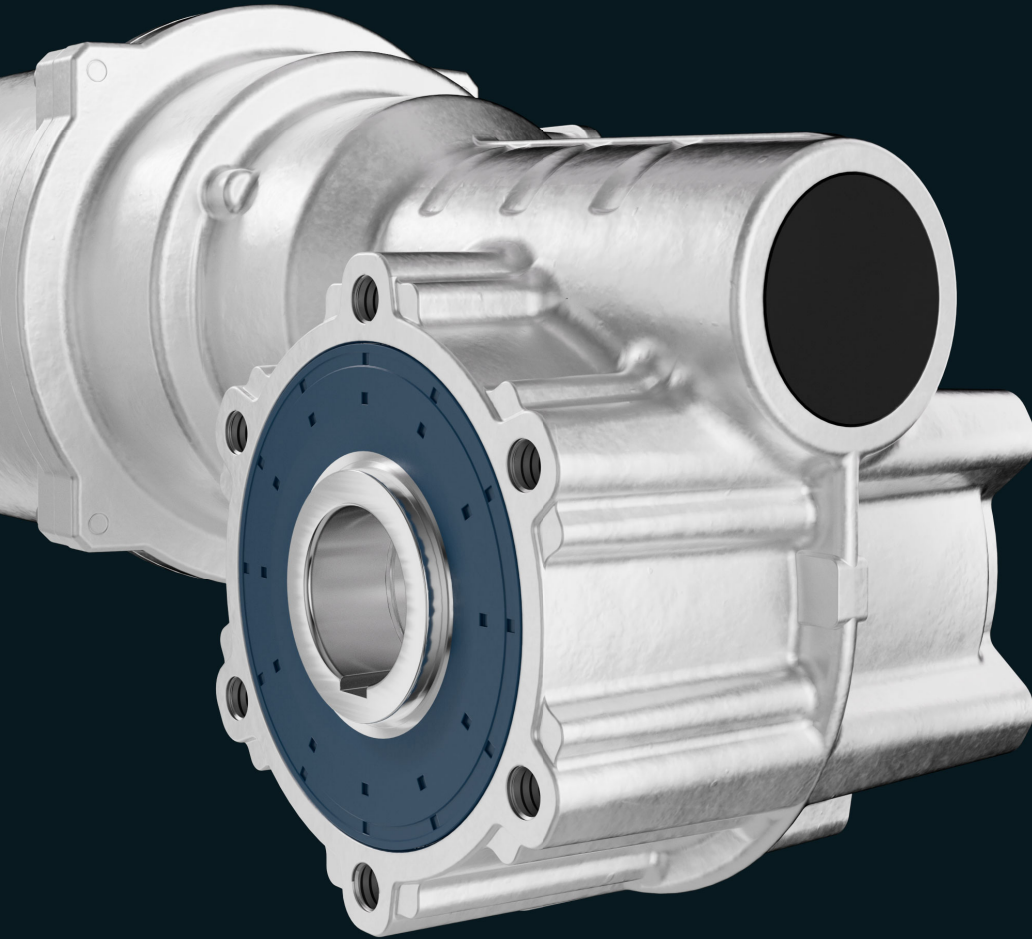


INNOMOTICS



Catalog D 50.12 | Edition 04/2026

Innomotics Moves! **Definite Geared Motors**

Geared motors for increased environmental requirements

innomotics.com/geared-motors

Related catalogs

D 50.1	Innomotics Standard Geared Motors Helical, Parallel Shaft, Bevel, Helical Worm, Worm Geared Motors and Electric-Monorail Geared Motors PDF (INGM-C00005-01-7600)
D 50.11	Innomotics SG Gearboxes with Adapter Mounting of IEC, NEMA and Servo Motors PDF (INGM-C00006-00-7600)
D 50.15	Innomotics SG G115D Distributed drive system PDF (INGM-C00002-00-7600)
D 81.1	Innomotics Low Voltage Motors GP, SD, XP, DP Type series 1FP1, 1LE1, 1LE5, 1MB1, 1MB5 and 1PC1 Frame sizes 63 to 450 Power range 0.09 to 1000 kW PDF (E86060-K5581-A111-B9)

Innomotics Evaluate energy saving/energy efficiency tool

Further information on the subject of energy saving and the Innomotics Evaluate energy efficiency tool is available at the following address:
evaluate.innomotics.com/en

Innomotics Configurator

The Innomotics Configurator can be used on the Internet without requiring any installation. The Innomotics Configurator can be found at the following address:
configurator.innomotics.com



Innomotives DG

Worm Geared Motors

[Innomotives.com/geared-motors](https://www.innomotives.com/geared-motors)

Dear Customer,

We are happy to present the new Catalog D 50.12 Edition April 2026. The catalog provides a comprehensive overview of the Innomotives Definite Geared Motors.

Please contact your local Innomotives office if you want to obtain more information.

Current information about Innomotives Geared Motors is available on the internet at www.innomotives.com/geared-motors

We hope that you will often use our Catalog D 50.12 Edition April 2026 as a selection and ordering reference document, and wish you every success with our products and solutions.

With kind regards,

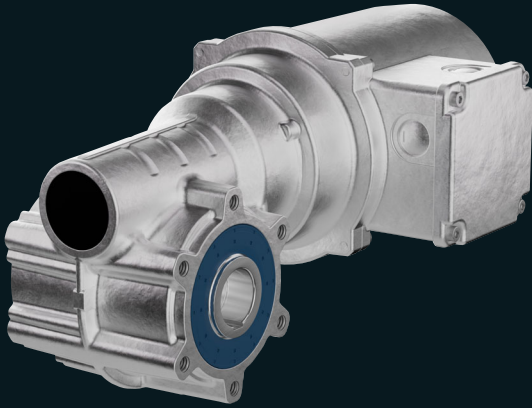
Martin Prescher

Head of Product Portfolio Management

Innomotives GmbH, Geared Motors

Innomotics DG

Worm Geared Motors



Definite Geared Motors

1

Innomotics Moves!

2

Appendix

3

Catalog D 50.12 · April 2026

Supersedes:
Catalog D 50.12 · May 2025

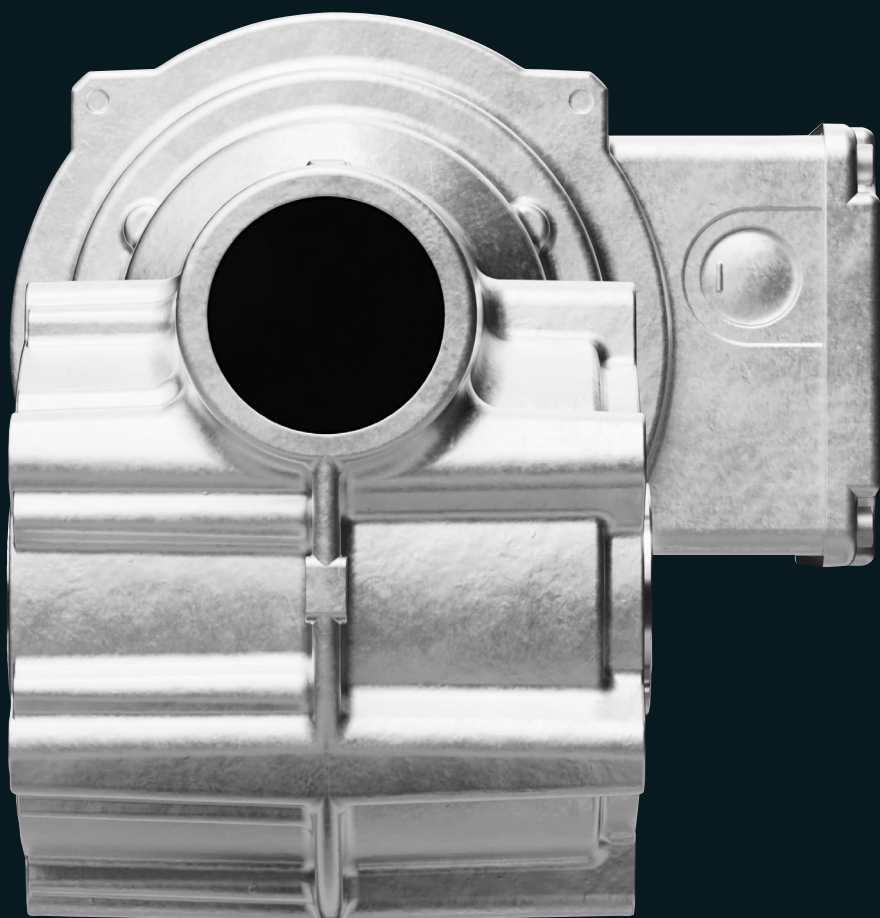
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For current updates of this catalog, refer to
innomotics.com

Please contact your local Innomotics branch

Definite Geared Motors

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Definite Geared Motors

Overview

The Definite Geared Motors (DG) are SCAQ/SCQ series worm geared motors designed specifically for increased environmental requirements.

The SCAQ/SCQ worm geared motors are characterized by their high power density in small spaces and high single-stage gear ratio. Thanks to their compact design, the gearboxes offer an ideal solution when installation space is limited.

Other advantages include high availability and robust construction. The one-piece die-cast aluminum gearbox and motor have good thermal conductivity, are stable and dampen vibration. As a result, the geared motors are well suited for harsh environmental conditions.

The output shafts are available as solid or hollow stainless steel shafts in a range of diameters.

SCAQ/SCQ are the perfect geared motors for use in special environmental conditions, such as car and truck washes or the food and pharmaceutical industries.

With the comprehensive, easy-to-configure and easy-to-install system solution you benefit from increased flexibility, shorter lead times, less effort, and higher performance.

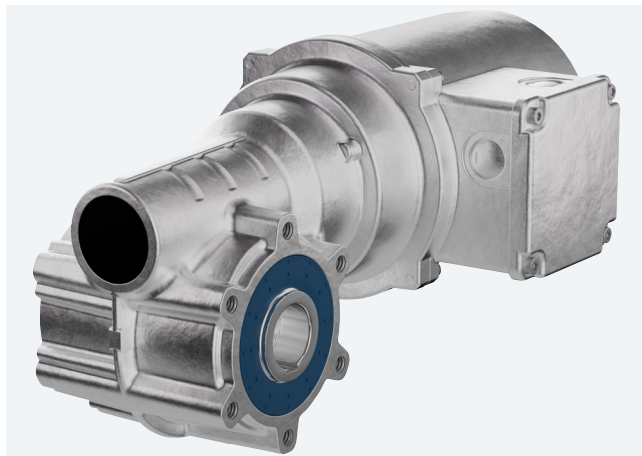


Fig. 1-1 Example of a worm geared motor SCAQ

Advantages

- _ One-piece, industry-specific housing
- _ Encapsulated motor winding
- _ High-quality worm gearing
- _ Optimal geared motor interface

Benefits

- _ Increased corrosion resistance
- _ Water ingress protection
- _ Resistance to cleaning agents
- _ High heat reserves and overload capability
- _ Longer service life and high operational reliability

Configuration

Product Configurator

The Product Configurator supports you when configuring the optimum drive technology products for a number of applications – from gearboxes, motors, converters as well as the associated options and components through to controllers, software licenses and connection systems.

The Product Configurator can be used on the internet without requiring any installation. It can be found at the following address:

configurator.innomotics.com

More information

The latest technical documentation (catalogs, dimensional drawings, certificates, manuals and operating instructions as well as further technical specifications) are available on the internet at:

www.innomotics.com/geared-motors

and

configurator.innomotics.com

Definite Geared Motors

Article No. code

To obtain a better overview, the Article No. is split up into three, hyphenated blocks.

Example:

2KJ7740-6CE61-1HA1-Z D10+M71

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

Ordering data

- Complete Article No. with a -Z suffix, and order code(s) or plain text.
- If a quotation has been requested, please specify the quotation number in addition to the Article No.
- When ordering a complete geared motor as a replacement unit, the serial number of the original geared motor must be specified.

1

Structure of the Article No.

Position of the Article No.		1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	-	Z
Innomotics Definite Geared Motors																					
1st to 7th position: Digit, letter, letter, digit, digit	Worm gearbox SCAQ/SCQ, 1-stage	2	K	J	7	7	4	0													
8th position: Digit	Output shaft, see page 1/7								-												
9th to 10th position: Letter, letter	Motor frame size, see page 1/8																				
11th to 12th position: Digit	Pot motor												6	1							
	Ribbed motor												7								
13th position: Digit	Frequency, voltage														-	1, 9					
	With Article No. 9, additional order code required																				
14th position: Letter	Housing flange design																H				
15th to 16th position: Letter, digit	Transmission ratio																	A ... J	1		
Special designs																					
Coded	Order code required																			-	Z
Non-coded	Plain text required																				
Non-ventilated motor	Order code is selected automatically																				S09

Type designation

The type designation is a meaningful name for SCAQ/SCQ geared motors.

It provides information about the fundamental design of the geared motor and its main technical features.

Example of type designation:		S	C	A	Q	24	-	T	71	S	4	U	-	LQ4G
Gearbox														
Gearbox type	Worm gearbox	S												
Type	Housing flange		C											
Shaft	Solid shaft			-										
	Hollow shaft			A										
Mounting	Special design				Q									
Series	Standard design					24								
Motor														
Motor type	Pot motor						-	T						
	Ribbed motor							QG						
Motor frame size	Defined according to EN 50347								63 ... 90					
Overall length	Packet length, short size									S				
	Packet length, medium size									M, MB				
	Packet length, long size									L				
Number of poles	4-pole										4			
Ventilation	Self-ventilated												-	
	Non-ventilated												U	
Brake	Enclosed brake, rated braking torque 0,9 Nm													-
	Enclosed brake, rated braking torque 4 Nm													BQ0,9
	Enclosed brake, rated braking torque 5 Nm													LQ4G
	Enclosed brake, rated braking torque 10 Nm													P5G
														P10G

Definite Geared Motors

Overview

Gearbox type	Worm gearbox
Motor type	Three-phase induction motors with squirrel-cage rotor
Housing	One-piece die-cast aluminum housing
Max. Torque gearbox	120 Nm
Ratio	5, 11, 13, 16, 20, 25, 43, 52, 60
Connection types	You can establish the connection type that can be used from the product number suffixes in the selection and ordering data for the required motor.
Motor frame size	63, 71, 80, 90
Number of poles	4-pole
Rated speed (synchronous speed)	1500 ... 1800 rpm
Rated power (50 Hz)	0.12 ... 1.5 kW (4-pole)
Voltage range	50/60 Hz 230/400 V P ₅₀ /P ₆₀ 60 Hz 460 V
Rated torque	1.67 ... 10.46 Nm (4-pole)
Stator winding insulation	Temperature class 155 (F)
Degree of protection according to IEC 60034-5 (EN 60034-5)	IP66
Cooling according to IEC 60034-6 (EN 60034-6)	Free cooling - non-ventilated IC410 Self-cooled IC 411
Vibration severity according to IEC 60034-14 (EN 60034-14)	Vibration severity A
Brake type	Electromagnetically released spring-loaded brakes
Ambient temperature	-20 ... +40 °C
Installation altitude	Up to 1000 m above sea level
Surface treatment and preservation	The standard version of the geared motor is unpainted at the factory.. Optional surface treatments are available, on page 1/14
Rating plates	see „Rating plates“ on page 1/15
Connection and terminal boxes	see „Connection, circuit and terminal boxes“ on page 1/9
Compliance with standards	CE, EAC, UL 1004-1, CSA-C22.2 No. 100
CE marking, according to	Low-voltage directive 2014/35/EU RoHS directive 2011/65/EU

The geared motors comply with all of the applicable IEC/EN standards.

IEC	EN	DIN/VDE	Title
IEC 60034-1	EN 60034-1	DIN EN 60034-1 (VDE 0530-1)	Rotating electrical machines: _ Rating and performance
IEC 60034-2-1 IEC 60034-2-2	EN 60034-2-1 EN 60034-2-1	DIN EN 60034-2-1 (VDE 0530-2-1) DIN EN 60034-2-2 (VDE 0530-2-2)	_ Standard technique to determine the losses and efficiency based on testing (with the exception of machines for track and road vehicles) (IEC 60034-2-1:2007); German Edition EN 60034-2-1:2007
IEC 60034-2-3	EN 60034-2-3		_ Measuring the energy efficiency for converter operation
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)	_ Classification of cooling methods (IC 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 60034-11	EN 60034-11	DIN EN 60034-11 (VDE 0530-11)	_ Built-in thermal protection
IEC 60034-12	EN 60034-12	DIN EN 60034-12 (VDE 0530-12)	_ Starting behavior of three-phase squirrel-cage motors, with the exception of pole-changing motors
IEC 60034-30-1	EN 60034-30-1	DIN EN 60034-30-1 (VDE 0530-30)	International efficiency classes for rotating electrical machines (IE code)
IEC 60038	EN 60038	DIN EN 60038 (VDE 0175-1)	IEC standard voltages

Geared motors for use worldwide

The following certificates are available for Innomotics DG Worm geared motors. You can select these individually, or combine them freely into a multi-certificate.

Specifications

Marking	Legal/normative requirements
Examples	
	Low-voltage directive 2014/35/EU RoHS directive 2011/65/EU
	UL 1004 Standard of the Underwriters Laboratories Inc. (testing and certification body)
MG1-12	NEMA MG1 Table 12-12 National standard
	CSA-C22.2 No. 100 Standard of the Canadian Standards Association
Energy Verified	EER Energy Efficiency Regulations
	EAC TR CU EAC declaration for the Eurasian customs union

Motors for the Eurasian Customs Union

To import geared motors into the Eurasian Customs Union area, the TR CU EAC declaration (Russia, Belarus, Kazakhstan, Armenia, Kyrgyzstan) is required.

TR CU = Technical Regulation Customs Union EAC = Eurasian Conformity

The motors have the “EAC” logo marked on the rating plate and the packaging.

The “TR CU EAC declaration” must be available; however, it is generally not included with the delivery. The customs authorities use the motor article number to check the motor certification.

The following are available at configurator.innomotics.com:

- _ TR CU EAC-declaration in line with the low-voltage directive
- _ Additional TR CU EAC declaration according to the EMC Directive.

The TR CU EAC declaration is valid for all geared motors. For gearboxes with adapters, the certificate is not necessary as the TR CU EAC declaration only refers to the motor.

Motors for the Eurasian Customs Union	Additional identification code -Z with order code
	2KJ7740 -.....-Z Order code
Design in accordance with EAC	N30

Motors for the North American market

Motors in frame sizes 63 to 90 are available in designs which meet the UL-R and CSA standards.

Motors for the North American market	Additional identification code -Z with order code	Order code
	2KJ7740 -.....-Z	N38
Design in accordance with UL-R and CSA		

Note:

In the USA, a distinction is made between the rated voltage of the supply system and the rated voltage of the motor. See the table below for the assignment:

Country	Rated voltage of the supply system	Rated voltage of the motor
USA	208 V	200 V
	240 V	230 V
	480 V	460 V

UL-R – Underwriters Laboratories Inc.

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 according to UL. “UL Recognition Mark” is included on the rating plate of the motor.

Externally or internally mounted components such as:

- _ Motor protection
- _ Brake

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 the cable entry.

CSA – Canadian Standard Association

The motors are approved for up to 690 V in accordance with 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 stamped on the rating plate.

Definite Geared Motors

EU directives

WEEE directive

Recycling and disposal of Innomotics geared motors

EU directive 2012/19/EU governs the disposal of used electrical and electronic devices that are placed on the market in the EU. Since August 15, 2018, geared motors have also been subject to EU directive 2012/19/EU and are marked accordingly:



Information on proper disposal is provided in the latest operating instructions of the geared motors.

European RoHS directive

Innomotics DG geared motors comply with the stipulations set up in the directive 2011/65/EU and "The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012" regarding the restriction of the use of certain hazardous substances.

Transmission ratios**Selection and ordering data**

Transmission ratio <i>i</i>	Rated speed 1400 rpm η %	Article No. (Article No. supplement, see below)
60	0.66	2KJ7740 - ■ ■ ■ ■ ■ - ■ ■ J1
52	0.73	2KJ7740 - ■ ■ ■ ■ ■ - ■ ■ H1
43	0.75	2KJ7740 - ■ ■ ■ ■ ■ - ■ ■ G1
25	0.81	2KJ7740 - ■ ■ ■ ■ ■ - ■ ■ F1
20	0.85	2KJ7740 - ■ ■ ■ ■ ■ - ■ ■ E1
16	0.88	2KJ7740 - ■ ■ ■ ■ ■ - ■ ■ D1
13	0.90	2KJ7740 - ■ ■ ■ ■ ■ - ■ ■ C1
11	0.91	2KJ7740 - ■ ■ ■ ■ ■ - ■ ■ B1
5	0.93	2KJ7740 - ■ ■ ■ ■ ■ - ■ ■ A1

Article No. supplement	
Shaft design	see below
Motor frame size, motor type	see page 1/8
Frequency and voltage	see page 1/8
Housing flange design	H

Mounting position

The geared motors are supplied with mounting position M0.

M0 is a universal mounting position in which the geared motor can be installed in any position.

Mounting position	Additional identification code -Z with order code	Order code
M0 output side A	2KJ7740 --Z	D10
M0 output side B		D20

Shaft designs

Shaft designs	Dimen- sions	8th position of the Article No. An order code is required when 9 appears in the 8th position of the Article No.	Order code
Solid shaft	mm	2KJ7740 - ■-Z	
stainless steel with Flange coupling	KFX105	1	-
	KFX78	2	-
Hollow shaft	HX25	5	-
stainless steel	HX30	6	-
Hollow shaft	HX1.125"	9	H7A
stainless steel, inches			

Lubrication and sealing

Gearboxes can be used for different applications. The following lubricants and sealing systems can be selected to ensure an optimum configuration.

The temperature rise of the gearbox during operation increases the oil sump temperature. When selecting the oil, pay attention to the upper limit of the recommended oil sump temperature.

Note:

- _ For ambient conditions with a high air humidity and salt-laden atmosphere, we recommend that only PAO oils are used.
- _ For gearboxes with CLP ISO PG oils for applications in the USA, the approval must be checked. Alternatively, a different type of oil must be used (e.g. CLP ISO PAO oil).

Lubrication

The gearboxes are initially filled at the factory with a high-quality lubricant. Lubricants permitted for the various gearbox types and applications are listed in the lubricant table.

Other oils from various lubricant manufacturers that have been approved by Innomotics can be found on the internet in the Service and Support pages in the List of approved and recommended gear lubricants NT 7300:

<https://www.innomotics.com/hub/de/109753864>

Selection of lubricant

Applica- tions	Oil type	Permissible oil sump temperature range in operation °C	Additional identification code -Z with order code	Order code
Standard	Marking according to DIN 51502		2KJ7740 --Z	
	CLP ISO PAO VG220	-30 ... +100		K12
	CLP ISO PAO VG460	-25 ... +110		K16
	CLP ISO PG VG460	-25 ... +110		K08
	CLP ISO PG VG220	-25 ... +110		K07
Foodstuff area	CLP ISO H1 VG460	-25 ... +100		K11

CLP = mineral oil
CLP PG = polyglycol oil
PAO = poly-alpha-olefin oil
CLP H1 = physiologically safe oil (USDA-H1 approval)

Sealing

The standard models of gearbox are supplied with highquality radial shaft sealing rings with 2 dust protection lips. This sealing design is reliable for a wide range of applications.

Special application areas and environmental conditions require special radial shaft sealing rings and materials, which are coordinated with the particular gearbox oil and environment. This coordinated sealing system results in a high reliability and availability of the plant.

Output shaft sealing	Description	Additional identification code -Z with order code	Order code
		2KJ7740 --Z	

Normal environmental stress			
Standard	High-quality NBR radial shaft sealing ring with 2 dust protection lips.		-
Increased environmental stress			
Seal for increased environ- mental stress	In addition to , this seal offers to the longer service life, it also provides increased protection against higher environmental stress as a result of spray water, moisture and dirt de- posits. As a consequence, the seal- ing system has even a higher degree of reliability.		G27

Definite Geared Motors

Motor options

Motors

The motor with integrated terminal box has a high-quality die-cast aluminum housing, which eliminates the need for an end shield and further reduces the weight of the motor and the required system space.

Duty types

The following operating modes are available depending on the voltages. See the "Selection and ordering data" table below for detailed information.

Duty types	Additional identification code -Z with order code	Order code
Duty types S1	2KJ7740 -.....-Z	-
Duty types S3-75 %		P90
Duty types S3-60 %		P98
Duty types S3-40 %		P99

Selection and ordering data

Frame size	Motor	P _N kW	Voltage V	Duty type	Fre- quency Hz	n _N rpm	T _N Nm	I _N A	cos φ	η %	I _{mot} 10 ⁻⁴ kgm ²	9th to 12th position of the Article No.
63	T63S4U	0.25	230/400	S3-60 %	50	1400	1.71	1.47/0.85	0.64	67	8.3	2KJ7740-...-Z
			150/260			1400	1.71	2.16/1.25	0.69	65		2KJ7740-...-Z
71	T71S4U	0.12	230/400	S1	50	1415	0.81	0.7/0.4	0.7	61.5	10	2KJ7740-...-Z
			220/380		60	1690	0.68	0.67/0.39	0.75	62.5		2KJ7740-...-Z
		0.25	230/400	S1/ S3-60 %	50	1430	1.67	1.56/0.9	0.54	73.5		2KJ7740-...-Z
				S1	50	1430	1.67	1.78/1.03	0.51	70		2KJ7740-...-Z
			220/380	S1	60	1750	1.36	1.91/1.1	0.55	65.3		2KJ7740-...-Z
			150/260	S3-60 %	50	1430	1.67	2.40/1.38	0.54	73.5		2KJ7740-...-Z
			230/460	S3-60 %	60	1740	1.37	1.88/0.94	0.49	72		2KJ7740-...-Z
		0.3	230/400	S3-60 %	60	1730	1.66	1.72/0.99	0.54	76.5		2KJ7740-...-Z
			220/380	S3-60 %	60	1720	1.67	1.82/1.05	0.56	77.5		2KJ7740-...-Z
		0.37	230/400	S3-60 %	50	1410	2.51	2.08/1.2	0.66	75		2KJ7740-...-Z
			220/380	S3-60 %	60	1715	2.06	2.16/1.25	0.69	71.3		2KJ7740-...-Z
	T71M4U	0.55	230/400	S3-60 %	50	1390	3.78	2.42/1.4	0.76	73.3	12.5	2KJ7740-...-Z
			220/380	S3-60 %	60	1700	3.09	2.76/1.59	0.72	73.1		2KJ7740-...-Z
		0.66	230/400	S3-60 %	60	1680	3.75	3.16/1.82	0.74	71		2KJ7740-...-Z
			220/380	S3-60 %	60	1680	3.75	3.36/1.94	0.74	71		2KJ7740-...-Z
			254/440	S3-60 %	60	1680	3.75	2.9/1.66	0.74	71		2KJ7740-...-Z
		0.75	230/400	S3-40 %	50	1400	5.12	3.46/2.00	0.77	79		2KJ7740-...-Z
			220/380	S3-40 %	60	1700	4.21	3.79/2.19	0.71	75.7		2KJ7740-...-Z
			230/460	S3-40 %	60	1725	4.15	3.9/1.95	0.66	77		2KJ7740-...-Z
80	QG80MB4U	0.66	230/400	S3-60 %	50	1420	4.44	3.4/1.97	0.72	67	20.5	2KJ7740-...-Z
	QG80MB4	1.1	230/400	S3-75 %	50	1320	7.96	4.8/2.8	0.86	65.8	30	2KJ7740-...-Z
90	QG90S4U	1.1	230/400	S3-60 %	50	1410	7.45	4.54/2.62	0.78	78	30	2KJ7740-...-Z
		1.3	230/400	S3-60 %	60	1700	7.30	5.2/3.0	0.8	78		2KJ7740-...-Z
	QG90L4U	1.5	230/400	S3-40 %	50	1370	10.46	5.93/3.42	0.84	75.5		2KJ7740-...-Z
		1.8	230/400	S3-40 %	60	1660	10.35	7.1/4.1	0.85	74.5		2KJ7740-...-Z
			460Y	S3-40 %	60	1660	10.35	6.2/3.58	0.85	74.5		2KJ7740-...-Z

Standard voltages

Three-phase motors are available for rated voltages ranging from 150 up to 460 V.

Motor frame sizes 63 up to 90 are generally supplied for the voltage range 230/400 V at 50 Hz.

Frequency Hz	Voltages V	Power	Possible specifications			Motor frame size				13th position of the Article No. An order code is required when 9 appears in the 13th position of the Article No.
			CE	UL-R/CSA	EAC	63	71	80	90	2KJ7740 --Z
Voltages for 50 Hz										
50 Hz	230 V Δ/400 V Y	P ₅₀	✓	✓	✓	✓	✓	✓	✓	1 -
50 Hz	150 V Δ/260 V Y	P ₅₀	✓	-	✓	✓	✓	-	-	9 N9C
Voltages for 50/60 Hz										
Voltages for 60 Hz, 50 Hz power										
50 Hz	230 V/400 V	P ₅₀	✓	-	✓	-	✓	-	-	9 N3Q
60 Hz	220 V/380 V	P ₆₀								
Voltages for 60 Hz										
Voltages for 60 Hz, 50 Hz power										
60 Hz	220 V Δ/380 V Y	P ₅₀	✓	✓	✓	-	✓	✓	-	9 N4C
60 Hz	230 V YY/460 V Y	P ₅₀	✓	✓	✓	-	✓	✓	-	9 N4N
60 Hz	230 V Δ/400 V Y	P ₆₀	✓	-	✓	-	-	-	✓	9 N5A
Voltages for 60 Hz, 60 Hz power										
60 Hz	220 V Δ/380 V Y	P ₆₀	✓	-	✓	-	✓	-	-	9 N5C
60 Hz	460 V Y	P ₆₀	✓	-	✓	-	-	-	✓	9 N5H
60 Hz	254 V Δ/440 V Y	P ₆₀	✓	-	✓	-	✓	-	-	9 N9D

Connection, circuit and terminal boxes**Location and position of the terminal box**

For motors of size 63 and 71 the terminal box is part of the stator. There are preset breaking points (d = 20 mm) on all 4 sides for cable insertion, which can be freely selected for the connection.

For motor sizes 80 and 90, the terminal box can be mounted in four different locations or positions.

The position of the terminal box is always when viewing the drive end (DE) of the motor.

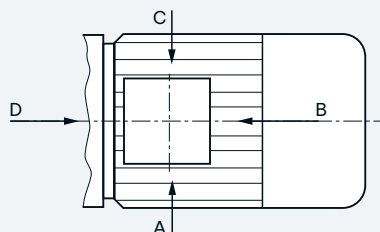
The standard position of the terminal box is on the right-hand side, with the cable entry from below (1A).

The terminal box is always located at the drive end (DE) of the motor.

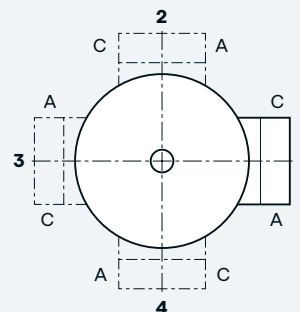
Selection data, cable entry

Terminal box position	Position of the cable entry	Additional identification code -Z with order code	Order code
Motor frame size 63 and 71			
1	–	2KJ7740 -.....-Z	M71
2	–		M72
3	–		M73
4	–		M74
Motor frame size 80 and 90			
1	A		M55
	B		M56
	C		M57
	D		M58
2	A		M59
	B		M60
	C		M61
	D		M62
3	A		M63
	B		M64
	C		M65
	D		M66
4	A		M67
	B		M68
	C		M69
	D		M70

Position of the cable entry



Terminal box position (when viewing DE)

**Fig. 1-2** Terminal box position and cable entry

Definite Geared Motors

Motor options

Connection, circuit and terminal boxes

Motor connection Δ/Y

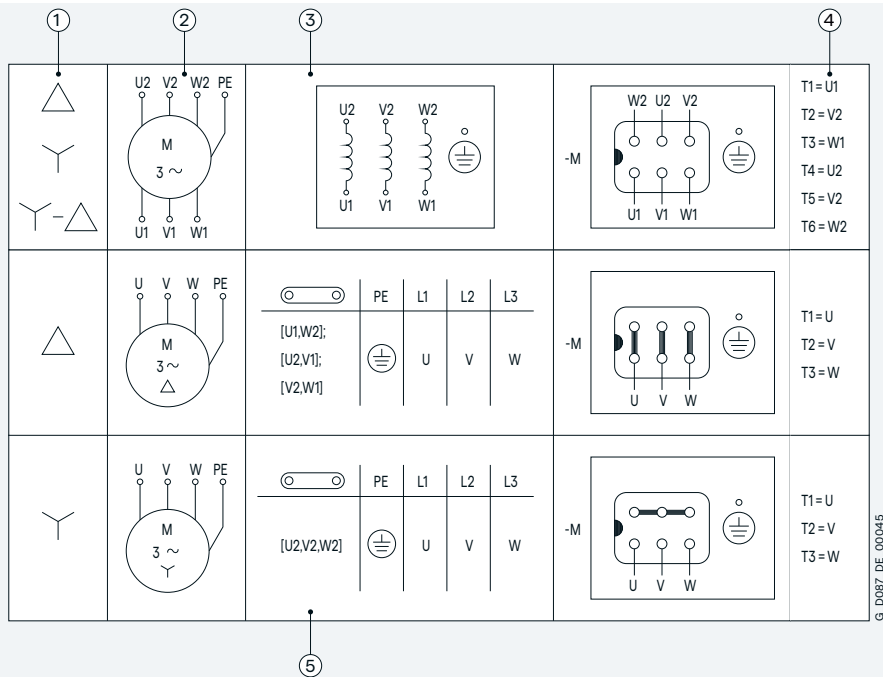


Fig. 1-3 Connection circuit diagram, motor connection Δ/Y

- ① Motor connection
- ② Circuit diagram symbols
- ③ Winding arrangement in the motor
- ④ Comparison:
Terminal designation acc. to NEMA MG1/acc. to IEC 60034-8
- ⑤ Location of the jumpers on the terminal board and juxtaposition of the line connection with the motor connection

Motor connection YY/Y

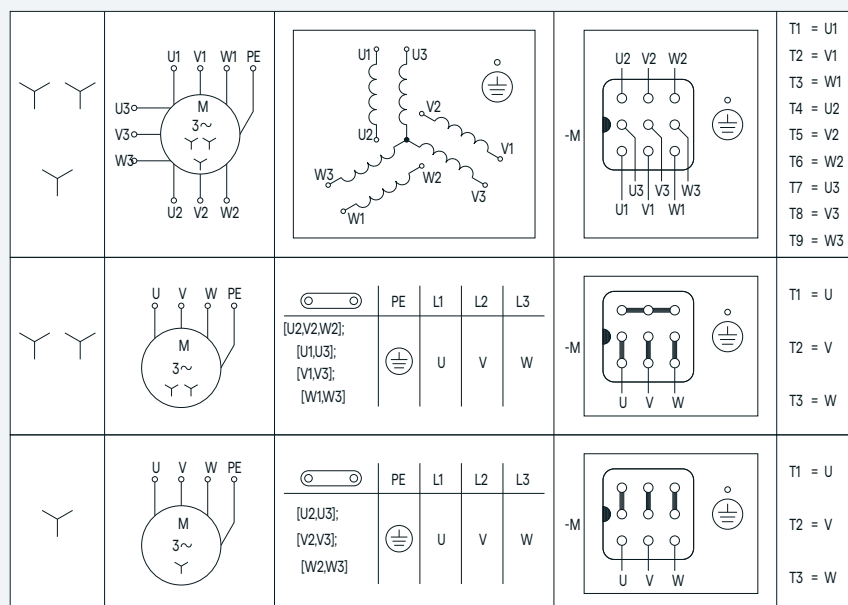


Fig. 1-4 Connection circuit diagram, motor connection YY/Y

Brake

The LQ4G, BQ0,9, P5G and P10G electromagnetically opened spring-applied brakes are failsafe brakes. During normal operation, the braking torque is generated by spring force and is released by magnetic force.

The brakes are standard supplied as enclosed brakes. This prevents the release and penetration of dust, moisture, and other pollution. Other advantages are reduced noise when applying the brake as well as a reduced risk of the rotor freezing on the friction surfaces.

The LQ4G, P5G, and P10G brakes can be used as working brakes or holding brakes. The BQ0,9 brake, on the other hand, is a holding brake only.

Connecting the brake

Labeled terminals are provided in the main terminal box of the motor to connect the brake.

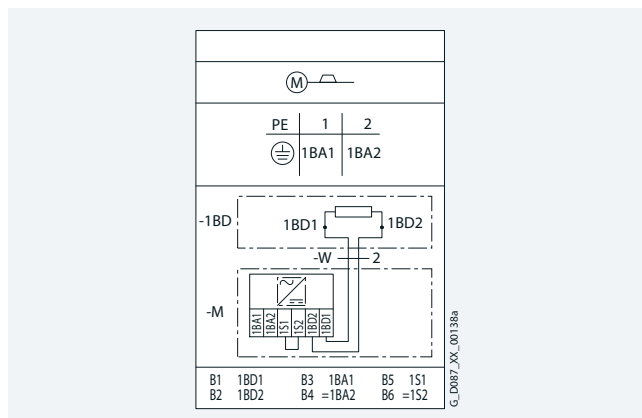
Connection circuit diagram with AC or DC control

Fig. 1-5 Connection circuit diagram with AC control voltage

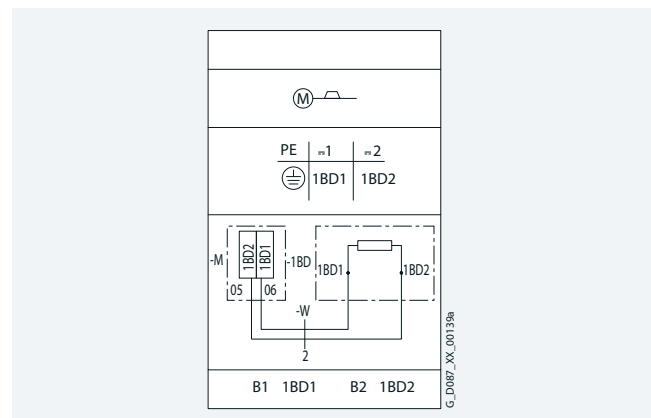


Fig. 1-6 Connection circuit diagram with DC control voltage

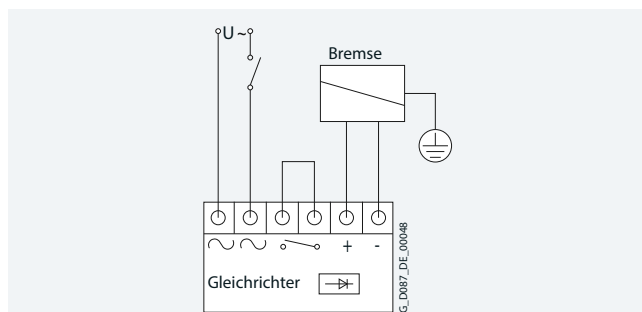
Function diagram of a brake switched on the AC or DC and AC sides

Fig. 1-7 Function diagram of a brake switched on the AC side

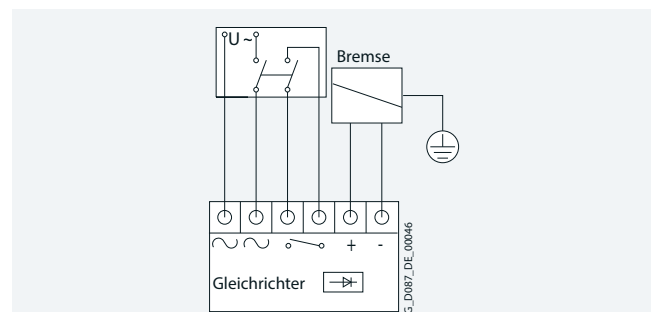


Fig. 1-8 Function diagram of a brake switched on the DC and AC sides

Supply voltages

The following supply voltages are available for brakes.

Supply voltage	Possible specifications for SCAQ/SCQ			Brake type	Rectifier	Coil voltage	Additional identification code -Z with order code	Order code
	CE	UL-R/CSA	EAC				2KJ7740 -.....-Z	
DC voltages								
DC 24 V ± 10 %	✓	✓	✓	LQ4G, P10G	–	–		C66
DC 103 V ± 10 %	✓	✓ ¹⁾	–	LQ4G, BQ0,9, P5G, P10G	–	–		C52
AC voltages								
AC 230 V ± 10 %	✓	–	✓	LQ4G, P5G, P10G	Half-wave rectifier	DC 103 V		C46

¹⁾ The UL-R/CSA specification is not available for the BQ0,9 brake.

Definite Geared Motors

Motor options

Technical specifications of the brake

Braking torques, disconnection times, application times and moments of inertia

Brake type	Power consumption		Rated torque at n = rpm		Moment of inertia of the rotor				Maximum permissible switching duty cycle W_{max} for a single braking operation from n = 1500 rpm		Application time DC side		Disconnection time			
	at +20 °C		M_2		J_B						t_1		t_2			
	W		Nm		10 ⁻⁴ kgm ²				kJ		ms		ms			
Holding brake																
BQ0,9	8		0.9		0.155				7		45		28			
Brake type	Power consumption	Rated torque at n = rpm	Moment of inertia of the rotor	Braking torque measured at rated braking torque at 100 rpm					Friction energy		Transition switching frequency	Application time DC side			Disconnection time	
				1500 rpm	1800 rpm	2500 rpm	3000 rpm	3600 rpm	Per braking operation	until the brake lining is replaced		t_{11} ms	t_{12} ms	t_1 ms		t_2 ms
									$W_{1\text{max}}$ kJ	W_{tot} MJ						
	At +20 °C	M_2	J_B	%	%	%	%	%			$S_{\text{hü}}$ h ⁻¹					
	W	Nm														
Working brakes																
LQ4G	20	4	0.13	87	85	82	80	78	3	36	79	14	29	43	62	
P5G	29	5	0.15	87	85	82	80	78	3	64	96	18	20	38	35	
P10G	40	10	0.45	85	83	80	78	76	6	120	60	20	30	50	60	

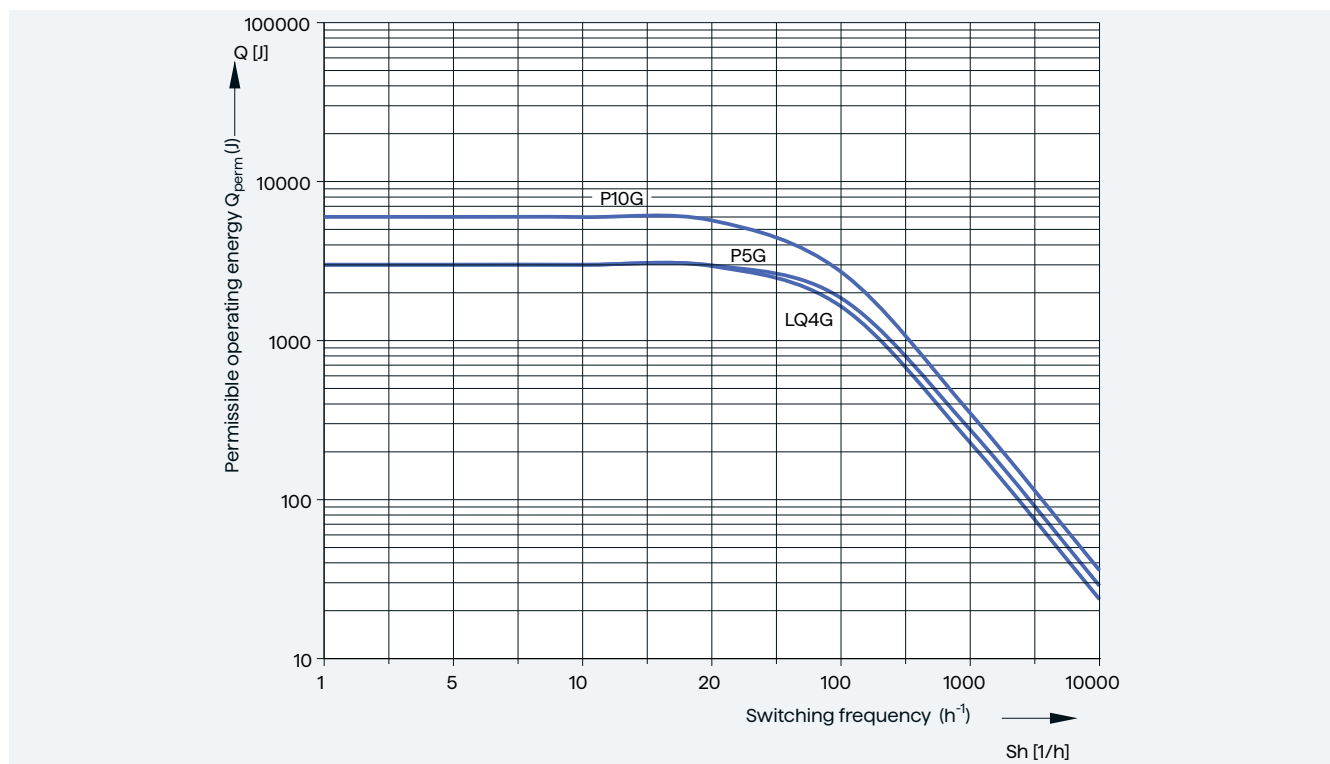
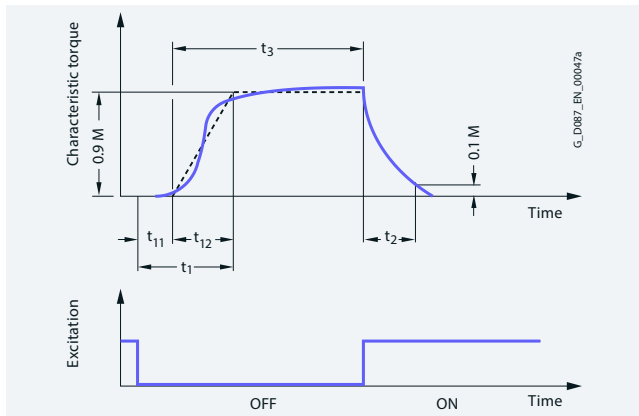


Fig. 1-9 Permissible operating energy

Definition of switching times (VDI 2241)**Fig. 1-10** Brake switching times

Switching times:

- t_1 Application time of the brake
- t_2 Disconnection time
- t_3 Slipping time
- t_{11} Response time
- t_{12} Rise time

Definite Geared Motors

General options

Surface treatment and preservation

For a higher protect of the drives against corrosion and external influences, a high-quality paint systems is available in various colors.

1

The corrosion protection system is designed in accordance with the corrosivity categories of Standard EN ISO 12944-2.

The geared motors are supplied unpainted as standard.

The shaft extensions and bare surfaces are treated with corrosion protection for 6 months.

Note:

Parts made of plastic are generally not painted.

Corrosivity category	Paint system			Additional identification code -Z with order code	
	Base coat	Intermediate coat	Top coat	2KJ7740 -.....-.....-Z	Order code
Surface protection					
Unpainted (standard)	-	-	-		L00
C5 Very high environmental stress	2-component epoxy zinc phosphate 90 µm	2-component epoxy zinc phosphate 90 µm	2-component polyurethane 100 µm		L05
Layer thickness					

Colors

In addition to anthracite gray (RAL 7016), you can select from other standard colors.

RAL color	Designation	Additional identification code -Z with order code	
		2KJ7740 -.....-.....-Z	Order code
RAL 7016	Anthracite gray (standard)		L75
RAL 7035	Light gray		L54
RAL 7045	Telegrey 1		L39
RAL 9005	Jet black		L77
RAL 9006	White aluminum		L78
RAL 9011	Graphite black		L80

Definite Geared Motors

General options

Rating plate

The rating plate of the gearbox or geared motor is printed on a labeled polyester. The rating plate is glued using a special masking film. The film ensures permanent resistance to UV radiation and media of all kinds, such as oils, greases, salt water and cleaning agents.

The adhesive and material ensure firm adhesion and long-term readability throughout the operating temperature range of the gearbox and geared motor.

For painted drives, the edges of the rating plate have a paint finish to match the drive color.

For geared motors, the rating plate is attached to a stainless steel plate on the motor.

For specific designs, additional rating plates are attached to the motor.

Customer-specific data can be indicated with option **Y00** and plain text (e.g. Y00:*LSF@plain text*).

1**Geared motors SC.Q not in UL/CSA design**

INNOMOTICS S ZZLP0/8311500701 1P 2KJ7740-6CD61-1A11-Z SCAQ24-T71S4U-LQ4G SCA1-1AN0072B IP66 IC410 15kg Tamb -20...+40 °C K-ID: 201308 0.18L OIL CLPP PGVG460 i: 60 50Hz n2: 23.70r/min T2: 66Nm fB: 1.8 3-G-Mot. Th.CL155(F) 50Hz 230/400V D/Y 1.56/0.9A S3-60% cosφ 0.54 0.25kW 1430r/min Innomotics GmbH, Bahnhofstr. 40, DE-72072 Tuebingen / Made in Germany																	
INNOMOTICS 1 3 5 6 8 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 Innomotics GmbH, Bahnhofstr. 40, DE-72072 Tuebingen /																	

Fig. 1-11 Example of a rating plate for non-UL/CSA geared motors**General data**

- 1 Data Matrix Code
- 2 Applicable standard
- 3 Serial No.
- 4 CE marking or other marking, if required
- 5 Article No.
- 6 Type designation
- 7 Mounting position
- 8 Geared motors type
- 9 Degree of protection according to IEC 60034-5
- 10 Ventilation method according to IEC 600034-6
- 11 Weight m [kg]
- 12 Ambient temperature
- 13 Customer-specific data ¹⁾ (customer ID/free text), max. 20 characters
- 14 Oil quantity [l] gearbox
- 15 Oil type
- 16 Oil viscosity ISO VG class according to DIN 51519/ISO 3448
- 17 Total transmission ratio i
- 18 Year of manufacture

Frequency 1

- 19 Rated frequency f [Hz]
- 20 Gearbox output speed n_2 [rpm]
- 21 Geared motor output torque T_2 [Nm]
- 22 Service factor f_B

Motor and brake data

- 23 Phase number and type of current for the motor
- 24 Temperature class Th.Cl.
- 25 Symbols (IEC 60617-2): = brake
- 26 Rated braking torque T_{br} [Nm]
- 27 Brake supply voltage U [V]

Frequency 1

- 28 Rated frequency f [Hz]
- 29 Rated voltage range U [V]
- 30 Circuit, graphic symbols according to EN 60617 Part 6 / IEC 60617-6
- 31 Rated current I_N [A]
- 32 Operating mode for motor and brake (if ≠ S1)
- 33 Power factor $\cos \varphi$
- 34 Rated power P_N [kW]
- 35 Rated speed n_N [rpm]
- 36 Manufacturer's address and country of origin

Additional order options

Definite Geared Motors

General options

Rating plate

Geared motors SC.Q in UL/CSA design

INNOMOTICS S ZZLP1/8308468201 1P 2KJ7740-6CD61-9AJ1-Z SCAQ24-T7IS4U-LQ4G SCAI-1AN0072B IP66 IC410/TENV 15kg WP Tamb -20...+40 °C K-ID: 3015634 0.18L OIL CLP PGVG460 i: 60 2022 60Hz n2: 29.16r/min T2: 54Nm fB: 2.2 3-G-Mot. Th.CL155(F) 60Hz 230/400V D/Y DES.B CODE N 4Nm 24V DC 1.74/1.0A PF0.59 0.25kW 1750r/min 0.33HP 6'ON/4'OFF SF1.15 Innomotics GmbH, Bahnhofstr. 40, DE-72072 Tuebingen / Made in Germany													
INNOMOTICS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 Innomotics GmbH, Bahnhofstr. 40, DE-72072 Tuebingen /													

Fig. 1-12 Example of a rating plate with a UL/CSA design

General data

1	Data Matrix Code
2	Applicable standard
3	Serial No.
4	CE marking or other marking, if required
5	Article No.
6	Type designation
7	Mounting position
8	Geared motors type
9	Degree of protection according to IEC 60034-5
10	Ventilation method according to IEC 600034-6
11	Weight m [kg]
12	Waterproof
13	Ambient temperature
14	Customer-specific data ¹⁾ (customer ID/free text), max. 20 characters
15	Oil quantity [l] gearbox
16	Oil type
17	Oil viscosity ISO VG class according to DIN 51519/ISO 3448
18	Total transmission ratio /
19	Year of manufacture

Frequency 1

20	Rated frequency f [Hz]
21	Gearbox output speed n_2 [rpm]
22	Geared motor output torque T_2 [Nm]
23	Service factor f_B

Motor and brake data

24	Phase number and type of current for the motor
25	Temperature class Th.Cl.
26	Symbols (IEC 60617-2): = brake
27	Rated braking torque T_{br} [Nm]
28	Brake supply voltage U [V]
Frequency 1	
29	Rated frequency f [Hz]
30	Rated voltage range U [V]
31	Circuit, graphic symbols according to EN 60617 Part 6 / IEC 60617-6
32	Rated current I_N [A]
33	Power Factor
34	Rated power P_N [kW]
35	Rated speed n_N [rpm]
36	Design Letter
37	Code letter
38	Power in hp
39	NEMA operating mode
40	Service factor
41	Manufacturer's address and country of origin

Packaging options

The geared motors are sent in a box as standard.

For countries that cannot be supplied by truck are shipped in a carton suitable for sea and air freight.

The following packaging options are available.

Packaging option	Can be selected for the following countries	Minimum order quantity	Additional identification code -Z with order code	Order code
Individual packaging				
Box	Albania, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Great Britain, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Kosovo, Malta, the Netherlands, Poland, Portugal, Romania, Serbia, Slovakia, Republic of Srpska, Sweden, Switzerland, Slovenia, Spain	-	2KJ7740 -.....-Z	W40
Collective packaging				
Wire-mesh box	Germany	20 units		W45
Overseas	Worldwide	-		W46

General notes**Shaft heights**

DIN 747 shaft heights for machines

Shaft height mm	Tolerance mm
≤ 250	−0.5
> 250	−1

1

Shaft extensions

DIN 748-1 cylindrical shaft extensions

Diameter tolerance:

Diameter mm	Tolerance mm
≤ 50	ISO k6
> 50	ISO m6

Center holes according to DIN 332 type DR:

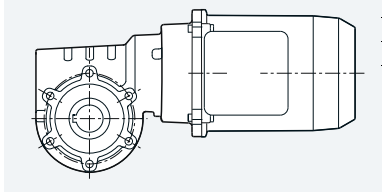
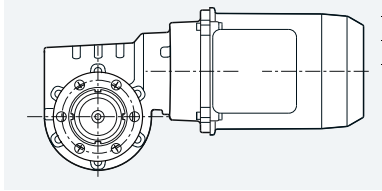
Diameter mm	Thread size
> 16 ... 21	M6
> 21 ... 24	M8
> 24 ... 30	M10
> 30 ... 38	M12
> 38 ... 50	M16
> 50 ... 85	M20

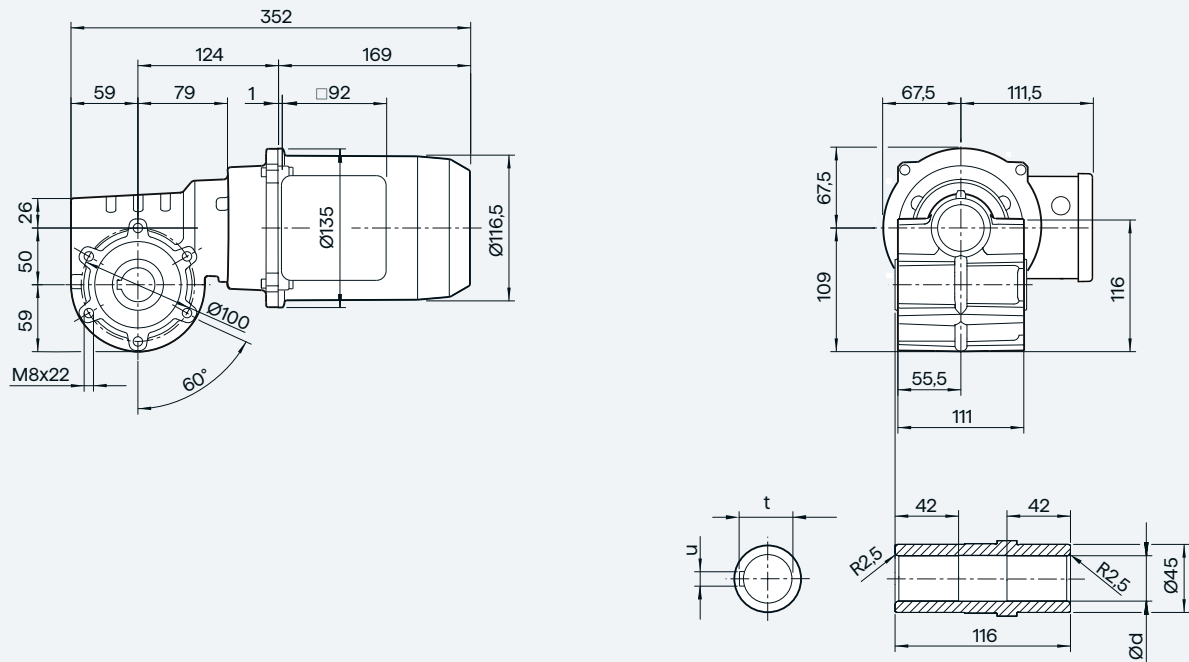
Hollow shaftsHollow shaft design with feather key

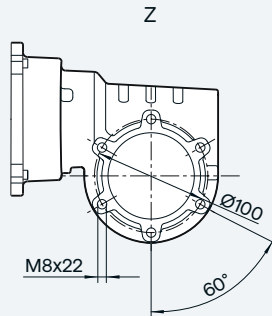
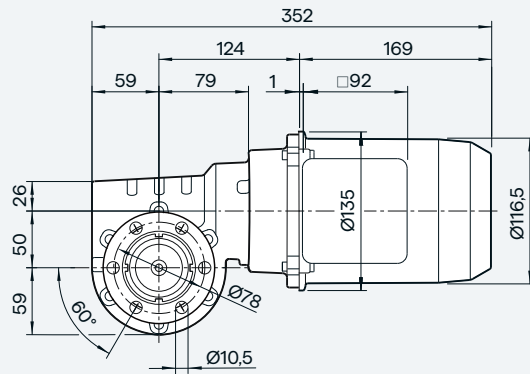
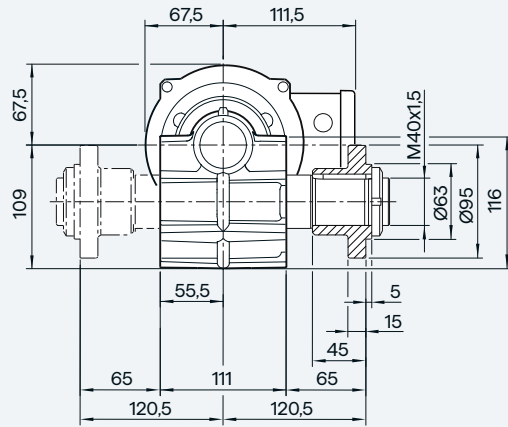
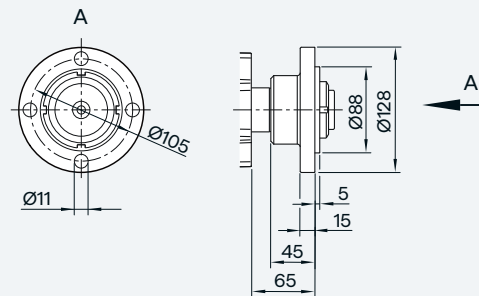
Diameter tolerance Ø: ISO H7 measured using a mandrel

Feather keys: acc. to DIN 6885-1 (high form)

Overview

Design	Motor frame size	Dimensional drawing, see page
SCAQ24 	T63	1/18
	T71	1/20
	QG80	1/22
	QG90	1/24
SCQ24 	T63	1/19
	T71	1/21
	QG80	1/23
	QG90	1/25

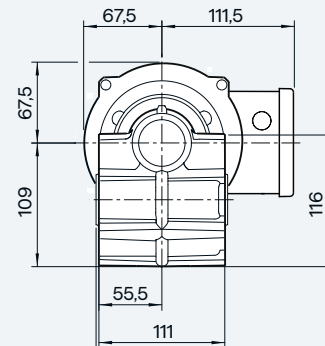
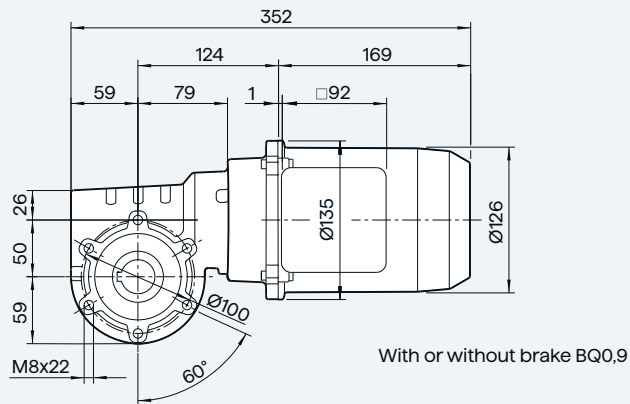
Definite Geared Motors**Geared motor SCAQ24-T63****SCAQ24-T63S4U**

Geared motor SCQ24-T63**SCQ24-T63S4U****KFX78 with Flange coupling****KFX105 with Flange coupling**

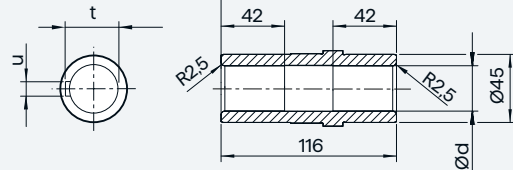
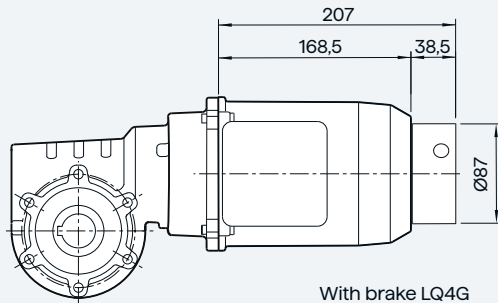
Definite Geared Motors

Geared motor SCAQ24-T71

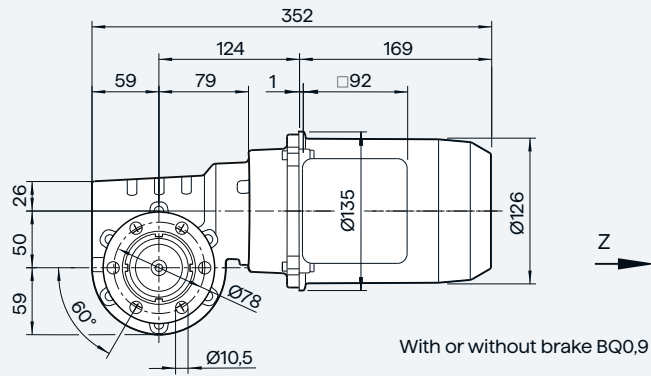
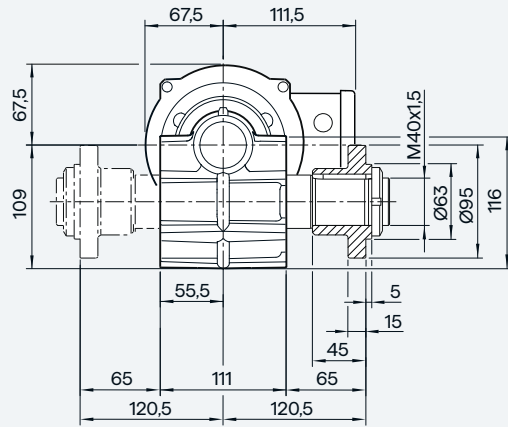
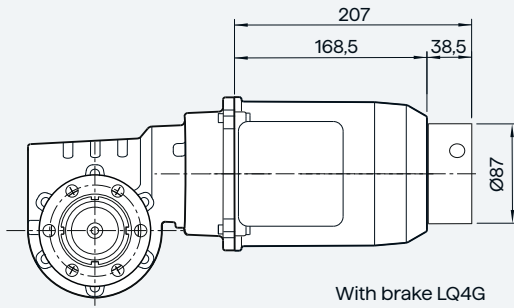
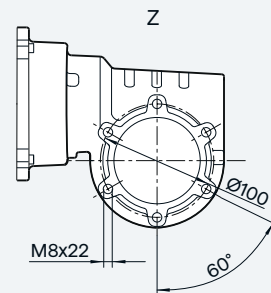
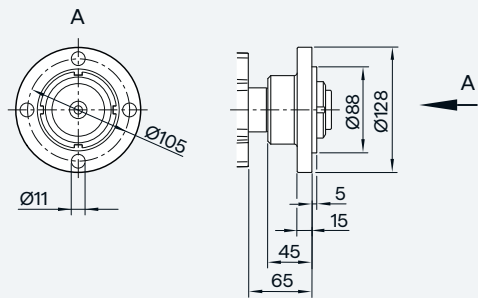
SCAQ24-T71.4U



SCAQ24-T71.4U-LQ4G



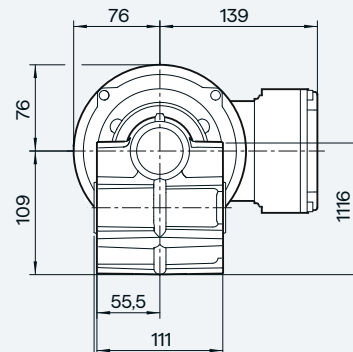
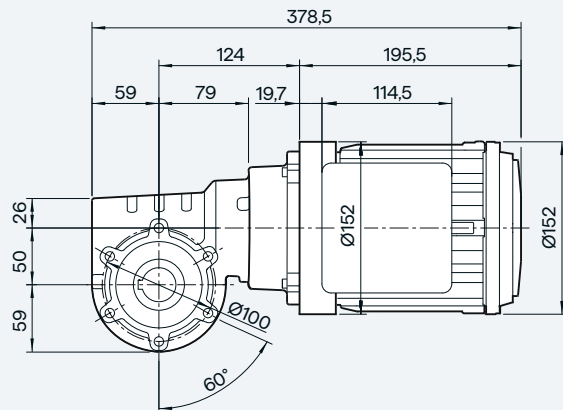
Hohlwelle	d	u	t
HX25	25 H7	8 JS9	28.3 +0.2
HX30	30 H7	8 JS9	33.3 +0.3
HX1.125"	1.125" +0.0008" +0.0003"	0.25" + 0.0019"	1.25" + 0.051"

Geared motor SCQ24-T71**SCQ24-T71.4U****KFX78 with Flange coupling****SCQ24-T71.4U-LQ4G****KFX105 with Flange coupling**

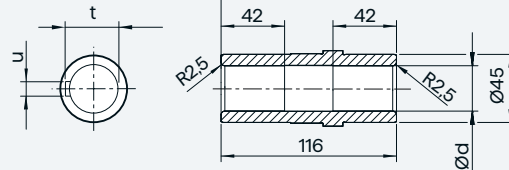
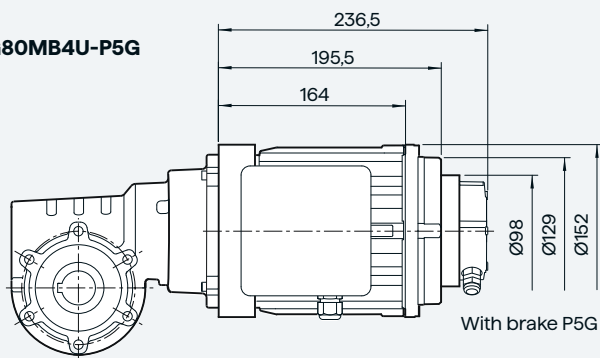
Definite Geared Motors

Geared motor SCAQ24-QG80

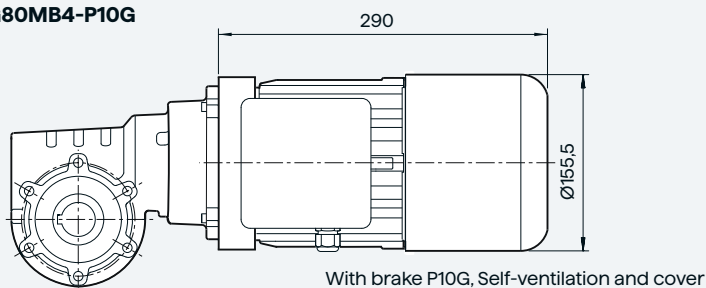
SCAQ24-QG80M4U



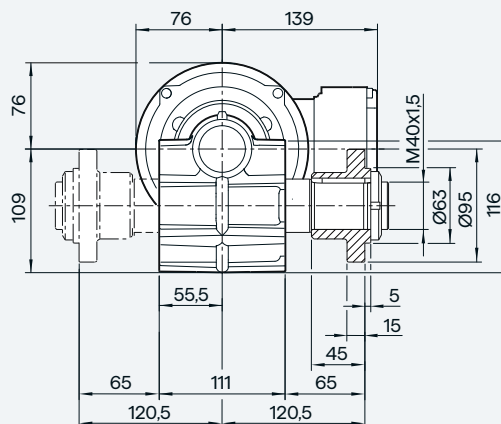
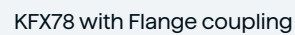
SCAQ24-QG80MB4U-P5G



SCAQ24-QG80MB4-P10G



Hohlwelle	d	u	t
HX25	25 H7	8 JS9	28.3 +0.2
HX30	30 H7	8 JS9	33.3 +0.3
HX1.125"	1.125" +0.0008" +0.0003"	0.25" + 0.0019"	1.25" + 0.051"

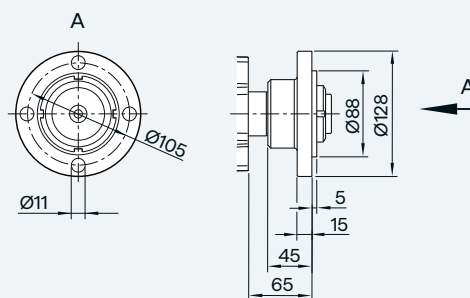
SCQ24-QG80M4U

Technical drawing of the 80MB4U-P5G motor. The drawing includes a side view and a front view. The side view shows the motor's profile with the following dimensions:

- Total length: 236,5
- Length to the start of the cooling fins: 195,5
- Length of the cooling fin section: 164
- Flange diameter: Ø98
- Motor body diameter: Ø129
- Terminal box diameter: Ø152

The front view shows the motor's mounting flange with four mounting holes. The text "With brake P5G" is located below the side view.

KFX105 with Flange coupling

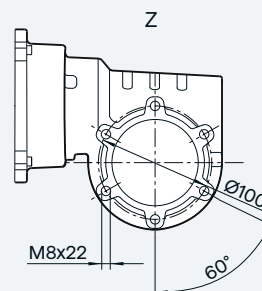


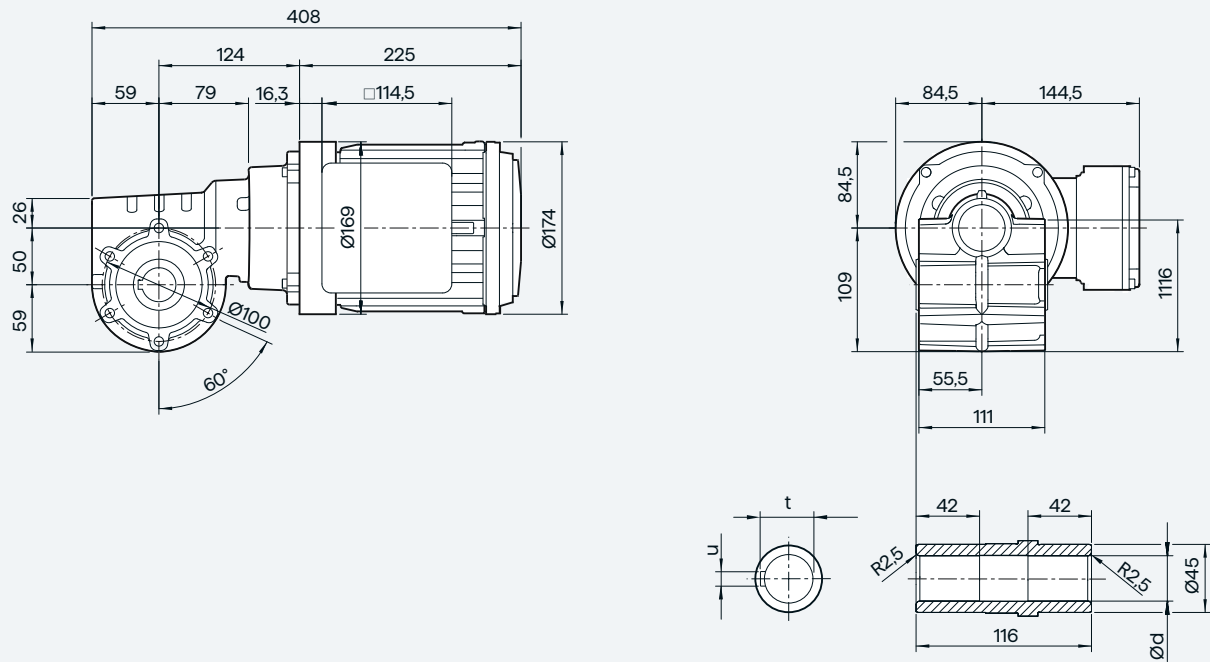
80MB4-P10G

290

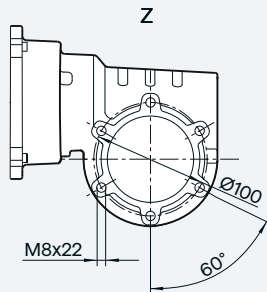
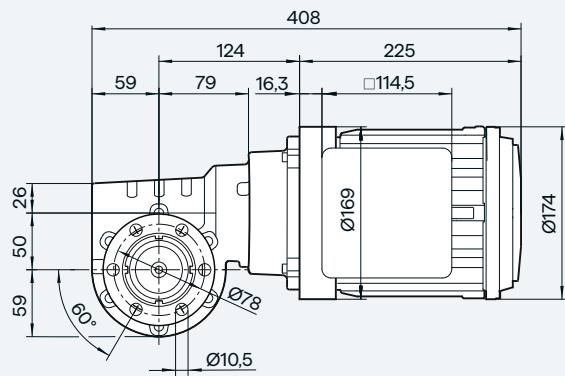
Ø155.5

With brake P10G, self-ventilation and cover

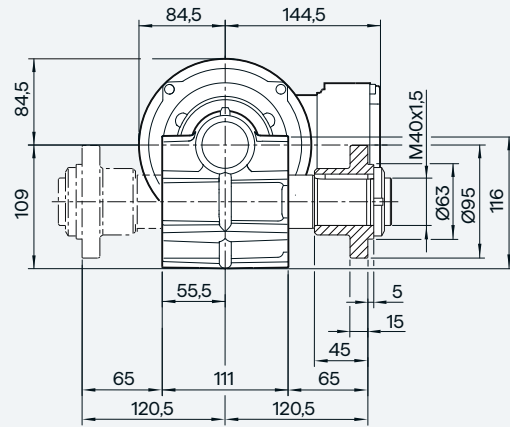
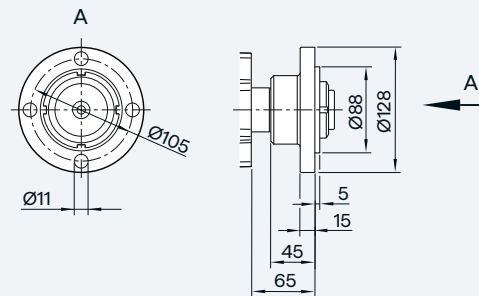


Definite Geared Motors**Geared motor SCAQ24-QG90****SCAQ24-QG90.4U**

Hohlwelle	d	u	t
HX25	25 H7	8 JS9	28.3 +0.2
HX30	30 H7	8 JS9	33.3 +0.3
HX1.125"	1.125" +0.0008" +0.0003"	0.25" + 0.0019"	1.25" + 0.051"

Geared motor SCQ24-QG90**SCQ24-QG90.4U**

Z

KFX78 with Flange coupling**KFX105 with Flange coupling**

A

Innomotics

Moves!

2



2

Innomotics Moves!

2/2 Innomotics Geared motors

- 2/2 Innomotics SG Geared motors 2KJ3
- 2/4 Innomotics SG Gearboxes with adapter 2KJ3
- 2/6 Innomotics SG G115D 2KJ8

2/8 Innomotics Low Voltage Motors

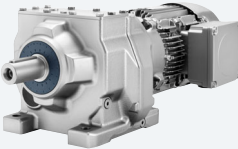
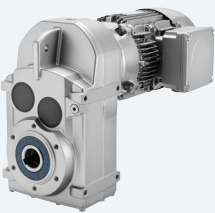
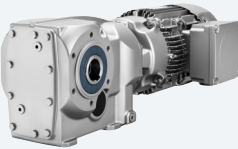
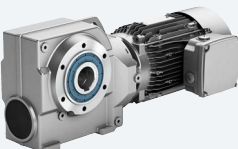
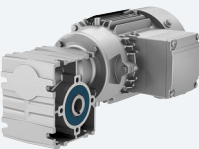
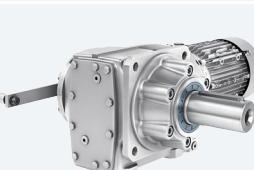
- 2/8 Innomotics GP and SD low-voltage motors
- 2/8 Innomotics XP explosion-protected motors

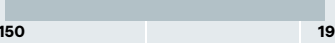
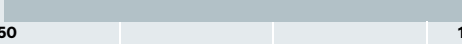
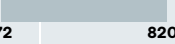
2/10 Innomotics SG Drive Train

1

2

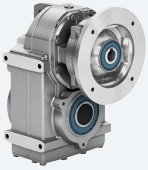
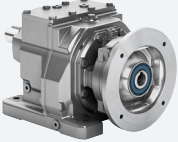
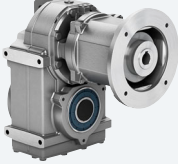
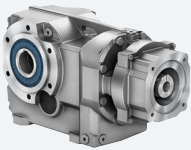
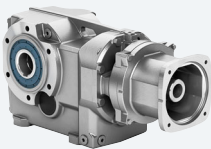
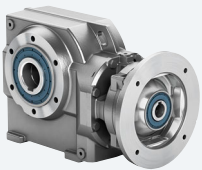
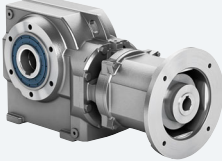
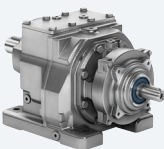
3

Geared motors		Features	Degree of protection	Gearbox designation (stages)
Innomotics SG Geared motors 2KJ3				
	Helical geared motors	1-stage, 2-stage and 3-stage Solid shaft designs	IP65	Z19 ... Z189 (2-stage) D19 ... D189 (3-stage) E39 ... E149 (1-stage)
	Parallel shaft geared motors	2-stage and 3-stage Hollow shaft designs Solid shaft designs	IP65	FZ29 ... FZ189 (2-stage) FD29 ... FD189 (3-stage)
	Bevel geared motors	2-stage and 3-stage Hollow shaft designs Solid shaft designs	IP65	B19 ... B49 (2-stage) K39 ... K189 (3-stage)
	Helical worm geared motors	2-stage Hollow shaft designs Solid shaft designs	IP65	C29 ... C89 (2-stage)
	Worm geared motors	1-stage Hollow shaft designs Solid shaft designs	IP65	S09 ... S29 (2-stage)
	Electric-monorail geared motors	2-stage and 3-stage Hollow shaft designs Solid shaft designs	IP65	BH.29 ... BH.39 (2-stage) KHF49 ... KHF79 (3-stage)

Gearbox size	Maximum output torque T_{2N} Nm					Gearbox transmission ratio i	Catalog
	10	100	1000	10000	100000		
19, 29, 39, 49, 59, 69, 79, 89, 109, 129, 149, 169, 189	 3019000					1.29 ... 373	D 50.1
29, 39, 49, 69, 79, 89, 109, 129, 149, 169, 189	 15019000					3.57 ... 413	
19, 29, 39, 49, 69, 79, 89, 109, 129, 149, 169, 189	 5019500					3.47 ... 244.25	
29, 39A, 49, 69, 89	 821450					6.43 ... 363	
09, 19, 29	 33116					5 ... 100	
29, 39, 49, 69, 79	 72820					7.23 ... 244.25	

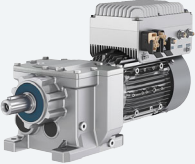
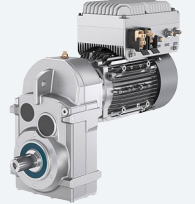
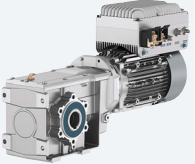
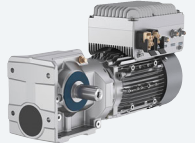
Innomotics Moves!

2

Gearbox with adapter		Features	Gearboxes	Low voltage motors	
Innomotics SG Gearbox with adapter 2KJ3					
	Adapter KU	Coupling adapter with flexible coupling	_ Helical gearboxes _ Parallel shaft gearboxes _ Bevel gearboxes _ Helical worm gearboxes	_ Innomotics GP/SD low-voltage motors _ Innomotics XP explosion-protected motors	
	Adapter K4	Short adapter with plug-in connection	_ Helical gearboxes _ Parallel shaft gearboxes _ Bevel gearboxes _ Helical worm gearboxes	_ Innomotics GP/SD low-voltage motors _ Innomotics XP explosion-protected motors	
	Adapter K2	Coupling adapter with flexible coupling	_ Helical gearboxes _ Parallel shaft gearboxes _ Bevel gearboxes _ Helical worm gearboxes	_ Innomotics GP/SD low-voltage motors _ Innomotics XP explosion-protected motors	
	KS adapter	Coupling adapter with flexible coupling exclusively for mounting defined Siemens servo motors	_ Helical gearboxes _ Parallel shaft gearboxes _ Bevel gearboxes _ Helical worm gearboxes	_ SIMOTICS S-1FK2 _ SIMOTICS S-1FK7 _ SIMOTICS S-1FT7 _ SIMOTICS M-1PH8 (1PH808 and 1PH810) _ SIMOTICS S-1FL6	
	Adapter K8	Coupling adapter with flexible coupling for mounting a servo motor from the SIMOTICS M-1PH8 range	_ Helical gearboxes _ Parallel shaft gearboxes _ Bevel gearboxes _ Helical worm gearboxes	_ SIMOTICS M-1PH8 (from 1PH813)	
	Adapter K5	Short adapter with plug-in connection	_ Helical gearboxes _ Parallel shaft gearboxes _ Bevel gearboxes _ Helical worm gearboxes	_ NEMA motors	
	Adapter K3	Coupling adapter with flexible coupling	_ Helical gearboxes _ Parallel shaft gearboxes _ Bevel gearboxes _ Helical worm gearboxes	_ NEMA motors	
	Adapter A/AZ	Adapters with free input shaft	_ Helical gearboxes _ Parallel shaft gearboxes _ Bevel gearboxes _ Helical worm gearboxes	-	

Gearbox size	Maximum output torque T_{2N} Nm					Gearbox transmission ratio i	Catalog
	10	100	1000	10000	100000		
29, 39, 49, 59, 69, 79, 89, 109, 129, 149, 169, 189	70				19500	_ 1.29 ... 373 _ 3.57 ... 413 _ 3.47 ... 244.25 _ 6.43 ... 363	D 50.11
29, 39, 49, 69, 79, 89, 109, 129, 149, 169, 189	70				19500	_ 1.29 ... 373 _ 3.57 ... 413 _ 3.47 ... 244.25 _ 6.43 ... 363	
29, 39, 49, 69, 79, 89, 109, 129, 149, 169, 189	70				19500	_ 1.29 ... 373 _ 3.57 ... 413 _ 3.47 ... 244.25 _ 6.43 ... 363	
19, 29, 39, 49, 59, 69, 79, 89, 109, 129, 149, 169, 189	30				19500	_ 1.29 ... 373 _ 3.57 ... 413 _ 3.47 ... 244.25 _ 6.43 ... 363	
89, 109, 129, 149, 169, 189			675		19500	_ 3.85 ... 373 _ 3.76 ... 413 _ 5.81 ... 244.25 _ 6.86 ... 363	
29, 39, 49, 69, 79, 89, 109, 129, 149, 169, 189	70				19500	_ 1.29 ... 373 _ 3.57 ... 413 _ 3.47 ... 244.25 _ 6.43 ... 363	
29, 39, 49, 69, 79, 89, 109, 129, 149, 169, 189	70				19500	_ 1.29 ... 373 _ 3.57 ... 413 _ 3.47 ... 244.25 _ 6.43 ... 363	
29, 39, 49, 69, 79, 89, 109, 129, 149, 169, 189	70				19500	_ 1.29 ... 373 _ 3.57 ... 413 _ 3.47 ... 244.25 _ 6.43 ... 363	

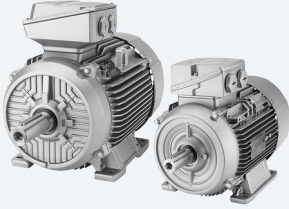
Innomotics Moves!

Geared motors		Features	Degree of protection	Gearbox designation (stages)
Innomotics SG G115D - 2KJ8 distributed drive system				
	Helical geared motors	1-stage, 2-stage und 3-stage Solid shaft designs	IP65	Z19 ... Z89 (2-stage) D19 ... D89 (3-stage) E39 ... E89 (1-stage)
	Parallel shaft geared motors	2-stage and 3-stage Hollow shaft designs Solid shaft designs	IP65	FZ29 ... FZ89 (2-stage) FD29 ... FD89 (3-stage)
	Bevel geared motors	2-stage and 3-stage Hollow shaft designs Solid shaft designs	IP65	B19 ... B49 (2-stage) K39 ... K109 (3-stage)
	Helical worm geared motors	2-stage Hollow shaft designs Solid shaft designs	IP65	C29 ... C89 (2-stage)

Gearbox size	Maximum output torque T_{2N} Nm					Gearbox transmission ratio i	Catalog
	10	100	1000	10000	100000		
19, 29, 39, 49, 59, 69, 79, 89	12	2110				1.29 ... 330.23	D 50.15
29, 39, 49, 69, 79, 89	25	2270				3.57 ... 357	
19, 29, 39, 49, 69, 79, 89, 109	7.7	2900				3.47 ... 244.25	
29, 39A, 49, 69, 89	14	1680				6.2 ... 363	

Innomotics Moves!

2

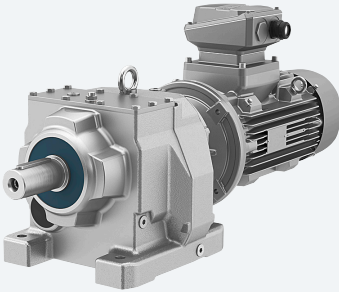
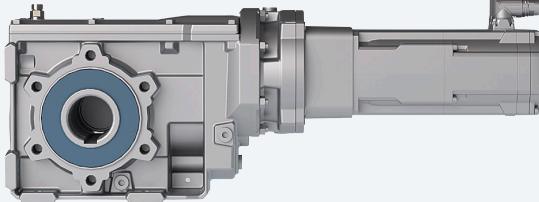
Motor type	Features	Degree of protection	Cooling method
Innomotics GP and SD low voltage motors			
 Innomotics GP 1LE10 and VSD10 line 1LE10 standard motors Innomotics GP VSD4000 line 1FP10 reluctance motors	For general purpose applications Motors with an aluminum housing	IP55	Natural cooling/ Forced ventilation
Innomotics SD 1LE15, 1LE16, and VSD10 line 1LE15 standard motors Innomotics SD VSD4000 line 1FP15 reluctance motors	For severe duty applications Motors with cast-iron housing	IP55	Natural cooling

Motor type	Features	Type of protection	Cooling method
Innomotics XP explosion-protected motors			
 Innomotics XP 1MB10 explosion-protected motors	Seamless series of explosion-protected motors for gas and dust protection in harsh, hazardous areas Motors with an aluminum housing	Ex tb, Ex tc, Ex ec	Natural cooling
 Innomotics XP 1MB15, 1MB16, 1MB5 explosion-protected motors	Seamless series of explosion-protected motors for gas and dust protection in harsh, hazardous areas Motors with cast-iron housing	Ex tb, Ex tc, Ex ec	Natural cooling

Shaft height (SH)	Rated power P_N for S1 duty type kW					Rated torque T_N	Catalog
63, 71, 80, 90, 100, 112, 132, 160, 180, 200	0.09 <						

Shaft height (SH)	Rated power P_N for S1 duty type kW							Rated torque T_N	Catalog
80, 90, 100, 112, 132, 160	0.01	0.1	1	10	100	1000	10000	2.5 ... 109 Nm	D 81.1
71, 80, 90, 100, 112, 132, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450	1000							1.2 ... 8100 Nm	

Innomotics Moves!

Innomotics SG Drive Train 	Flexible combinations of		
	Motors Innomotics GP/SD low voltage motors Innomotics XP explosion-protected motors	Innomotics SG gearboxes Helical gearbox Parallel shaft gearbox Bevel gearbox Helical worm gearbox	Innomotics SG adapter K2 adapter K4 adapter KU adapter
	SIMOTICS S-1FK2 SIMOTICS S-1FK7 Siemens servomotors	Helical gearbox Parallel shaft gearbox Bevel gearbox Helical worm gearbox	KS adapter

Configuration is possible in the TIA Selection Tool.

More information on the TIA Selection Tool can be found atunter
www.siemens.com/tia-selection-tool

Appendix

3



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Appendix

3/2 Lists

- 3/2 List of order codes
- 3/3 List of variables to dimension drives
- 3/6 Index of abbreviations

3/7 Customer Services

- 3/7 Overview

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Appendix

List of order codes

Order codes	Special version Designation	Detailed data Chapter/Page
Brake type		
B80	LQ4G	1/11
B82	P5G	1/11
B83	P10G	1/11
Brake supply voltage		
C46	AC 230 V ± 10 %	1/11
C52	DC 103 V ± 10 %	1/11
C66	DC 24 V ± 10 %	1/11
Mounting positions		
D10	Output side A	1/7
D20	Output side B	1/7
Output sealing		
G27	Seal for increased environmental stress	1/7
Lubricants		
K07	CLP ISO PG VG220	1/7
K08	CLP ISO PG VG460	1/7
K11	CLP ISO H1 VG460	1/7
K12	CLP ISO PAO VG220	1/7
K16	CLP ISO PAO VG460	1/7
Surface treatment		
L00	Unpainted	1/14
L05	Surface protection for very high environmental stress C5	1/14
RAL colors		
L39	RAL 7045 Telegrey 1	1/14
L54	RAL 7035 Light gray	1/14
L75	RAL 7016 Anthracite gray	1/14
L77	RAL 9005 Jet black	1/14
L78	RAL 9006 White aluminum	1/14
L80	RAL 9011 Graphite black	1/14
Terminal box position motor frame size 63 and 71		
M71	1	1/9
M72	2	1/9
M73	3	1/9
M74	4	1/9
Terminal box position motor frame size 80 and 90		
M55 ... M70	Location and position of the terminal box	1/9
Geared motors for use worldwide		
N30	Design in accordance EAC	1/5
N38	Design in accordance UL-R and CSA	1/5
Duty types		
P90	Duty type S3-75 %	1/8
P98	Duty type S3-60 %	1/8
P99	Duty type S3-40 %	1/8
Ventilation		
S09	Non-ventilated motor	1/3
Packaging options		
W40	Individual packaging box	1/16
W46	Collective packaging ocean freight	1/16

Overview of data to dimension drives

Code	Description	Unit
a	Gearbox constant for calculating the radial force	kNmm
α	Force application angle	°
b, d, l, y, z	Gearbox constants	mm
C	Additional factor to calculate the radial force	-
$\cos \varphi$	Power factor	-
d	Diameter of the input element	mm
d_0	Average diameter of the mounted transmission element	mm
DC	Cyclic duration factor	%
η	Efficiency	%
f	Rated frequency	Hz
f_B	Service factor	-
f_{B1}	Required service factor	-
f_{Btot}	Service factor of the driven machine	-
f_{br}	Braking torque correction factor	-
f_{limit}	Limit frequency	Hz
f_N	Rated motor frequency	Hz
F_{ax}	Permissible axial force	N
F_G	Force due to weight	N
F_r	Radial force at the output shaft	N
F_{R2}	Permissible radial force at the center of shaft extension (l/2)	N
F_{R2max}	Maximum permissible radial force according to table	N
F_{Ravail}	Available radial force from the mounted transmission element	N
F_x	Permissible radial force from out of center force application point	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
H	Vertical distance between running wheel axis and center of gravity	mm
i	Transmission ratio	-
I_A	Starting current	A
I_N	Rated current	A
J_2	Moment of inertia referred to the output speed of the gearbox	kgm ²
J_{AD}	Moment of inertia of the adapter	kgm ²
J_{add}	Additional moment of inertia	kgm ²
J_B	Moment of inertia of the brake	kgm ²
J_{bstp}	Moment of inertia of cage and inner ring	kgm ²
J_G	Moment of inertia of the gearbox reduced to the input shaft	kgm ²
J_{mot}	Moment of inertia of the motor	kgm ²
J_k	Moment of inertia of the load referred to the motor shaft	kgm ²
J_z	Additional moment of inertia of a high inertia fan	kgm ²
k	Factor for taking into account operating conditions	-
k_{DC}	Factor for increased power	-
k_{FI}	Factor for taking into account the additional moment of inertia	-
k_{HT}	Factor for abnormal coolant temperature and installation altitude	-

Code	Description	Unit
k_M	Factor for taking into account the load torque while accelerating	-
k_p	Factor for taking into account the required power and duty cycle	-
L1	Distance between running wheels	mm
L2	Horizontal distance between running wheel and center of gravity	mm
L3	Distance between swivel joints	mm
L_{h10}	Nominal bearing service life	h
L_N	Service life of the brake lining until readjustment	h
L_{na}	Modified bearing service life	h
L_{nmax}	Service life of the brake lining until replacement	h
L_{pFA}	Measuring surface sound pressure level	dB (A)
L_{WA}	Sound power level	dB (A)
m	Drive weight without any oil	kg
m_{AF}	Mass acceleration factor	-
m_{bstp}	Weight of the backstop	kg
m_{fan}	Fan weight	kg
m_{mot}	Motor weight (without end shield at DE)	kg
n_1	Input speed of the gearbox	rpm
n_2	Output speed of the gearbox	rpm
n_{dis}	Disengage speed	rpm
n_{br}	Braking speed	rpm
n_{max}	Maximum speed	rpm
n_N	Rated speed	rpm
P_1	Actual steady-state power of the motor	kW
P_{DC}	Power for the new duty cycle	kW
P_{req}	Required input power	kW
P_{mot}	Motor power	kW
P_N	Rated motor power	kW
P_{perm}	Permissible motor power	kW
P_s	Actual steady-state power of the motor	kW
Q_{perm}	Permissible operating energy	J
r	Radius of the output element	m
R_{ex}	Exact number of teeth ratio	-
RWC	Running wheel center	-
s_{br}	Braking distance	m
s_{gap}	Brake air gap	mm
s_{gapmax}	Maximum brake air gap	mm
S	Center of gravity	mm
t_1	Application time of the brake	ms
t_2	Disconnection time	ms
t_3	Slipping time	ms
t_{11}	Response time	ms
t_{12}	Rise time	ms
t_{br}	Braking time	s
t_R	Duty cycle (decimal)	-
t_s	Cycle duration	ms

Appendix

List of variables to dimension drives

Overview of data to dimension drives

Code	Description	Unit
T	Additional factor for ambient temperature	-
$T_{1\max}$	Maximum permissible motor torque	Nm
T_2	Geared motor output torque	Nm
$T_{2\text{req}}$	Required output torque of the driven machine	Nm
T_{2N}	Maximum output torque of the gearbox	Nm
T_A	Acceleration torque of the motor	Nm
T_{Bk}	Breakdown torque	Nm
T_{br}	Rated braking torque	Nm
T_{DC}	Torque for the new duty cycle	Nm
T_N	Rated motor torque	Nm
T_{req}	Required torque	Nm
T_{SP}	Rated backstop torque	Nm
T_{St}	Relative starting torque	Nm
T_x	Reduced load torque	Nm
U	Rated voltage	V
v	Travel velocity	m/s
W_1	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 readjusted	MJ
x	Distance from the shaft shoulder up to the point where force is applied	mm
x_1	Distance from the shaft shoulder up to the force application point at running wheel center for F_x	mm
Z	Switching frequency	1/h
Z_0	No-load switching frequency, motor without brake	1/h
Z_A	No-load switching frequency, motor with brake	1/h
Z_{perm}	Permissible switching frequency	1/h
ϑ_{amb}	Ambient temperature	°C

Important drive technology variables

SI unit Size	Formula symbol		Unit symbol		Designation or Conversion factor *)
	SI	Previously	SI	Previously	
Length (distance)	l	L, s	m	m	1 km = 1 000 m
Surface	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 = $\pi/2$ rad 1° = $\pi/180$ rad
Rotation angle	ϕ	φ		Degrees °	1' = 1°/60; 1'' = 1'/60
Time					1 min = 60 s 1 h = 60 min
Time period/duration	t	t	s	s	1 d = 24 h
Frequency	f	f	Hz	1/s	1 Hz = 1/s
Speed	n	n	min ⁻¹	rpm	Revolutions per minute
Velocity	v	v	m/s	m/s	1 km/h = $\frac{1}{3.6}$ m/s
Acceleration	a	b	m/s ²	m/s ²	$g = 9.81 \text{ m/s}^2$
Acceleration due to gravity	g	g			
Angular velocity	ω	Ω	rad/s	1/s	
Angular acceleration	α	ζ	rad/s ²	1/s ²	
Mass	m	m	kg	kg	1
Density		d	kg/dm ³	kg/dm ³	10 ³
Force	G	P, K	N	kp	9.81
Force due to weight	G	G			1 N = 1 kg · 1 m/s ²
Pressure	p	p	Pa		1 Pa = 1 N/m ²
			N/m ²	kp/cm ²	9.81 · 10 ⁴
Mechanical tension	σ	σ	N/mm ²	kp/mm ²	9.81
Work	W	A		kpm	9.81
Energy	W	E	J	kcal	4187
Quantity of heat	Q	Q			1 J = 1 Nm = 1 Ws
Torque of a force	T	M_t, M_d, M_b	Nm	kpm	9.81
Torque					1 Nm = 1 J
Bending torque					
Power	P	N	W	PS	735.5 1 W = 1 J/s = 1 Nm/s = $\frac{\text{kgm}^2}{\text{s}^3}$
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 factor gives the numerical value of the variable in SI units.

Conversion from kW to hp:

1 kW = 1.34102 hp

1 hp = 0.745700 kW

1 hp = 1.01387 PS

hp = horse power (US)

PS = Pferdestärke (horse power in German)

Appendix

List of abbreviations

Abbreviation	Meaning	Abbreviation	Meaning
AC	Alternating Current, three-phase	NDE	Non-drive end
CAD	Computer-Aided Design	NEE	NEMA Energy Efficient
CSA	Canadian Standard Association	NN	Sea level
CT	Coolant temperature	NPT	National Pipe Thread
DC	Direct Current	PAO	Polyalphaolefine
DE	Drive end	PE	Protective Earth, grounding
DG	Definite Geared Motors	PG	Polyglycol
DIN	German Institute for Standardization (Deutsches Institut für Normen e. V.)	PTC	Positive Temperature Coefficient
EAC	Eurasian conformity	RoHS	Restriction of hazardous substances
EBPG	Energy-related products directive	TIA	Totally Integrated Automation
EC	European Community	TR CU	Technical Regulation Customs Union
ECL	Energy Conservation Law of PRC	TTL	Transistor Transistor Logic
EER	Energy Efficiency Regulations	UL-R	Underwriters Laboratories Inc. -Recognition Mark
EFF	Efficiency	WEEE	Waste electrical and electronic equipment
EGE	European Size Unit (Europäische Größeneinheit)		
EISA	Energy Independence and Security Act		
EMC	Electromagnetic compatibility		
EN	European standard		
EPAct	Energy Policy Act		
EU	European Union		
EuP	Energy Using Products		
FVA	Research Association for Drive Technology (Forschungsvereinigung Antriebstechnik e. V.)		
HF	High frequency		
HTL	High Transistor Logic		
IDS	Integrated Drive Systems		
IE	International Efficiency		
IEC	International Electrotechnical Commission		
IP	International Protection		
ISO	International Organization of Standardization		

Overview



3

Keep your business running and shape your digital future – with Customer Services for Innomotics

Optimizing the productivity of your equipment and operations can be a challenge, especially with constantly changing market conditions. Working with our service experts makes it easier. We understand your industry's unique processes and provide the services needed so that you can better achieve your business goals.

You can count on us to maximize your uptime and minimize your downtime, increasing your operations' productivity and reliability. When your operations have to be changed quickly to meet a new demand or business opportunity, our services give you the flexibility to adapt.

We assist in keeping your operations as energy and resource efficient as possible and reducing your total cost of ownership. As a trendsetter, we ensure that you can capitalize on the opportunities of digitalization and by applying data analytics to enhance decision making: You can be sure that your plant reaches its full potential and retains this over the longer lifespan.

You can rely on our highly dedicated team of engineers, technicians and specialists to deliver the services you need – safely, professionally and in compliance with all regulations. We are there for you, where you need us, when you need us.

<https://www.innomotics.com/hub/en/customer-service>

Appendix

Overview



Support and Consulting

Benefit from our wide range of Support and Consulting Services:

Our Innomotics portal offers you comprehensive information, application examples, FAQs and support request options at <https://www.innomotics.com/hub/en/search/entrypages/productinformation>. This also comprises Technical Support and Diagnostics, including advice and answers to inquiries about functionality, application and fault clearance.



Retrofit and Upgrade

Use Retrofit and Upgrade Services to extend the service life of your machines and plants. Optimize the availability, reliability and energy efficiency of your installed motors and drives by retrofitting existing products and systems.

Your benefit: Optimized performance, higher productivity and stable production processes with highly available drives.



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As part of Field and Maintenance Services, our global network of specialists offers you high-quality maintenance services and optimized commissioning times.

Maximize the availability of your systems by offering regular inspections and "health checks" and optimize your production processes.



Digital Services

Two service packages from our digital Inspire IQ range provide you with optimum support for your work.

The first package Rapid Response, is all about getting your devices up and running again as quickly as possible. The second, Guided Supervision, is a service package specifically for the challenges of continuous monitoring.



Training

Training Services are geared entirely towards offering our know-how as a manufacturer didactically concentrated to the industry and expanding the competence of your employees in handling the entire spectrum of Innomotics products. This ranges from basic skills training courses to specialized training for advanced technical skills.



Service Agreements

The Service Agreements give you the opportunity to bundle a variety of services in a single annual or multi-year contract. You can select these individually to match your requirements or fill gaps in your organization's maintenance capacities. Programs and agreements can be contracted on a KPI-based and/or performance-based basis.



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We offer Repair Services with specialized service technicians on site and in regional repair centers to quickly restore the functionality of faulty devices. Extended repair services are also available, including additional diagnostic and repair measures as well as emergency services.



Spare Parts

Spare Parts Services means optimum system availability in two ways: fast delivery of original spare parts for up to ten years, with optimized logistics processes – and preventive spare parts provisioning at the customer's premises through coordinated spare parts packages for individual products, custom-assembled drive components and entire integrated drive trains.

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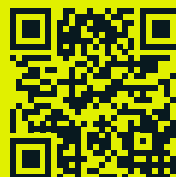
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