension drawing overview

Representation	Input unit	Dimension drawing on page
	K2	7/20
	K4	7/23
	KQ and KQS	7/28
	A	7/30
	P	7/33

Input units

Dimensions

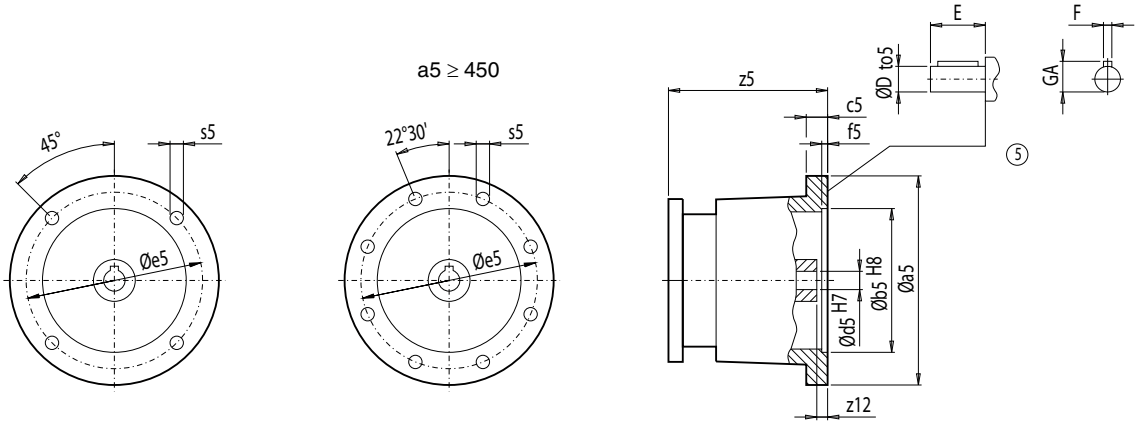
Input unit K2



Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	c5	f5	e5	s5	z12	d5 D	to5	E	GA	F	z5
–	–	B38	38B	-K2	(80)	200	130	17	4.5	165	M10	15	19	k6	40	21.5	6	176.0
					(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	176.0
					(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	198.5
38	–	38 48	48B	-K2	(80)	200	130	17	4.5	165	M10	15	19	k6	40	21.5	6	201.0
					(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	201.0
					(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	223.5
–	38	–	–	-K2	(80)	200	130	17	4.5	165	M10	15	19	k6	40	21.5	6	216.0
					(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	216.0
48	–	68	68B	-K2	(80)	200	130	17	4.5	165	M10	15	19	k6	40	21.5	6	195.5
					(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	195.5
					(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	218.0
					(112)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	217.0
					(132)	300	230	19	5.0	265	M12	45	38	k6	80	41.0	10	280.0
–	48	–	–	-K2	(80)	200	130	17	4.5	165	M10	15	19	k6	40	21.5	6	212.5
					(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	212.5
					(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	235.0
68	–	88	88B	-K2	(80)	200	130	17	4.5	165	M10	15	19	k6	40	21.5	6	189.5
					(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	189.5
					(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	212.0
					(112)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	209.0
					(132)	300	230	19	5.0	265	M12	45	38	k6	80	41.0	10	270.5
–	68	–	–	-K2	(80)	200	130	17	4.5	165	M10	15	19	k6	40	21.5	6	208.0
					(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	208.0
					(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	230.5
88	–	108	108B	-K2	(80)	200	130	17	4.5	165	M10	15	19	k6	40	21.5	6	174.5
					(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	174.5
					(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	194.5
					(112)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	190.5
					(132)	300	230	19	5.0	265	M12	45	38	k6	80	41.0	10	252.0
					(160)	350	250	30	6.0	300	M16	66	42	k6	110	45.0	12	318.5
–	88	–	–	-K2	(80)	200	130	17	4.5	165	M10	15	19	k6	40	21.5	6	199.5
					(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	199.5
					(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	222.0
					(112)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	219.5
					(132)	300	230	19	5.0	265	M12	45	38	k6	80	41.0	10	280.0

⑤ Feather key / keyway DIN 6885

Input unit K2 (continued)

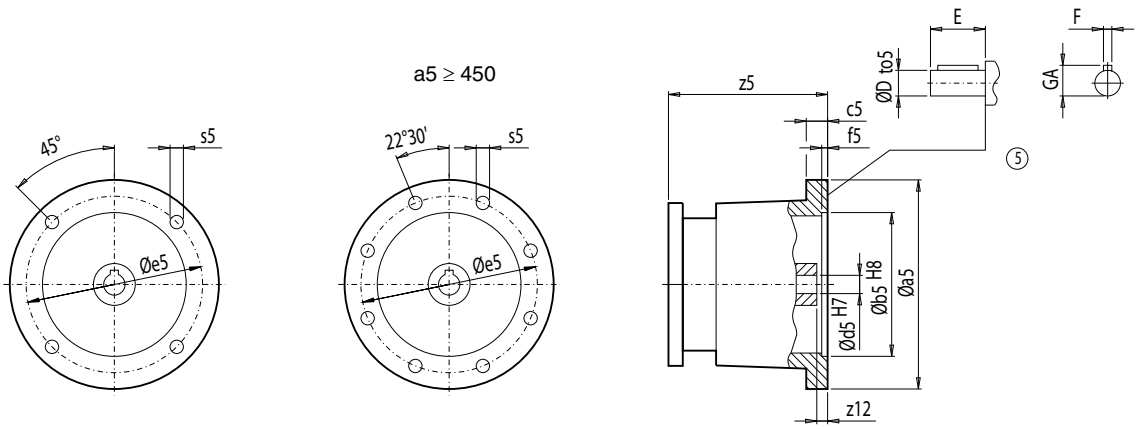


Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	c5	f5	e5	s5	z12	d5 D	to5	E	GA	F	z5
108	–	128	128B	-K2	(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	163.0
					(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	182.5
					(112)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	179.0
					(132)	300	230	19	5.0	265	M12	45	38	k6	80	41.0	10	239.5
					(160)	350	250	30	6.0	300	M16	66	42	k6	110	45.0	12	307.0
					(180)	350	250	25	6.0	300	M16	59	48	k6	110	51.5	14	357.5
					(200)	400	300	25	6.0	350	M16	60	55	m6	110	59.0	16	358.5
–	108	–	–	-K2	(80)	200	130	17	4.5	165	M10	15	19	k6	40	21.5	6	193.5
					(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	193.5
					(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	216.0
					(112)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	210.5
					(132)	300	230	19	5.0	265	M12	45	38	k6	80	41.0	10	272.0
					(160)	350	250	30	6.0	300	M16	66	42	k6	110	45.0	12	336.5
128	–	148	148B	-K2	(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	173.0
					(112)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	168.5
					(132)	300	230	19	5.0	265	M12	45	38	k6	80	41.0	10	229.0
					(160)	350	250	30	6.0	300	M16	66	42	k6	110	45.0	12	290.5
					(180)	350	250	25	6.0	300	M16	59	48	k6	110	51.5	14	344.0
					(200)	400	300	25	6.0	350	M16	60	55	m6	110	59.0	16	345.0
					(225)	450	350	27	6.0	400	M16	90	60	m6	140	64.0	18	428.5
–	128	–	–	-K2	(90)	200	130	17	4.5	165	M10	26	24	k6	50	27.0	8	186.5
					(100)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	209.0
					(112)	250	180	19	5.0	215	M12	30	28	k6	60	31.0	8	202.5
					(132)	300	230	19	5.0	265	M12	45	38	k6	80	41.0	10	263.0
					(160)	350	250	30	6.0	300	M16	66	42	k6	110	45.0	12	327.5
					(180)	350	250	25	6.0	300	M16	59	48	k6	110	51.5	14	381.0
					(200)	400	300	25	6.0	350	M16	60	55	m6	110	59.0	16	382.0
148	–	168	168B	-K2	(132)	300	230	19	5.0	265	M12	45	38	k6	80	41.0	10	221.0
					(160)	350	250	30	6.0	300	M16	66	42	k6	110	45.0	12	283.0
					(180)	350	250	25	6.0	300	M16	59	48	k6	110	51.5	14	336.5
					(200)	400	300	25	6.0	350	M16	60	55	m6	110	59.0	16	337.5
					(225)	450	350	27	6.0	400	M16	90	60	m6	140	64.0	18	421.0
					(250)	550	450	27	6.0	500	M16	75	65	m6	140	69.0	18	425.5
					(280)	550	450	27	7.0	500	M16	51	75	m6	140	79.5	18	469.0

⑤ Feather key / keyway DIN 6885

Dimensions

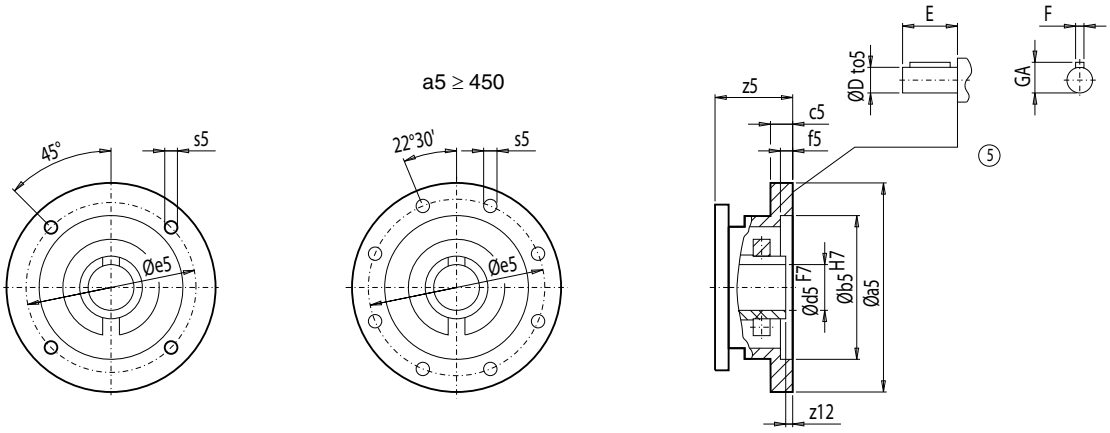
Input unit K2 (continued)



Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	c5	f5	e5	s5	z12	d5 D	to5	E	GA	F	z5
–	148	–	–	-K2	(100)	250	180	19	5	215	M12	30	28	k6	60	31.0	8	204.0
					(112)	250	180	19	5	215	M12	30	28	k6	60	31.0	8	199.5
					(132)	300	230	19	5	265	M12	45	38	k6	80	41.0	10	259.0
					(160)	350	250	30	6	300	M16	66	42	k6	110	45.0	12	321.0
					(180)	350	250	25	6	300	M16	59	48	k6	110	51.5	14	374.5
					(200)	400	300	25	6	350	M16	60	55	m6	110	59.0	16	375.5
					(225)	450	350	27	6	400	M16	90	60	m6	140	64.0	18	459.0
168	–	188	188B 208	-K2	(132)	300	230	19	5	265	M12	45	38	k6	80	41.0	10	206.5
					(160)	350	250	30	6	300	M16	66	42	k6	110	45.0	12	268.5
					(180)	350	250	25	6	300	M16	59	48	k6	110	51.5	14	322.0
					(200)	400	300	25	6	350	M16	60	55	m6	110	59.0	16	323.0
					(225)	450	350	27	6	400	M16	90	60	m6	140	64.0	18	406.5
					(250)	550	450	27	6	500	M16	75	65	m6	140	69.0	18	411.0
					(280)	550	450	27	7	500	M16	51	75	m6	140	79.5	18	469.0
					(315) *)	660	550	32	8	600	M20	33	80	m6	170	85.0	22	299.0
–	168	–	–	-K2	(132)	300	230	19	5	265	M12	45	38	k6	80	41.0	10	247.5
					(160)	350	250	30	6	300	M16	66	42	k6	110	45.0	12	309.5
					(180)	350	250	25	6	300	M16	59	48	k6	110	51.5	14	363.0
					(200)	400	300	25	6	350	M16	60	55	m6	110	59.0	16	364.0
					(225)	450	350	27	6	400	M16	90	60	m6	140	64.0	18	447.5
188	–	–	–	-K2	(160)	350	250	30	6	300	M16	66	42	k6	110	45.0	12	268.5
					(180)	350	250	25	6	300	M16	59	48	k6	110	51.5	14	322.0
					(200)	400	300	25	6	350	M16	60	55	m6	110	59.0	16	323.0
					(225)	450	350	27	6	400	M16	90	60	m6	140	64.0	18	406.5
					(250)	550	450	27	6	500	M16	75	65	m6	140	69.0	18	411.0
					(280)	550	450	27	7	500	M16	51	75	m6	140	79.5	18	469.0
					(315)	660	550	32	8	600	M20	33	80	m6	170	85.0	22	299.0
–	188	–	–	-K2	(132)	300	230	19	5	265	M12	45	38	k6	80	41.0	10	206.5
					(160)	350	250	30	6	300	M16	66	42	k6	110	45.0	12	268.5
					(180)	350	250	25	6	300	M16	59	48	k6	110	51.5	14	322.0
					(200)	400	300	25	6	350	M16	60	55	m6	110	59.0	16	323.0
					(225)	450	350	27	6	400	M16	90	60	m6	140	64.0	18	406.5
					(250)	550	450	27	6	500	M16	75	65	m6	140	69.0	18	411.0
					(280)	550	450	27	7	500	M16	51	75	m6	140	79.5	18	469.0

⑤ Feather key / keyway DIN 6885 *) Not possible in conjunction with Z.168

Input unit K4



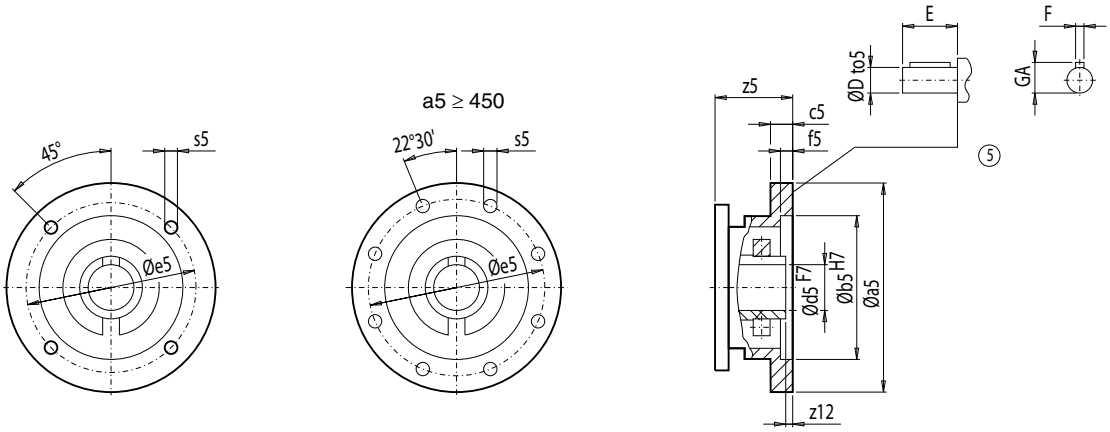
Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	c5	f5	e5	s5	z12	d5 D	to5	E	GA	F	z5
–	–	B38	38B	-K4	(63)	140	95	10.0	4.5	115	M8x17	4.0	11	k6	23	12.5	4	48.5
					(71)	160	110	10.0	4.5	130	M8x17	4.0	14	k6	30	16.0	5	45.0
					(80)	200	130	15.5	4.5	165	M10	15.5	19	k6	40	21.5	6	69.0
					(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	69.0
					(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	76.5
38	–	38 48	48B	-K4	(63)	140	95	10.0	4.5	115	M8x17	4.0	11	k6	23	12.5	4	73.5
					(71)	160	110	10.0	4.5	130	M8x17	4.0	14	k6	30	16.0	5	70.0
					(80)	200	130	15.5	4.5	165	M10	15.5	19	k6	40	21.5	6	94.0
					(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	94.0
					(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	101.5
					(112)	250	180	20.0	5.0	215	M12	7.0	28	k6	60	31.0	8	110.5
–	38	–	–	-K4	(63)	140	95	10.0	4.5	115	M8x17	4.0	11	k6	23	12.5	4	88.5
					(71)	160	110	10.0	4.5	130	M8x17	4.0	14	k6	30	16.0	5	85.0
					(80)	200	130	15.5	4.5	165	M10	15.5	19	k6	40	21.5	6	109.0
					(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	109.0
48	–	68	68B	-K4	(63)	140	95	10.0	4.5	115	M8x17	4.0	11	k6	23	12.5	4	68.0
					(71)	160	110	10.0	4.5	130	M8x17	4.0	14	k6	30	16.0	5	64.5
					(80)	200	130	15.5	4.5	165	M10	15.5	19	k6	40	21.5	6	88.5
					(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	88.5
					(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	96.0
					(112)	250	180	19.0	5.0	215	M12	7.0	28	k6	60	31.0	8	104.5
					(132)	300	230	20.0	5.0	265	M12	22.0	38	k6	80	41.0	10	147.5
–	48	–	–	-K4	(63)	140	95	10.0	4.5	115	M8x17	4.0	11	k6	23	12.5	4	85.0
					(71)	160	110	10.0	4.5	130	M8x17	4.0	14	k6	30	16.0	5	81.5
					(80)	200	130	15.5	4.5	165	M10	15.5	19	k6	40	21.5	6	105.5
					(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	105.5
					(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	113.0

⑤ Feather key / keyway DIN 6885

Input units

Dimensions

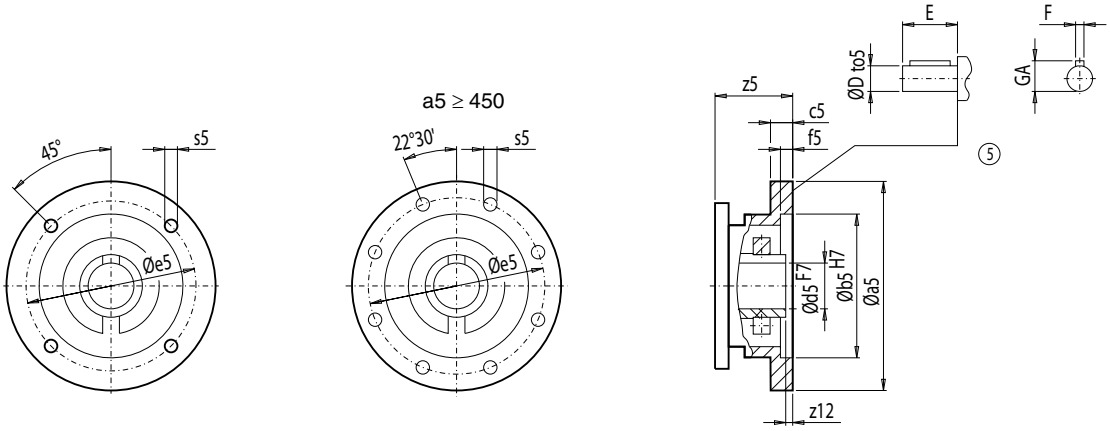
Input unit K4 (continued)



Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	c5	f5	e5	s5	z12	d5 D	to5	E	GA	F	z5
68	–	88	88B	-K4	(63)	140	95	10.0	4.5	115	M8x17	4.0	11	k6	23	12.5	4	62.0
					(71)	160	110	10.0	4.5	130	M8x17	4.0	14	k6	30	16.0	5	58.5
					(80)	200	130	15.5	4.5	165	M10	15.5	19	k6	40	21.5	6	82.5
					(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	82.5
					(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	90.0
					(112)	250	180	19.0	5.0	215	M12	7.0	28	k6	60	31.0	8	96.5
					(132)	300	230	19.0	5.0	265	M12	22.0	38	k6	80	41.0	10	137.5
					(160)	350	250	26.0	6.0	300	M16	20.0	42	k6	110	45.0	12	178.5
–	68	–	–	-K4	(63)	140	95	10.0	4.5	115	M8x17	4.0	11	k6	23	12.5	4	80.5
					(71)	160	110	10.0	4.5	130	M8x17	4.0	14	k6	30	16.0	5	77.0
					(80)	200	130	15.5	4.5	165	M10	15.5	19	k6	40	21.5	6	101.0
					(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	101.0
					(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	108.5
88	–	108	108B	-K4	(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	67.5
					(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	72.5
					(112)	250	180	19.0	5.0	215	M12	7.0	28	k6	60	31.0	8	78.0
					(132)	300	230	19.0	5.0	265	M12	22.0	38	k6	80	41.0	10	119.0
					(160)	350	250	26.0	6.0	300	M16	20.0	42	k6	110	45.0	12	162.0
					(180)	350	250	26.0	6.0	300	M16x22	21.0	48	k6	110	51.5	14	179.0
–	88	–	–	-K4	(63)	140	95	10.0	4.5	115	M8x17	4.0	11	k6	23	12.5	4	72.0
					(71)	160	110	10.0	4.5	130	M8x17	4.0	14	k6	30	16.0	5	68.5
					(80)	200	130	15.5	4.5	165	M10	15.5	19	k6	40	21.5	6	92.5
					(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	92.5
					(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	100.0
					(112)	250	180	19.0	5.0	215	M12	7.0	28	k6	60	31.0	8	107.0
					(132)	300	230	19.0	5.0	265	M12	22.0	38	k6	80	41.0	10	147.0
108	–	128	128B	-K4	(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	56.0
					(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	60.5
					(112)	250	180	19.0	5.0	215	M12	7.0	28	k6	60	31.0	8	66.5
					(132)	300	230	19.0	5.0	265	M12	22.0	38	k6	80	41.0	10	106.5
					(160)	350	250	25.0	6.0	300	M16	20.0	42	k6	110	45.0	12	150.5
					(180)	350	250	15.5	6.0	300	M16x22	21.0	48	k6	110	51.5	14	164.0
					(200)	400	300	25.0	6.0	350	M16	30.0	55	m6	110	59.0	16	174.0
					(225)	450	350	27.0	6.0	400	M16	30.0	60	m6	140	64.0	18	247.0

⑤ Feather key / keyway DIN 6885

Input unit K4 (continued)

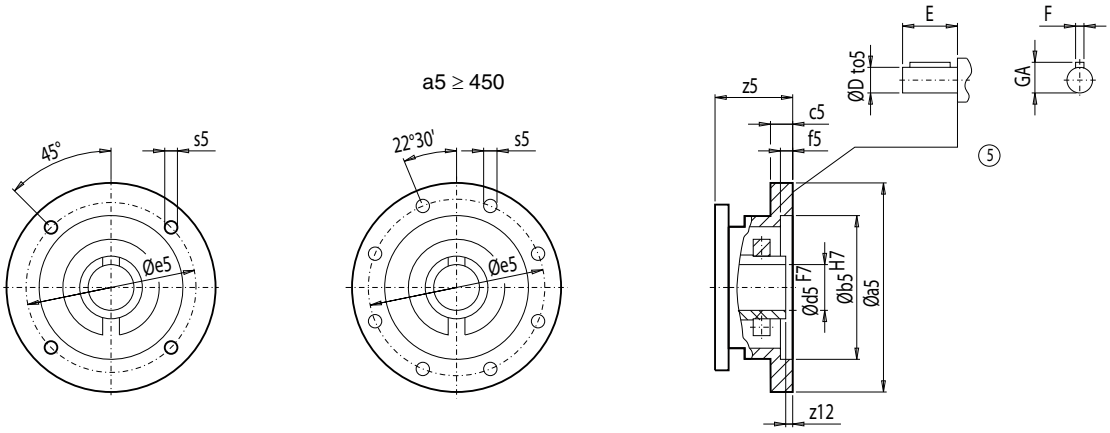


Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	c5	f5	e5	s5	z12	d5 D	to5	E	GA	F	z5
–	108	–	–	-K4	(80)	200	130	15.5	4.5	165	M10	15.5	19	k6	40	21.5	6	86.5
					(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	86.5
					(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	94.0
					(112)	250	180	19.0	5.0	215	M12	7.0	28	k6	60	31.0	8	98.0
					(132)	300	230	19.0	5.0	265	M12	22.0	38	k6	80	41.0	10	139.0
					(160)	350	250	25.0	6.0	300	M16	20.0	42	k6	110	45.0	12	180.0
128	–	148	148B	-K4	(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	51.0
					(112)	250	180	19.0	5.0	215	M12	7.0	28	k6	60	31.0	8	56.0
					(132)	300	230	19.0	5.0	265	M12	22.0	38	k6	80	41.0	10	96.0
					(160)	350	250	25.0	6.0	300	M16	20.0	42	k6	110	45.0	12	134.0
					(180)	350	250	15.5	6.0	300	M16x22	21.0	48	k6	110	51.5	14	150.5
					(200)	400	300	25.0	6.0	350	M16	30.0	55	m6	110	59.0	16	160.5
					(225)	450	350	27.0	6.0	400	M16	30.0	60	m6	140	64.0	18	233.0
					(250)	550	450	27.0	6.0	500	M16	30.0	65	m6	140	69.0	18	233.0
–	128	–	–	-K4	(90)	200	130	15.5	4.5	165	M10	15.5	24	k6	50	27.0	8	79.5
					(100)	250	180	20.5	5.0	215	M12	7.0	28	k6	60	31.0	8	87.0
					(112)	250	180	19.0	5.0	215	M12	7.0	28	k6	60	31.0	8	90.0
					(132)	300	230	19.0	5.0	265	M12	22.0	38	k6	80	41.0	10	130.0
					(160)	350	250	25.0	6.0	300	M16	20.0	42	k6	110	45.0	12	171.0
					(180)	350	250	15.5	6.0	300	M16x22	21.0	48	k6	110	51.5	14	187.5
					(200)	400	300	25.0	6.0	350	M16	30.0	55	m6	110	59.0	16	197.5
148	–	168	168B	-K4	(132)	300	230	19.0	5.0	265	M12	22.0	38	k6	80	41.0	10	88.0
					(160)	350	250	25.0	6.0	300	M16	20.0	42	k6	110	45.0	12	126.5
					(180)	350	250	15.5	6.0	300	M16x22	21.0	48	k6	110	51.5	14	143.0
					(200)	400	300	25.0	6.0	350	M16	30.0	55	m6	110	59.0	16	153.0
					(225)	450	350	27.0	6.0	400	M16	30.0	60	m6	140	64.0	18	225.5
					(250)	550	450	27.0	6.0	500	M16	30.0	65	m6	140	69.0	18	225.0
					(280)	550	450	27.0	6.0	500	M16	30.0	75	m6	140	79.5	20	238.0

⑤ Feather key / keyway DIN 6885

Dimensions

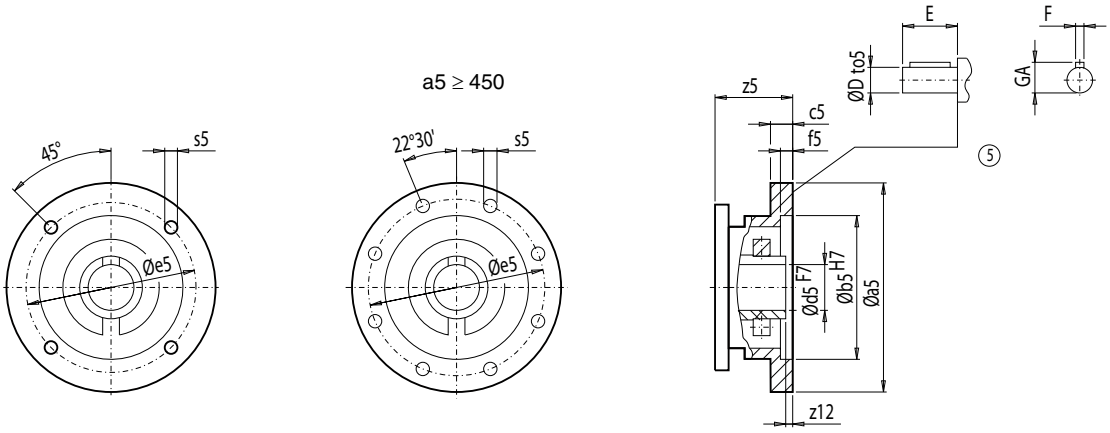
Input unit K4 (continued)



Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	c5	f5	e5	s5	z12	d5 D	to5	E	GA	F	z5
–	148	–	–	-K4	(100)	250	180	20.5	5	215	M12	7	28	k6	60	31.0	8	82.0
					(112)	250	180	19.0	5	215	M12	7	28	k6	60	31.0	8	87.0
					(132)	300	230	19.0	5	265	M12	22	38	k6	80	41.0	10	126.0
					(160)	350	250	25.0	6	300	M16	20	42	k6	110	45.0	12	164.5
					(180)	350	250	15.5	6	300	M16x22	21	48	k6	110	51.5	14	181.0
					(200)	400	300	25.0	6	350	M16	30	55	m6	110	59.0	16	191.0
					(225)	450	350	27.0	6	400	M16	30	60	m6	140	64.0	18	263.5
168	–	188	188B 208	-K4	(132)	300	230	19.0	5	265	M12	22	38	k6	80	41.0	10	73.5
					(160)	350	250	25.0	6	300	M16	20	42	k6	110	45.0	12	112.0
					(180)	350	250	15.5	6	300	M16x22	21	48	k6	110	51.5	14	128.5
					(200)	400	300	25.0	6	350	M16	30	55	m6	110	59.0	16	138.5
					(225)	450	350	27.0	6	400	M16	30	60	m6	140	64.0	18	211.0
					(250)	550	450	27.0	6	500	M16	30	65	m6	140	69.0	18	210.5
					(280)	550	450	27.0	6	500	M16	30	75	m6	140	79.5	20	223.5
–	168	–	–	-K4	(132)	300	230	19.0	5	265	M12	22	38	k6	80	41.0	10	114.5
					(160)	350	250	25.0	6	300	M16	20	42	k6	110	45.0	12	153.0
					(180)	350	250	15.5	6	300	M16x22	21	48	k6	110	51.5	14	169.5
					(200)	400	300	25.0	6	350	M16	30	55	m6	110	59.0	16	179.5
					(225)	450	350	27.0	6	400	M16	30	60	m6	140	64.0	18	252.0
188	–	–	–	-K4	(160)	350	250	25.0	6	300	M16	20	42	k6	110	45.0	12	112.0
					(180)	350	250	15.5	6	300	M16x22	21	48	k6	110	51.5	14	128.5
					(200)	400	300	25.0	6	350	M16	30	55	m6	110	59.0	16	138.5
					(225)	450	350	27.0	6	400	M16	30	60	m6	140	64.0	18	211.0
					(250)	550	450	27.0	6	500	M16	30	65	m6	140	69.0	18	210.5
					(280)	550	450	27.0	6	500	M16	30	75	m6	140	79.5	20	223.5

⑤ Feather key / keyway DIN 6885

Input unit K4 (continued)



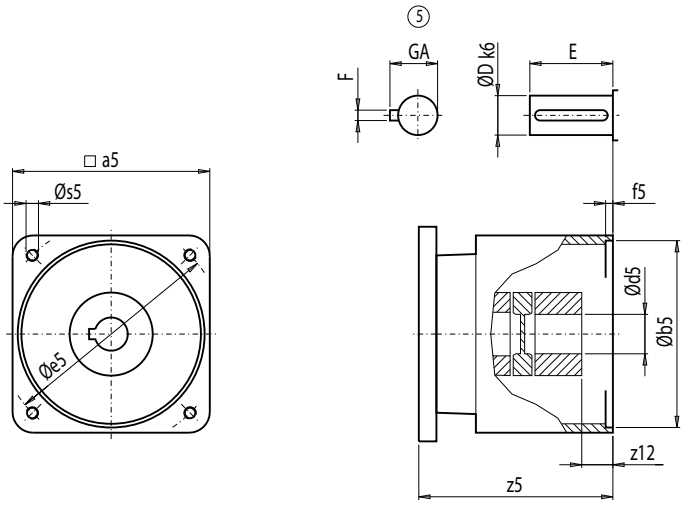
Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	c5	f5	e5	s5	z12	d5 D	to5	E	GA	F	z5
–	188	–	–	-K4	(132)	300	230	19.0	5	265	M12	22	38	k6	80	41.0	10	73.5
					(160)	350	250	25.0	6	300	M16	20	42	k6	110	45.0	12	112.0
					(180)	350	250	15.5	6	300	M16x22	21	48	k6	110	51.5	14	128.5
					(200)	400	300	25.0	6	350	M16	30	55	m6	110	59.0	16	138.5
					(225)	450	350	27.0	6	400	M16	30	60	m6	140	64.0	18	211.0
					(250)	550	450	27.0	6	500	M16	30	65	m6	140	69.0	18	210.5
					(280)	550	450	27.0	6	500	M16	30	75	m6	140	79.5	20	223.5
168	–	188	188B 208	-K4	(132)	300	230	19.0	5	265	M12	22	38	k6	80	41.0	10	73.5
					(160)	350	250	25.0	6	300	M16	20	42	k6	110	45.0	12	112.0
					(180)	350	250	15.5	6	300	M16x22	21	48	k6	110	51.5	14	128.5
					(200)	400	300	25.0	6	350	M16	30	55	m6	110	59.0	16	138.5
					(225)	450	350	27.0	6	400	M16	30	60	m6	140	64.0	18	211.0
					(250)	550	450	27.0	6	500	M16	30	65	m6	140	69.0	18	210.5
					(280)	550	450	27.0	6	500	M16	30	75	m6	140	79.5	20	223.5
–	168	–	–	-K4	(132)	300	230	19.0	5	265	M12	22	38	k6	80	41.0	10	114.5
					(160)	350	250	25.0	6	300	M16	20	42	k6	110	45.0	12	153.0
					(180)	350	250	15.5	6	300	M16x22	21	48	k6	110	51.5	14	169.5
					(200)	400	300	25.0	6	350	M16	30	55	m6	110	59.0	16	179.5
					(225)	450	350	27.0	6	400	M16	30	60	m6	140	64.0	18	252.0
188	–	–	–	-K4	(160)	350	250	25.0	6	300	M16	20	42	k6	110	45.0	12	112.0
					(180)	350	250	15.5	6	300	M16x22	21	48	k6	110	51.5	14	128.5
					(200)	400	300	25.0	6	350	M16	30	55	m6	110	59.0	16	138.5
					(225)	450	350	27.0	6	400	M16	30	60	m6	140	64.0	18	211.0
					(250)	550	450	27.0	6	500	M16	30	65	m6	140	69.0	18	210.5
					(280)	550	450	27.0	6	500	M16	30	75	m6	140	79.5	20	223.5
–	188	–	–	-K4	(132)	300	230	19.0	5	265	M12	22	38	k6	80	41.0	10	73.5
					(160)	350	250	25.0	6	300	M16	20	42	k6	110	45.0	12	112.0
					(180)	350	250	15.5	6	300	M16x22	21	48	k6	110	51.5	14	128.5
					(200)	400	300	25.0	6	350	M16	30	55	m6	110	59.0	16	138.5
					(225)	450	350	27.0	6	400	M16	30	60	m6	140	64.0	18	211.0
					(250)	550	450	27.0	6	500	M16	30	65	m6	140	69.0	18	210.5
					(280)	550	450	27.0	6	500	M16	30	75	m6	140	79.5	20	223.5

⑤ Feather key / keyway DIN 6885

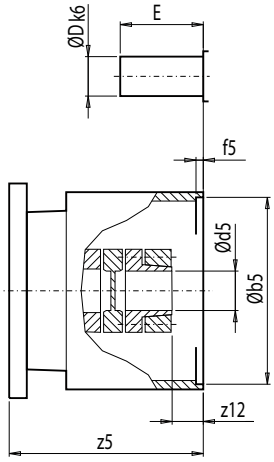
Dimensions

Input units KQ and KQS

KQ (keyway)



KQS (clamping ring hub / clamping collar hub)

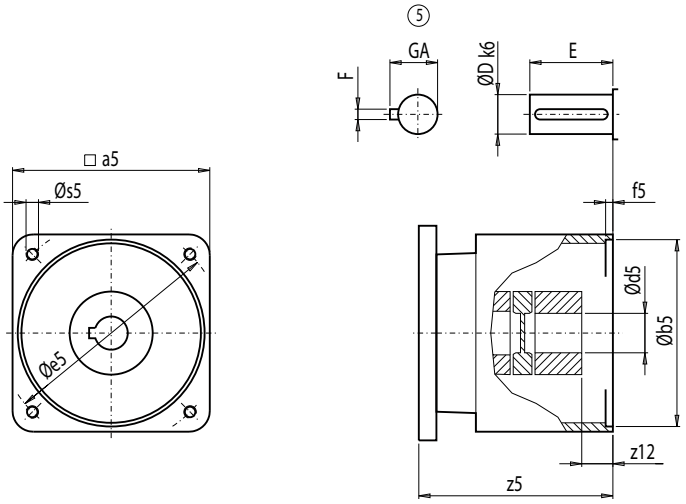


Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	f5	e5	s5	z12	d5 D	E	GA	F	z5
Z28	28	B28	28	-KQ -KQS	(71.2)	82	60	5	75	M5	19	14	30	16.0	5	102.5
					(80.3)	100	80	5	100	M6	15	19	40	21.5	6	145.5
					(90.4)	115	110	7	130	M8	15	24	50	27.0	8	160.5
–	–	B38	38B	-KQ -KQS	(71.2)	82	60	5	75	M5	19	14	30	16.0	5	69.0
					(80.3)	100	80	5	100	M6	15	19	40	21.5	6	112.0
					(90.4)	115	110	7	130	M8	15	24	50	27.0	8	127.0
38	–	38 48	48B	-KQ -KQS	(71.2)	82	60	5	75	M5	19	14	30	16.0	5	94.0
					(80.3)	100	80	5	100	M6	15	19	40	21.5	6	137.0
					(90.4)	115	110	7	130	M8	15	24	50	27.0	8	152.0
–	38	–	–	-KQ -KQS	(71.2)	82	60	5	75	M5	19	14	30	16.0	5	109.0
					(80.3)	100	80	5	100	M6	15	19	40	21.5	6	152.0
					(90.4)	115	110	7	130	M8	15	24	50	27.0	8	167.0
48	–	68	68B	-KQ -KQS	(71.2)	82	60	5	75	M5	19	14	30	16.0	5	88.5
					(80.3)	100	80	5	100	M6	15	19	40	21.5	6	131.5
					(90.4)	115	110	7	130	M8	15	24	50	27.0	8	146.5
					(112.3)	140	130	5	165	M10	25	32	60	35.0	10	183.0
–	48	–	–	-KQ -KQS	(71.2)	82	60	5	75	M5	19	14	30	16.0	5	105.5
					(80.3)	100	80	5	100	M6	15	19	40	21.5	6	148.5
					(90.4)	115	110	7	130	M8	15	24	50	27.0	8	163.5
68	–	88	88B	-KQ -KQS	(71.2)	82	60	5	75	M5	19	14	30	16.0	5	82.5
					(80.3)	100	80	5	100	M6	15	19	40	21.5	6	125.5
					(90.4)	115	110	7	130	M8	15	24	50	27.0	8	140.5
					(112.3)	140	130	5	165	M10	25	32	60	35.0	10	175.0
					(132.3)	190	180	7	215	M12	30	38	80	41.0	10	224.5
–	68	–	–	-KQ -KQS	(71.2)	82	60	5	75	M5	19	14	30	16.0	5	101.0
					(80.3)	100	80	5	100	M6	15	19	40	21.5	6	144.0
					(90.4)	115	110	7	130	M8	15	24	50	27.0	8	159.0

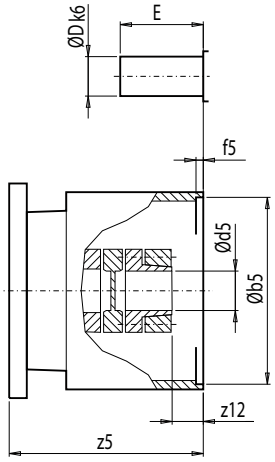
⑤ Feather key / keyway DIN 6885

Input units KQ and KQS (continued)

KQ (keyway)



KQS (clamping ring hub / clamping collar hub)



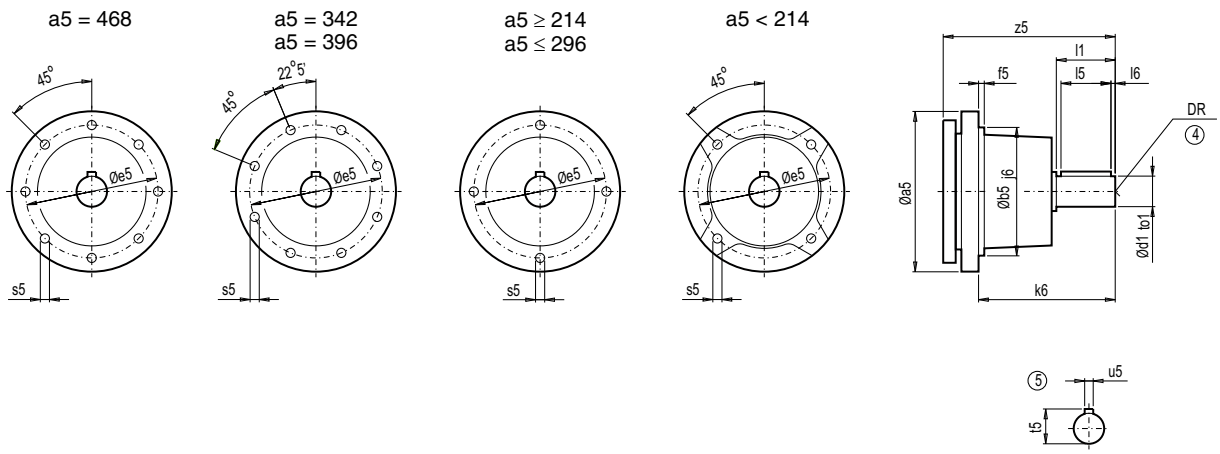
Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	f5	e5	s5	z12	d5 D	E	GA	F	z5
88	–	108	108B	-KQ -KQS	(80.3)	100	80	5	100	M6	15	19	40	21.5	6	110.5
					(90.4)	115	110	7	130	M8	15	24	50	27.0	8	125.5
					(112.3)	140	130	5	165	M10	25	32	60	35.0	10	156.5
					(132.3)	190	180	7	215	M12	30	38	80	41.0	10	206.0
–	88	–	–	-KQ -KQS	(71.2)	82	60	5	75	M5	19	14	30	16.0	5	92.5
					(80.3)	100	80	5	100	M6	15	19	40	21.5	6	135.5
					(90.4)	115	110	7	130	M8	15	24	50	27.0	8	150.5
					(112.3)	140	130	5	165	M10	25	32	60	35.0	10	185.5
					(132.3)	190	180	7	215	M12	30	38	80	41.0	10	234.0
108	–	128	128B	-KQ -KQS	(90.4)	115	110	7	130	M8	15	24	50	27.0	8	114.0
					(112.3)	140	130	5	165	M10	25	32	60	35.0	10	145.0
					(132.3)	190	180	7	215	M12	30	38	80	41.0	10	193.5
–	108	–	–	-KQ -KQS	(80.3)	100	80	5	100	M6	15	19	40	21.5	6	129.5
					(90.4)	115	110	7	130	M8	15	24	50	27.0	8	144.5
					(112.3)	140	130	5	165	M10	25	32	60	35.0	10	176.5
					(132.3)	190	180	7	215	M12	30	38	80	41.0	10	226.0
128	–	148	148B	-KQ -KQS	(112.3)	140	130	5	165	M10	25	32	60	35.0	10	134.5
					(132.3)	190	180	7	215	M12	30	38	80	41.0	10	183.0
–	128	–	–	-KQ -KQS	(90.4)	115	110	7	130	M8	15	24	50	27.0	8	137.5
					(112.3)	140	130	5	165	M10	25	32	60	35.0	10	168.5
					(132.3)	190	180	7	215	M12	30	38	80	41.0	10	217.0
148	–	168	168B	-KQ -KQS	(132.3)	190	180	7	215	M12	30	38	80	41.0	10	175.0
–	148	–	–	-KQ -KQS	(112.3)	140	130	5	165	M10	25	32	60	35.0	10	165.5
					(132.3)	190	180	7	215	M12	30	38	80	41.0	10	213.0
168	–	188	188B	-KQ -KQS	(132.3)	190	180	7	215	M12	30	38	80	41.0	10	160.5
–	168	–	–	-KQ -KQS	(132.3)	190	180	7	215	M12	30	38	80	41.0	10	201.5
–	188	–	–	-KQ -KQS	(132.3)	190	180	7	215	M12	30	38	80	41.0	10	160.5

⑤ Feather key / keyway DIN 6885

Input units

Dimensions

Input unit A



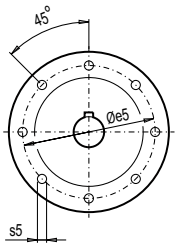
Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	f5	e5	s5	d1	to1	l1	l5	l6	t5	u5	DR	k6	z5
–	–	B38	38B	-A	(71)	136	95	4.0	116	M8x14	16	k6	40	32	4	18.0	5	M5x12.5	61	125.5
					(80)	140	95	4.0	116	M8x14	19	k6	40	32	4	21.5	6	M6x16	61	160.5
					(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	170.5
					(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	186.5
38	–	38 48	48B	-A	(71)	136	95	4.0	116	M8x14	16	k6	40	32	4	18.0	5	M5x12.5	61	151.0
					(80)	140	95	4.0	116	M8x14	19	k6	40	32	4	21.5	6	M6x16	61	186.0
					(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	196.0
					(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	212.0
–	38	–	–	-A	(71)	136	95	4.0	116	M8x14	16	k6	40	32	4	18.0	5	M5x12.5	61	166.0
					(80)	140	95	4.0	116	M8x14	19	k6	40	32	4	21.5	6	M6x16	61	201.0
					(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	211.0
48	–	68	68B	-A	(71)	136	95	4.0	116	M8x14	16	k6	40	32	4	18.0	5	M5x12.5	61	145.5
					(80)	140	95	4.0	116	M8x14	19	k6	40	32	4	21.5	6	M6x16	61	180.5
					(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	190.5
					(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	206.5
					(112)	178	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	207.5
–	48	–	–	-A	(71)	136	95	4.0	116	M8x14	16	k6	40	32	4	18.0	5	M5x12.5	61	162.5
					(80)	140	95	4.0	116	M8x14	19	k6	40	32	4	21.5	6	M6x16	61	197.5
					(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	207.5
					(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	223.5
68	–	88	88B	-A	(71)	136	95	4.0	116	M8x14	16	k6	40	32	4	18.0	5	M5x12.5	61	139.5
					(80)	140	95	4.0	116	M8x14	19	k6	40	32	4	21.5	6	M6x16	61	174.5
					(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	184.5
					(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	200.5
					(112)	178	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	199.5
					(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168	284.0
–	68	–	–	-A	(71)	136	95	4.0	116	M8x14	16	k6	40	32	4	18.0	5	M5x12.5	61	158.0
					(80)	140	95	4.0	116	M8x14	19	k6	40	32	4	21.5	6	M6x16	61	193.0
					(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	203.0
					(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	219.0

④ DIN 332

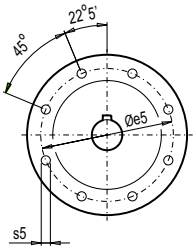
⑤ Feather key / keyway DIN 6885

Input unit A (continued)

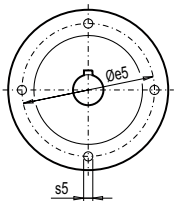
a5 = 468



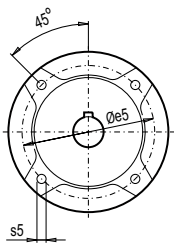
a5 = 342
a5 = 396

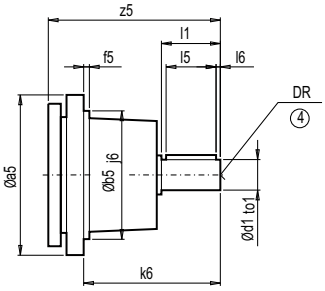


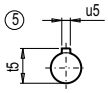
a5 ≥ 214
a5 ≤ 296



a5 < 214







Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	f5	e5	s5	d1	to1	l1	l5	l6	t5	u5	DR	k6	z5
88	-	108	108B	-A	(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	169.0
					(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	182.5
					(112)	178	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	180.5
					(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168	265.0
					(160)	251	160	5.0	184	M16x28	42	k6	110	90	10	45.0	12	M16x36	215	308.5
–	88	–	–	-A	(71)	136	95	4.0	116	M8x14	16	k6	40	32	4	18.0	5	M5x12.5	61	149.5
					(80)	140	95	4.0	116	M8x14	19	k6	40	32	4	21.5	6	M6x16	61	184.5
					(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	194.5
					(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	210.5
					(112)	178	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	210.0
					(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168	293.5
108	–	128	128B	-A	(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	157.5
					(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	170.5
					(112)	178	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	169.0
					(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168	252.5
					(160)	251	160	5.0	184	M16x28	42	k6	110	90	10	45.0	12	M16x36	215	297.0
					(200)	296	195	5.0	230	M16x28	55	m6	110	90	10	59.0	16	M20x42	235	317.5
–	108	–	–	-A	(80)	140	95	4.0	116	M8x14	19	k6	40	32	4	21.5	6	M6x16	61	178.5
					(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	188.5
					(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	204.5
					(112)	178	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	201.0
					(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168	285.5
					(160)	251	160	5.0	184	M16x28	42	k6	110	90	10	45.0	12	M16x36	215	327.0
128	–	148	148B	-A	(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	161.0
					(112)	178	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	158.5
					(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168	242.0
					(160)	251	160	5.0	184	M16x28	42	k6	110	90	10	45.0	12	M16x36	215	280.5
					(200)	296	195	5.0	230	M16x28	55	m6	110	90	10	59.0	16	M20x42	235	304.0
					(225)	342	250	5.0	300	M16x22	60	m6	140	110	15	64.0	18	M20x42	259	361.5
–	128	–	–	-A	(90)	140	95	4.0	116	M8x14	24	k6	50	40	5	27.0	8	M8x19	71	181.5
					(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	197.5
					(112)	178	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83	193.0
					(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168	276.5
					(160)	251	160	5.0	184	M16x28	42	k6	110	90	10	45.0	12	M16x36	215	318.0
					(200)	296	195	5.0	230	M16x28	55	m6	110	90	10	59.0	16	M20x42	235	341.5

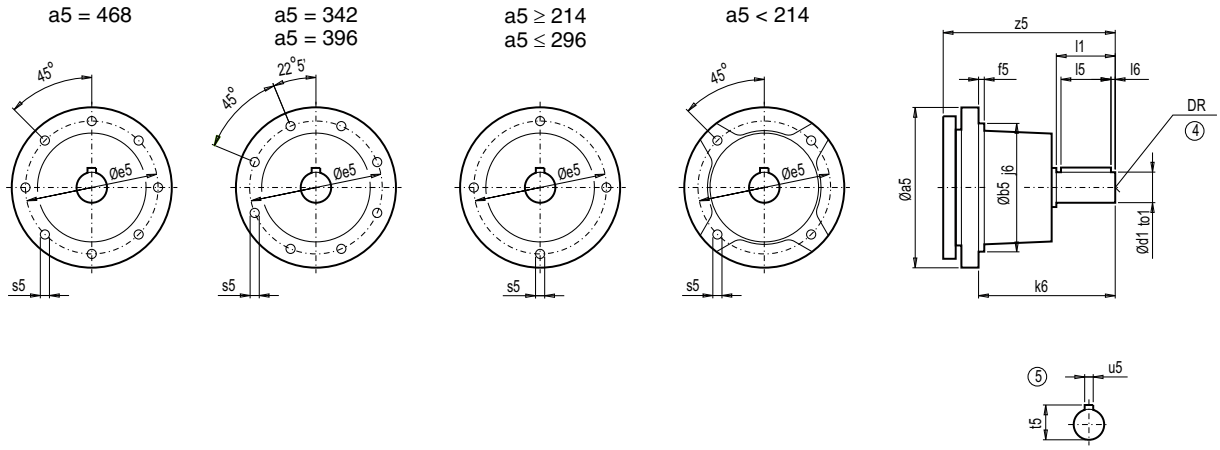
④ DIN 332

⑤ Feather key / keyway DIN 6885

Input units

Dimensions

Input unit A (continued)



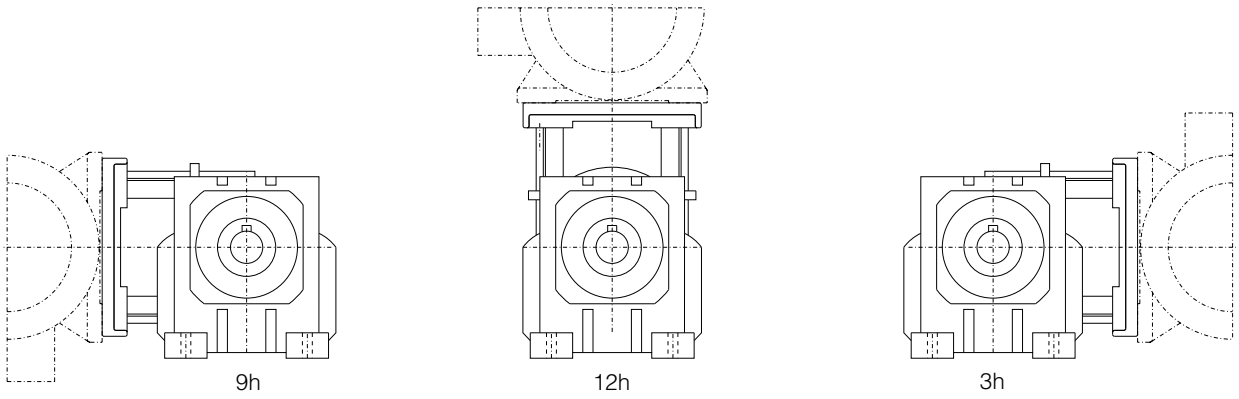
Gearbox E.Z.	D.	K./C.	FZ./ FD.			a5	b5	f5	e5	s5	d1	to1	l1	l5	l6	t5	u5	DR	k6	z5
148	–	168	168B	-A	(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168.0	234.0
					(160)	251	160	5.0	184	M16x28	42	k6	110	90	10	45.0	12	M16x36	215.0	273.0
					(200)	296	195	5.0	230	M16x28	55	m6	110	90	10	59.0	16	M20x42	235.0	296.5
					(225)	342	250	5.0	300	M16x22	60	m6	140	110	15	64.0	18	M20x42	259.0	354.0
					(250)	396	250	5.0	300	M16x22	65	m6	140	110	15	69.0	18	M20x42	259.0	353.5
					(280)	485	250	5.0	300	M20x34	70	m6	140	110	15	74.5	20	M20x42	300.0	361.5
–	148	–	–	-A	(100)	174	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83.0	192.5
					(112)	178	120	4.0	145	M10x17	28	k6	60	50	5	31.0	8	M10x22	83.0	190.0
					(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168.0	272.5
					(160)	251	160	5.0	184	M16x28	42	k6	110	90	10	45.0	12	M16x36	215.0	311.5
					(200)	296	195	5.0	230	M16x28	55	m6	110	90	10	59.0	16	M20x42	235.0	335.0
					(225)	342	250	5.0	300	M16x22	60	m6	140	110	15	64.0	18	M20x42	259.0	392.5
168	–	188	188B 208	-A	(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168.0	220.0
					(160)	251	160	5.0	184	M16x28	42	k6	110	90	10	45.0	12	M16x36	215.0	259.0
					(200)	296	195	5.0	230	M16x28	55	m6	110	90	10	59.0	16	M20x42	235.0	282.5
					(225)	342	250	5.0	300	M16x22	60	m6	140	110	15	64.0	18	M20x42	259.0	340.0
					(250)	396	250	5.0	300	M16x22	65	m6	140	110	15	69.0	18	M20x42	259.0	339.5
					(280)	468	250	5.0	300	M20x34	70	m6	140	110	15	74.5	20	M20x42	288.5	347.5
–	168	–	–	-A	(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168.0	261.0
					(160)	251	160	5.0	184	M16x28	42	k6	110	90	10	45.0	12	M16x36	215.0	300.0
					(200)	296	195	5.0	230	M16x28	55	m6	110	90	10	59.0	16	M20x42	235.0	323.5
					(225)	342	250	5.0	300	M16x22	60	m6	140	110	15	64.0	18	M20x42	259.0	381.0
188	–	–	–	A-	(160)	251	160	5.0	184	M16x28	42	k6	110	90	10	45.0	12	M16x36	215.0	259.0
					(200)	296	195	5.0	230	M16x28	55	m6	110	90	10	59.0	16	M20x42	235.0	282.5
					(225)	342	250	5.0	300	M16x22	60	m6	140	110	15	64.0	18	M20x42	259.0	340.0
					(250)	396	250	5.0	300	M16x22	65	m6	140	110	15	69.0	18	M20x42	259.0	339.5
					(280)	485	250	5.0	300	M20x34	70	m6	140	110	15	74.5	20	M20x42	286.0	347.5
–	188	–	–	-A	(132)	214	160	3.5	184	M16x22	38	k6	80	70	5	41.0	10	M12x28	168.0	220.0
					(160)	251	160	5.0	184	M16x28	42	k6	110	90	10	45.0	12	M16x36	215.0	259.0
					(200)	296	195	5.0	230	M16x28	55	m6	110	90	10	59.0	16	M20x42	235.0	282.5
					(225)	342	250	5.0	300	M16x22	60	m6	140	110	15	64.0	18	M20x42	259.0	340.0
					(250)	396	250	5.0	300	M16x22	65	m6	140	110	15	69.0	18	M20x42	259.0	339.5
					(280)	485	250	5.0	300	M20x34	70	m6	140	110	15	74.5	20	M20x42	286.0	347.5

④ DIN 332

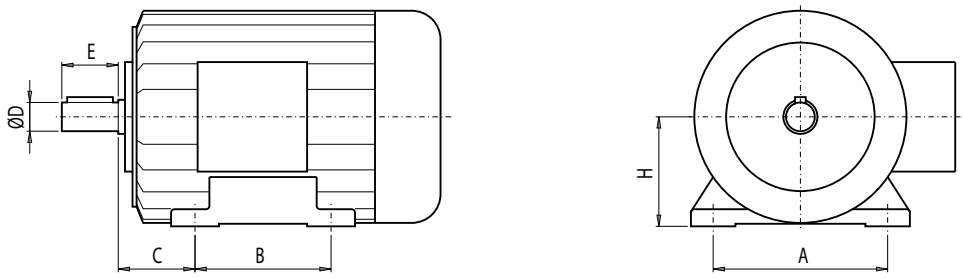
⑤ Feather key / keyway DIN 6885

Input unit P

Piggy back design position



Fixing dimensions for surface-cooled AC motors, mounting position IM B3 to DIN 42673/1

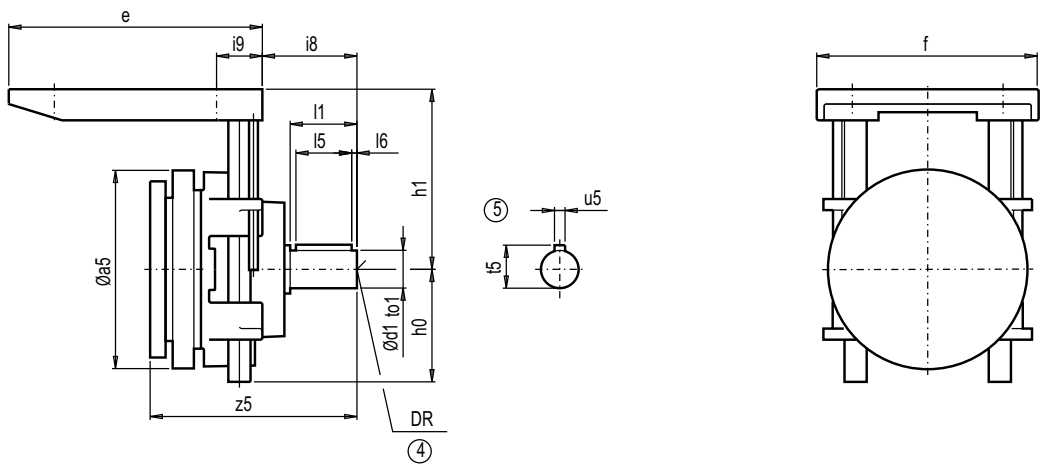


Size	D	E	C	H	B	A
80	19	40	50	80	100	125
90S	24	50	56	90	100	140
90L					125	
100L	28	60	63	100	140	160
112M	28	60	70	112	140	190
132S	38	80	89	132	140	216
132M					178	
160M	42	110	108	160	210	254
160L					254	
180M	48	110	121	180	241	279
180L					279	
200L	55	110	133	200	305	318
225S	55 60*)	110 140*)	149	225	286	356
225M					311	
250M	60 65*)	140	168	250	349	406
280S	65 75*)	140	190	280	368	457
280M					419	

*) 4-pole and multi-pole motors

Dimensions

Input unit P (continued)

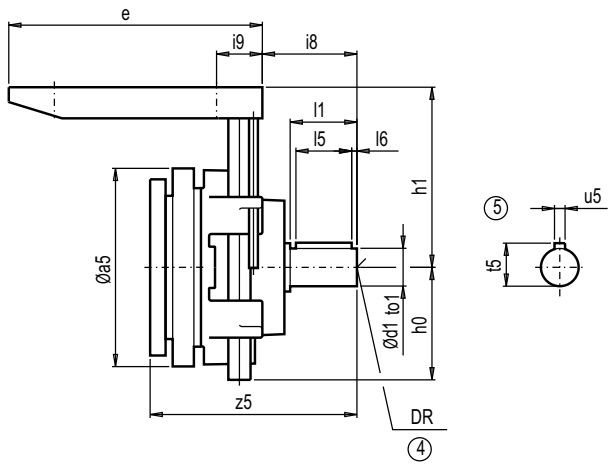


Gearbox			a5	e	f	i9	12h h0 Max.	12h h1 Min.	12h h1 Max.	3/9h h0 Max.	3/9h h1 Min.	3/9h h1 Max.	d1	to1	l1	l5	l6	t5	u5	DR	i8	z5
F.38B	-P	(80)	140	225	174	44	88	130	225	88	130	225	19	k6	40	32	4	21.5	6	M6x16	53	160.5
		(90)	140	225	174	53	88	130	225	88	130	225	24	k6	50	40	5	27.0	8	M8x19	63	170.5
		(100)	174	250	232	60	88	145	240	88	145	240	28	k6	60	50	5	31.0	8	M10x22	73	186.5
E./Z.38 K.38/48 C.38/48	-P	(80)	140	225	174	44	88	130	235	88	130	235	19	k6	40	32	4	21.5	6	M6x16	53	185.5
		(90)	140	225	174	53	88	130	235	88	130	235	24	k6	50	40	5	27.0	8	M8x19	63	195.5
		(100)	174	250	232	60	88	145	240	88	145	240	28	k6	60	50	5	31.0	8	M10x22	73	211.5
D.38	-P	(80)	140	225	174	44	88	130	235	88	130	235	19	k6	40	32	4	21.5	6	M6x16	53	200.5
		(90)	140	225	174	53	88	130	235	88	130	235	24	k6	50	40	5	27.0	8	M8x19	63	210.0
E./Z.48	-P	(80)	140	225	174	44	88	130	235	88	140	235	19	k6	40	32	4	21.5	6	M6x16	53	180.0
		(90)	140	225	174	53	88	130	235	88	140	235	24	k6	50	40	5	27.0	8	M8x19	63	190.0
		(100)	174	250	232	60	88	145	240	88	145	240	28	k6	60	50	5	31.0	8	M10x22	73	206.0
		(112)	178	250	232	67	88	145	240	88	145	240	28	k6	60	50	5	31.0	8	M10x22	73	207.0
D.48	-P	(80)	140	225	174	44	88	130	235	88	140	235	19	k6	40	32	4	21.5	6	M6x16	53	197.0
		(90)	140	225	174	53	88	130	235	88	140	235	24	k6	50	40	5	27.0	8	M8x19	63	207.0
		(100)	174	250	232	60	88	145	240	88	145	240	28	k6	60	50	5	31.0	8	M10x22	73	223.0
F.48B	-P	(80)	140	225	174	44	88	130	225	88	130	225	19	k6	40	32	4	21.5	6	M6x16	53	186.0
		(90)	140	225	174	53	88	130	225	88	130	225	24	k6	50	40	5	27.0	8	M8x19	63	196.0
		(100)	174	250	232	60	88	145	240	88	145	240	28	k6	60	50	5	31.0	8	M10x22	73	212.0
		(112)	178	250	232	67	88	145	240	88	145	240	28	k6	60	50	5	31.0	8	M10x22	73	181.0
E.68	-P	(80)	140	225	174	44	88	140	235	88	130	235	19	k6	40	32	4	21.5	6	M6x16	53	174.0
		(90)	140	225	174	53	88	140	235	88	130	235	24	k6	50	40	5	27.0	8	M8x19	63	184.0
		(100)	174	250	232	60	88	150	240	88	150	240	28	k6	60	50	5	31.0	8	M10x22	73	200.0
		(112)	178	250	232	67	88	150	240	88	150	240	28	k6	60	50	5	31.0	8	M10x22	73	199.0
		(132)	214	374	300	84	209	180	270	184	180	270	38	k6	80	70	5	41.0	10	M12x28	85	283.5
D.68	-P	(80)	140	225	174	44	88	140	235	88	160	235	19	k6	40	32	4	21.5	6	M6x16	53	192.5
		(90)	140	225	174	53	88	140	235	88	160	235	24	k6	50	40	5	27.0	8	M8x19	63	202.5
		(100)	174	250	232	60	88	145	240	88	160	240	28	k6	60	50	5	31.0	8	M10x22	73	218.5
Z.68	-P	(80)	140	225	174	44	88	140	235	88	160	235	19	k6	40	32	4	21.5	6	M6x16	53	174.0
		(90)	140	225	174	53	88	140	235	88	160	235	24	k6	50	40	5	27.0	8	M8x19	63	184.0
		(100)	174	250	232	60	88	145	240	88	160	240	28	k6	60	50	5	31.0	8	M10x22	73	200.0
		(112)	178	250	232	67	88	145	240	88	160	240	28	k6	60	50	5	31.0	8	M10x22	73	199.0
		(132)	214	374	300	84	139	180	230	139	180	230	38	k6	80	70	5	41.0	10	M12x28	85	283.5

④ DIN 332

⑤ Feather key / keyway DIN 6885

Input unit P (continued)



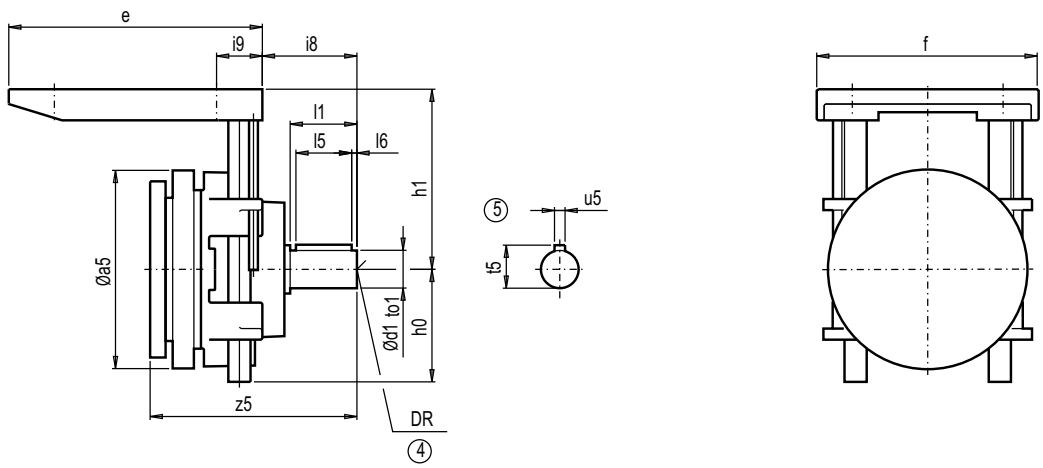
Gearbox							12h			3/9h												
			a5	e	f	i9	h0	h1	h1	h0	h1	h1	d1	to1	l1	l5	l6	t5	u5	DR	i8	z5
							Max.	Min.	Max.	Max.	Min.	Max.										
K.68	-P	(80)	140	225	174	44	88	140	235	88	160	235	19	k6	40	32	4	21.5	6	M6x16	53	180.5
		(90)	140	225	174	53	88	140	235	88	160	235	24	k6	50	40	5	27.0	8	M8x19	63	190.5
		(100)	174	250	232	60	88	145	240	88	160	240	28	k6	60	50	5	31.0	8	M10x22	73	206.5
		(112)	178	250	232	67	88	145	240	88	160	240	28	k6	60	50	5	31.0	8	M10x22	73	207.5
F.68B	-P	(80)	140	225	174	44	88	140	225	88	140	225	19	k6	40	32	4	21.5	6	M6x16	53	180.5
		(90)	140	225	174	53	88	140	225	88	140	225	24	k6	50	40	5	27.0	8	M8x19	63	190.5
		(100)	174	250	232	60	88	145	240	88	148	238	28	k6	60	50	5	31.0	8	M10x22	73	206.5
		(112)	178	250	232	67	88	145	240	88	148	238	28	k6	60	50	5	31.0	8	M10x22	73	207.5
C.68	-P	(80)	140	225	174	44	88	170	235	88	140	235	19	k6	40	32	4	21.5	6	M6x16	53	180.0
		(90)	140	225	174	53	88	170	235	88	140	235	24	k6	50	40	5	27.0	8	M8x19	63	190.0
		(100)	174	250	232	60	88	175	240	88	145	240	28	k6	60	50	5	31.0	8	M10x22	73	206.0
		(112)	178	250	232	67	88	175	240	88	145	240	28	k6	60	50	5	31.0	8	M10x22	73	207.0
E.88	-P	(90)	140	225	174	53	88	165	235	88	160	235	24	k6	50	40	5	27.0	8	M8x19	63	169.0
		(100)	174	250	232	60	88	160	240	88	160	240	28	k6	60	50	5	31.0	8	M10x22	73	182.5
		(112)	178	250	232	67	88	160	240	88	160	240	28	k6	60	50	5	31.0	8	M10x22	73	180.5
		(132)	214	374	300	84	139	200	270	139	180	270	38	k6	80	70	5	41.0	10	M12x29	85	265.0
		(160)	251	374	300	86	139	200	270	134	180	270	42	k6	110	90	10	45.0	12	M16x36	132	308.5
Z.88	-P	(90)	140	225	174	53	88	160	235	88	190	235	24	k6	50	40	5	27.0	8	M8x19	63	169.0
		(100)	174	250	232	60	88	160	240	88	190	240	28	k6	60	50	5	31.0	8	M10x22	73	182.5
		(112)	178	250	232	67	88	160	240	88	190	240	28	k6	60	50	5	31.0	8	M10x22	73	180.5
		(132)	214	374	300	84	154	180	230	124	220	270	38	k6	80	70	5	41.0	10	M12x29	85	265.0
		(160)	251	374	300	86	209	180	230	184	220	270	42	k6	110	90	10	45.0	12	M16x36	132	308.5
K.88	-P	(80)	140	225	174	44	88	160	235	88	190	235	19	k6	40	32	4	21.5	6	M6x16	53	174.5
		(90)	140	225	174	53	88	160	235	88	190	235	24	k6	50	40	5	27.0	8	M8x19	63	184.5
		(100)	174	250	232	60	88	160	240	88	190	240	28	k6	60	50	5	31.0	8	M10x22	73	200.5
		(112)	178	250	232	67	88	160	240	88	190	240	28	k6	60	50	5	31.0	8	M10x22	73	199.5
		(132)	214	374	300	84	139	180	230	139	180	230	38	k6	80	70	5	41.0	10	M12x28	85	284.0
F.88B	-P	(80)	140	225	174	44	88	163	228	88	168	228	19	k6	40	32	4	21.5	6	M6x16	53	174.5
		(90)	140	225	174	53	88	163	228	88	168	228	24	k6	50	40	5	27.0	8	M8x19	63	184.5
		(100)	174	250	232	60	88	163	238	88	160	240	28	k6	60	50	5	31.0	8	M10x22	73	200.5
		(112)	178	250	232	67	88	163	238	88	160	240	28	k6	60	50	5	31.0	8	M10x22	73	199.5
		(132)	214	374	300	84	137	178	228	127	188	228	38	k6	80	70	5	41.0	10	M12x28	85	284.0

④ DIN 332

⑤ Feather key / keyway DIN 6885

Dimensions

Input unit P (continued)

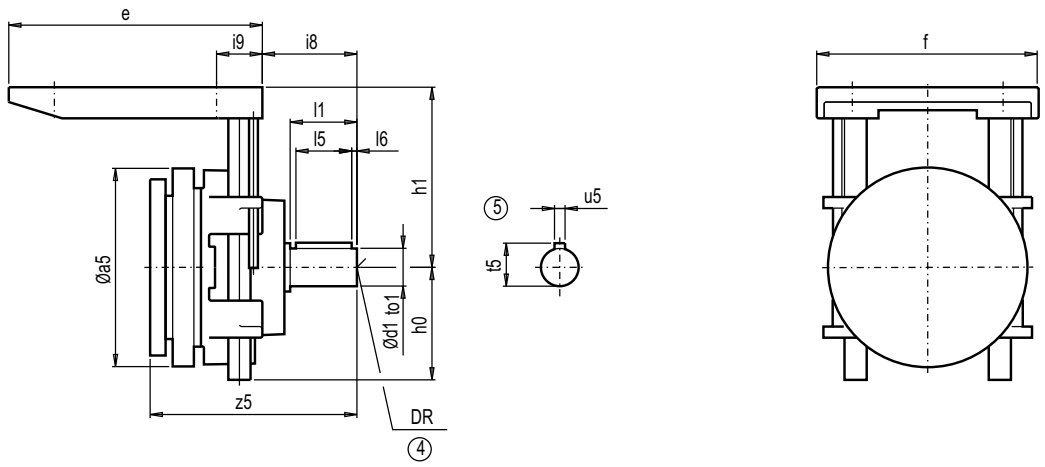


Gearbox							12h			3/9h												
			a5	e	f	i9	h0	h1	h1	h0	h1	h1	d1	to1	l1	l5	l6	t5	u5	DR	i8	z5
							Max.	Min.	Max.	Max.	Min.	Max.										
C.88	-P	(80)	140	225	174	44	88	200	235	88	150	235	19	k6	40	32	4	21.5	6	M6x16	53	174.0
		(90)	140	225	174	53	88	200	235	88	150	235	24	k6	50	40	5	27.0	8	M8x19	63	184.0
		(100)	174	250	232	60	88	200	240	88	145	240	28	k6	60	50	5	31.0	8	M10x22	73	200.0
		(112)	178	250	232	67	88	200	240	88	145	240	28	k6	60	50	5	31.0	8	M10x22	73	199.0
		(132)	214	374	300	84	139	220	270	134	220	270	38	k6	80	70	5	41.0	10	M12x28	85	283.5
D.88	-P	(80)	140	225	174	44	88	160	235	88	190	235	19	k6	40	32	4	21.5	6	M6x16	53	184.0
		(90)	140	225	174	53	88	160	235	88	190	235	24	k6	50	40	5	27.0	8	M8x19	63	194.0
		(100)	174	250	232	60	88	160	240	88	190	240	28	k6	60	50	5	31.0	8	M10x22	73	210.0
		(112)	178	250	232	67	88	160	240	88	190	240	28	k6	60	50	5	31.0	8	M10x22	73	209.5
		(132)	214	374	300	84	154	180	230	124	220	270	38	k6	80	70	5	41.0	10	M12x28	85	293.0
E.108	-P	(90)	140	225	174	53	88	195	300	88	195	300	24	k6	50	40	5	27.0	8	M8x19	63	157.5
		(100)	174	250	232	60	88	220	320	88	220	320	28	k6	60	50	5	31.0	8	M10x22	73	170.5
		(112)	178	250	232	67	88	220	320	88	220	320	28	k6	60	50	5	31.0	8	M10x22	73	169.0
		(132)	214	374	300	84	209	240	340	184	220	340	38	k6	80	70	5	41.0	10	M12x30	85	252.5
		(160)	251	374	300	86	184	240	340	159	220	340	42	k6	110	90	10	45.0	12	M16x36	132	297.0
		(180)	296	476	400	96	218	250	352	218	290	352	55	m6	110	90	10	59.0	16	M20x42	135	317.5
		(200)	296	476	400	108	218	250	352	218	290	352	55	m6	110	90	10	59.0	16	M20x42	135	317.5
Z.108	-P	(90)	140	225	174	53	88	190	300	88	230	300	24	k6	50	40	5	27.0	8	M8x19	63	157.5
		(100)	174	250	232	60	88	220	320	88	230	320	28	k6	60	50	5	31.0	8	M10x22	73	170.5
		(112)	178	250	232	67	88	220	320	88	230	320	28	k6	60	50	5	31.0	8	M10x22	73	169.0
		(132)	214	374	300	84	134	220	270	209	255	300	38	k6	80	70	5	41.0	10	M12x30	85	252.5
		(160)	251	374	300	86	134	220	270	209	255	305	42	k6	110	90	10	45.0	12	M16x36	132	297.0
		(180)	296	476	400	96	243	268	352	233	268	352	55	m6	110	90	10	59.0	16	M20x42	135	317.5
		(200)	296	476	400	108	243	268	352	233	268	352	55	m6	110	90	10	59.0	16	M20x42	135	317.5
K.108	-P	(80)	140	225	174	53	88	190	300	88	230	300	24	k6	50	40	5	27.0	8	M8x19	53	159.5
		(90)	140	225	174	53	88	190	300	88	230	300	24	k6	50	40	5	27.0	8	M8x19	63	169.5
		(100)	174	250	232	60	88	220	320	88	230	320	28	k6	60	50	5	31.0	8	M10x22	73	183.0
		(112)	178	250	232	67	88	220	320	88	230	320	28	k6	60	50	5	31.0	8	M10x22	73	181.0
		(132)	214	374	300	84	154	180	230	124	220	270	38	k6	80	70	5	41.0	10	M12x30	85	265.5
		(160)	251	374	300	86	209	180	230	184	220	270	42	k6	110	90	10	45.0	12	M16x36	132	309.0

④ DIN 332

⑤ Feather key / keyway DIN 6885

Input unit P (continued)



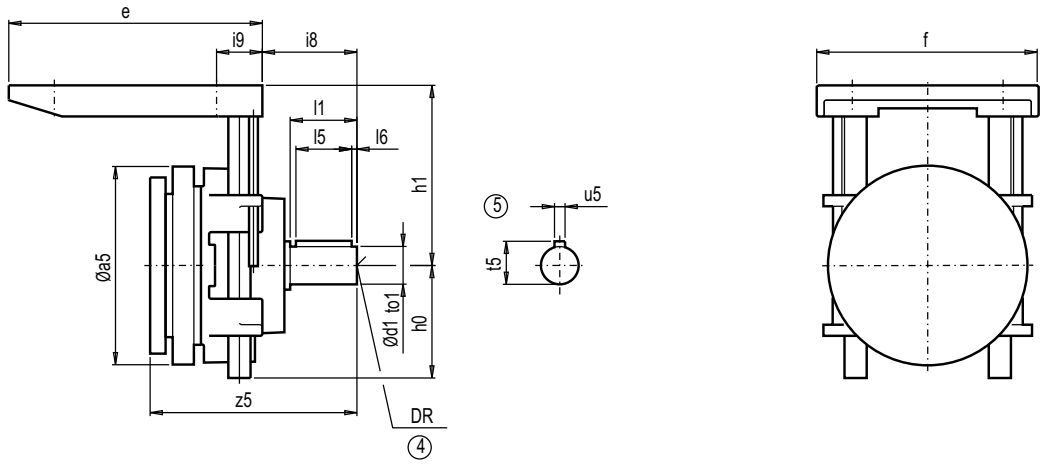
Gearbox			a5	e	f	i9	12h h0 Max.	12h h1 Min.	12h h1 Max.	3/9h h0 Max.	3/9h h1 Min.	3/9h h1 Max.	d1	to1	l1	l5	l6	t5	u5	DR	i8	z5
F.108B	-P	(80)	140	225	174	44	88	190	295	88	190	295	19	k6	40	32	4	21.5	6	M6x16	53	159.5
		(90)	140	225	174	53	88	190	295	88	190	295	24	k6	50	40	5	27.0	8	M8x19	63	169.5
		(100)	174	250	232	60	88	223	318	88	190	240	28	k6	60	50	5	31.0	8	M10x22	73	183.0
		(112)	178	250	232	67	88	223	318	88	190	240	28	k6	60	50	5	31.0	8	M10x22	73	181.0
		(132)	214	374	300	84	143	207	257	135	215	265	38	k6	80	70	5	41.0	10	M12x28	85	265.5
		(160)	251	374	300	86	143	207	257	135	215	265	42	k6	110	90	10	45.0	12	M16x36	132	309.0
D.108	-P	(80)	140	225	174	44	88	190	300	88	230	300	19	k6	40	32	4	21.5	6	M6x16	53	178.0
		(90)	140	225	174	53	88	190	300	88	230	300	24	k6	50	40	5	27.0	8	M8x19	63	188.0
		(100)	174	250	232	60	88	220	320	88	230	320	28	k6	60	50	5	31.0	8	M10x22	73	204.0
		(112)	178	250	232	67	88	220	320	88	230	320	28	k6	60	50	5	31.0	8	M10x22	73	200.5
		(132)	214	374	300	84	134	220	270	209	255	300	38	k6	80	70	5	41.0	10	M12x28	85	285.0
		(160)	251	374	300	86	134	220	270	209	255	305	42	k6	110	90	10	45.0	12	M16x36	132	326.5
E.128	-P	(100)	174	250	232	60	88	220	320	88	220	320	28	k6	60	50	5	31.0	8	M10x22	73	161.0
		(112)	178	250	232	67	88	220	320	88	220	320	28	k6	60	50	5	31.0	8	M10x22	73	158.5
		(132)	214	374	300	84	154	250	340	124	250	340	38	k6	80	70	5	41.0	10	M12x31	85	242.0
		(160)	251	374	300	86	209	250	340	184	250	340	42	k6	110	90	10	45.0	12	M16x36	132	280.5
		(180)	296	476	400	96	243	270	352	243	270	352	55	m6	110	90	10	59.0	16	M20x42	135	304.0
		(200)	296	476	400	108	243	270	352	243	270	352	55	m6	110	90	10	59.0	16	M20x42	135	304.0
		(225)	342	557	480	142	209	295	345	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	361.5
Z.128	-P	(100)	174	250	232	60	88	220	320	88	255	320	28	k6	60	50	5	31.0	8	M10x22	73	161.0
		(112)	178	250	232	67	88	220	320	88	255	320	28	k6	60	50	5	31.0	8	M10x22	73	158.5
		(132)	214	374	300	84	139	255	305	134	280	330	38	k6	80	70	5	41.0	10	M12x31	85	242.0
		(160)	251	374	300	86	139	255	305	134	280	330	42	k6	110	90	10	45.0	12	M16x36	132	280.5
		(180)	296	476	400	96	233	253	352	209	293	352	55	m6	110	90	10	59.0	16	M20x42	135	304.0
		(200)	296	476	400	108	233	253	352	209	293	352	55	m6	110	90	10	59.0	16	M20x42	135	304.0
		(225)	342	557	480	142	199	295	340	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	361.5
K.128	-P	(90)	140	225	174	53	88	230	300	88	255	300	24	k6	50	40	5	27.0	8	M8x19	63	158.0
		(100)	174	250	232	60	88	220	320	88	255	320	28	k6	60	50	5	31.0	8	M10x22	73	171.0
		(112)	178	250	232	67	88	220	320	88	255	320	28	k6	60	50	5	31.0	8	M10x22	73	169.5
		(132)	214	374	300	84	134	220	270	209	255	300	38	k6	80	70	5	41.0	10	M12x28	85	253.0
		(160)	251	374	300	86	134	220	270	209	255	305	42	k6	110	90	10	45.0	12	M16x36	132	297.5
		(180)	296	476	400	96	196	243	352	261	243	352	55	m6	110	90	10	59.0	16	M20x42	135	318.0
		(200)	296	476	400	108	196	243	352	261	243	352	55	m6	110	90	10	59.0	16	M20x42	135	318.0

④ DIN 332

⑤ Feather key / keyway DIN 6885

Dimensions

Input unit P (continued)

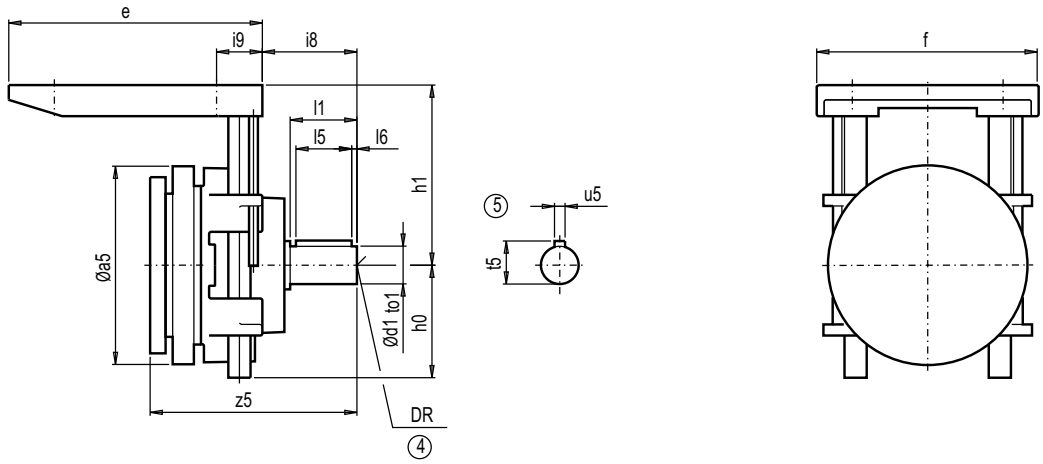


Gearbox			a5	e	f	i9	12h h0 Max.	12h h1 Min.	12h h1 Max.	3/9h h0 Max.	3/9h h1 Min.	3/9h h1 Max.	d1	to1	l1	l5	l6	t5	u5	DR	i8	z5
F.128B	-P	(90)	140	225	174	53	88	235	295	88	230	295	24	k6	50	40	5	27.0	8	M8x19	63	158.0
		(100)	174	250	232	60	88	250	320	88	235	320	28	k6	60	50	5	31.0	8	M10x22	73	171.0
		(112)	178	250	232	67	88	250	320	88	235	320	28	k6	60	50	5	31.0	8	M10x22	73	169.5
		(132)	214	374	300	84	195	265	365	175	285	365	38	k6	80	70	5	41.0	10	M12x28	85	253.0
		(160)	251	374	300	86	195	265	365	175	285	365	42	k6	110	90	10	45.0	12	M16x36	132	297.5
		(180)	296	476	400	96	217	268	358	217	268	358	55	m6	110	90	10	59.0	16	M20x42	135	318.0
		(200)	296	476	400	108	217	268	358	217	268	358	55	m6	110	90	10	59.0	16	M20x42	135	318.0
D.128	-P	(90)	140	225	174	53	88	230	300	88	255	300	24	k6	50	40	5	27.0	8	M8x19	63	181.0
		(100)	174	250	232	60	88	220	320	88	255	320	28	k6	60	50	5	31.0	8	M10x22	73	197.0
		(112)	178	250	232	67	88	220	320	88	255	320	28	k6	60	50	5	31.0	8	M10x22	73	192.5
		(132)	214	374	300	84	139	255	305	134	280	330	38	k6	80	70	5	41.0	10	M12x28	85	276.0
		(160)	251	374	300	86	139	255	305	134	280	330	42	k6	110	90	10	45.0	12	M16x36	132	317.5
		(180)	296	476	400	96	233	253	352	209	293	352	55	m6	110	90	10	59.0	16	M20x42	135	341.0
		(200)	296	476	400	108	233	253	352	209	293	352	55	m6	110	90	10	59.0	16	M20x42	135	341.0
E.148	-P	(132)	214	374	300	84	134	280	380	209	280	380	38	k6	80	70	5	41.0	10	M12x32	85	234.0
		(160)	251	374	300	86	134	280	380	209	280	380	42	k6	110	90	10	45.0	12	M16x36	132	273.0
		(180)	296	476	400	96	193	300	425	233	300	425	55	m6	110	90	10	59.0	16	M20x42	135	296.5
		(200)	296	476	400	108	193	300	425	233	300	425	55	m6	110	90	10	59.0	16	M20x42	135	296.5
		(225)	342	557	480	142	254	315	415	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	354.0
		(250)	396	557	480	161	254	305	350	–	–	–	65	m6	140	110	15	69.0	18	M20x42	147	353.5
		(280)	485	666	558	173	265	399	369	–	–	–	70	m6	140	110	15	74.5	20	M20x42	171	361.5
D.148	-P	(100)	174	250	232	60	88	245	320	88	280	320	28	k6	60	50	5	31.0	8	M10x22	73	192.0
		(112)	178	250	232	67	88	245	320	88	280	320	28	k6	60	50	5	31.0	8	M10x22	73	189.5
		(132)	214	374	300	84	184	280	330	159	305	355	38	k6	80	70	5	41.0	10	M12x28	85	272.0
		(160)	251	374	300	86	184	280	330	159	305	355	42	k6	110	90	10	45.0	12	M16x36	132	311.0
		(180)	296	476	400	96	248	318	407	248	318	407	55	m6	110	90	10	59.0	16	M20x42	135	334.5
		(200)	296	476	400	108	248	293	352	248	318	407	55	m6	110	90	10	59.0	16	M20x42	135	334.5
		(225)	342	557	480	142	199	305	350	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	392.0
Z.148	-P	(132)	214	374	300	84	184	280	330	159	305	355	38	k6	80	70	5	41.0	10	M12x28	85	234.0
		(160)	251	374	300	86	184	280	330	159	305	355	42	k6	110	90	10	45.0	12	M16x36	132	273.0
		(180)	296	476	400	96	248	318	407	248	318	407	55	m6	110	90	10	59.0	16	M20x42	135	296.5
		(200)	296	476	400	108	248	293	352	248	318	407	55	m6	110	90	10	59.0	16	M20x42	135	296.5
		(225)	342	557	480	142	199	305	350	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	354.0
		(250)	396	557	480	161	254	305	350	–	–	–	65	m6	140	110	15	69.0	18	M20x42	147	353.5
		(280)	485	666	558	173	265	399	429	–	–	–	70	m6	140	110	15	74.5	20	M20x42	171	361.5

④ DIN 332

⑤ Feather key / keyway DIN 6885

Input unit P (continued)



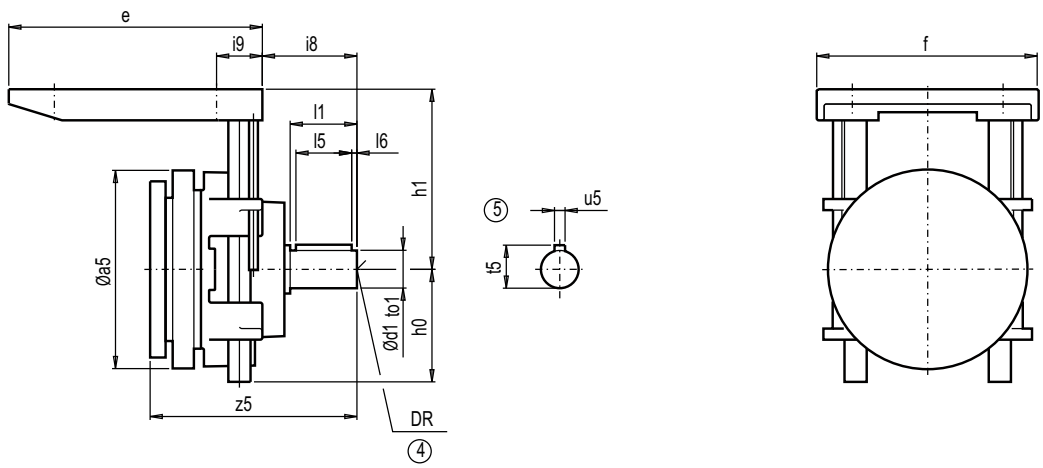
Gearbox			a5	e	f	i9	12h h0 Max.	12h h1 Min.	12h h1 Max.	3/9h h0 Max.	3/9h h1 Min.	3/9h h1 Max.	d1	to1	l1	l5	l6	t5	u5	DR	i8	z5
K.148	-P	(100)	174	250	232	60	88	245	320	88.0	280	320	28	k6	60	50	5	31.0	8	M10x22	73	161.5
		(112)	178	250	232	67	88	245	320	88.0	280	320	28	k6	60	50	5	31.0	8	M10x22	73	159.0
		(132)	214	374	300	84	139	255	305	134.0	280	330	38	k6	80	70	5	41.0	10	M12x28	85	242.5
		(160)	251	374	300	86	139	255	305	134.0	280	330	42	k6	110	90	10	45.0	12	M16x36	132	281.0
		(180)	296	476	400	96	193	293	352	233.0	253	352	55	m6	110	90	10	59.0	16	M20x42	135	304.5
		(200)	296	476	400	108	193	293	352	233.0	253	352	55	m6	110	90	10	59.0	16	M20x42	135	304.5
		(225)	342	557	480	142	199	345	390	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	362.0
F.148B	-P	(100)	174	250	232	60	88	255	320	88.0	255	320	28	k6	60	50	5	31.0	8	M10x22	73	161.5
		(112)	178	250	232	67	88	255	320	88.0	255	320	28	k6	60	50	5	31.0	8	M10x22	73	159.0
		(132)	214	374	300	84	170	290	365	175.0	285	365	38	k6	80	70	5	41.0	10	M12x28	85	242.5
		(160)	251	374	300	86	170	290	365	175.0	285	365	42	k6	110	90	10	45.0	12	M16x36	132	281.0
		(180)	296	476	400	96	192	293	358	198.0	287	357	55	m6	110	90	10	59.0	16	M20x42	135	304.5
		(200)	296	476	400	108	192	293	358	198.0	287	357	55	m6	110	90	10	59.0	16	M20x42	135	304.5
		(225)	342	557	480	142	244	323	353	187.5	393	423	60	m6	140	110	15	64.0	18	M20x42	147	362.0
D.168	-P	(132)	214	374	300	84	154	310	360	124.0	340	390	38	k6	80	70	5	41.0	10	M12x28	85	260.5
		(160)	251	374	300	86	154	310	360	124.0	340	390	42	k6	110	90	10	45.0	12	M16x36	132	299.5
		(180)	296	476	400	96	239	337	407	233.0	343	407	55	m6	110	90	10	59.0	16	M20x42	135	323.0
		(200)	296	476	400	108	239	337	407	233.0	343	407	55	m6	110	90	10	59.0	16	M20x42	135	323.0
		(225)	342	557	480	142	199	345	390	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	380.5
Z.168	-P	(132)	214	374	300	84	154	310	360	124.0	340	390	38	k6	80	70	5	41.0	10	M12x28	85	219.5
		(160)	251	374	300	86	154	310	360	124.0	340	390	42	k6	110	90	10	45.0	12	M16x36	132	258.5
		(180)	296	476	400	96	239	337	407	233.0	343	407	55	m6	110	90	10	59.0	16	M20x42	135	282.0
		(200)	296	476	400	108	239	337	407	233.0	343	407	55	m6	110	90	10	59.0	16	M20x42	135	282.0
		(225)	342	557	480	142	199	345	390	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	339.5
		(250)	396	557	480	161	194	345	390	–	–	–	65	m6	140	110	15	69.0	18	M20x42	147	339.0
		(280)	468	666	558	173	200	402	432	–	–	–	70	m6	140	110	15	74.5	20	M20x42	171	347.5
K.168	-P	(132)	214	374	300	84	184	280	330	159.0	305	355	38	k6	80	70	5	41.0	10	M12x28	85	234.5
		(160)	251	374	300	86	184	280	330	159.0	305	355	42	k6	110	90	10	45.0	12	M16x36	132	273.5
		(180)	296	476	400	96	239	337	407	209.0	277	352	55	m6	110	90	10	59.0	16	M20x42	135	297.0
		(200)	296	476	400	108	239	337	407	209.0	277	352	55	m6	110	90	10	59.0	16	M20x42	135	297.0
		(225)	342	557	480	142	199	390	435	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	354.5
		(250)	396	557	480	161	199	390	435	–	–	–	65	m6	140	110	15	69.0	18	M20x42	147	354.0
		(280)	485	666	558	173	180	472	502	–	–	–	70	m6	140	110	15	74.5	20	M20x42	171	361.5

④ DIN 332

⑤ Feather key / keyway DIN 6885

Dimensions

Input unit P (continued)

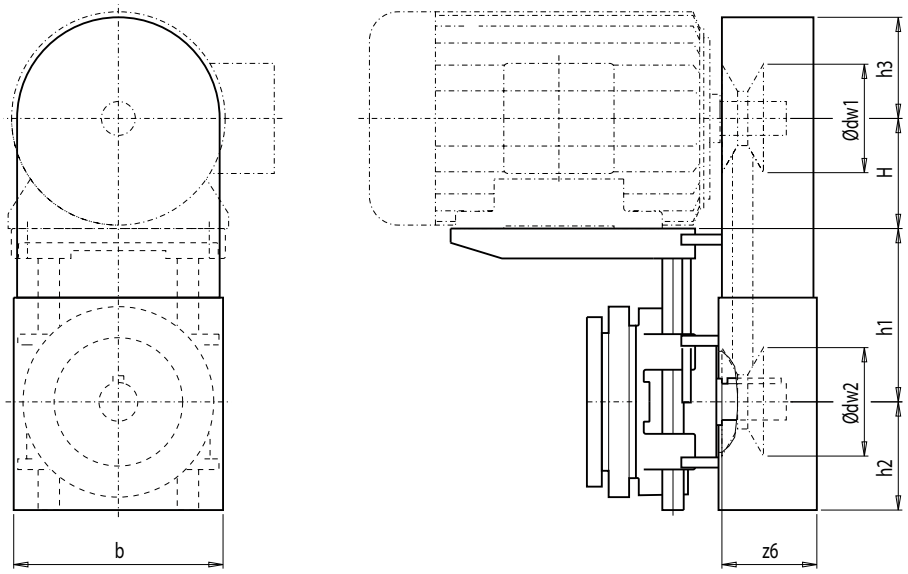


Gearbox			a5	e	f	i9	12h h0 Max.	12h h1 Min.	12h h1 Max.	3/9h h0 Max.	3/9h h1 Min.	3/9h h1 Max.	d1	to1	l1	l5	l6	t5	u5	DR	i8	z5
F.168B	-P	(132)	214	374	300	84	152.0	308	368	155.0	305	365	38	k6	80	70	5	41.0	10	M12x28	85	234.5
		(160)	251	374	300	86	152.0	308	368	155.0	305	365	42	k6	110	90	10	45.0	12	M16x36	132	273.5
		(180)	296	476	400	96	258.0	318	432	262.0	313	428	55	m6	110	90	10	59.0	16	M20x42	135	297.0
		(200)	296	476	400	108	258.0	318	432	262.0	313	428	55	m6	110	90	10	59.0	16	M20x42	135	297.0
		(225)	342	557	480	142	218.5	393	423	218.5	393	423	60	m6	140	110	15	64.0	18	M20x42	147	354.5
		(250)	396	557	480	161	255.5	356	386	187.5	424	454	65	m6	140	110	15	69.0	18	M20x42	147	354.0
		(280)	485	666	558	173	253.0	399	429	252.0	400	430	70	m6	140	110	15	74.5	20	M20x42	171	361.5
D.188	-P	(132)	214	374	300	84	120.0	340	380	125.0	372	412	38	k6	80	70	5	41.0	10	M12x28	85	219.5
		(160)	251	374	300	86	120.0	340	380	125.0	372	412	42	k6	110	90	10	45.0	12	M16x36	132	258.5
		(180)	296	476	400	96	207.0	368	433	193.0	382	432	55	m6	110	90	10	59.0	16	M20x42	135	282.0
		(200)	296	476	400	108	207.0	368	433	193.0	382	432	55	m6	110	90	10	59.0	16	M20x42	135	282.0
		(225)	342	557	480	142	193.5	393	423	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	339.5
		(250)	396	557	480	161	193.5	418	448	–	–	–	65	m6	140	110	15	69.0	18	M20x42	147	339.0
		(280)	485	666	558	173	201.0	399	424	–	–	–	70	m6	140	110	15	74.5	20	M20x42	171	347.0
Z.188	-P	(160)	251	374	300	86	120.0	340	380	125.0	372	412	42	k6	110	90	10	45.0	12	M16x36	132	259.0
		(180)	296	476	400	96	207.0	368	433	193.0	382	432	55	m6	110	90	10	59.0	16	M20x42	135	282.5
		(200)	296	476	400	108	207.0	368	433	193.0	382	432	55	m6	110	90	10	59.0	16	M20x42	135	282.5
		(225)	342	557	480	142	193.5	393	423	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	340.0
		(250)	396	557	480	161	193.5	418	448	–	–	–	65	m6	140	110	15	69.0	18	M20x42	147	339.5
		(280)	468	666	558	173	201.0	399	424	–	–	–	70	m6	140	110	15	74.5	20	M20x42	171	347.5
K.188	-P	(132)	214	374	300	84	140.0	360	410	160.0	300	370	38	k6	80	70	5	41.0	10	M12x28	85	220.0
		(160)	251	374	300	86	140.0	360	410	160.0	300	370	42	k6	110	90	10	45.0	12	M16x36	132	259.0
		(180)	296	476	400	96	197.0	378	433	183.0	302	357	55	m6	110	90	10	59.0	16	M20x42	135	282.5
		(200)	296	476	400	108	197.0	378	433	183.0	302	357	55	m6	110	90	10	59.0	16	M20x42	135	282.5
		(225)	342	557	480	142	223.5	463	493	–	–	–	60	m6	140	110	15	64.0	18	M20x42	147	340.0
		(250)	396	557	480	161	193.5	493	523	–	–	–	65	m6	140	110	15	69.0	18	M20x42	147	339.5
		(280)	485	666	558	173	180.0	472	502	–	–	–	70	m6	140	110	15	74.5	20	M20x42	171	347.0
F.188B	-P	(132)	214	374	300	84	125.0	335	375	125.0	335	375	38	k6	80	70	5	41.0	10	M12x28	85	220.0
		(160)	251	374	300	86	125.0	335	375	125.0	335	375	42	k6	110	90	10	45.0	12	M16x36	132	259.0
		(180)	296	476	400	96	228.0	347	432	232.0	343	428	55	m6	110	90	10	59.0	16	M20x42	135	282.5
		(200)	296	476	400	108	228.0	347	432	232.0	343	428	55	m6	110	90	10	59.0	16	M20x42	135	282.5
		(225)	342	557	480	142	196.5	390	420	223.5	463	493	60	m6	140	110	15	64.0	18	M20x42	147	340.0
		(250)	396	557	480	161	192.5	419	449	187.5	424	454	65	m6	140	110	15	69.0	18	M20x42	147	339.5
		(280)	468	666	558	173	186.5	463	493	181.0	471	501	70	m6	140	110	15	74.5	20	M20x42	171	347.5

④ DIN 332

⑤ Feather key / keyway DIN 6885

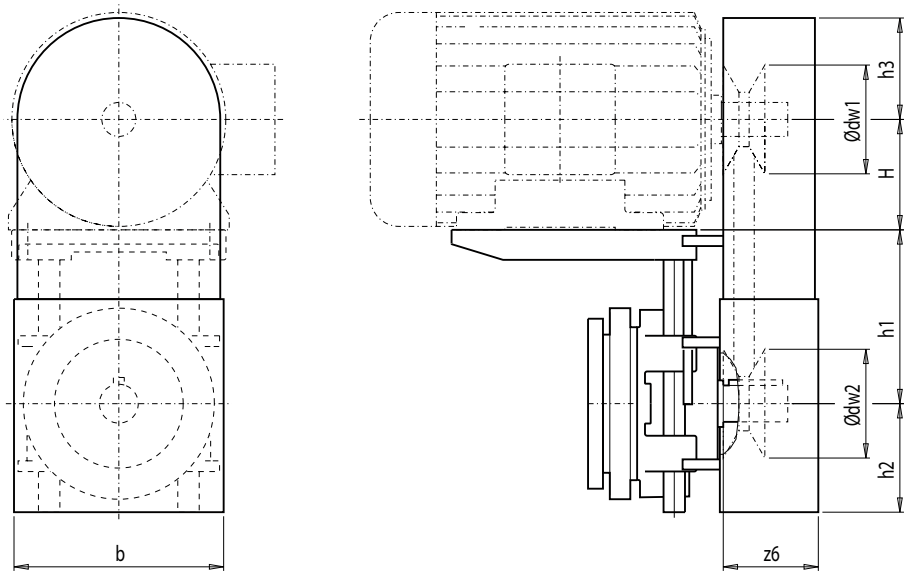
Protective belt cover for piggy back design PS



Gearbox					12h		3/9h						
			dw1	dw2	h1	h1	h1	h1	H	h2	h3	z6	b
			Max.	Max.	Min.	Max.	Min.	Max.					
B.38 F.38B/48B	-PS	(80)	150	140	130	225	130	225	80	88	97	71	190
		(90)	150	140	130	225	130	225	90	88	97	71	190
		(100)	210	140	145	240	145	240	100	88	132	83	248
E./Z.38 C.38/48 K.38/48	-PS	(80)	150	140	130	235	130	235	80	88	97	71	190
		(90)	150	140	130	235	130	235	90	88	97	71	190
		(100)	210	140	145	240	145	240	100	88	132	83	248
D.38	-PS	(80)	150	140	130	235	130	235	80	88	97	71	190
		(90)	150	140	130	235	130	235	90	88	97	71	190
E./Z.48	-PS	(80)	150	140	130	235	140	235	80	88	97	71	190
		(90)	150	140	130	235	140	235	90	88	97	71	190
		(100)	210	140	145	240	145	240	100	88	132	83	248
		(112)	210	140	145	240	145	240	112	88	120	83	248
D.48	-PS	(80)	150	140	130	235	140	235	80	88	97	71	190
		(90)	150	140	130	235	140	235	90	88	97	71	190
		100	210	140	145	240	145	240	100	88	132	83	248
E./Z.68 C.68 K.68	-PS	(80)	150	140	140	235	160	235	80	88	97	71	190
		(90)	150	140	140	235	160	235	90	88	97	71	190
		(100)	210	140	145	240	160	240	100	88	132	83	248
		(112)	210	140	145	240	160	240	112	88	120	83	248
		(132)	250	220	180	230	180	230	132	135	140	147	288
F.68B	-PS	(80)	150	140	140	225	140	225	80	88	97	71	190
		(90)	150	140	140	225	140	225	90	88	97	71	190
		(100)	210	140	145	240	148	238	100	88	132	83	248
		(112)	210	140	145	240	148	238	112	88	120	83	248
D.68	-PS	(80)	150	140	140	235	160	235	80	88	97	71	190
		(90)	150	140	140	235	160	235	90	88	97	71	190
		(100)	210	140	145	240	160	240	100	88	132	83	248
E./Z.88	-PS	(90)	150	140	160	235	190	235	90	88	97	71	190
		(100)	210	140	160	240	190	240	100	88	132	83	248
		(112)	210	140	160	240	190	240	112	88	120	83	248
		(132)	250	220	180	230	220	270	132	135	140	147	288
		(160)	250	220	180	230	220	270	160	135	140	135	288

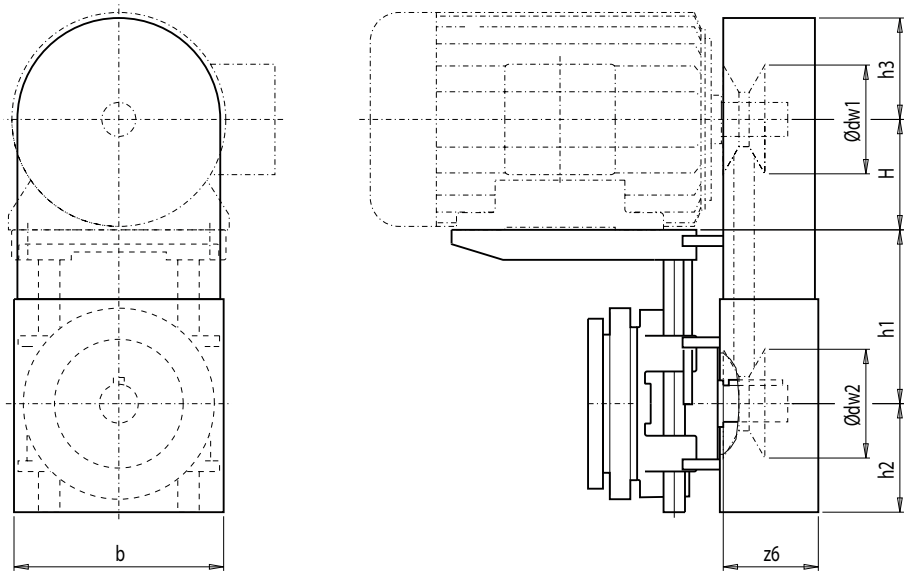
Dimensions

Protective belt cover for piggy back design PS (continued)



Gearbox			dw1	dw2	12h h1	h1	3/9h h1	h1	H	h2	h3	z6	b
			Max.	Max.	Min.	Max.	Min.	Max.					
F.88B	-PS	(80)	150	140	163	228	168	228	80	88	97	71	190
		(90)	150	140	163	228	168	228	90	88	97	71	190
		(100)	210	140	163	238	160	240	100	88	132	83	248
		(112)	210	140	163	238	160	240	112	88	120	83	248
		(132)	250	220	178	228	188	228	132	135	140	147	288
C.88	-PS	(80)	150	140	160	235	190	235	80	88	97	71	190
		(90)	150	140	160	235	190	235	90	88	97	71	190
		(100)	210	140	160	240	190	240	100	88	132	83	248
		(112)	210	140	160	240	190	240	112	88	120	83	248
		(132)	250	220	180	230	180	230	132	135	140	147	288
K.88	-PS	(80)	150	140	160	235	190	235	80	88	97	71	190
		(90)	150	140	160	235	190	235	90	88	97	71	190
		(100)	210	140	160	240	190	240	100	88	132	83	248
		(112)	210	140	160	240	190	240	112	88	120	83	248
		(132)	250	220	180	230	180	230	132	135	140	147	288
D.88	-PS	(80)	150	140	160	235	190	235	80	88	97	71	190
		(90)	150	140	160	235	190	235	90	88	97	71	190
		(100)	210	140	160	240	190	240	100	88	132	83	248
		(112)	210	140	160	240	190	240	112	88	120	83	248
		(132)	250	220	180	230	220	270	132	135	140	147	288
E./Z.108 K.108	-PS	(80)	150	140	190	300	230	300	80	88	97	71	190
		(90)	150	140	190	300	230	300	90	88	97	71	190
		(100)	210	140	220	320	230	320	100	88	132	83	248
		(112)	210	140	220	320	230	320	112	88	120	83	248
		(132)	250	220	220	270	255	305	132	135	140	147	288
		(160)	250	220	220	270	255	305	160	135	140	135	288
		(180)	330	310	268	352	268	352	180	205	182	134	372
		(200)	330	310	268	352	268	352	200	205	182	134	372

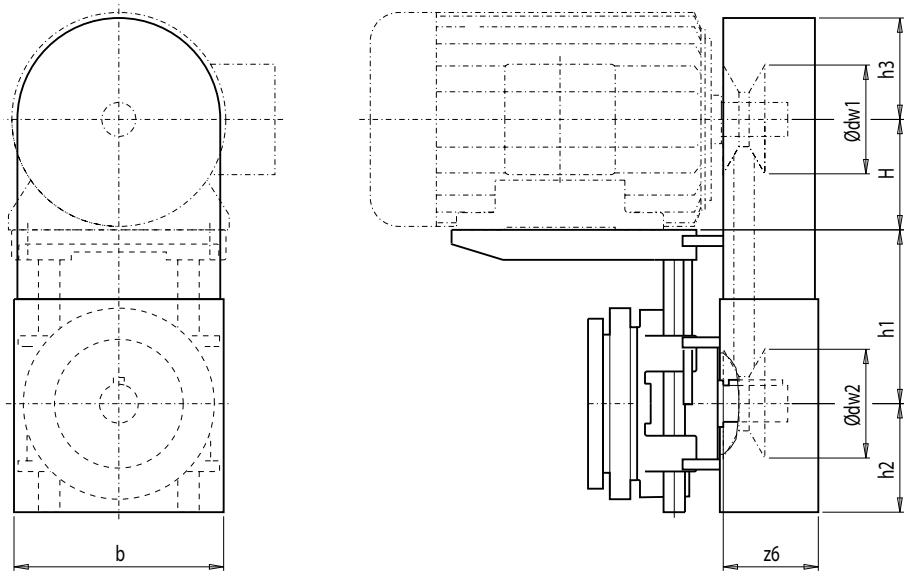
Protective belt cover for piggy back design PS (continued)



Gearbox			dw1	dw2	12h h1		3/9h h1		H	h2	h3	z6	b
			Max.	Max.	Min.	Max.	Min.	Max.					
F.108B	-PS	(80)	150	140	190	295	190	295	80	88	97.0	71	190
		(90)	150	140	190	295	190	295	90	88	97.0	71	190
		(100)	210	140	223	318	190	240	100	88	132.0	83	248
		(112)	210	140	223	318	190	240	112	88	120.0	83	248
		(132)	250	220	207	257	215	265	132	135	140.0	147	288
		(160)	250	220	207	257	215	265	160	135	140.0	135	288
D.108	-PS	(80)	150	140	190	300	23	300	80	88	97.0	71	190
		(90)	150	140	190	300	230	300	90	88	97.0	71	190
		(100)	210	140	220	320	230	320	100	88	132.0	83	248
		(112)	210	140	220	320	230	320	112	88	120.0	83	248
		(132)	250	220	220	270	255	305	132	135	140.0	147	288
		(160)	250	220	220	270	255	305	160	135	140.0	135	288
E./Z.128	-PS	(100)	210	140	220	320	255	320	100	88	132.0	83	248
		(112)	210	140	220	320	255	320	112	88	120.0	83	248
		(132)	250	220	255	305	280	330	132	135	140.0	147	288
		(160)	250	220	255	305	280	330	160	135	140.0	135	288
		(180)	330	310	253	352	293	352	180	205	182.0	134	372
		(200)	330	310	253	352	293	352	200	205	182.0	134	372
		(225)	390	390	295	340	–	–	225	215	232.5	174	428
F.128B	-PS	(90)	150	140	235	295	230	295	90	88	97.0	71	190
		(100)	210	140	250	320	235	320	100	88	132.0	83	248
		(112)	210	140	250	320	235	320	112	88	120.0	83	248
		(132)	250	220	265	365	285	365	132	135	140.0	147	288
		(160)	250	220	265	365	285	330	160	135	140.0	135	288
		(180)	330	310	268	358	268	358	180	205	182.0	134	372
		(200)	330	310	268	358	268	358	200	205	182.0	134	372
K.128	-PS	(90)	150	140	230	300	255	300	90	88	97.0	71	190
		(100)	210	140	220	320	255	320	100	88	132.0	83	248
		(112)	210	140	220	320	255	320	112	88	120.0	83	248
		(132)	250	220	220	270	255	305	132	135	140.0	147	288
		(160)	250	220	220	270	255	305	160	135	140.0	135	288
		(180)	330	310	243	352	243	352	180	205	182.0	134	372
		(200)	330	310	243	352	243	352	200	205	182.0	134	372

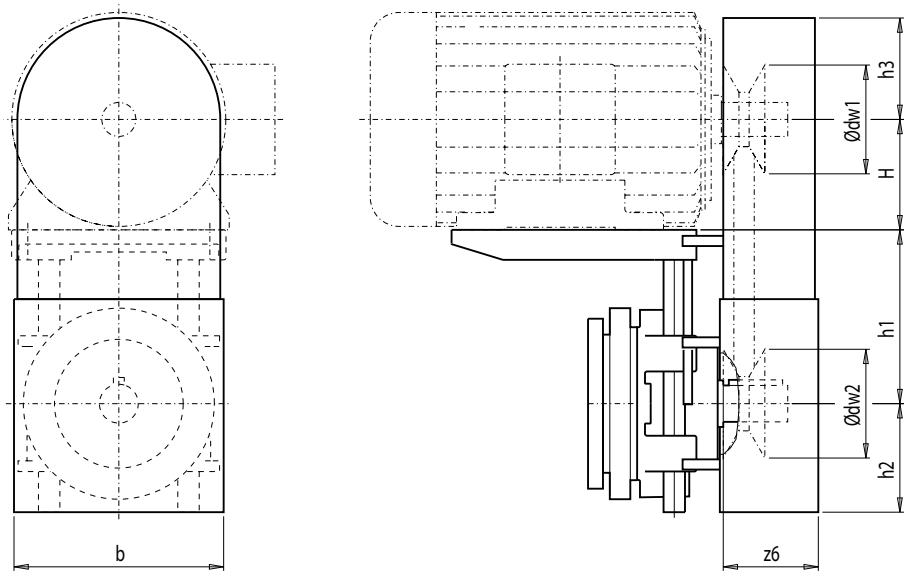
Dimensions

Protective belt cover for piggy back design PS (continued)



Gearbox			dw1	dw2	12h h1	h1	3/9h h1	h1	H	h2	h3	z6	b
			Max.	Max.	Min.	Max.	Min.	Max.					
D.128	-PS	(90)	150	140	230	300	255	300	90	88	97.0	71	190
		(100)	210	140	220	320	255	320	100	88	132.0	83	248
		(112)	210	140	220	320	255	320	112	88	120.0	83	248
		(132)	250	220	255	305	280	330	132	135	140.0	147	288
		(160)	250	220	255	305	280	330	160	135	140.0	135	288
		(180)	330	310	253	352	293	352	180	205	182.0	134	372
		(200)	330	310	253	352	293	352	200	205	182.0	134	372
E./Z.148	-PS	(132)	250	220	280	330	305	355	132	135	140.0	147	288
		(160)	250	220	280	330	305	355	160	135	140.0	135	288
		(180)	330	310	293	352	318	407	180	205	182.0	134	372
		(200)	330	310	293	352	318	407	200	205	182.0	134	372
		(225)	390	390	305	350	–	–	225	215	232.5	174	428
		(250)	390	350	305	350	–	–	250	215	210.0	174	428
		(280)	520	410	339	369	–	–	280	240	274.0	162	556
F.148B	-PS	(100)	210	140	255	320	255	320	100	88	132.0	83	248
		(112)	210	140	255	320	255	320	112	88	120.0	83	248
		(132)	250	220	290	365	285	365	132	135	140.0	147	288
		(160)	250	220	290	365	285	365	160	135	140.0	135	288
		(180)	330	310	293	358	287	357	180	205	182.0	134	372
		(200)	330	310	293	358	287	357	200	205	182.0	134	372
		(225)	390	390	323	353	393	423	225	215	232.5	174	428
K.148	-PS	(100)	210	140	245	320	280	320	100	88	132.0	83	248
		(112)	210	140	245	320	280	320	112	88	120.0	83	248
		(132)	250	220	255	305	280	330	132	135	140.0	147	288
		(160)	250	220	255	305	280	330	160	135	140.0	135	288
		(180)	330	310	293	352	253	352	180	205	182.0	134	372
		(200)	330	310	293	352	253	352	200	205	182.0	134	372
		(225)	390	390	345	390	–	–	225	215	232.5	174	428

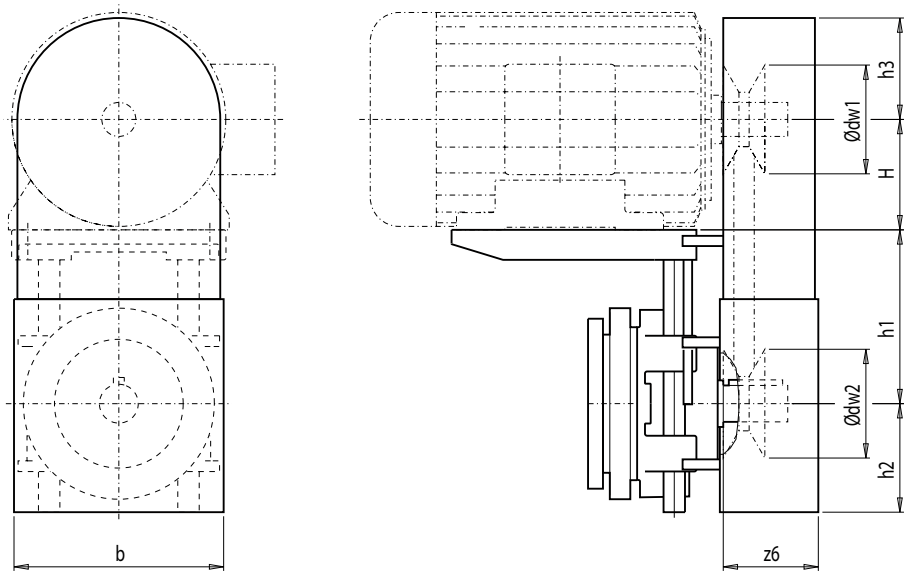
Protective belt cover for piggy back design PS (continued)



Gearbox			dw1	dw2	12h h1	h1	3/9h h1	h1	H	h2	h3	z6	b
			Max.	Max.	Min.	Max.	Min.	Max.					
D.148	-PS	(100)	210	140	245	320	280	320	100	88	132.0	83	248
		(112)	210	140	245	320	280	320	112	88	120.0	83	248
		(132)	250	220	280	330	305	355	132	135	140.0	147	288
		(160)	250	220	280	330	305	355	160	135	140.0	135	288
		(180)	330	310	293	352	318	407	180	205	182.0	134	372
		(200)	330	310	293	352	318	407	200	205	182.0	134	372
		(225)	390	390	305	350	–	–	225	215	232.5	174	428
Z.168	-PS	(132)	250	220	310	360	340	390	132	135	140.0	147	288
		(160)	250	220	310	360	340	390	160	135	140.0	135	288
		(180)	330	310	337	407	343	407	180	205	182.0	134	372
		(200)	330	310	337	407	343	407	200	205	182.0	134	372
		(225)	390	390	345	390	–	–	225	215	232.5	174	428
		(250)	390	350	345	390	–	–	250	215	210.0	174	428
		(280)	520	410	402	432	–	–	280	240	274.0	162	556
F.168B	-PS	(132)	250	220	308	368	305	365	132	135	140.0	147	288
		(160)	250	220	308	368	305	365	160	135	140.0	135	288
		(180)	330	310	318	432	313	428	180	205	182.0	134	372
		(200)	330	310	318	432	313	428	200	205	182.0	134	372
		(225)	390	390	393	423	393	423	225	215	232.5	174	428
		(250)	390	350	356	386	424	454	250	215	210.0	174	428
		(280)	520	410	399	429	400	430	280	240	274.0	162	556
K.168	-PS	(132)	250	220	280	330	305	355	132	135	140.0	147	288
		(160)	250	220	280	330	305	355	160	135	140.0	135	288
		(180)	330	310	337	407	277	352	180	205	182.0	134	372
		(200)	330	310	337	407	277	352	200	205	182.0	134	372
		(225)	390	390	390	435	–	–	225	215	232.5	174	428
		(250)	390	350	390	435	–	–	250	215	210.0	174	428
		(280)	520	410	472	502	–	–	280	240	274.0	162	556
D.168	-PS	(132)	250	220	310	360	340	390	132	135	140.0	147	288
		(160)	250	220	310	360	340	390	160	135	140.0	135	288
		(180)	330	310	337	407	343	407	180	205	182.0	134	372
		(200)	330	310	337	407	343	407	200	205	182.0	134	372
		(225)	390	390	345	390	–	–	225	215	232.5	174	428

Dimensions

Protective belt cover for piggy back design PS (continued)



Gearbox			dw1	dw2	12h h1	h1	3/9h h1	h1	H	h2	h3	z6	b
			Max.	Max.	Min.	Max.	Min.	Max.					
Z.188	-PS	(132)	250	220	340	380	372	412	132	135	140.0	147	288
		(160)	250	220	340	380	372	412	160	135	140.0	135	288
		(180)	330	310	368	433	382	432	180	205	182.0	134	372
		(200)	330	310	368	433	382	432	200	205	182.0	134	372
		(225)	390	390	393	423	–	–	225	215	232.5	174	428
		(250)	390	350	418	448	–	–	250	215	210.0	174	428
		(280)	520	410	399	424	–	–	280	240	274.0	177	556
K.188	-PS	(132)	250	220	360	410	300	370	132	135	140.0	147	288
		(160)	250	220	360	410	300	370	160	135	140.0	135	288
		(180)	330	310	378	433	302	357	180	205	182.0	134	372
		(200)	330	310	378	433	302	357	200	205	182.0	134	372
		(225)	390	390	463	493	–	–	225	215	232.5	174	428
		(250)	390	350	493	523	–	–	250	215	210.0	174	428
		(280)	520	410	472	502	–	–	280	240	274.0	177	556
F.188B	-PS	(132)	250	220	335	375	335	375	132	135	140.0	147	288
		(160)	250	220	335	375	335	375	160	135	140.0	135	288
		(180)	330	310	347	432	343	428	180	205	182.0	134	372
		(200)	330	310	347	432	343	428	200	205	182.0	134	372
		(225)	390	390	390	420	463	493	225	215	232.5	174	428
		(250)	390	350	419	449	424	454	250	215	210.0	174	428
		(280)	520	410	463	493	471	501	280	240	274.0	177	556
D.188	-PS	(132)	250	220	340	380	372	412	132	135	140.0	147	288
		(160)	250	220	340	380	372	412	160	135	140.0	135	288
		(180)	330	310	368	433	382	432	180	205	182.0	134	372
		(200)	330	310	368	433	382	432	200	205	182.0	134	372
		(225)	390	390	393	423	–	–	225	215	232.5	174	428
		(250)	390	350	418	448	–	–	250	215	210.0	174	428
		(280)	520	410	399	424	–	–	280	240	274.0	177	556

Appendix

9

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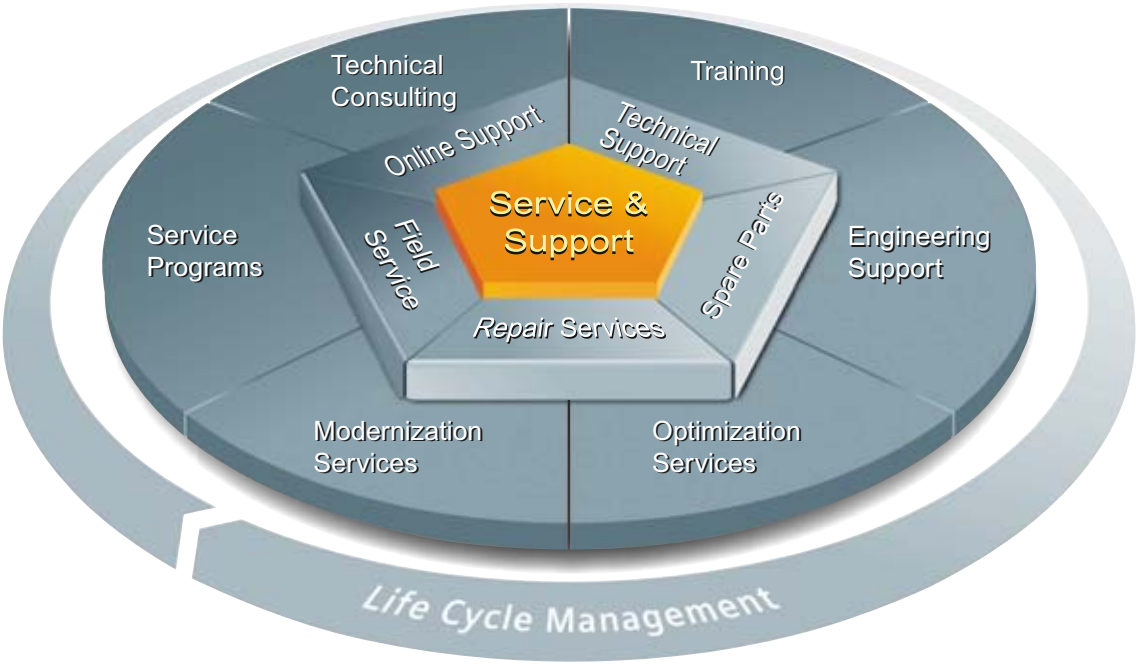

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To accompany our products and systems, we offer integrated and structured services that provide valuable support in every phase of the life cycle of your machine or plant – from planning and implementation through commissioning as far as maintenance and modernization.

Our Service & Support accompanies you worldwide in all matters concerning automation and drives from Siemens. We provide direct on-site support in more than 100 countries through all phases of the life cycle of your machines and plants.

You have an experienced team of specialists at your side to provide active support and bundled know-how. Regular training courses and intensive contact among our employees – even across continents – ensure reliable service in the most diverse areas.

Contact information is available in the Internet at:
www.siemens.com/automation/partner

The unmatched complete service for the entire life cycle

Online Support

The comprehensive online information platform supports you in all aspects of our Service & Support at any time and from any location in the world.

www.siemens.com/automation/service&support

Technical Consulting

Support in planning and designing your project: From detailed actual-state analysis, definition of the goal and consulting on product and system questions right through to the creation of the automation solution.

Technical Support

Expert advice on technical questions with a wide range of demand-optimized services for all our products and systems.

www.siemens.com/automation/support-request

Training

Extend your competitive edge – through practical know-how directly from the manufacturer.

www.siemens.com/sitrain

Contact information is available in the Internet at:
www.siemens.com/automation/partner

Service & Support

The unmatched complete service for the entire life cycle

Engineering Support

Support during project engineering and development with services fine-tuned to your requirements, from configuration through to implementation of an automation project.

Spare parts

In every sector worldwide, plants and systems are required to operate with constantly increasing reliability. We will provide you with the support you need to prevent a standstill from occurring in the first place: with a worldwide network and optimum logistics chains.

Field Service

Our Field Service offers you services for commissioning and maintenance – to ensure that your machines and plants are always available.

Repairs

Downtimes cause problems in the plant as well as unnecessary costs. We can help you to reduce both to a minimum – with our worldwide repair facilities.

Contact information is available in the Internet at:
www.siemens.com/automation/partner

The unmatched complete service for the entire life cycle

Optimization

During the service life of machines and plants, there is often a great potential for increasing productivity or reducing costs. To help you achieve this potential, we are offering a complete range of optimization services.

Modernization

You can also rely on our support when it comes to modernization – with comprehensive services from the planning phase all the way to commissioning.

Service programs

Our service programs are selected service packages for an automation and drives system or product group. The individual services are coordinated with each over to ensure smooth coverage of the entire life cycle and support optimum use of your products and systems.

The services of a Service Program can be flexibly adapted at any time and used separately.

Examples of service programs:

- Service contracts
- Plant IT Security Services
- Life Cycle Services for Drive Engineering
- SIMATIC PCS 7 Life Cycle Services
- SINUMERIK Manufacturing Excellence
- SIMATIC Remote Support Servicess

Advantages at a glance:

- Reduced downtimes for increased productivity
- Optimized maintenance costs due to a tailored scope of services
- Costs that can be calculated and therefore planned
- Service reliability due to guaranteed response times and spare part delivery times
- Customer service personnel will be supported and relieved of additional tasks
- Comprehensive service from a single source, fewer interfaces and greater expertise

Contact information is available in the Internet at:
www.siemens.com/automation/partner

Knowledge Base on DVD

For locations without online connections to the Internet there are excerpts of the free part of the information sources available on DVD (Service & Support Knowledge Base). This DVD contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service & Support.

The DVD also includes a full-text search and our Knowledge Manager for targeted searches for solutions. The DVD will be updated every 4 months.

Just the same as our online offer in the Internet, the Service & Support Knowledge Base on DVD comes complete in 5 languages (German, English, French, Italian, Spanish).

You can order the **Service & Support Knowledge Base** DVD from your Siemens contact.

Order no. **6ZB5310-0EP30-0BA2**

Automation Value Card

Small card – great support

The Automation Value Card is an integral component of the comprehensive service concept with which Siemens Automation and Drives will accompany you in each phase of your automation project.

It doesn't matter whether you want just specific services from our Technical Support or want to purchase something on our Online portal, you can always pay with your Automation Value Card. No invoicing, transparent and safe. With your personal card number and associated PIN you can view the state of your account and all transactions at any time.

Services on card. This is how it's done.

Card number and PIN are on the back of the Automation Value Card. When delivered, the PIN is covered by a scratch field, guaranteeing that the full credit is on the card.

By entering the card number and PIN you have full access to the Service & Support services being offered. The charge for the services procured is debited from the credits on your Automation Value Card.

All the services offered are marked in currency-neutral credits, so you can use the Automation Value Card worldwide.

Order your Automation and Value Card easily and comfortably like a product with your sales contact.

Automation Value Card order numbers	
Credits	Order no.
200	**6ES7 997-0BA00-0XA0**
500	**6ES7 997-0BB00-0XA0**
1 000	**6ES7 997-0BC00-0XA0**
10 000	**6ES7 997-0BG00-0XA0**

Detailed information on the services offered is available on our Internet site at:

www.siemens.com/automation/service&support

Service & Support à la Card: Examples

Technical Support	
"Priority"	Priority processing for urgent cases
"24 h"	Availability round the clock
"Extended"	Technical consulting for complex questions
"Mature Products"	Consulting service for products that are not available any more
Support Tools in the Support Shop	
	Tools that can be used directly for configuration, analysis and testing

I IA/DT/BT Standard-Anhang En 09.02.2011

Notes

Notes

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By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following terms apply exclusively for orders placed with Siemens AG.

For customers with a seat or registered office in Germany

The "General Terms of Payment" as well as the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany" shall apply.

For customers with a seat or registered office outside of Germany

The "General Terms of Payment" as well as the "General Conditions for Supplies of Siemens, Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

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The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given – these are subject to change without prior notice.

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

Surcharges will be added to the prices of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order.
The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used. The metal factor, provided it is relevant, is included with the price information of the respective products.

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- 6ZB5310-0KR30-0BA1
  (for customers based in Germany)
- 6ZB5310-0KS53-0BA1
  (for customers based outside Germany)

or download them from the Internet
www.siemens.com/industrymall
(Germany: Industry Mall Online-Help System)

Export regulations

Our obligation to fulfill this agreement is subject to the proviso that the fulfillment is not prevented by any impediments arising out of national and international foreign trade and customs requirements or any embargos and/or other sanctions.

If you transfer goods (hardware and/ or software and/ or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you shall comply with all applicable national and international (re-) export control regulations.

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Therefore, any export requiring a license is subject to approval by the competent authorities.

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Industry Automation, Drive Technologies and Low Voltage Distribution

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

Interactive Catalog on DVD

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for Industry Automation, Drive Technologies and Low Voltage Distribution	**CA 01**

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SINAMICS G130 Drive Converter Chassis Units SINAMICS G150 Drive Converter Cabinet Units	D 11
SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12
SINAMICS S120 Chassis Format Units and Cabinet Modules SINAMICS S150 Converter Cabinet Units	D 21.3
SINAMICS DCM Converter Units	D 23.1
Three-phase Induction Motors • H-compact • H-compact PLUS	D 84.1
Asynchronous Motors Standardline	D 86.1
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
DC Motors	DA 12
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1
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MICROMASTER 420/430/440 Inverters	DA 51.2
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SIMOVERT MASTERDRIVES Vector Control	DA 65.10
SIMOVERT MASTERDRIVES Motion Control	DA 65.11
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3
SIMODRIVE 611 universal and POSMO	DA 65.4
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
SINAMICS S110 The Basic Positioning Drive	PM 22
Low-Voltage Three-Phase-Motors	
IEC Squirrel-Cage Motors	D 81.1
MOTOX Geared Motors	D 87.1
Automation Systems for Machine Tools SIMODRIVE • Motors • Converter Systems SIMODRIVE 611/POSMO	NC 60
Automation Systems for Machine Tools SINAMICS • Motors • Drive System SINAMICS S120	NC 61
Drive and Control Components for Hoisting Equipment	HE 1
Mechanical Driving Machines	
Flender Standard Couplings	MD 10.1

Low-Voltage Power Distribution and Electrical Installation Technology

Protection, Switching, Measuring & Monitoring Devices	LV 10.1
Switchboards and Distribution Systems	LV 10.2
GAMMA Building Management Systems	ET G1
PDF: *DELTA Switches and Socket Outlets*	*ET D1*
SICUBE System Cubicles and Cubicle Air-Conditioning	LV 50
SIVACON 8PS Busbar Trunking Systems	LV 70

Motion Control

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SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60
SINUMERIK & SINAMICS Equipment for Machine Tools	NC 61
SINUMERIK 828D BASIC T/BASIC M, SINAMICS S120 Combi and 1FK7/1PH8 motors	NC 82
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SINAMICS S110 The Basic Positioning Drive	PM 22

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Power supply SITOP	KT 10.1
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Field Instruments for Process Automation	FI 01
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PDF: *Process Analytics, Components for the System Integration*	*PA 11*

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SIMATIC HMI/PC-based Automation

Human Machine Interface Systems/ PC-based Automation	ST 80/ ST PC

SIMATIC Industrial Automation Systems

Products for Totally Integrated Automation and Micro Automation	ST 70
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Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7.1
PDF: *Migration solutions with the SIMATIC PCS 7 Process Control System*	*ST PCS 7.2*

SIMATIC NET

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SIMATIC Sensors

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SIRIUS Industrial Controls

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System Solutions

Applications and Products for Industry are part of the interactive catalog CA 01

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Siemens AG
Industry Sector
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