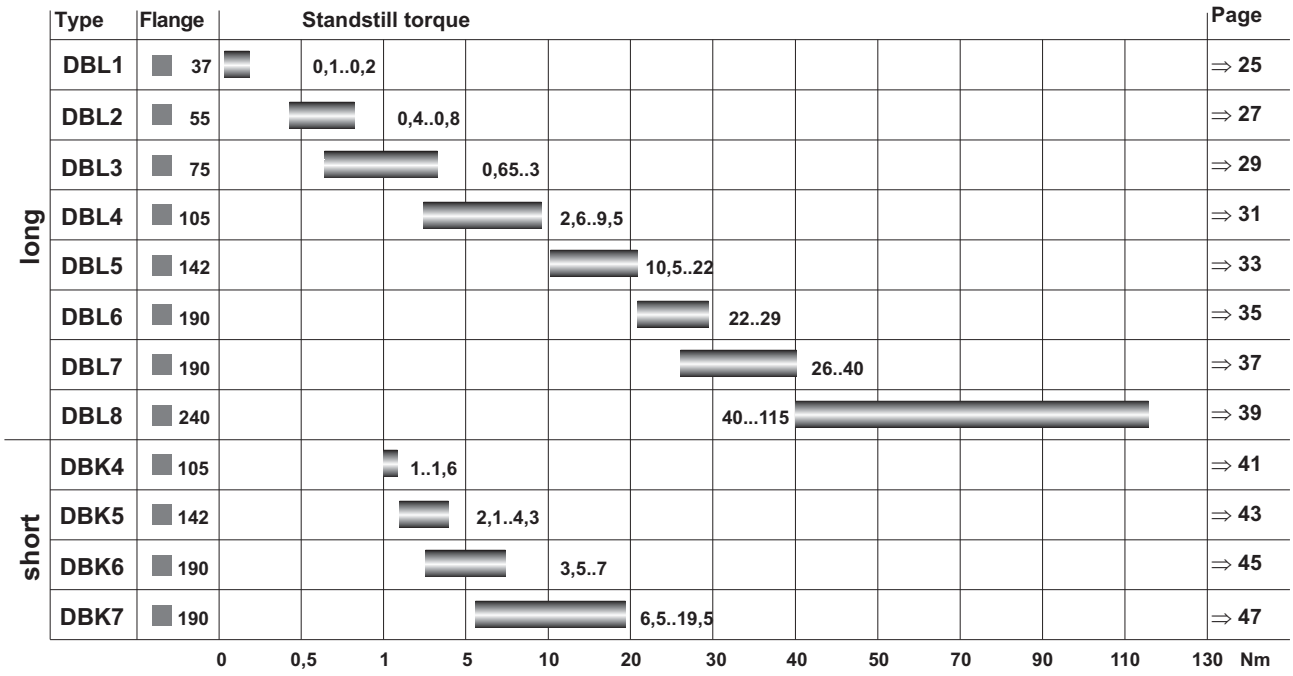
DBL/DBK

Instructions Manual, Synchronous Servomotors

Edition 11/2016
Translation of the original version

Keep all manuals as a product component
during the life span of the motor.
Pass all manuals to future users / owners
of the motor.

Choose your Motor:



Already published editions

Edition	Comments
04 / 2001	First edition
05 / 2001	some minor corrections
07 / 2001	some minor corrections, model number description new, name plate new, dimension drawings optimized
02 / 2002	some minor corrections, encoder dimensions added
07 / 2002	new layout, resolver connection corrected
03 / 2003	new model numbers, dimension drawings corrected
01 / 2004	some minor corrections, Tolerance for technical data supplemented
05 / 2006	technical data updated, some minor corrections, order codes cables, performance curves removed
09 / 2006	New design, new structure, gearbox reference list new
09 / 2007	Branding, axial forces, symbols, CE-Declaration, material data for cables
10 / 2007	Nameplate, vibration class, target group, prohibited use
12 / 2010	New company name, brand logo, nameplate, CE certificate
07 / 2012	CE certificate, DBL8 dimensions (feedback cover)
11 / 2016	CE certificate removed, warning notes updated, safety chapter restructured, RoHS compliant

Technical changes to improve the performance of the equipment may be made without prior notice!

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1 General

1.1 About this manual

This manual describes the DBL/DBK series of synchronous servomotors (standard version).

The motors are operated in drive systems together with Kollmorgen servo amplifiers. Please observe the entire system documentation, consisting of:

— Product manual for the servo amplifier
— Installation and setup instructions for any expansion card which is connected
— Online help of the amplifier's setup software
— Accessories manual
— Technical description of the DBL/DBK series of motors (this manual)

More background information can be found in our "Product WIKI", available at www.wiki-kollmorgen.eu.

1.2 Symbols used

Symbol	Indication
DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	This is not a safety symbol. Indicates situations which, if not avoided, could result in property damage.
NOTE	This is not a safety symbol. This symbol indicates important notes.
	Warning of a danger (general). The type of danger is specified by the warning text next to it.
	Warning of danger from electricity and its effects.
	Warning of hot surfaces.
	Warning of danger from automatic start.

1.3 Abbreviations used

see chapter 10.1 "Definition of Terms".

2 Safety

This section helps you to recognize and avoid dangers to people and objects.

2.1 You should pay attention to this

Read the documentation!

Read the available documentation before installation and commissioning. Improper handling of the motors can cause harm to people or damage to property. The operator must therefore ensure that all persons entrusted to work on the motor have read and understood the manual and that the safety notices in this manual are observed.

Pay attention to the technical data!

Adhere to the technical data and the specifications on connection conditions (rating plate and documentation). If permissible voltage values or current values are exceeded, the servo amplifiers can be damaged.

Perform a risk assessment!

The manufacturer of the machine must generate a risk assessment for the machine, and take appropriate measures to ensure that unforeseen movements cannot cause injury or damage to any person or property. Additional requirements on specialist staff may also result from the risk assessment.

Specialist staff required!

Only properly qualified personnel are permitted to perform such tasks as transport, assembly, setup and maintenance. Qualified specialist staff are persons who are familiar with the transport, installation, assembly, commissioning and operation of motors and who bring their relevant minimum qualifications to bear on their duties:

Transport :	only by personnel with knowledge of handling electrostatically sensitive components.
Unpacking:	only by electrically qualified personnel.
Installation :	only by electrically qualified personnel.
Setup :	only by qualified personnel with extensive knowledge of electrical engineering and drive technology

The qualified personnel must know and observe IEC 60364 / IEC 60664 and national accident prevention regulations.

Secure key

Remove any fitted key (if present) from the shaft before letting the motor run independently, to avoid the dangerous results of the key being thrown out by centrifugal forces.

Hot surface

The surfaces of the motors can be very hot in operation, according to their protection category. The surface temperature can reach 100°C. Measure the temperature, and wait until the motor has cooled down below 40°C before touching it.

Earthing!

It is vital that you ensure that the servo amplifiers are safely earthed to the PE (protective earth) busbar in the switch cabinet. Risk of electric shock. Without low-resistance earthing no personal protection can be guaranteed and there is a risk of death from electric shock.

High voltages!

Keep all covers and cabinet doors closed during operation. The absence of optical indicators does not guarantee absence of tension. Power connections may be live even when the motor is not rotating.

Never disconnect the power connections of the motor while the equipment is energized. This can cause flashovers with resulting injuries to persons and damage to the contacts.

After disconnecting the servo amplifier from the supply voltage, wait several minutes before touching any components which are normally live (e.g. contacts, screw connections) or opening any connections. The capacitors in the servo amplifier can still carry a dangerous voltage several minutes after switching off the supply voltages. To be quite safe, measure the DC-link voltage and wait until the voltage has fallen below 50V.

2.2 Use as directed

- The DBL/DBK series of synchronous servomotors is designed especially for drives for industrial robots, machine tools, textile and packing machinery and similar with high requirements for dynamics.
- The user is **only** permitted to operate the motors under the ambient conditions which are defined in this documentation.
- The DBL/DBK series of motors is **exclusively** intended to be driven by digital servo amplifiers under speed and / or torque control.
- The motors are installed as components in electrical apparatus or machines and can only be commissioned and put into operation as integral components of such apparatus or machines.
- The thermal contact which is integrated in the motor windings must be observed and evaluated.
- The conformity of the servosystem to the standards mentioned on page 8 is only guaranteed when the components (servo amplifier, motor, leads etc.) that are used have been supplied by us.

2.3 Prohibited use

- The use of the motors in the following environments is prohibited:
  - potentially explosive areas
  - environments with corrosive and/or electrically conductive acids, alkaline solutions, oils, vapours, dusts
  - directly on supply networks
- Commissioning the motor is prohibited if the machine in which it was installed
  - does not meet the requirements of the EC Machinery Directive
  - does not comply with the EMC Directive
  - does not comply with the Low Voltage Directive
- Built-in holding brakes without further equipment must not be used to ensure personnel safety.

3 Safe Handling

3.1 Transport

- Climate category 2K3 to EN61800-2
- Transport temperature -25...+70°C, max. 20K/hr change
- Transport humidity rel. humidity 5% - 95% , no condensation
- Only by qualified personnel in the manufacturer's original recyclable packaging
- Avoid shocks, especially to the shaft end
- If the packaging is damaged, check the motor for visible damage. Inform the carrier and, if appropriate, the manufacturer.

3.2 Packaging

Motor type	Carton	Pallet or skeleton box	Max.stacking height	Motor type	Carton	Pallet or skeleton box	Max.stacking height
DBL1	X		10	**DBL7**	X	X	1
DBL2	X		10	**DBL8**		X	1
DBL3	X		6	**DBK4**	X		6
DBL4	X		6	**DBK5**	X		5
DBL5	X		5	**DBK6**	X	X	1
DBL6	X	X	1	**DBK7**	X	X	1

3.3 Storage

- Climate category 1K4 to EN61800-2
- Storage temperature - 25...+55°C, max. variation 20K/hr.
- Humidity rel. humidity 5% - 95%, no condensation
- Store only in the manufacturer's original recyclable packaging
- Max. stacking height see table under Packaging
- Storage time unlimited

3.4 Maintenance / Cleaning

- Maintenance and cleaning only by qualified personnel
- The ball bearings have a grease packing which is adequate for 20,000 hours of operation under normal conditions. The bearings should be replaced after 20,000 hours of operation under rated conditions (by manufacturer).
- Check the motor for bearing noise every 2500 operating hours, respectively each year. If any noises are heard, then the operation of the motor must stop, the bearings must be replaced (by manufacturer).
- Opening the motor invalidates the warranty.
- If the housing is dirty, clean housing with Isopropanol or similar, ***do not immerse or spray***

3.5 Disposal

In accordance to the WEEE-2002/96/EG-Guidelines we take old devices and accessories back for professional disposal, if the transport costs are taken over by the sender. Send the devices to:
Kollmorgen Europe GmbH
Pempelfurtstraße 1
D-40880 Ratingen

4 Approvals

4.1 Conformance with CE

NOTE

Certificates can be found on the Kollmorgen Website.

Any divergence from the configuration and installation described in this documentation means that the user will be responsible for carrying out new measurements to ensure conformance with regulatory requirements.

Kollmorgen declares the conformity of the product series DBL/DBK with the directives listed:

- Low Voltage Directive 2014/35/EC
- EMC Directive 2014/30/EC

4.2 Conformance with UL/cUL

Recognized for USA and Canada in File E224106.

4.3 Conformance with RoHS

Directive 2011/65/EC of the European Union on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) became operative as from the 3rd of January, 2013. Following substances namely are involved:
Lead (Pb), Cadmium (Cd), Hexavalent chromium (CrVI), Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), Mercury (Hg)

The DBL/DBK motor series is manufactured RoHS conformal.

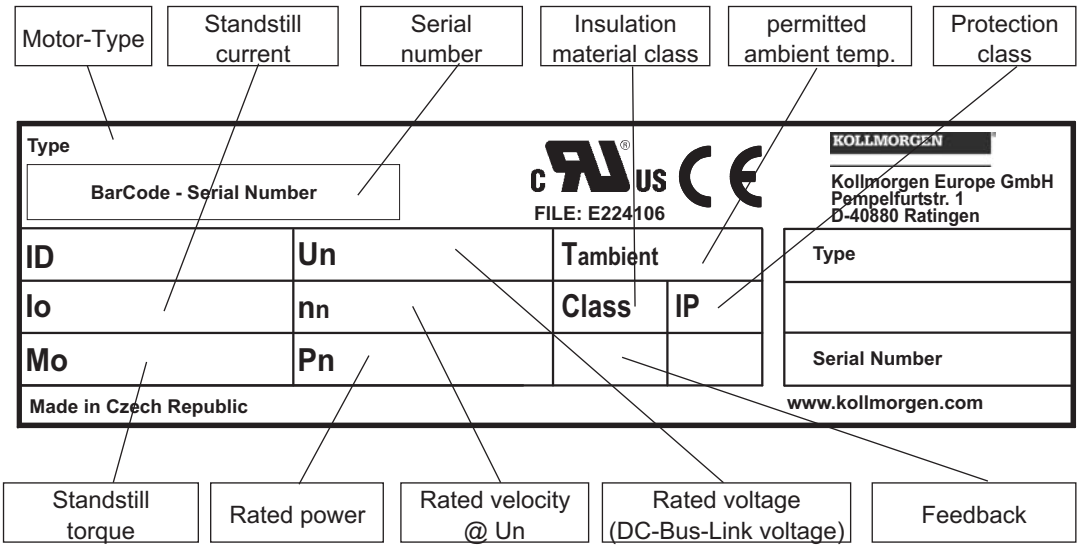
5 Package

5.1 Delivery package

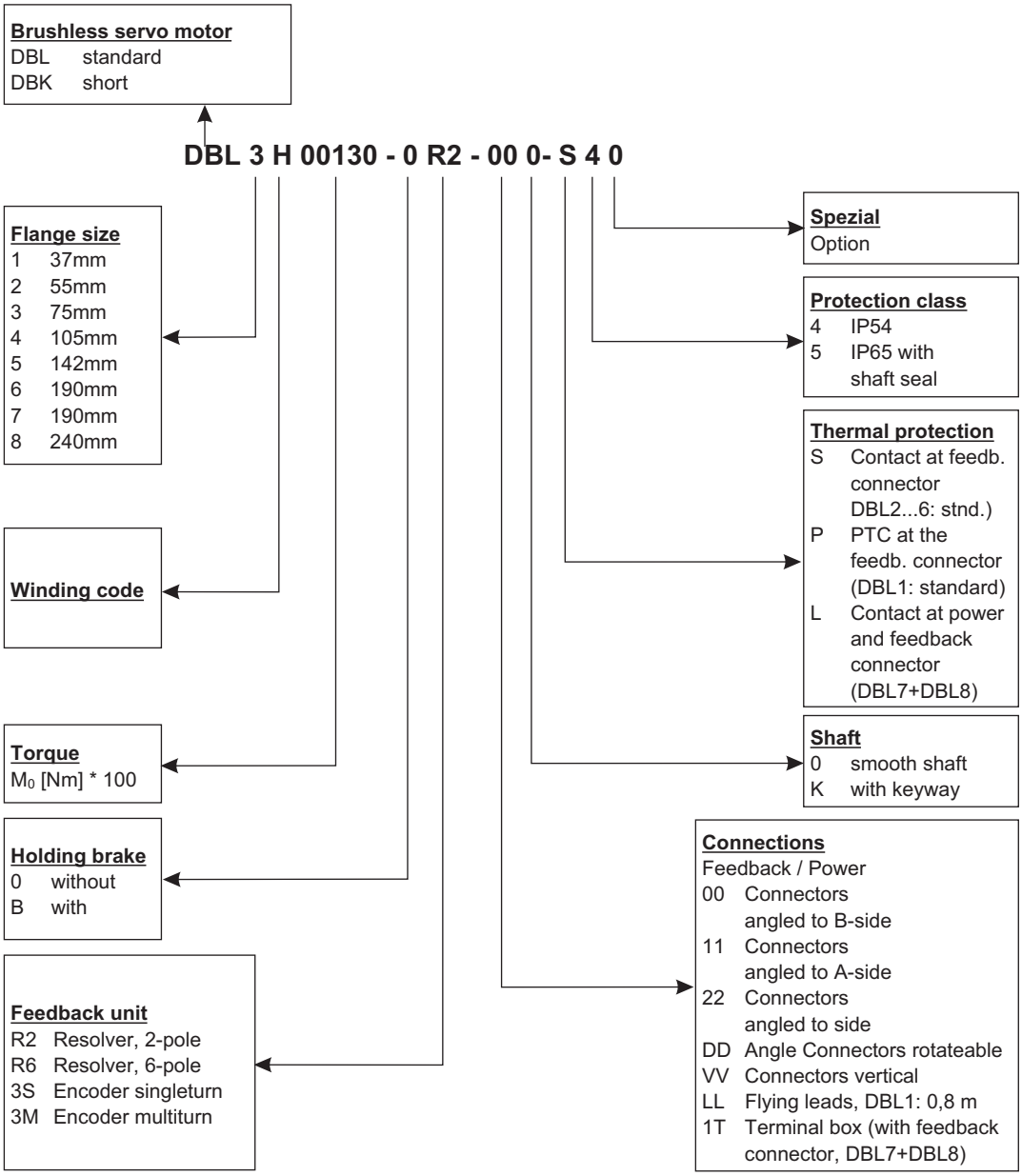
- Motor from the DBL/DBK series
- Technical description on CDROM
- Motor package leaflet (short info)

5.2 Nameplate

Image similar to the real nameplate.



5.3 Model number decsription



6 Technical Description

6.1 Design of the motors

Synchronous servomotors in the DBL/DBK series are brushless DC motors for demanding servo applications. When combined with our digital servo amplifiers they are especially suited for positioning tasks in industrial robots, machine tools, transfer lines etc. With high requirements for dynamics and stability.

The servomotors have permanent magnets in the rotor. The rare earth neodymium -iron-boron magnetic material is an important factor in making it possible to drive these motors in a highly dynamic fashion. A three-phase winding which is driven by the servo amplifier is integrated into the stator. The motor does not have any brushes since commutation is performed electronically by the servo amplifier.
The temperature of the winding is monitored by temperature sensors in the stator windings and is signaled via an electrically isolated contact (normally closed, DBL1: PTC/3kΩ).
A **resolver** is built into the motors as standard feedback element. The servo amplifiers evaluate the resolver position and supply sinusoidal currents to the motors.
The motors can be delivered with or without a built-in holding brake. Retrofitting of the brake is not possible.
The motors are enamelled in matt black (RAL 9005). This finish is not resistant against solvents (e.g. trichlorethylene, nitro-thinners, or similar).

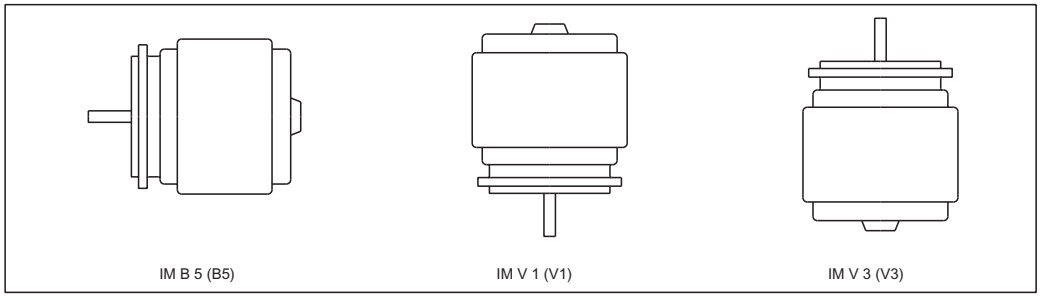
6.2 General technical data

Climate category	3K3 to EN61800-2
Ambient temperature (at rated values)	5...+40°C for site altitude up to 1000m amsl It is vital to consult our applications department for ambient temperatures above 40°C and encapsulated mounting of the motors.
Permissible humidity (at rated values)	95% rel. humidity, no condensation
Power derating (currents and torques)	1% / K in range 40°C...50°C up to 1000m amsl for site altitude above 1000m amsl and 40°C 6% up to 2000m amsl 17% up to 3000m amsl 30% up to 4000m amsl 55% up to 5000m amsl No derating for site altitudes above 1000m amsl with temperature reduction of 10K / 1000m
Determination of nominal dates	Adapter flange with constantly 65°C
Ball-bearing life	≥ 20.000 operating hours
Technical data	⇒ p. 24
Storage data	⇒ p. 8

6.3 Standard features

6.3.1 Style

The basic style for the DBL/DBK synchronous motors is style IM B5 according to DIN EN 60034-7. The permitted mounting positions may be read from the technical data of the motor series.



6.3.2 Shaft end, A-side

Power transmission is made through the cylindrical shaft end A (fit k6) to EN50347 , with a locking thread (except DBL1/DBL2) but **without a fitted-keyway**.
Bearing life is calculated with 20.000 operating hours.

Radial force
If the motors drive via pinions or toothed belts, then high radial forces will occur. The permissible values at the end of the shaft may be read from the diagrams in chapter 10. The maximum values at rated speed you will find at the technical data. Power take-off from the middle of the free end of the shaft allows a 10% increase in F_R.

Axial force
When assembling pinions or wheels to the axis and use of e.g. angular gearheads axial forces arise. The maximum values you will find at the technical data.

Coupling
Double-coned collets have proved to be ideal zero-backlash coupling devices, combined, if required, with metal bellows couplings.

6.3.3 Flange

Flange dimensions to IEC standard, fit j6, accuracy according to DIN 42955.
Tolerance class: **R**

6.3.4 Protection class

Standard version	IP65
Standard shaft bushing	IP54
Shaft bushing with shaft-sealing ring	IP65

6.3.5 Protective device

The standard version of each motor is fitted with a thermostat (electrically isolated, normally closed, DBL1: PTC/3kΩ). You will find the switching point at the technical data. The thermostat does **not** provide any protection against short, heavy overloading. Provided that our preassembled resolver cable is used, the thermostat contact is integrated into the monitoring system of the digital servo amplifier. **The flange temperature must not exceed 65°C in rated operation.**

6.3.6 Insulation material class

The motors come up to insulation material class F according to IEC 60085 (UL 1446 class F).

6.3.7 Vibration class

The motors are made to vibration class A according to DIN EN 60034-14. For a speed range of 600-3600 rpm and a shaft centre between 56-132mm, this means that the actual value of the permitted vibration severity is 1.6mm/s.

Velocity [rpm]	max. rel. Vibration Displacement[µm]	max. Run-out [µm]
<= 1800	90	23
> 1800	65	16

6.3.8 Connection method

Motor series	Resolver	Power
DBL1	Cable	Cable
DBL2..DBL6, DBK	Connector	Connector
DBL7, DBL8	Connector	Terminal box

The mating connectors are not part of the delivery package. We can supply preassembled resolver and power leads. In Chapter 8.3 you will find notes on the cable materials.

6.3.9 Feedback unit

Standard	Resolver	two-pole hollow-shaft
Option	EnDat Encoder, Single-Turn	DBL2: ECN 1113, DBL3-8/DBK4-7: ECN1313
Option	EnDat Encoder, Multi-Turn	DBL2: EQN 1125, DBL3-8/DBK4-7: EQN1325

The motor length changes when an encoder is mounted. Retrofitting is not possible.

6.3.10 Holding brake

The motors are optionally available with a holding brake. A permanent magnet brake (24V DC) is integrated into the motors. When this brake is de-energized it blocks the rotor.

NOTICE

Personal safety in case of hanging loads (vertical axes) can be ensured only by using an additional, external, mechanical brake.
If the brake is released then the rotor can be moved without a remanent torque.

NOTICE

The holding brakes are designed as standstill brakes and are not suited for repeated operational braking. In the case of frequent, operational braking, premature wear and failure of the holding brake is to be expected.

The motor length increases when a holding brake is mounted.

The holding brake can be controlled directly by Kollmorgen servo amplifiers (no personal safety!), the winding is suppressed in the servo amplifier — additional circuitry is not required.

If the holding brake is not controlled directly by the servo amplifier, an additional wiring (e.g. varistor) is required. Consult our applications department beforehand.

6.3.11 Pole numbers

The motors have 6 poles.

6.4 Options

— Holding brake

Built-in holding brake (⇒ p.13).
Motor length increases by the holding brake.

— Radial shaft-sealing rings

A radial shaft-sealing ring can be supplied at extra charge to seal against oil mist and oil spray. This increases the protection rating of the shaft bushing to IP65. The sealing ring is not suitable for dry running. When a holding brake is built in, the motor length increases by a sealing ring for approximately 10mm.

— Vertical mounting sockets

If fitted with angular sockets for feedback and power connectors, the motors are also available with vertical sockets.

— Keyway

The motors are available with keyway and key inserted
The shaft is balanced with a short (half) key.

— EnDat

A high resolution EnDat-encoder is mounted instead of the resolver (⇒ p.13).
The motor length increases by the encoder.

— 2nd Thermostat

An additional thermostat can be applied to the motor winding. The connection takes place via the power connector resp. the terminal box.

All options can **not** be retrofitted.

6.5 Selection criteria

The three-phase servomotors are designed to operate with Kollmorgen servo amplifiers. Together, both units form a closed speed or torque control loop.

The most important selection criteria are:

—	**Standstill torque**	M_0	[Nm]
—	**Rated speed**	n_n	[min^{-1}]
—	**Moment of inertia of motor and load**	J	[$kgcm^2$]
—	**Effective torque (calculated)**	M_{rms}	[Nm]

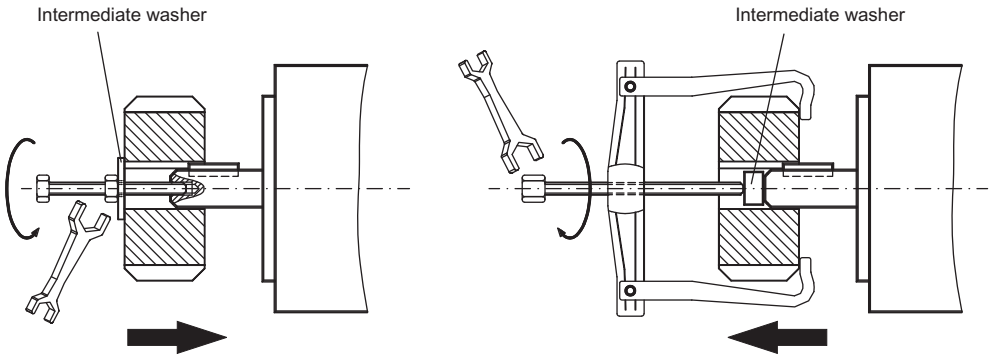
When calculating the motors and servo amplifiers which are required, take account of the static load **and** the dynamic load (acceleration/braking). Collected formulae and examples of the calculations are available from our applications department.

7 Mechanical Installation

7.1 Important Notes

NOTE Only qualified staff with knowledge of mechanical engineering are permitted to assemble the motor.

- Protect the motor from unacceptable stresses.
  Take care, especially during transport and handling, that components are not bent and that insulation clearances are not altered.
- The site must be free of conductive and aggressive material. For V3-mounting (shaft end upwards), make sure that no liquids can enter the bearings. If an encapsulated assembly is required, please consult our applications department beforehand.
- Ensure an unhindered ventilation of the motors and observe the permissible ambient and flange temperatures. For ambient temperatures above 40°C please consult our applications department beforehand.
  Ensure that there is adequate heat transfer in the surroundings and the motor flange, so that the maximum permissible flange temperature of 65°C is not exceeded in S1 operation.
- Servomotors are precision equipment. The flange and shaft are especially vulnerable during storage and assembly — so avoid brute force. Precision requires delicacy. It is important to use the locking thread which is provided to tighten up couplings, gear wheels or pulley wheels and warm up the drive components, where possible. Blows or the use of force will lead to damage to the bearings and the shaft.



- Wherever possible, use only backlash-free, frictionally-locking collets or couplings. Ensure correct alignment of the couplings. A displacement will cause unacceptable vibration and the destruction of the bearings and the coupling.
- For toothed belts, it is vital to observe the permissible radial forces. An excessive radial load on the shaft will significantly shorten the life of the motor.
- Avoid axial loads on the motor shaft, as far as possible. Axial loading significantly shortens the life of the motor.
- In all cases, do not create a mechanically constrained motor shaft mounting by using a rigid coupling with additional external bearings (e.g. in a gearbox).
- Take note of the no. of motor poles (6-pole) and the no. of resolver poles (2-pole), and ensure that the correct setting is made in the servo amplifier which is used. An incorrect setting can lead to the destruction of the motor, especially with small motors.
- Check the compliance to the permitted radial and axial forces F_R and F_A.
  When you use a toothed belt drive, the **minimal** permitted diameter of the pinion e.g. follows from the equation: $d_{min} \geq {}^{M_0}\!/_{F_R} \times 2$.

8 Electrical Installation

8.1 Safety notes

NOTE Only staff qualified and trained in electrical engineering are allowed to wire up the motor.

DANGER

High Voltage up to 900 V!
There is a risk of death or severe injury from touching exposed contacts.

- Always make sure that the motors are de-energized during assembly and wiring, i.e. no voltage may be switched on for any piece of equipment which is to be connected.
- Ensure that the switch cabinet remains turned off (barrier, warning signs etc.). The individual voltages will only be turned on again during setup.
- Never undo the electrical connections to the motor while it is energized. Risk of electric shock! In unfavorable circumstances, electric arcs can arise causing harm to people and damaging contacts.
- A dangerous voltage, resulting from residual charge, can be still present on the capacitors up to 10 minutes after switch-off of the mains supply. Even when the motor is not rotating, control and power leads may be live.
- Measure the DC-link voltage and wait until it has fallen below 50V.

NOTE The ground symbol , which you will find in the wiring diagrams, indicates that you must provide an electrical connection, with as large a surface area as possible, between the unit indicated and the mounting plate in the switch cabinet. This connection is to suppress HF interference and must not be confused with the PE (protective earth) symbol (protective measure to EN 60204).
To wire up the motor, use the wiring diagrams in the Installation and Setup Instructions of the servo amplifier which is used.

8.2 Guide to electrical installation

- Check that the servo amplifier and motor match each other. Compare the rated voltage and rated current of the unit. Carry out the wiring according to the wiring diagram in the product manual of the servo amplifier. The connections to the motor are shown on pages 18f. Notes on the connection methods can be found on page 17.
- Ensure that there is proper earthing of the servo amplifier and the motor. Use correct earthing and EMC-shielding according to the product manual of the servo amplifier which is used. Earth the mounting plate and motor casing. For connection methods see chapter 8.3.
- Route the power and control cables as separately as possible from one another (separation > 20 cm). This will improve the immunity of the system to electromagnetic interference.
  If a motor power cable is used which includes integral brake control leads, then these brake control leads must be shielded. The shielding must be connected at both ends (see product manual for the servo amplifier).
- Wiring:
  - Route power cables as separately as possible from control cables
  - Connect up the resolver or encoder.
  - Connect the motor cables, install motor chokes close to the servo amplifier
  - Connect shields to shielding terminals or EMC with connectors at both ends
  - Connect the holding brake, if used
  - Connect shielding at both ends.
- Install all cables carrying a heavy current with an adequate cross-section, as per EN 60204. The recommended cross-section can be found in the Technical data.

NOTICE In case of long motor cables (>25m) and dependent on the type of the used servo amplifier a motor choke (3YL) must be switched into the motor cable (see product manual of the servo amplifier and accessory manual).

- Connect up all shielding via a wide surface-area contact (low impedance) and metallized connector housings or EMC-cable glands.

8.3 Connection of the motors

- Carry out the wiring in accordance with the valid standards and regulations.
- Only use our preassembled shielded leads for the resolver and power connections.
- Connect up the shielding according to the wiring diagrams in the product manual of the used servo amplifier.
- Incorrectly installed shielding inevitably leads to EMC interference.
- The maximum cable length is defined in the product manual of the used servo amplifier.

Requirements to cable material:

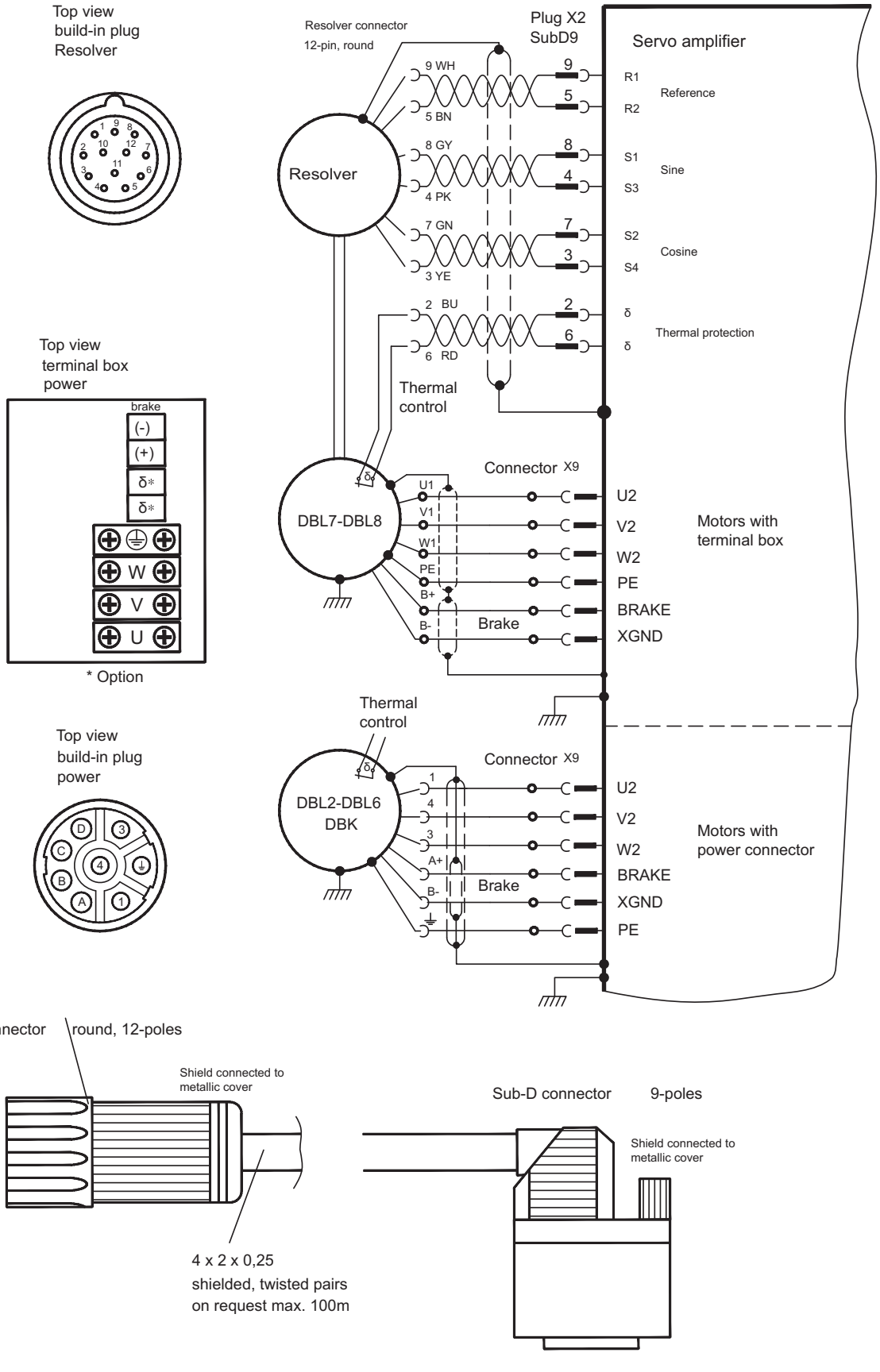
Capacity

Motor cable	less than 150 pF/m
Resolver cable	less than 120 pF/m

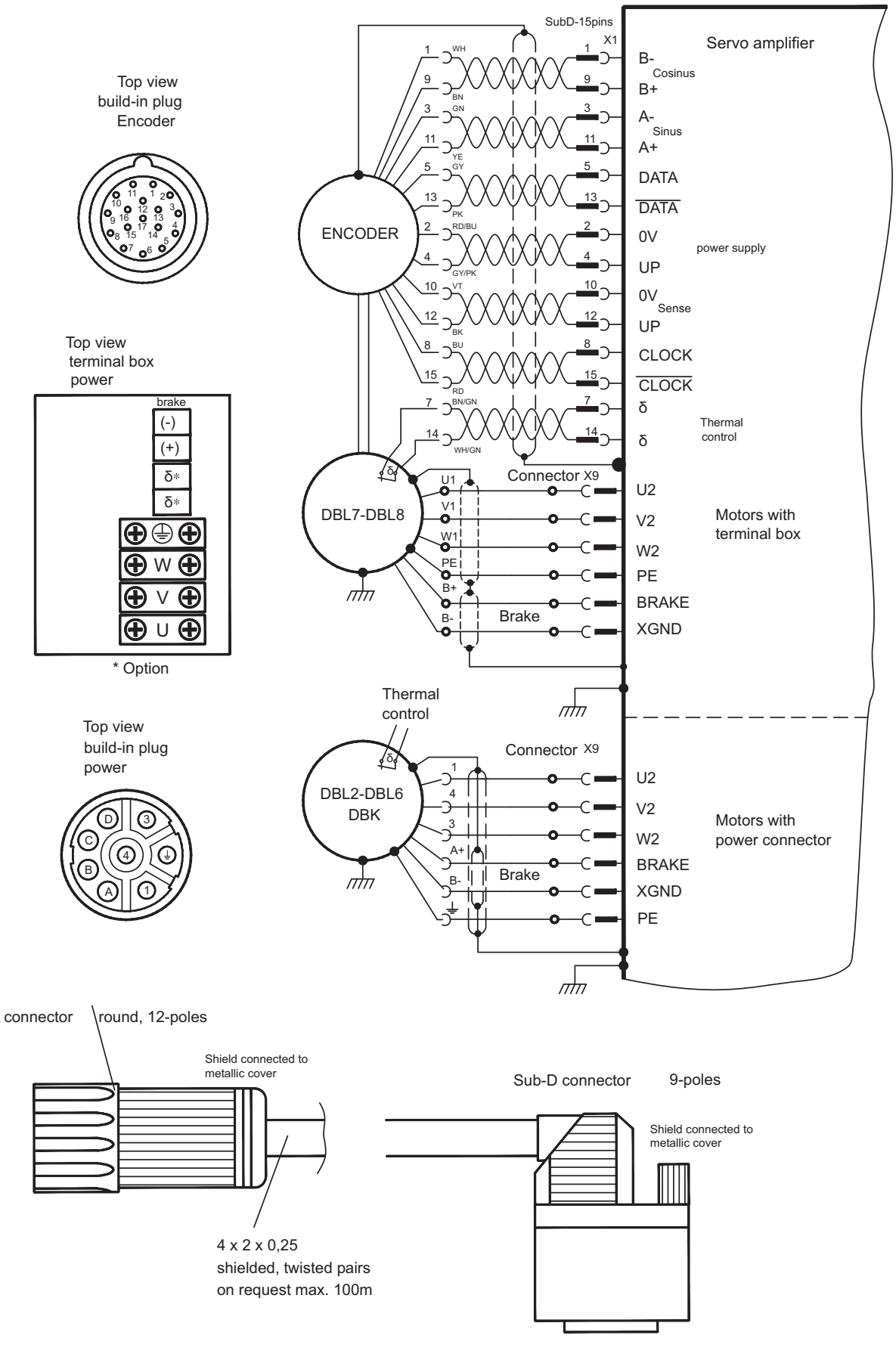
For a detailed description of preassembled cables, please refer to the accessories manual.

8.4 Wiring diagrams

8.4.1 Wiring diagram for resolver motors



8.4.2 Wiring diagram for encoder motors



8.5 Pin assignment

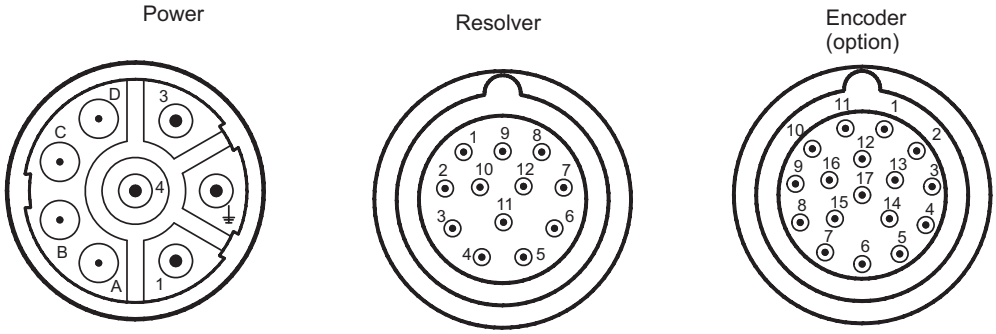
8.5.1 DBL1

The motors of the DBL1 series are fitted with loose cables (length approx. 80cm). The cables are stripped, the power cores are additionally fitted with ferrules. The shielding braids are twisted to a cord each. The resolver leads are colour-coded, the power leads (except PE) are numbered.

Power Cable		Resolver Cable		
Lead	**Connection**	**Lead**	**Connection**	**Pin-No. Resolver connector (servo amplifier)**
1	U2	WH	- Reference	9
2	V2	BN	+ Reference	5
3	W2	GN	- Cosine	7
GNYE	PE	YE	+ Cosine	3
		GY	+ Sine	8
		PK	- Sine	4
		BU	Thermostat	2
		RD	Thermostat	6

8.5.2 DBL2...6, DBK4...7

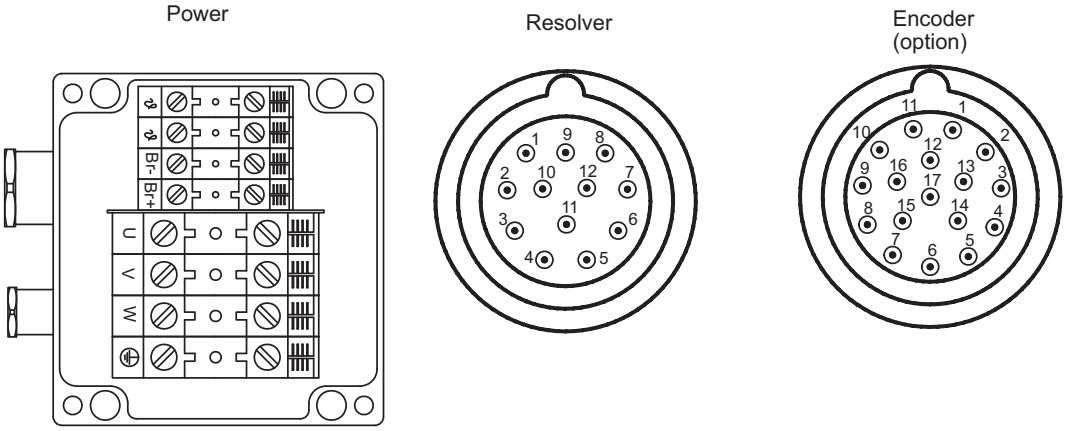
View to the built-in connector.



Power connector		Resolver connector		Encoder connector (Option)	
Pin	**Connection**	**Pin**	**Connection**	**Pin**	**Connection**
1	U2	1	n.c.	1	B- (Cosine)
⏚	PE	2	Thermostat	2	0 V (power supply)
3	W2	3	+ Cosine	3	A- (Sine)
4	V2	4	- Sine	4	U_P (power supply)
		5	+ Reference	5	DATA
A	Brake +	6	Thermostat	6	n.c.
B	Brake -	7	- Cosine	7	Thermostat
C	2nd Thermostat (Option)	8	+ Sine	8	CLOCK
D	2nd Thermostat (Option)	9	- Reference	9	B+ (Cosine)
		10	n.c.	10	0 V (Sense)
		11	n.c.	11	A+ (Sine)
		12	n.c.	12	U_P (Sense)
				13	$\overline{\text{DATA}}$
				14	Thermostat
				15	$\overline{\text{CLOCK}}$
				16	n.c.
				17	n.c.

8.5.3 DBL7...8

View to the built-in connector.



Terminal box		Resolver connector		Encoder connector (Option)	
Kl.	**Connection**	**Pin**	**Connection**	**Pin**	**Connection**
U	U2	1	n.c.	1	B- (Cosine)
⏚	PE	2	Thermostat	2	0 V (power supply)
V	V2	3	+ Cosine	3	A- (Sine)
W	W2	4	- Sine	4	U_P (power supply)
		5	+ Reference	5	DATA
(+)	Brake + (Option)	6	Thermostat	6	n.c.
(-)	Brake - (Option)	7	- Cosine	7	Thermostat
ϑ	2nd Thermostat (Option)	8	+ Sine	8	CLOCK
ϑ	2nd Thermostat (Option)	9	- Reference	9	B+ (Cosine)
		10	n.c.	10	0 V (Sense)
		11	n.c.	11	A+ (Sine)
		12	n.c.	12	U_P (Sense)
				13	$\overline{\text{DATA}}$
				14	Thermostat
				15	$\overline{\text{CLOCK}}$
				16	n.c.
				17	n.c.

9 Setup

9.1 Important notes

NOTE

Only specialist personnel with extensive knowledge in the areas of electrical engineering / drive technology are allowed to commission the drive unit of servo amplifier and motor.

DANGER

Lethal voltage!

Risk of electric shock. Lethal danger exists at live parts of the device.

- Built-in protection measures such as insulation or shielding may not be removed.
- Work on the electrical installation may only be performed by trained and qualified personnel, in compliance with the regulations for safety at work, and only with switched off mains supply, and secured against restart

CAUTION

High temperature!

Risk of light burns! The surface temperature of the motor can exceed 100°C in operation.

- Check (measure) the temperature of the motor.
- Wait until the motor has cooled down below 40°C before touching it.

CAUTION

Automatic restart!

The drive performing unplanned movements during commissioning cannot be ruled out.

- Make sure that, even if the drive starts to move unintentionally, no danger can result for personnel or machinery.
- The measures you must take in this regard for your task are based on the risk assessment of the application.

9.2 Guide to setup

The procedure for setup is described as an example. A different method may be appropriate or necessary, depending on the application of the equipment.

- Check the assembly and orientation of the motor.
- Check the drive components (clutch, gear unit, belt pulley) for the correct seating and setting (observe the permissible radial and axial forces).
- Check the wiring and connections to the motor and the servo amplifier. Check that the earthing is correct.
- Test the function of the holding brake, if used. (apply 24V, the brake must be released).
- Check whether the rotor of the motor revolves freely (release the brake, if necessary). Listen out for grinding noises.
- Check that all the required measures against accidental contact with live and moving parts have been carried out.
- Carry out any further tests which are specifically required for your system.
- Now commission the drive according to the setup instructions for the servo amplifier.
- In multi-axis systems, individually commission each drive unit (servo amplifier and motor).

9.3 Trouble Shooting

The following table is to be seen as a “First Aid” box. There can be a large number of different reasons for a fault, depending on the particular conditions in your system. The fault causes described below are mostly those which directly influence the motor. Peculiarities which show up in the control loop behaviour can usually be traced back to an error in the parameterization of the servo amplifier. The documentation for the servo amplifier and the setup software provides information on these matters. For multi-axis systems there may be further hidden reasons for faults. Our applications department can give you further help with your problems.

Fault	Possible cause	Measures to remove the cause
Motor doesn’t rotate	— Servoamplifier not enabled — Break in setpoint lead — Motor phases in wrong sequence — Brake not released — Drive is mechanically blocked	— Supply ENABLE signal — Check setpoint lead — Correct the phase sequence — Check brake controls — Check mechanism
Motor runs away	— Motor phases in wrong sequence	— Correct the phase sequence
Motor oscillates	— Break in the shielding of the resolver cable — amplifier gain to high	— Replace resolver cable — use motor default values
Error message: brake	— Short-circuit in the supply voltage lead to the motor holding brake — Faulty motor holding brake	— Remove the short-circuit — Replace motor
Error message: output stage fault	— Motor cable has short-circuit or earth short — Motor has short-circuit or earth short	— Replace cable — Replace motor
Error message: resolver	— Resolver connector is not properly plugged in — Break in resolver cable, cable crushed or similar	— Check connector — Check cables
Error message: motor temperature	— Motor thermostat has switched — Loose resolver connector or break in resolver cable	— Wait until the motor has cooled down. Then investigate why the motor becomes so hot. — Check connector, replace resolver cable if necessary
Brake does not grip	— Required holding torque too high — Brake faulty — Motor shaft axially overloaded	— Check the dimensioning — Replace motor — Check the axial load, reduce it. Replace motor, since the bearings have been damaged

10 Technical data

10.1 Definitions

Standstill torque M_0 [Nm]
The standstill torque can be maintained indefinitely at a speed n=0 min^{-1} and rated ambient conditions.

Rated torque M_n [Nm]
The rated torque is produced when the motor is drawing the rated current at the rated speed. The rated torque can be produced indefinitely at the rated speed in continuous operation (S1).

Standstill current I_{0rms} [A]
The standstill current is the effective sinusoidal current which the motor draws during standstill to produce the standstill torque.

Rated current I_{nrms} [A]
The rated current is the effective sinusoidal current which the motor draws at the rated speed in order to produce the rated torque.

Peak current (pulse current) I_{0max} [A]
The peak current (effective sinusoidal value) is approximately equivalent to 4-times the rated current. The actual value is determined by the peak current of the servo amplifier which is used.

Torque constant K_{Trms} [Nm/A]
The torque constant defines how much torque in Nm is produced by the motor with 1A r.m.s. current. The relationship is M=I x K_T (up to I = 2 x I_0)

Voltage constant K_{Erms} [mV/min^{-1}]
The voltage constant defines the induced motor EMF, as an effective sinusoidal value between two terminals, per 1000 rpm

Rotor moment of inertia J [kgcm²]
The constant J is a measure of the acceleration capability of the motor. For instance, at I_0 the acceleration time t_b from 0 to 3000 rpm is given as:

$$t_b\,[s] = \frac{3000 \times 2\pi}{M_0 \times 60s} \times \frac{m^2}{10^4 \times cm^2} \times J$$ with M_0 in Nm and J in kgcm²

Thermal time constant t_{th} [min]
The constant t_{th} defines the time for the cold motor, under a load of I0, to heat up to an overtemperature of 0.63 x 105 Kelvin. This temperature rise happens in a much shorter time when the motor is loaded with the rated current.

Release delay time t_{BRH} [ms] / Application delay time t_{BRL} [ms] of the brake
These constants define the response times of the holding brake when operated with the rated voltage from the servo amplifier.

U_N
Rated mains voltage

U_n
DC-Bus link voltage. $U_n = \sqrt{2} * U_N$

10.2 DBL1

The data can have a tolerance of +/- 10%.

Technical data

Data		Symbol [Unit]	DBL1 X00010	DBL1 X00020
Electrical data				
	Standstill torque	**M_0 [Nm]**	**0,1**	**0,2**
	Standstill current	**I_{0rms} [A]**	**0,60**	**0,93**
	Mains voltage	U_N [VAC]	230	
U_N = 230V	Rated speed	n_n [min^{-1}]	6000	6000
	Rated torque	M_n [Nm]	0,09	0,18
	Rated current	I_n [A]	0,56	0,89
	Rated power	P_n [kW]	0,06	0,11
U_N = 400V	**Rated speed**	**n_n [min^{-1}]**	—	—
	Rated torque	M_n [Nm]	—	—
	Rated current	I_n [A]	—	—
	Rated power	P_n [kW]	—	—
U_N = 480V	Rated speed	n_n [min^{-1}]	—	—
	Rated torque	M_n [Nm]	—	—
	Rated current	I_n [A]	—	—
	Rated power	P_n [kW]	—	—
	Peak current	I_{0max} [A]	2,5	4,2
	Torque constant	K_{Trms} [Nm/A]	0,17	0,22
	Voltage constant	K_{Erms} [mVmin]	10,5	13
	Winding resistance Ph-Ph	R_{20} [Ω]	38,9	18,9
	Winding inductance Ph-Ph	L [mH]	6,5	4,5
Mechanical data				
	Rotor moment of inertia	J [kgcm²]	0,06	0,08
	Static friction torque	M_R [Nm]	0,01	0,01
	Thermal time constant	t_{TH} [min]	18	20
	Weight standard	G [kg]	0,37	0,45
	Radial load permitted at shaft end @ 6000 min^{-1}	F_R [N]	60	
	Axial load max. permitted	F_A [N]	60	
	Motor number		00647R	00670R

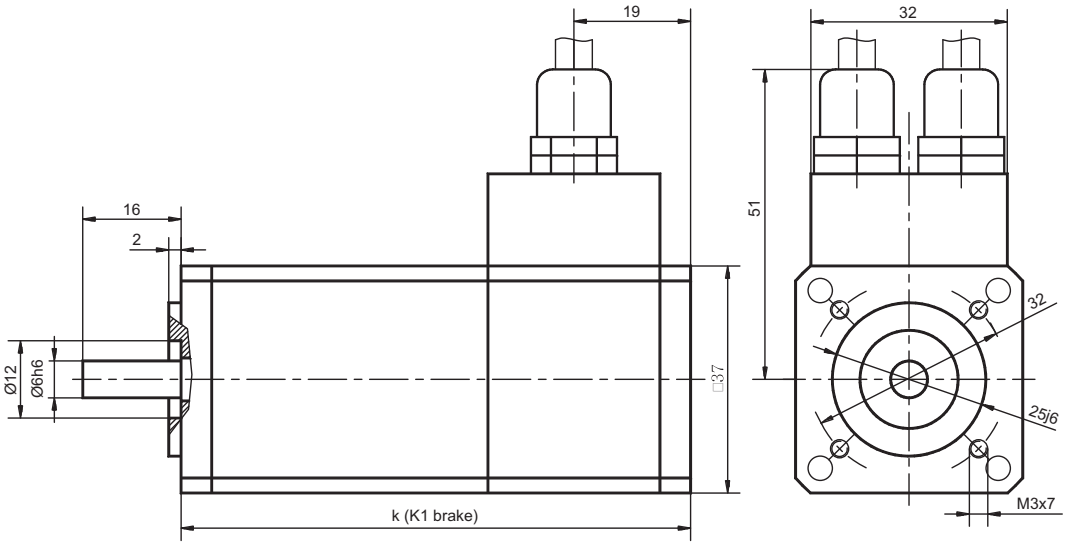
Brake data

Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	0,35
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	8
Moment of inertia	J_{BR} [kgcm²]	0,0013
Release delay time	t_{BRH} [ms]	10-20
Application delay time	t_{BRL} [ms]	5-10
Weight of the brake	G_{BR} [kg]	0,1

Connections and leads

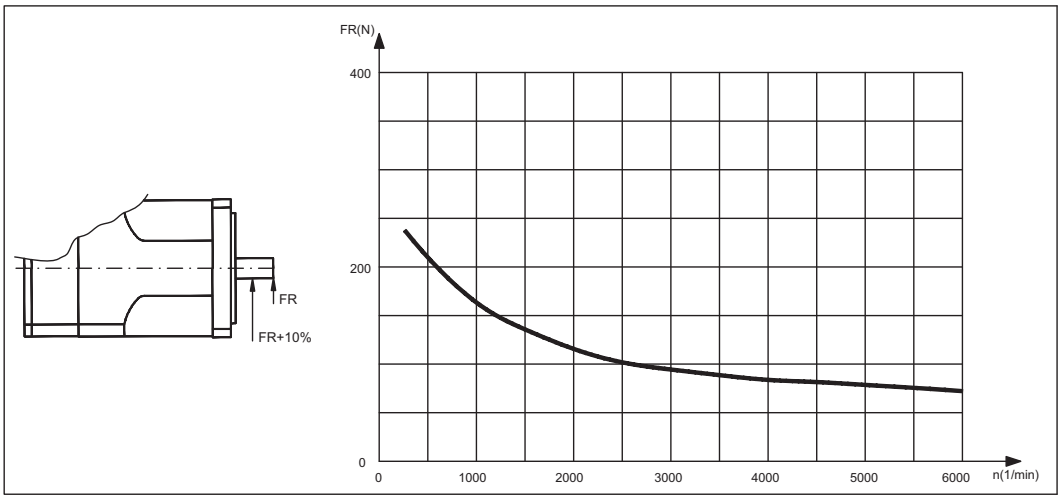
Data	DBL1 X00010	DBL1 X00020
Power connection	cable	
Motor cable, shielded	4 x 1	
Resolver connection	cable	
Resolver cable, shielded	4 x 2 x 0,25mm²	

Dimensions (drawing in principle)



TYP	K	K1
DBL1X00010	83	113
DBL1X00020	99	123

Radial forces at the shaft end



10.3 DBL2

The data can have a tolerance of +/- 10%.

Technical data

Data		Symbol [Unit]	DBL2 H00040	DBL2 H00060	DBL2 M00080	DBL2 H00080
Electrical data						
	Standstill torque	**M_0 [Nm]**	**0,4**	**0,6**	**0,8**	**0,8**
	Standstill current	**I_{0rms} [A]**	**0,91**	**1,4**	**0,85**	**1,51**
	Mains voltage	U_N [VAC]	230-400			
U_N = 230V	Rated speed	n_n [min^{-1}]	4500	4500	—	4500
	Rated torque	M_n [Nm]	0,36	0,55	—	0,72
	Rated current	I_n [A]	0,90	1,42	—	1,45
	Rated power	P_n [kW]	0,17	0,26	—	0,34
U_N = 400V	**Rated speed**	**n_n [min^{-1}]**	**6000**	**6000**	**4500**	**6000**
	Rated torque	M_n [Nm]	0,34	0,52	0,72	0,69
	Rated current	I_n [A]	0,85	1,3	0,8	1,4
	Rated power	P_n [kW]	0,21	0,33	0,34	0,43
U_N = 480V	Rated speed	n_n [min^{-1}]	—	—	—	—
	Rated torque	M_n [Nm]	—	—	—	—
	Rated current	I_n [A]	—	—	—	—
	Rated power	P_n [kW]	—	—	—	—
	Peak current	I_{0max} [A]	3,9	6	3,6	6,7
	Torque constant	K_{Trms} [Nm/A]	0,44	0,43	0,94	0,53
	Voltage constant	K_{Erms} [mVmin]	26,5	26	57	32
	Winding resistance Ph-Ph	R_{20} [Ω]	26	15,1	46,5	14,6
	Winding inductance Ph-Ph	L [mH]	21,5	13,5	46,2	14,4
Mechanical data						
	Rotor moment of inertia	J [kgcm²]	0,08	0,11	0,13	
	Static friction torque	M_R [Nm]	0,02	0,02	0,02	
	Thermal time constant	t_{TH} [min]	15	20	22	
	Weight standard	G [kg]	1,06	1,21	1,36	
	Radial load permitted at shaft end @ 3000 min^{-1}	F_R [N]	115			
	Axial load max. permitted	F_A [N]	81			
	Motor number		00728R	00771R	00348R	00772R

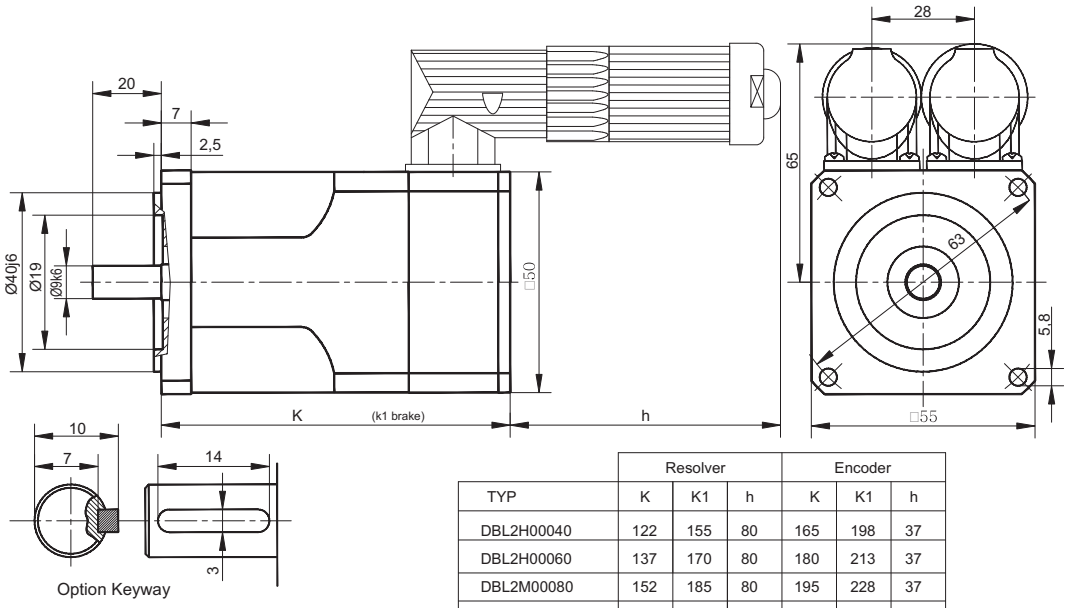
Brake data

Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	1,2
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	8
Moment of inertia	J_{BR} [kgcm²]	0,07
Release delay time	t_{BRH} [ms]	15-20
Application delay time	t_{BRL} [ms]	5-10
Weight of the brake	G_{BR} [kg]	0,3

Connections and leads

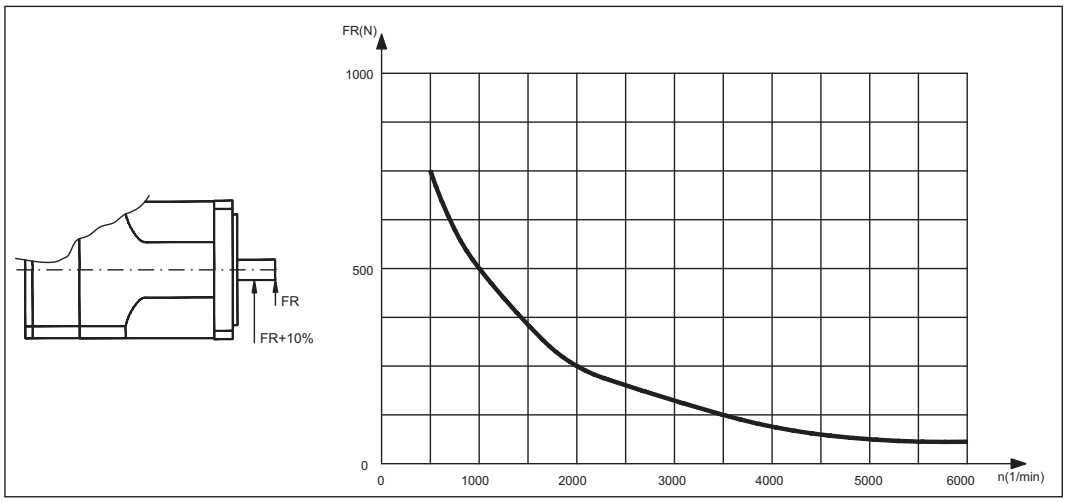
Data	DBL2 H00040	DBL2 H00060	DBL2 M00080	DBL2 H00080
Power connection	4 + 4 poles, round, angular			
Motor cable, shielded	4 x 1			
Motor cable with control leads, shielded	4 x 1 + 2 x 0,75			
Resolver connection	12 poles, round, angular			
Resolver cable, shielded	4 x 2 x 0,25mm²			
Encoder connection (Option)	17 poles, round, angular			
Encoder cable, shielded	7 x 2 x 0,25mm²			

Dimensions (drawing in principle)



	Resolver			Encoder		
TYP	K	K1	h	K	K1	h
DBL2H00040	122	155	80	165	198	37
DBL2H00060	137	170	80	180	213	37
DBL2M00080	152	185	80	195	228	37
DBL2H00080	152	185	80	195	228	37

Radial forces at the shaft end



10.4 DBL3

The data can have a tolerance of +/- 10%.

Technical data

	Data	Symbol [Unit]	DBL3 N00065	DBL3 H00065	DBL3 N00130	DBL3 H00130	DBL3 M00190	DBL3 H00250	DBL3 N00300
Electrical data									
	Standstill torque	**M_0 [Nm]**	**0,65**	**0,65**	**1,3**	**1,3**	**1,9**	**2,5**	**3,0**
	Standstill current	**I_{0rms} [A]**	**0,65**	**1,06**	**1,01**	**1,67**	**1,42**	**3,0**	**2,1**
	Mains voltage	U_N [VAC]	230-480						
U_N = 230V	Rated speed	n_n [min^{-1}]	—	3000	—	3000	—	3000	—
	Rated torque	M_n [Nm]	—	0,6	—	1,2	—	2,2	—
	Rated current	I_n [A]	—	1,05	—	1,6	—	2,7	—
	Rated power	P_n [kW]	—	0,19	—	0,38	—	0,69	—
U_N = 400V	**Rated speed**	**n_n [min^{-1}]**	**3000**	**6000**	**3000**	**6000**	**3000**	**6000**	**3000**
	Rated torque	M_n [Nm]	0,60	0,55	1,15	1	1,6	1,80	2,5
	Rated current	I_n [A]	0,64	0,97	0,95	1,4	1,26	2,30	1,82
	Rated power	P_n [kW]	0,19	0,30	0,38	0,69	0,50	1,13	0,82
U_N = 480V	Rated speed	n_n [min^{-1}]	3600	—	3600	—	3600	—	3600
	Rated torque	M_n [Nm]	0,58	—	1,15	—	1,54	—	2,5
	Rated current	I_n [A]	0,59	—	0,90	—	1,21	—	1,73
	Rated power	P_n [kW]	0,22	—	0,43	—	0,58	—	0,94
	Peak current	I_{0max} [A]	2,8	4,6	4,3	7,52	6,1	13	9
	Torque constant	K_{Trms} [Nm/A]	0,99	0,60	1,29	0,78	1,34	0,83	1,44
	Voltage constant	K_{Erms}[mVmin]	60	37	78	47	81	50	87
	Winding resistance Ph-Ph	R_{20} [Ω]	75	28,5	34,5	12,7	20,9	5,4	11,6
	Winding inductance Ph-Ph	L [mH]	88	33,3	62	21,5	40,4	11,7	26,7
Mechanical data									
	Rotor moment of inertia	J [kgcm²]	0,39		0,65		0,92	1,2	1,5
	Static friction torque	M_R [Nm]	0,02		0,02		0,03	0,05	0,05
	Thermal time constant	t_{TH} [min]	25		30		31	32	32
	Weight standard	G [kg]	1,75		2,25		2,7	3,2	3,65
	Radial load permitted at shaft end @ 3000 min^{-1}	F_R [N]	350						
	Axial load max. permitted	F_A [N]	85						
	Motor number		00299R	00731R	00258R	00273R	00263R	00420R	00252R

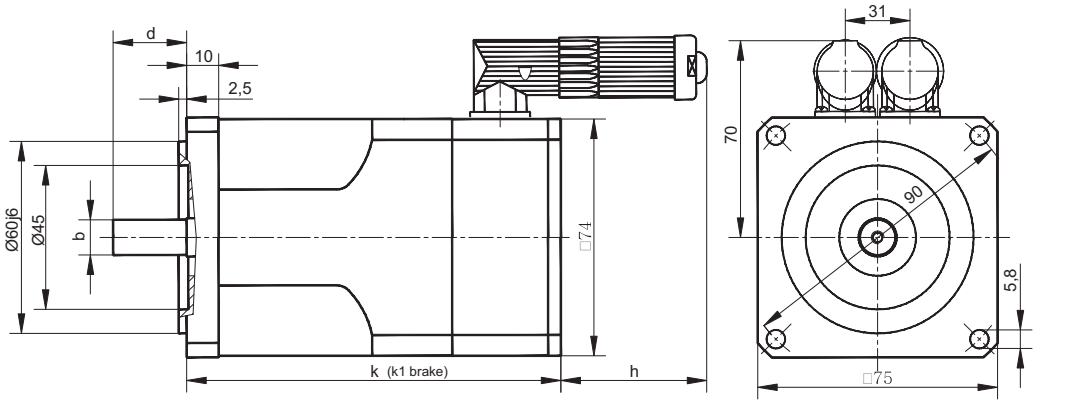
Brake data

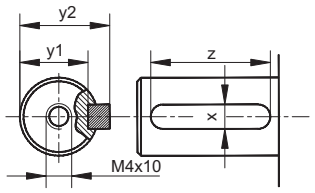
Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	2,5
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	12
Moment of inertia	J_{BR} [kgcm²]	0,38
Release delay time	t_{BRH} [ms]	10-15
Application delay time	t_{BRL} [ms]	10-15
Weight of the brake	G_{BR} [kg]	0,4

Connections and leads

Data	DBL3 N00065	DBL3 H00065	DBL3 N00130	DBL3 H00130	DBL3 M00190	DBL3 H00250	DBL3 N00300
Power connection	4 + 4 poles, round, angular						
Motor cable, shielded	4 x 1						
Motor cable with control leads, shielded	4 x 1 + 2 x 0,75						
Resolver connection	12 poles, round, angular						
Resolver cable, shielded	4 x 2 x 0,25mm²						
Encoder connection (Option)	17 poles, round, angular						
Encoder cable, shielded	7 x 2 x 0,25mm²						

Dimensions (drawing in principle)

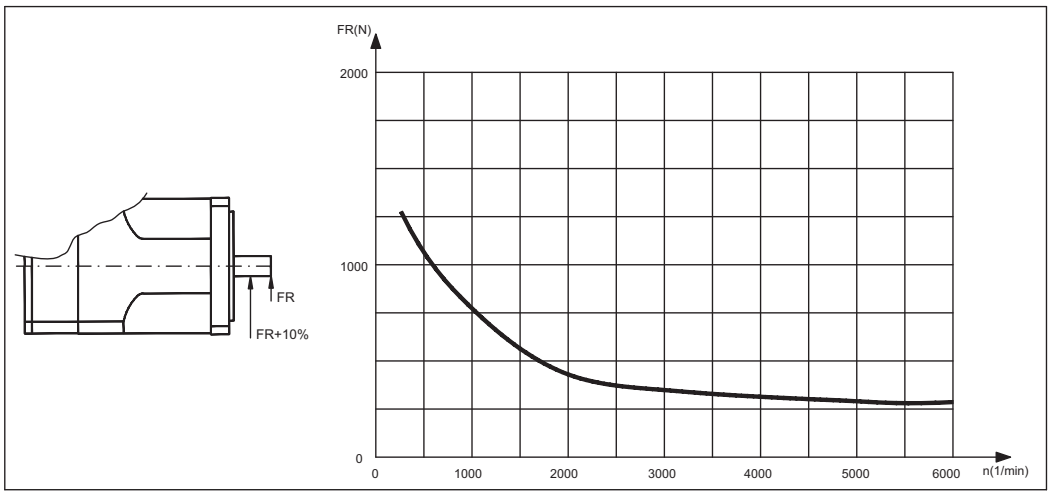




Option Keyway

TYP	Resolver			Encoder								
	k	k1	h	k	k1	h	d	b	x	y1	y2	z
DBL3N00065	116	149	80	172	205	24	23	Ø11k6	4	8.5	12.5	16
DBL3H00065	116	149	80	172	205	24	23	Ø11k6	4	8.5	12.5	16
DBL3N00130	134	167	80	190	223	24	23	Ø11k6	4	8.5	12.5	16
DBL3H00130	134	167	80	190	223	24	23	Ø11k6	4	8.5	12.5	16
DBL3M00190	152	185	80	208	241	24	23	Ø11k6	4	8.5	12.5	16
DBL3H00250	170	203	80	226	259	24	30	Ø14k6	5	11	16	22
DBL3N00300	188	221	80	244	277	24	30	Ø14k6	5	11	16	22

Radial forces at the shaft end



10.5 DBL4

The data can have a tolerance of +/- 10%.

Technical data

	Data	Symbol [Unit]	DBL4 N00260	DBL4 H00260	DBL4 N00530	DBL4 H00530	DBL4 N00750	DBL4 H00750	DBL4 N00950
Electrical data									
	Standstill torque	**M_0 [Nm]**	**2,6**	**2,6**	**5,3**	**5,3**	**7,5**	**7,5**	**9,5**
	Standstill current	**I_{0rms} [A]**	**1,9**	**3,1**	**3,4**	**6,5**	**4,2**	**9,1**	**6,4**
	Mains voltage	U_N [VAC]	230-480						
U_N = 230V	Rated speed	n_n [min^{-1}]	—	3000	—	3000	—	3000	—
	Rated torque	M_n [Nm]	—	2,3	—	4,6	—	6,4	—
	Rated current	I_n [A]	—	3	—	5,9	—	8,1	—
	Rated power	P_n [kW]	—	0,72	—	1,45	—	2,01	—
U_N = 400V	**Rated speed**	**n_n [min^{-1}]**	**3000**	**—**	**3000**	**—**	**3000**	**—**	**3000**
	Rated torque	M_n [Nm]	2,3	—	4,6	—	6,4	—	8,5
	Rated current	I_n [A]	1,85	—	3,1	—	3,8	—	6
	Rated power	P_n [kW]	0,72	—	1,45	—	2,04	—	2,51
U_N = 480V	Rated speed	n_n [min^{-1}]	3600	—	3600	—	3600	—	3600
	Rated torque	M_n [Nm]	2,2	—	4,4	—	6,25	—	7,8
	Rated current	I_n [A]	1,62	—	2,68	—	3,38	—	5,03
	Rated power	P_n [kW]	0,83	—	1,66	—	2,36	—	2,94
	Peak current	I_{0max} [A]	11,5	18,9	20,2	39,5	25,2	54,4	38,3
	Torque constant	K_{Trms} [Nm/A]	1,36	0,83	1,57	0,82	1,79	0,83	1,49
	Voltage constant	K_{Erms}[mVmin	82	50	95	49,5	108	50	90
	Winding resistance Ph-Ph	R_{20} [Ω]	9,6	3,6	6,1	1,7	3,95	0,87	1,65
	Winding inductance Ph-Ph	L [mH]	41,5	15,9	35,5	9,8	25,4	5,6	11,7
Mechanical data									
	Rotor moment of inertia	J [kgcm²]	1,9		2,7		4,2		6,1
	Static friction torque	M_R [Nm]	0,10		0,12		0,15		0,20
	Thermal time constant	t_{TH} [min]	60		64		66	66	68
	Weight standard	G [kg]	4,5		5,6		7,7		10,5
	Radial load permitted at shaft end @ 3000 min^{-1}	F_R [N]	580						
	Axial load max. permitted	F_A [N]	106						
	Motor number		00301R	00285R	00261R	00284R	00267R	00609R	00470R

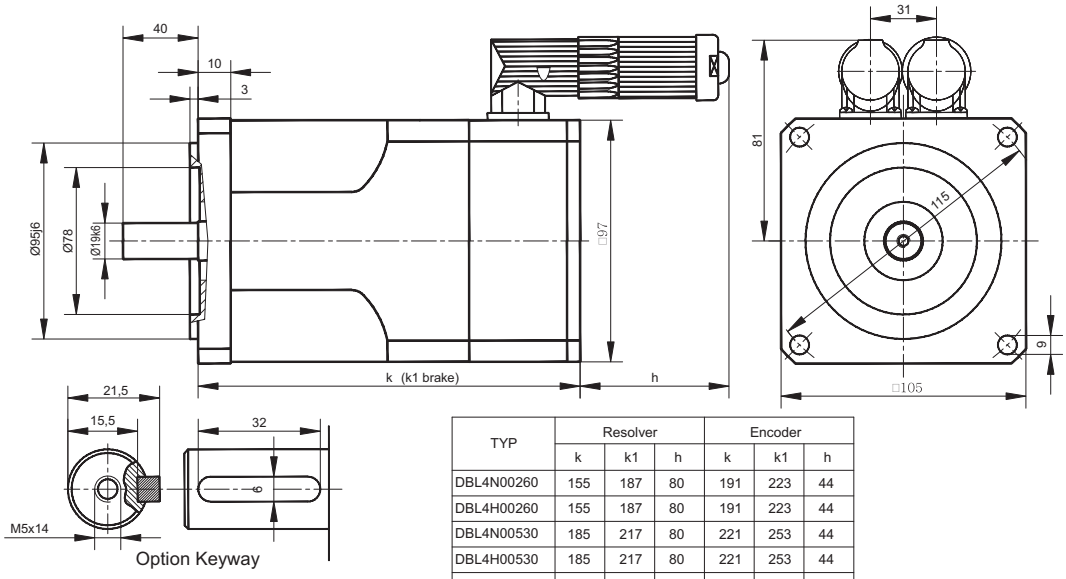
Brake data

Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	5
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	16
Moment of inertia	J_{BR} [kgcm²]	1,06
Release delay time	t_{BRH} [ms]	10-30
Application delay time	t_{BRL} [ms]	5-15
Weight of the brake	G_{BR} [kg]	0,75

Connections and leads

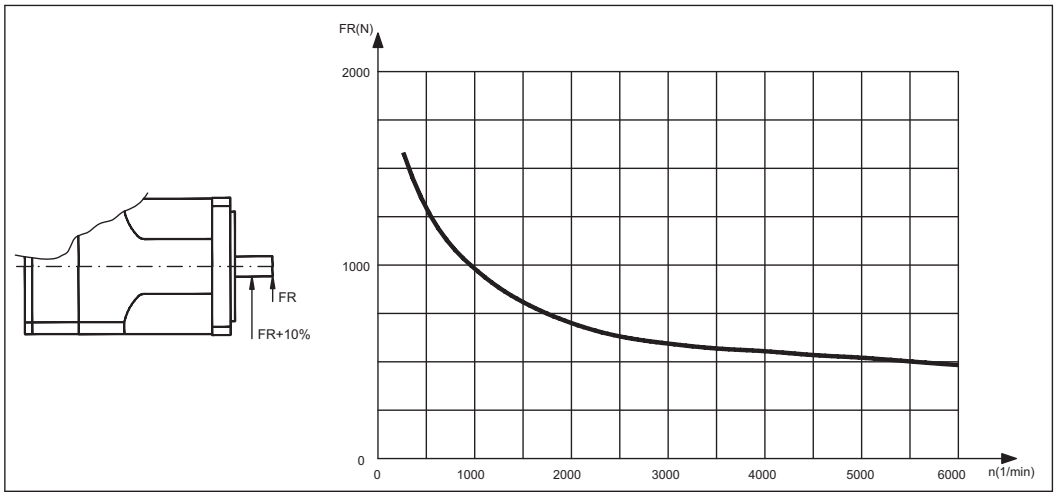
Data	DBL4 N00260	DBL4 H00260	DBL4 N00530	DBL4 H00530	DBL4 N00750	DBL4 H00750	DBL4 N00950
Power connection	4 + 4 poles, round, angular						
Motor cable, shielded	4 x 1,5						
Motor cable with control leads, shielded	4 x 1 + 2 x 0,75						
Resolver connection	12 poles, round, angular						
Resolver cable, shielded	4 x 2 x 0,25mm²						
Encoder connection (Option)	17 poles, round, angular						
Encoder cable, shielded	7 x 2 x 0,25mm²						

Dimensions (drawing in principle)



TYP	Resolver			Encoder		
	k	k1	h	k	k1	h
DBL4N00260	155	187	80	191	223	44
DBL4H00260	155	187	80	191	223	44
DBL4N00530	185	217	80	221	253	44
DBL4H00530	185	217	80	221	253	44
DBL4N00750	230	262	80	266	298	44
DBL4H00750	230	262	80	266	298	44
DBL4N00950	286	318	80	322	354	44

Radial forces at the shaft end



10.6 DBL5

The data can have a tolerance of +/- 10%.

Technical data

	Data	Symbol [Unit]	DBL5 N01050	DBL5 H01050	DBL5 N01350	DBL5 H01350	DBL5 N01700	DBL5 H01700	DBL5 N02200
Electrical data									
	Standstill torque	**M_0 [Nm]**	**10,5**	**10,5**	**13,5**	**13,5**	**17**	**17**	**22**
	Standstill current	**I_{0rms} [A]**	**6,4**	**13,4**	**8,7**	**17,4**	**9,9**	**18,4**	**12,8**
	Mains voltage	U_N [VAC]	230-480						
U_N = 230V	Rated speed	n_n [min^{-1}]	—	3000	—	3000	—	3000	—
	Rated torque	M_n [Nm]	—	8,8	—	11	—	14,5	—
	Rated current	I_n [A]	—	11,5	—	14,7	—	16	—
	Rated power	P_n [kW]	—	2,67	—	3,36	—	4,40	—
U_N = 400V	**Rated speed**	**n_n [min^{-1}]**	**3000**	**—**	**3000**	**—**	**3000**	**—**	**3000**
	Rated torque	M_n [Nm]	8,8	—	11	—	14,5	—	17,5
	Rated current	I_n [A]	5,5	—	7,3	—	8,6	—	10,5
	Rated power	P_n [kW]	2,67	—	3,36	—	4,40	—	5,34
U_N = 480V	Rated speed	n_n [min^{-1}]	3600	—	3600	—	3600	—	3600
	Rated torque	M_n [Nm]	8	—	10	—	13,4	—	16
	Rated current	I_n [A]	5	—	6,45	—	8,17	—	10
	Rated power	P_n [kW]	3,02	—	3,77	—	5,05	—	6,03
	Peak current	I_{0max} [A]	31,6	66,6	43,2	86,5	49,2	91,4	63,7
	Torque constant	K_{Trms} [Nm/A]	1,65	0,79	1,56	0,78	1,72	0,93	1,72
	Voltage constant	K_{Erms}[mVmin	100	47,5	94	47	104	56	104
	Winding resistance Ph-Ph	R_{20} [Ω]	2,25	0,55	1,55	0,39	1,26	0,36	0,95
	Winding inductance Ph-Ph	L [mH]	20	4,6	14,6	3,6	13,3	3,7	10,5
Mechanical data									
	Rotor moment of inertia	J [kgcm²]	6,2		7,3		9,5		11,7
	Static friction torque	M_R [Nm]	0,25		0,30		0,30		0,40
	Thermal time constant	t_{TH} [min]	50		55		60		75
	Weight standard	G [kg]	10		11,2		13,7		16,2
	Radial load permitted at shaft end @ 3000 min^{-1}	F_R [N]	640						
	Axial load max. permitted	F_A [N]	111						
	Motor number		00666R	00562R	00576R	00633R	00665R	00661R	00620R

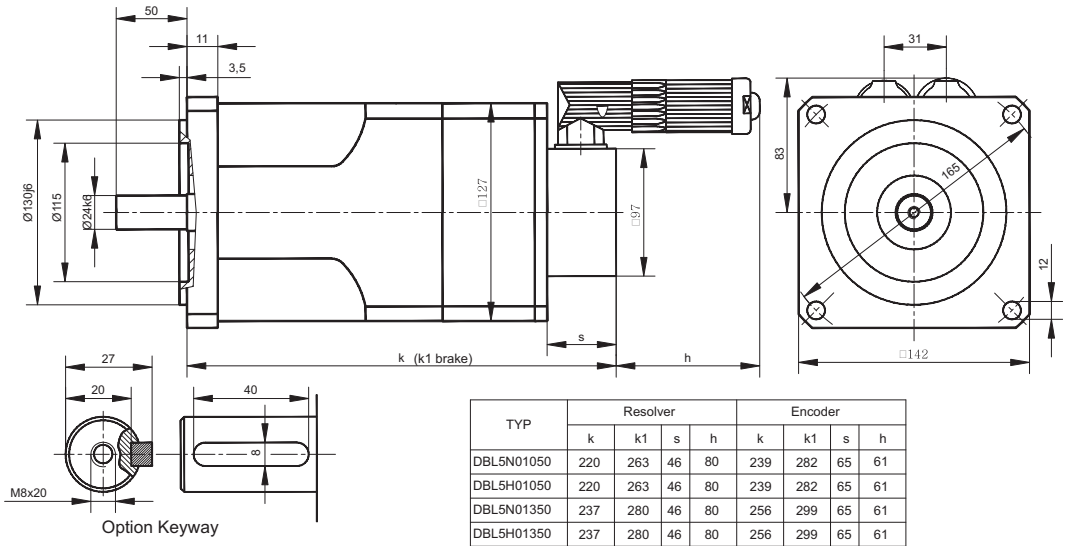
Brake data

Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	12
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	18
Moment of inertia	J_{BR} [kgcm²]	3,6
Release delay time	t_{BRH} [ms]	30-60
Application delay time	t_{BRL} [ms]	10-20
Weight of the brake	G_{BR} [kg]	1,5

Connections and leads

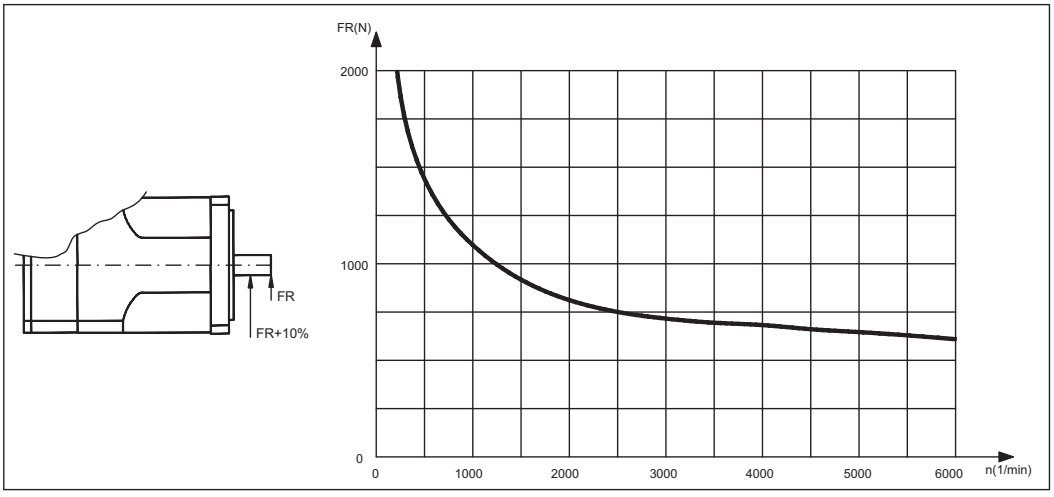
Data	DBL5 N01050	DBL5 H01050	DBL5 N01350	DBL5 H01350	DBL5 N01700	DBL5 H01700	DBL5 N02200
Power connection	4 + 4 poles, round, angular						
Motor cable, shielded	4 x 1,5	4 x 2,5	4 x 1,5	4 x 2,5	4 x 1,5	4 x 2,5	
Motor cable with control leads, shielded	4 x 1,5 + 2 x 0,75	4 x 2,5 + 2 x 1	4 x 1,5 + 2 x 0,75	4 x 2,5 + 2 x 1	4 x 1,5 + 2 x 0,75	4 x 2,5 + 2 x 1	
Resolver connection	12 poles, round, angular						
Resolver cable, shielded	4 x 2 x 0,25mm²						
Encoder connection (Option)	17 poles, round, angular						
Encoder cable, shielded	7 x 2 x 0,25mm²						

Dimensions (drawing in principle)



TYP	Resolver				Encoder			
	k	k1	s	h	k	k1	s	h
DBL5N01050	220	263	46	80	239	282	65	61
DBL5H01050	220	263	46	80	239	282	65	61
DBL5N01350	237	280	46	80	256	299	65	61
DBL5H01350	237	280	46	80	256	299	65	61
DBL5N01700	271	314	46	80	290	333	65	61
DBL5H01700	271	314	46	80	290	333	65	61
DBL5N02200	305	348	46	80	324	367	65	61

Radial forces at the shaft end



10.7 DBL6

The data can have a tolerance of +/- 10%.

Technical data

	Data	Symbol [Unit]	DBL6 N02200	DBL6 N02900
Electrical data				
	Standstill torque	**M_0 [Nm]**	**22**	**29**
	Standstill current	**I_{0rms} [A]**	**14,9**	**16,2**
	Mains voltage	U_N [VAC]	400-480	
U_N = 230V	Rated speed	n_n [min^{-1}]	—	—
	Rated torque	M_n [Nm]	—	—
	Rated current	I_n [A]	—	—
	Rated power	P_n [kW]	—	—
U_N = 400V	**Rated speed**	**n_n [min^{-1}]**	**3000**	**3000**
	Rated torque	M_n [Nm]	16	22
	Rated current	I_n [A]	11,8	13,6
	Rated power	P_n [kW]	5,03	6,28
U_N = 480V	Rated speed	n_n [min^{-1}]	3600	3600
	Rated torque	M_n [Nm]	14,8	18,4
	Rated current	I_n [A]	10,1	11,2
	Rated power	P_n [kW]	5,58	6,94
	Peak current	I_{0max} [A]	74,8	80,8
	Torque constant	K_{Trms} [Nm/A]	1,47	1,79
	Voltage constant	K_{Erms} [mVmin]	89	108
	Winding resistance Ph-Ph	R_{20} [Ω]	0,74	0,55
	Winding inductance Ph-Ph	L [mH]	9,2	8
Mechanical data				
	Rotor moment of inertia	J [kgcm²]	18,8	29,8
	Static friction torque	M_R [Nm]	0,40	0,40
	Thermal time constant	t_{TH} [min]	60	70
	Weight standard	G [kg]	17,3	24,4
	Radial load permitted at shaft end @ 3000 min^{-1}	F_R [N]	680	
	Axial load max. permitted	F_A [N]	111	
	Motor number		00332R	00407R

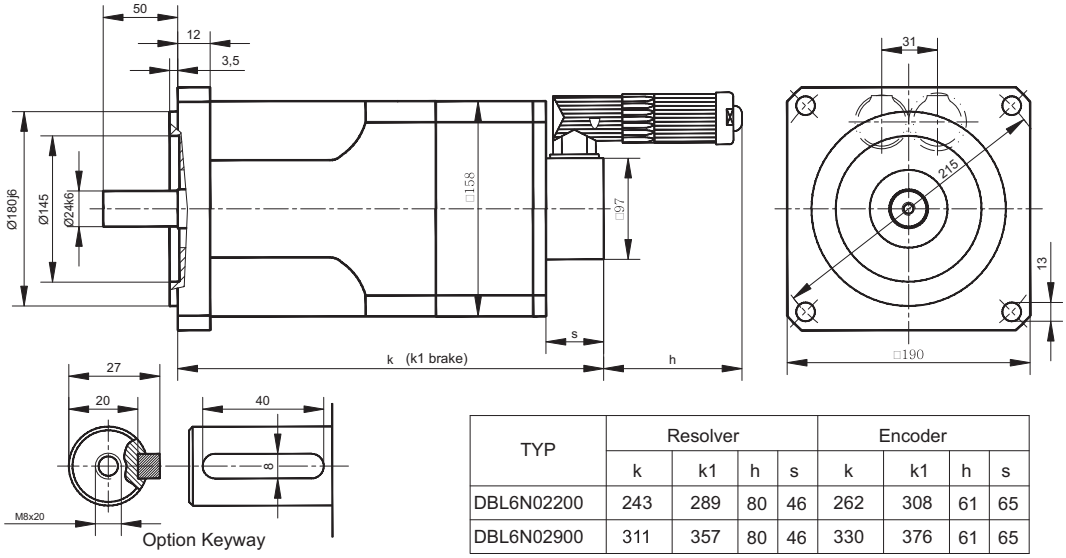
Brake data

Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	20
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	22
Moment of inertia	J_{BR} [kgcm²]	9,5
Release delay time	t_{BRH} [ms]	20-60
Application delay time	t_{BRL} [ms]	10-35
Weight of the brake	G_{BR} [kg]	2,75

Connections and leads

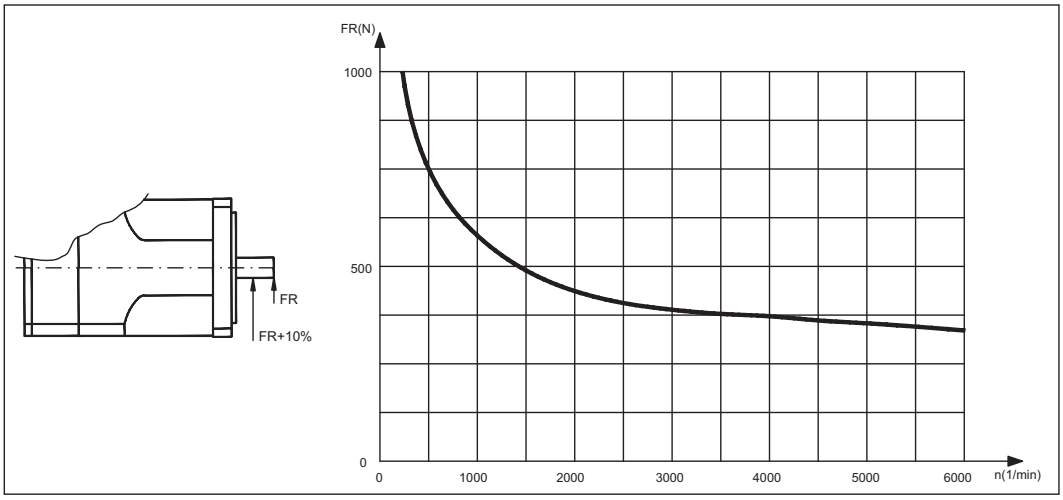
Data	DBL6 N02200	DBL6 N02900
Power connection	4 + 4 poles, round, angular	
Motor cable, shielded	4 x 2,5	
Motor cable with control leads, shielded	4 x 2,5 + 2 x 1	
Resolver connection	12 poles, round, angular	
Resolver cable, shielded	4 x 2 x 0,25mm²	
Encoder connection (Option)	17 poles, round, angular	
Encoder cable, shielded	7 x 2 x 0,25mm²	

Dimensions (drawing in principle)



TYP	Resolver				Encoder			
	k	k1	h	s	k	k1	h	s
DBL6N02200	243	289	80	46	262	308	61	65
DBL6N02900	311	357	80	46	330	376	61	65

Radial forces at the shaft end



10.8 DBL7

The data can have a tolerance of +/- 10%.

Technical data

	Data	Symbol [Unit]	DBL7 N02600	DBL7 N03200	DBL7 N04000
Electrical data					
	Standstill torque	**M_0 [Nm]**	**26**	**32**	**40**
	Standstill current	**I_{0rms} [A]**	**16,9**	**19,7**	**23,9**
	Mains voltage	U_N [VAC]	400-480		
U_N = 230V	Rated speed	n_n [min^{-1}]	—	—	—
	Rated torque	M_n [Nm]	—	—	—
	Rated current	I_n [A]	—	—	—
	Rated power	P_n [kW]	—	—	—
U_N = 400V	**Rated speed**	**n_n [min^{-1}]**	**3000**	**3000**	**3000**
	Rated torque	M_n [Nm]	20	23	26
	Rated current	I_n [A]	14,1	15,6	17,3
	Rated power	P_n [kW]	6,28	7,23	8,17
U_N = 480V	Rated speed	n_n [min^{-1}]	3600	3600	3600
	Rated torque	M_n [Nm]	18,8	21	23,2
	Rated current	I_n [A]	12,3	13,1	13,6
	Rated power	P_n [kW]	7,09	7,92	8,75
	Peak current	I_{0max} [A]	65,9	77	93
	Torque constant	K_{Trms} [Nm/A]	1,54	1,62	1,67
	Voltage constant	K_{Erms} [mVmin]	93	98	101
	Winding resistance Ph-Ph	R_{20} [Ω]	0,46	0,36	0,27
	Winding inductance Ph-Ph	L [mH]	5,1	4,2	3,4
Mechanical data					
	Rotor moment of inertia	J [kgcm²]	67	81	101
	Static friction torque	M_R [Nm]	0,40	0,50	0,60
	Thermal time constant	t_{TH} [min]	60	67	70
	Weight standard	G [kg]	22,3	26,2	32
	Radial load permitted at shaft end @ 3000 min^{-1}	F_R [N]	780		
	Axial load max. permitted	F_A [N]	90		
	Motor number		00335R	00402R	00450R

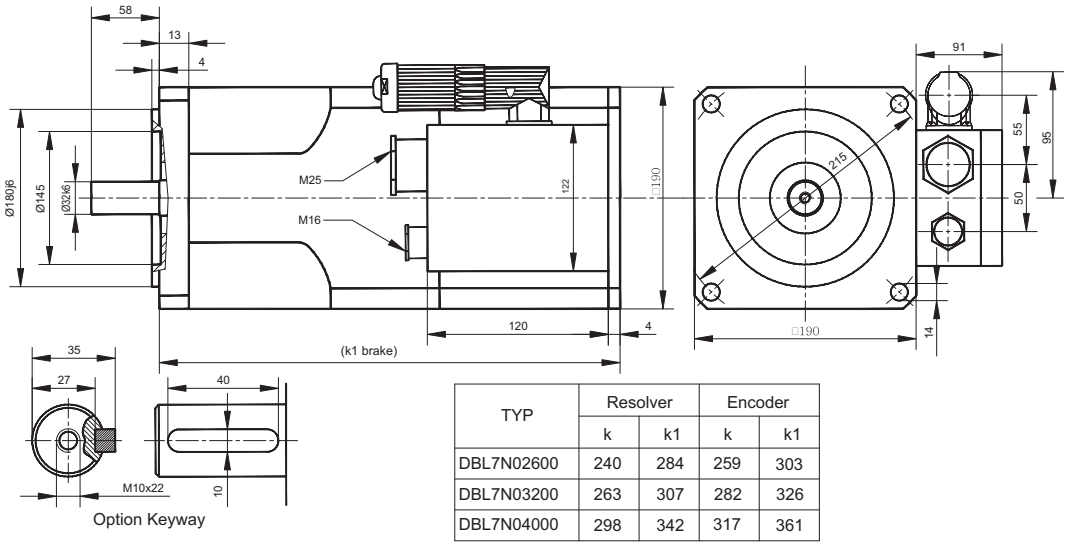
Brake data

Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	20
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	22
Moment of inertia	J_{BR} [kgcm²]	9,5
Release delay time	t_{BRH} [ms]	20-60
Application delay time	t_{BRL} [ms]	10-35
Weight of the brake	G_{BR} [kg]	3,3

Connections and leads

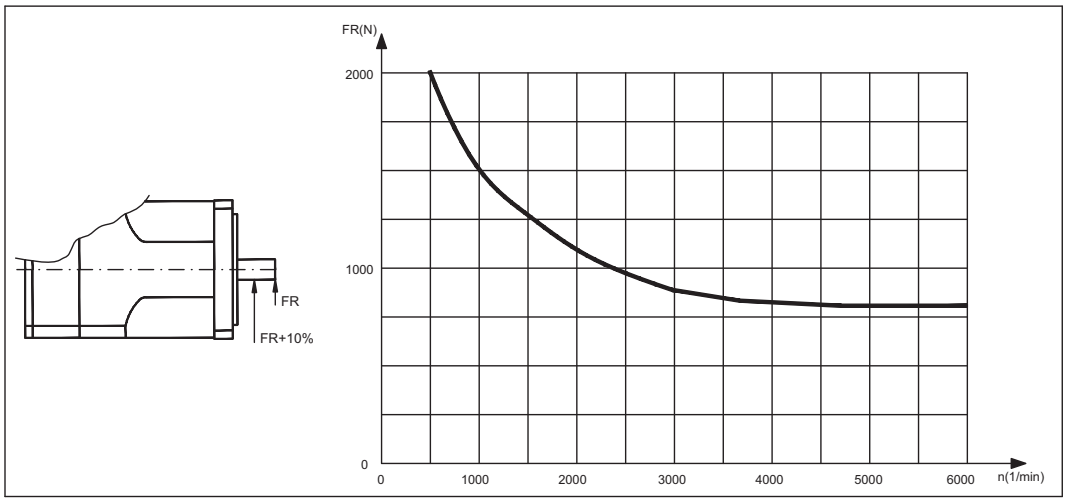
Data	DBL7 N02600	DBL7 N03200	DBL7 N04000
Power connection	Terminal box		
Motor cable, shielded	4 x 2,5		4 x 4
Motor cable with control leads, shielded	4 x 2,5 + 2 x 1		–
Control leads, shielded	4 x 1		
Resolver connection	12 poles, round		
Resolver cable, shielded	4 x 2 x 0,25mm²		
Encoder connection (Option)	17 poles, round		
Encoder cable, shielded	7 x 2 x 0,25mm²		

Dimensions (drawing in principle)



TYP	Resolver		Encoder	
	k	k1	k	k1
DBL7N02600	240	284	259	303
DBL7N03200	263	307	282	326
DBL7N04000	298	342	317	361

Radial forces at the shaft end



10.9 DBL8

The data can have a tolerance of +/- 10%.

Technical data

	Data	Symbol [Unit]	DBL8 N04000	DBL8 N06800	DBL8 L09300	DBL8 L11500
Electrical data						
	Standstill torque	**M_0 [Nm]**	**40**	**68**	**93**	**115**
	Standstill current	**I_{0rms} [A]**	**21,8**	**35,8**	**33,1**	**42,1**
	Mains voltage	U_N [VAC]	400-480			
U_N = 230V	Rated speed	n_n [min^{-1}]	—	—	—	—
	Rated torque	M_n [Nm]	—	—	—	—
	Rated current	I_n [A]	—	—	—	—
	Rated power	P_n [kW]	—	—	—	—
U_N = 400V	**Rated speed**	**n_n [min^{-1}]**	**3000**	**3000**	**2000**	**2000**
	Rated torque	M_n [Nm]	30	50	70	85
	Rated current	I_n [A]	17,8	27,8	26	32,4
	Rated power	P_n [kW]	10,1	15,7	14,7	17,8
U_N = 480V	Rated speed	n_n [min^{-1}]	3600	3600	—	—
	Rated torque	M_n [Nm]	30,4	45,6	—	—
	Rated current	I_n [A]	17,5	25	—	—
	Rated power	P_n [kW]	11,5	17,2	—	—
	Peak current	I_{0max} [A]	85	140	129	164
	Torque constant	K_{Trms} [Nm/A]	1,8	1,9	2,8	2,7
	Voltage constant	K_{Erms} [mVmin]	111	115	170	165
	Winding resistance Ph-Ph	R_{20} [Ω]	0,25	0,13	0,15	0,11
	Winding inductance Ph-Ph	L [mH]	5,7	3,3	4,8	3,4
Mechanical data						
	Rotor moment of inertia	J [kgcm²]	76	114	153	190
	Static friction torque	M_R [Nm]	0,70	0,70	0,80	0,80
	Thermal time constant	t_{TH} [min]	47	65	79	90
	Weight standard	G [kg]	41	56	73	89
	Radial load permitted at shaft end @ 2000 min^{-1}	F_R [N]	1800			
	Axial load max. permitted	F_A [N]	143			
	Motor number		00690R	00531R	00672R	00668R

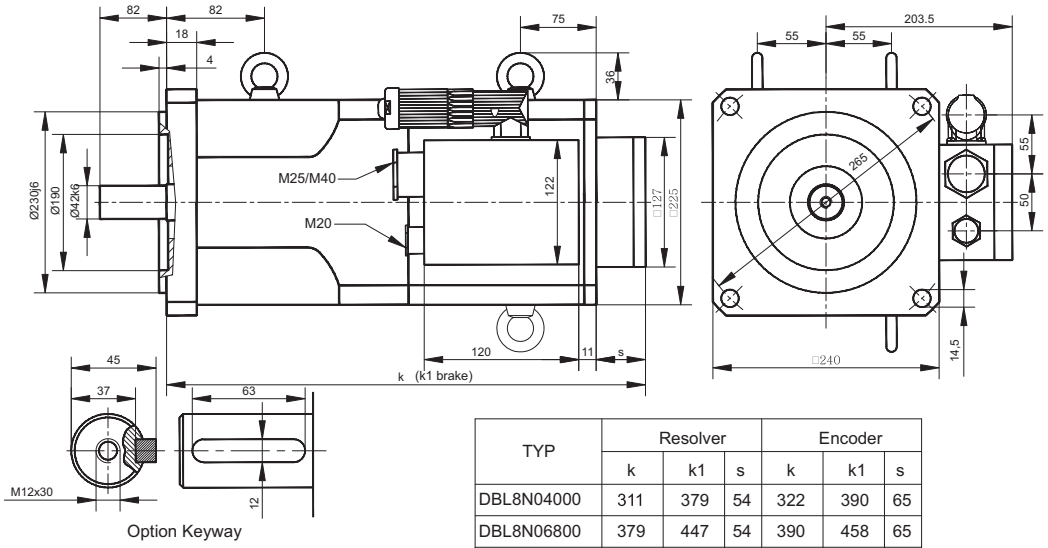
Brake data

Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	60
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	36
Moment of inertia	J_{BR} [kgcm²]	57,5
Release delay time	t_{BRH} [ms]	150
Application delay time	t_{BRL} [ms]	40
Weight of the brake	G_{BR} [kg]	5,4

Connections and leads

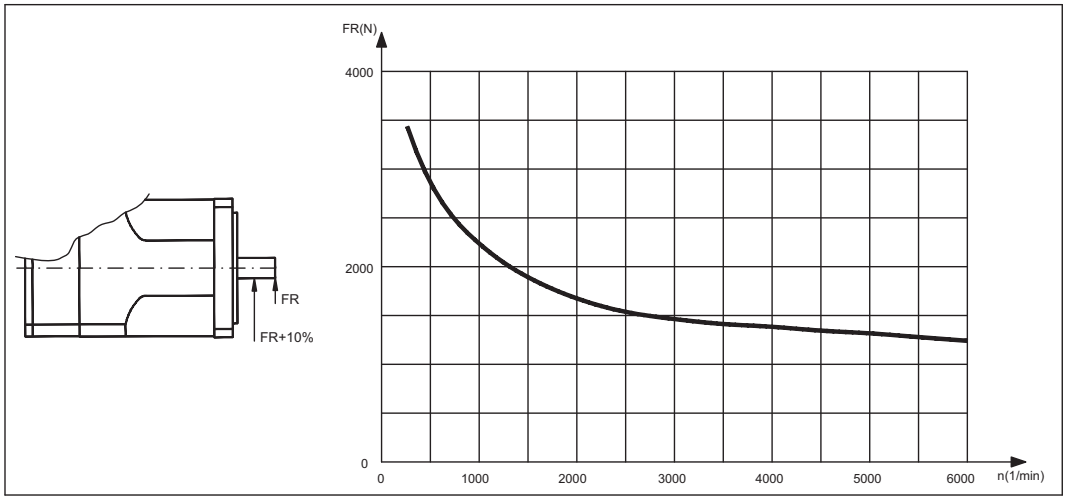
Data	DBL8 N04000	DBL8 N06800	DBL8 L09300	DBL8 L11500
Power connection	Terminal box			
Motor cable, shielded	4 x 4	4 x 10		
Control leads, shielded	4 x 1			
Resolver connection	12 poles, round			
Resolver cable, shielded	4 x 2 x 0,25mm²			
Encoder connection (Option)	17 poles, round			
Encoder cable, shielded	7 x 2 x 0,25mm²			

Dimensions (drawing in principle)



TYP	Resolver			Encoder		
	k	k1	s	k	k1	s
DBL8N04000	311	379	54	322	390	65
DBL8N06800	379	447	54	390	458	65
DBL8L09300	447	515	54	458	526	65
DBL8L11500	515	583	54	526	594	65

Radial forces at the shaft end



10.10 DBK4

The data can have a tolerance of +/- 10%.

Technical data

Data		Symbol [Unit]	DBK4 N00100	DBK4 H00100	DBK4 N00160	DBK4 H00160
Electrical data						
	Standstill torque	**M_0 [Nm]**	**1**	**1**	**1,6**	**1,6**
	Standstill current	**I_{0rms} [A]**	**1,1**	**1,8**	**1,1**	**2**
	Mains voltage	U_N [VAC]	230-480			
U_N = 230V	Rated speed	n_n [min^{-1}]	—	3000	—	3000
	Rated torque	M_n [Nm]	—	0,9	—	1,35
	Rated current	I_n [A]	—	1,75	—	1,85
	Rated power	P_n [kW]	—	0,28	—	0,44
U_N = 400V	**Rated speed**	**n_n [min^{-1}]**	**3000**	**—**	**3000**	**—**
	Rated torque	M_n [Nm]	0,9	—	1,35	—
	Rated current	I_n [A]	1,05	—	1	—
	Rated power	P_n [kW]	0,28	—	0,44	—
U_N = 480V	Rated speed	n_n [min^{-1}]	3600	—	3600	—
	Rated torque	M_n [Nm]	0,88	—	1,35	—
	Rated current	I_n [A]	0,95	—	0,91	—
	Rated power	P_n [kW]	0,33	—	0,5	—
	Peak current	I_{0max} [A]	6,4	10,8	6,4	12,1
	Torque constant	K_{Trms} [Nm/A]	0,94	0,55	1,51	0,79
	Voltage constant	K_{Erms} [mVmin]	57	33,3	91	48
	Winding resistance Ph-Ph	R_{20} [Ω]	36,3	13	25,9	7,4
	Winding inductance Ph-Ph	L [mH]	75	25	82	22,7
Mechanical data						
	Rotor moment of inertia	J [kgcm²]	0,54		1,28	
	Static friction torque	M_R [Nm]	0,10		0,13	
	Thermal time constant	t_{TH} [min]	45		50	50
	Weight standard	G [kg]	2,6			
	Radial load permitted at shaft end @ 3000 min^{-1}	F_R [N]	590			
	Axial load max. permitted	F_A [N]	106			
	Motor number		00259R	00017R	00441R	00347R

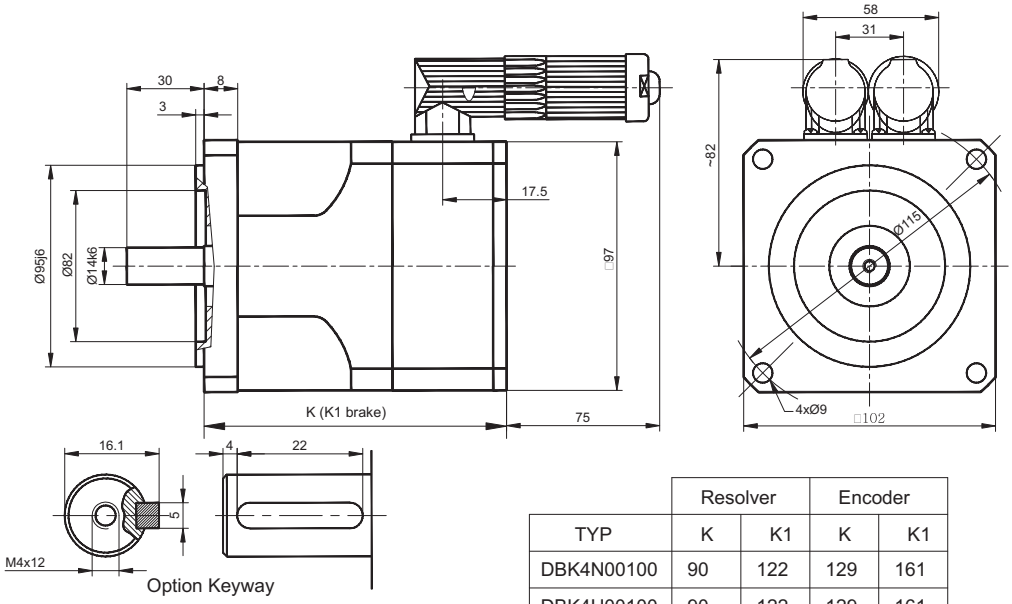
Brake data

Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	2,5
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	12
Moment of inertia	J_{BR} [kgcm²]	0,38
Release delay time	t_{BRH} [ms]	10-15
Application delay time	t_{BRL} [ms]	10-15
Weight of the brake	G_{BR} [kg]	0,45

Connections and leads

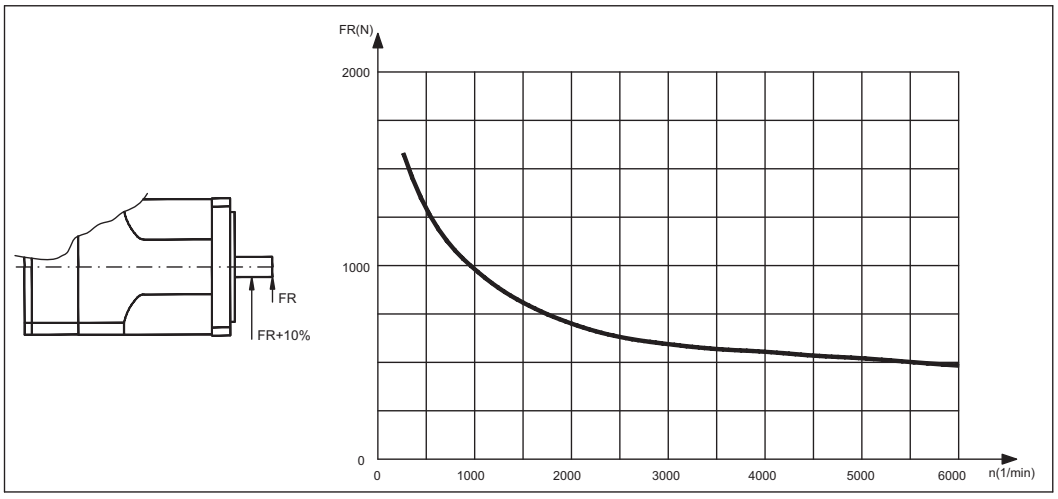
Data	DBK4 N00100	DBK4 H00100	DBK4 N00160	DBK4 H00160
Power connection	4 + 4 poles, round, angular			
Motor cable, shielded	4 x 1			
Motor cable with control leads, shielded	4 x 1 + 2 x 0,75			
Resolver connection	12 poles, round, angular			
Resolver cable, shielded	4 x 2 x 0,25mm²			
Encoder connection (Option)	17 poles, round, angular			
Encoder cable, shielded	7 x 2 x 0,25mm²			

Dimensions (drawing in principle)



	Resolver		Encoder	
TYP	K	K1	K	K1
DBK4N00100	90	122	129	161
DBK4H00100	90	122	129	161
DBK4N00160	105	143	144	182
DBK4H00160	105	143	144	182

Radial forces at the shaft end



10.11 DBK5

The data can have a tolerance of +/- 10%.

Technical data

Data		Symbol [Unit]	DBK5 N00210	DBK5 H00210	DBK5 N00430	DBK5 H00430
Electrical data						
	Standstill torque	**M_0 [Nm]**	**2,1**	**2,1**	**4,3**	**4,3**
	Standstill current	**I_{0rms} [A]**	**1,6**	**4**	**3**	**5,2**
	Mains voltage	U_N [VAC]	230-480			
U_N = 230V	Rated speed	n_n [min^{-1}]	—	3000	—	3000
	Rated torque	M_n [Nm]	—	1,9	—	3,9
	Rated current	I_n [A]	—	3,95	—	5
	Rated power	P_n [kW]	—	0,60	—	1,23
U_N = 400V	**Rated speed**	**n_n [min^{-1}]**	**3000**	**—**	**3000**	**—**
	Rated torque	M_n [Nm]	1,9	—	3,9	—
	Rated current	I_n [A]	1,6	—	2,9	—
	Rated power	P_n [kW]	0,60	—	1,23	—
U_N = 480V	Rated speed	n_n [min^{-1}]	3600	—	3600	—
	Rated torque	M_n [Nm]	1,8	—	3,8	—
	Rated current	I_n [A]	1,32	—	2,55	—
	Rated power	P_n [kW]	0,68	—	1,43	—
	Peak current	I_{0max} [A]	8,1	18,1	15	26
	Torque constant	K_{Trms} [Nm/A]	1,29	0,52	1,44	0,83
	Voltage constant	K_{Erms} [mVmin]	78	31,5	87	50
	Winding resistance Ph-Ph	R_{20} [Ω]	20,1	3	7,2	2,4
	Winding inductance Ph-Ph	L [mH]	75,5	11	35	11,5
Mechanical data						
	Rotor moment of inertia	J [kgcm²]	2,5		5,78	
	Static friction torque	M_R [Nm]	0,15		0,20	
	Thermal time constant	t_{TH} [min]	33		34	
	Weight standard	G [kg]	5		6,8	
	Radial load permitted at shaft end @ 3000 min^{-1}	F_R [N]	640			
	Axial load max. permitted	F_A [N]	111			
	Motor number		00374R	00549R	00375R	00345R

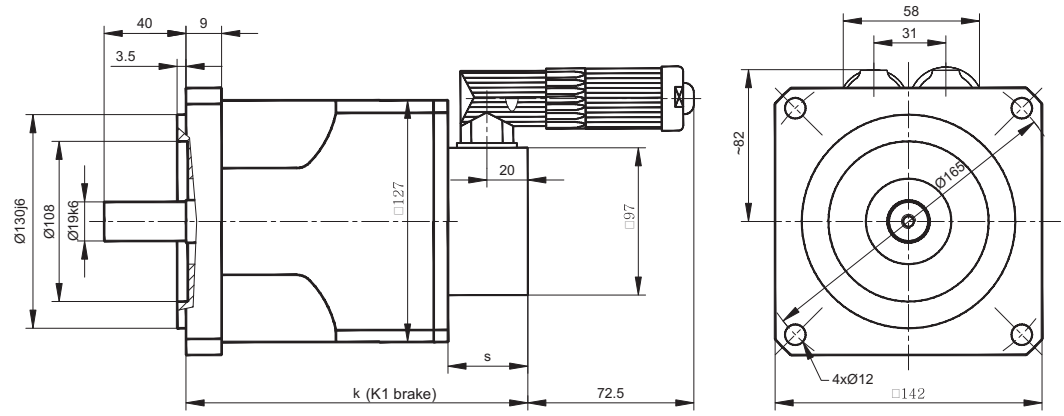
Brake data

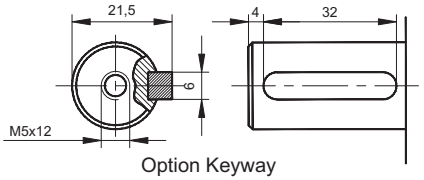
Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	5
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	16
Moment of inertia	J_{BR} [kgcm²]	1,06
Release delay time	t_{BRH} [ms]	10-30
Application delay time	t_{BRL} [ms]	5-15
Weight of the brake	G_{BR} [kg]	0,75

Connections and leads

Data	DBK5 N00210	DBK5 H00210	DBK5 N00430	DBK5 H00430
Power connection	4 + 4 poles, round, angular			
Motor cable, shielded	4 x 1			
Motor cable with control leads, shielded	4 x 1 + 2 x 0,75			
Resolver connection	12 poles, round, angular			
Resolver cable, shielded	4 x 2 x 0,25mm²			
Encoder connection (Option)	17 poles, round, angular			
Encoder cable, shielded	7 x 2 x 0,25mm²			

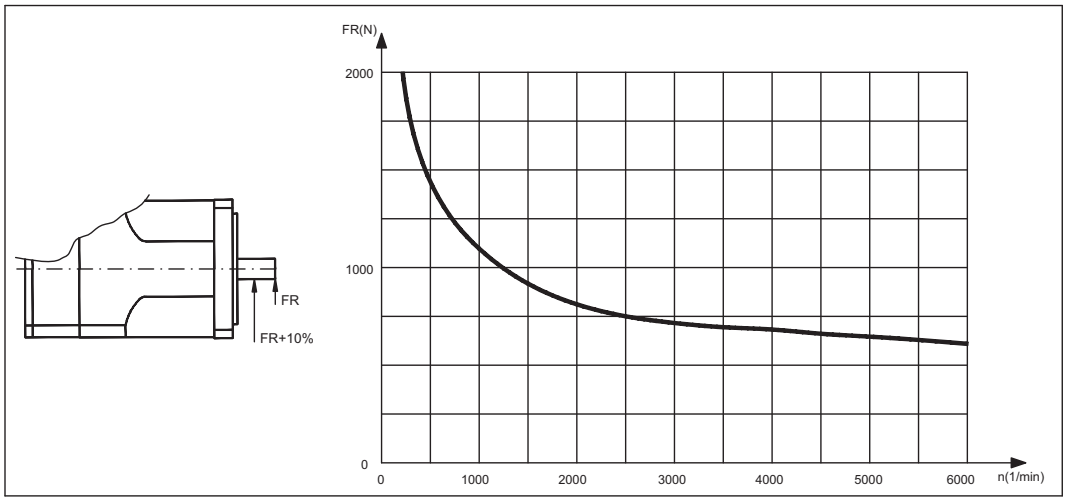
Dimensions (drawing in principle)





	Resolver			Encoder		
TYP	K	K1	s	K	K1	s
DBK5N00210	136	172	46	155	191	65
DBK5H00210	136	172	46	155	191	65
DBK5N00430	153	189	46	172	208	65
DBK5H00430	153	189	46	172	208	65

Radial forces at the shaft end



10.12 DBK6

The data can have a tolerance of +/- 10%.

Technical data

	Data	Symbol [Unit]	DBK6 N00350	DBK6 N00700
Electrical data				
	Standstill torque	**M_0 [Nm]**	**3,5**	**7**
	Standstill current	**I_{0rms} [A]**	**3**	**4,7**
	Mains voltage	U_N [VAC]	400-480	
U_N = 230V	Rated speed	n_n [min^{-1}]	—	—
	Rated torque	M_n [Nm]	—	—
	Rated current	I_n [A]	—	—
	Rated power	P_n [kW]	—	—
U_N = 400V	**Rated speed**	**n_n [min^{-1}]**	**3000**	**3000**
	Rated torque	M_n [Nm]	3	6
	Rated current	I_n [A]	3	4,5
	Rated power	P_n [kW]	0,94	1,89
U_N = 480V	Rated speed	n_n [min^{-1}]	3600	3600
	Rated torque	M_n [Nm]	2,9	5,7
	Rated current	I_n [A]	2,3	4,1
	Rated power	P_n [kW]	1,09	2,15
	Peak current	I_{0max} [A]	15,1	23,5
	Torque constant	K_{Trms} [Nm/A]	1,16	1,49
	Voltage constant	K_{Erms} [mVmin]	70	90
	Winding resistance Ph-Ph	R_{20} [Ω]	8,8	4,45
	Winding inductance Ph-Ph	L [mH]	52	36
Mechanical data				
	Rotor moment of inertia	J [kgcm²]	5,6	11,35
	Static friction torque	M_R [Nm]	0,30	0,30
	Thermal time constant	t_{TH} [min]	31	38
	Weight standard	G [kg]	6,9	8,7
	Radial load permitted at shaft end @ 3000 min^{-1}	F_R [N]	650	
	Axial load max. permitted	F_A [N]	111	
	Motor number		00476R	00356R

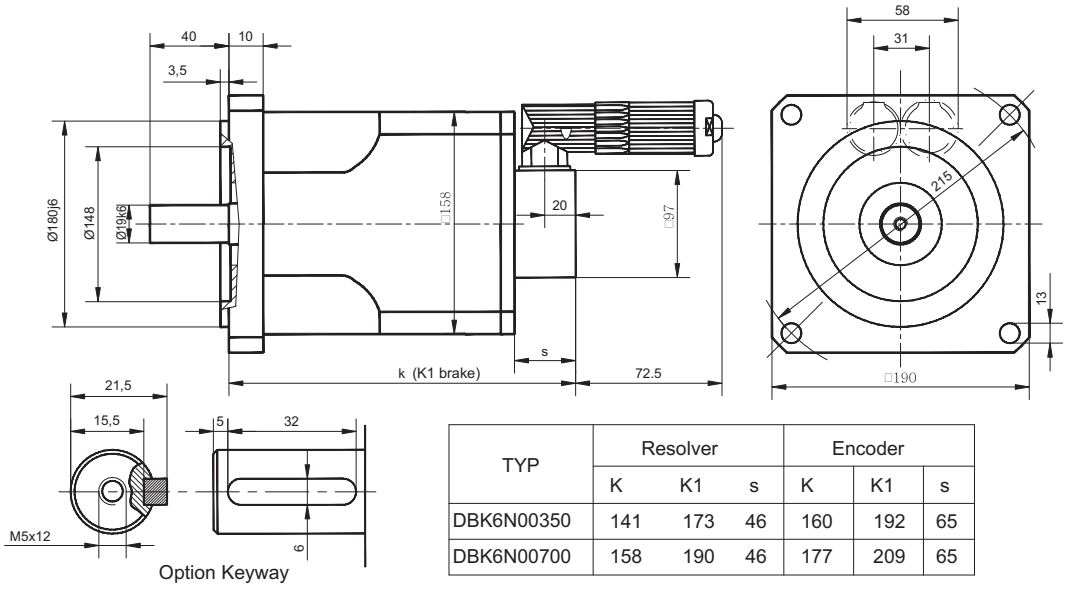
Brake data

Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	5
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	16
Moment of inertia	J_{BR} [kgcm²]	1,06
Release delay time	t_{BRH} [ms]	10-30
Application delay time	t_{BRL} [ms]	5-15
Weight of the brake	G_{BR} [kg]	0,75

Connections and leads

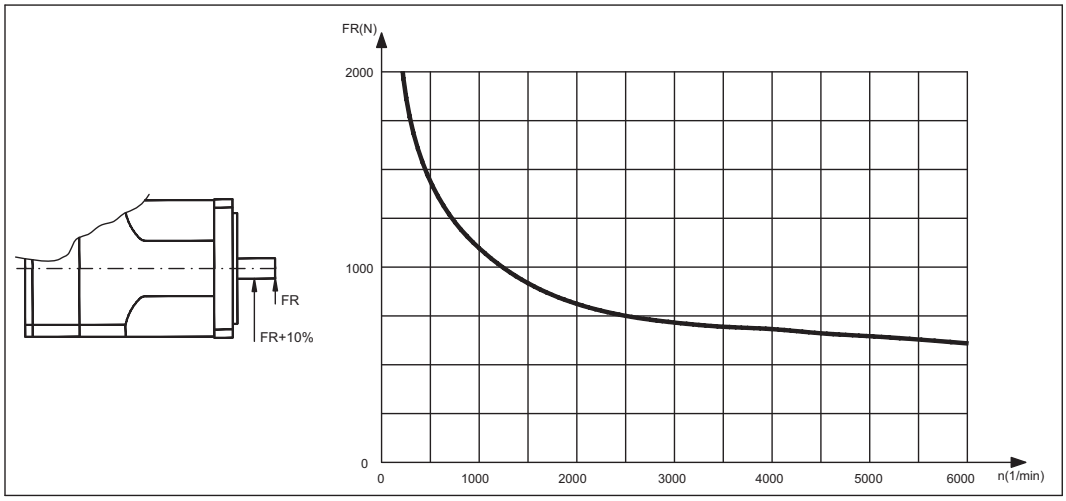
Data	DBK6 N00350	DBK6 N00700
Power connection	4 + 4 poles, round, angular	
Motor cable, shielded	4 x 1	
Motor cable with control leads, shielded	4 x 1 + 2 x 0,75	
Resolver connection	12 poles, round, angular	
Resolver cable, shielded	4 x 2 x 0,25mm²	
Encoder connection (Option)	17 poles, round, angular	
Encoder cable, shielded	7 x 2 x 0,25mm²	

Dimensions (drawing in principle)



TYP	Resolver			Encoder		
	K	K1	s	K	K1	s
DBK6N00350	141	173	46	160	192	65
DBK6N00700	158	190	46	177	209	65

Radial forces at the shaft end



10.13 DBK7

The data can have a tolerance of +/- 10%.

Technical data

Data		Symbol [Unit]	DBK7 N00650	DBK7 N01200	DBK7 N01950
Electrical data					
	Standstill torque	**M_0 [Nm]**	**6,5**	**12**	**19,5**
	Standstill current	**I_{0rms} [A]**	**4,5**	**7,5**	**11,8**
	Mains voltage	U_N [VAC]	400-480		
U_N = 230V	Rated speed	n_n [min^{-1}]	—	—	—
	Rated torque	M_n [Nm]	—	—	—
	Rated current	I_n [A]	—	—	—
	Rated power	P_n [kW]	—	—	—
U_N = 400V	Rated speed	n_n [min^{-1}]	**3000**	**3000**	**3000**
	Rated torque	M_n [Nm]	5	10	15
	Rated current	I_n [A]	4	6,8	10
	Rated power	P_n [kW]	1,57	3,14	4,71
U_N = 480V	Rated speed	n_n [min^{-1}]	3600	3600	3600
	Rated torque	M_n [Nm]	4,7	9,6	14
	Rated current	I_n [A]	3,3	5,96	8,48
	Rated power	P_n [kW]	1,77	3,62	5,28
	Peak current	I_{0max} [A]	17,6	27	46
	Torque constant	K_{Trms} [Nm/A]	1,44	1,6	1,65
	Voltage constant	K_{Erms} [mVmin]	87	97	100
	Winding resistance Ph-Ph	R_{20} [Ω]	4,2	1,6	0,8
	Winding inductance Ph-Ph	L [mH]	27	13	8,3
Mechanical data					
	Rotor moment of inertia	J [kgcm²]	32,36	36	69,16
	Static friction torque	M_R [Nm]	0,35	0,40	0,50
	Thermal time constant	t_{TH} [min]	35	42	52
	Weight standard	G [kg]	10	14	19
	Radial load permitted at shaft end @ 3000 min^{-1}	F_R [N]	690		
	Axial load max. permitted	F_A [N]	90		
	Motor number		00377R	00378R	00379R

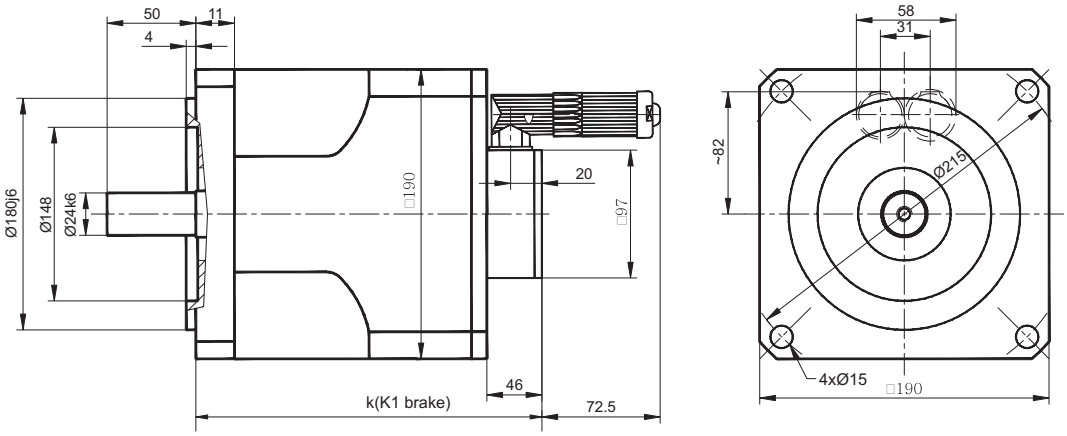
Brake data

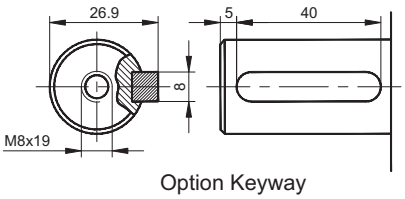
Data	Symbol [Unit]	Value
Holding torque	M_{BR} [Nm]	12
Operating voltage	U_{BR} [VDC]	24 +15 / -0 %
electrical power	P_{BR} [W]	18
Moment of inertia	J_{BR} [kgcm²]	3,6
Release delay time	t_{BRH} [ms]	30-60
Application delay time	t_{BRL} [ms]	10-20
Weight of the brake	G_{BR} [kg]	1,5

Connections and leads

Data	DBK7 N00650	DBK7 N01200	DBK7 N01950
Power connection	4 + 4 poles, round, angular		
Motor cable, shielded	4 x 1,5		
Motor cable with control leads, shielded	4 x 1,5 + 2 x 0,75		
Resolver connection	12 poles, round, angular		
Resolver cable, shielded	4 x 2 x 0,25mm²		
Encoder connection (Option)	17 poles, round, angular		
Encoder cable, shielded	7 x 2 x 0,25mm²		

Dimensions (drawing in principle)

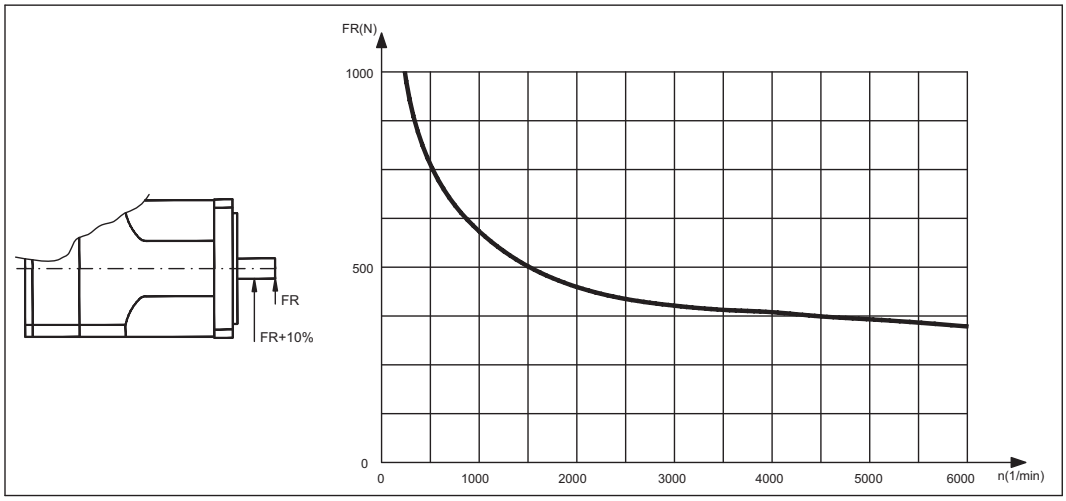




Option Keyway

TYP	Resolver		Encoder	
	K	K1	K	K1
DBK7N00650	152	190	171	209
DBK7N01200	175	213	194	232
DBK7N01950	198	236	217	255

Radial forces at the shaft end



11 Appendix

11.1 Assignment of RediMount gearhead mounts

Motor	RediMount	Flange length in. (mm)
DBL2x	RM060-7	1.22 (31.0)
	RM075-7	in preparation
DBL3x (11mm shaft)	RM060-57	1.22 (31.0)
	RM075-57	1.69 (42.9)
	RM090-57A	1.74 (44.1)
DBL3x (14mm shaft)	RM060-25	1.22 (31.0)
	RM075-25	1.69 (42.9)
	RM090-25	1.74 (44.1)
	RM100-25	1.72 (43.7)
	RM115-25	1.93 (48.9)
DBL4x	RM075-52A	1.69 (42.9)
	RM090-52A	1.74 (44.1)
	RM100-52	1.72 (43.7)
	RM115-52	2.36 (59.9)
	RM142-52	2.74 (69.6)
DBL5x	RM115-88	2.36 (59.9)
	RM142-88	3.21 (81.5)
	RM180-88	3.60 (91.4)
	RM220-88	in preparation
DBL6x	RM180-XXX	3.60 (91.4)
	RM220-XXX	2.74 (69.6)
DBL7x	RM142-107	3.36 (85.3)
	RM180-107	3.60 (91.4)
	RM220-107	2.74 (69.6)
DBL8x	RM220-119	3.35 (85.1)

Motor	RediMount	Flange length in. (mm)
DBK4x	RM060-49B	1.95 (49.5)
	RM075-49B	in preparation
	RM090-49B	1.74 (44.1)
	RM100-49B	TBD
	RM115-49B	1.93 (48.9)
DBK5x	RM115-84	23.6 (59.9)
	RM142-84	3.21 (81.5)
	RM180-84	3.60 (91.4)
	RM220-84	in preparation
DBK6x	RM142-XXX	in preparation
	RM180-XXX	3.60 (91.4)
	RM220-XXX	2.74 (69.6)
DBK7x	RM180-317	3.60 (91.4)
	RM220-317	2.74 (69.6)

11.2 Assignment of Micron Gearheads to RediMount mounts

These gearheads can be fitted to RediMount:

RediMount Mount	Micron gearhead
RM060	DT60, DTR60, DTRS60, DTRH60, NT23, NTP23, NT60, NTR23, UT006, UTR006, EQ23, EQ60
RM075	UT075, UTR075, UT090, UTR090
RM090	DT90, DTR90, DTRS90, DTRD90, DTRH90, NT34, NTP34, NT90, NTR34
RM100	UT010, UTR010, ET010, UT115, UTR115
RM115	DT115, DTR115, DTRS115, DTRD115, DTRH115, NT42, NTP42, NT115, NTR42
RM142	DT142, DTR142, DTRS142, DTRD142, DTRH142, NT142, UT014, UTR014, ET014
RM180	UT018, UTR018, ET018
RM220	UT220

You can find further information on Redimount and Micron gearheads on our website.

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