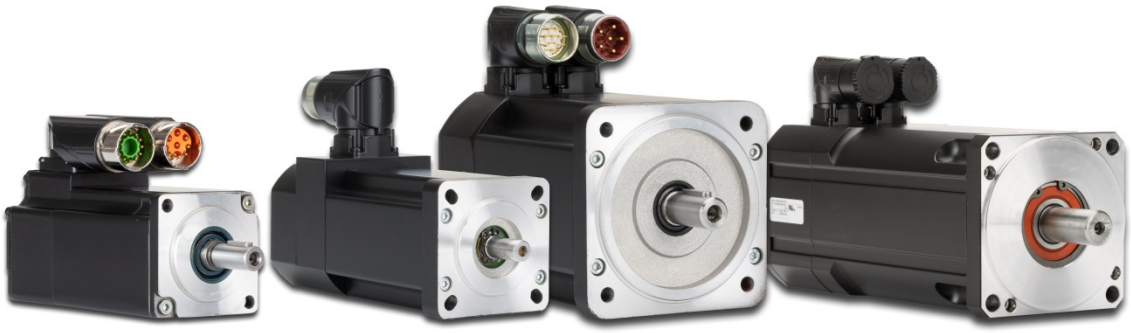
Jetter automation



User Manual

JHN, JHQ, and JL Servo Motors

We automate your success.

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Translation of the original German language document

Item number	60884703_03
Document revision	6.40
Date of issue	March 2021

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1 Introduction

This document is part of the product documentation describing Jetter drive technology and must be read and understood before using the motor. It contains important and safety-related information for the proper use of the motor as intended. It also contains technical data and type designations for synchronous servo motors by Jetter AG.

1.1 Target groups

This document is intended for specialists with appropriate qualifications.
The device may only be installed and commissioned by trained and qualified personnel who will observe the standards DIN EN 50110-1 and DIN IEC 60364 in their work.
During the whole product life cycle, safe handling and operation of the device must be ensured. In the case of missing or inadequate technical knowledge or knowledge of this document any liability is excluded.

1.2 Availability of information

Make sure this document is kept at the ready in the vicinity of the product throughout its service life.
For information on new revisions of this document, visit the download area on our website.

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This document is not subject to any updating service.

An overview of product documentation related to Jetter drive technology and where to find it is described in chapters 1.4 Overview: Product-specific documentation related to Jetter AG motion systems .

An overview of cross-product documentation and tools is described in chapters 1.5 Overview: General product documentation and tools .

1.3 Warranty information

Your product has left our factory fully tested and ready to use.

The information on the nameplate applies to rated operating conditions.
Warranty claims only apply to Jetter AG products.

Any warranty claims for a complete system in combination with third-party products are excluded.

Repairs shall only be carried out by the manufacturer.

Warranty claims become void if the device is opened or if modifications are made.

The following actions will void the warranty:

- Dismantling or opening of gearbox, motor or encoder electronics.
- Incorrect connection of the drive shaft which results in excessive forces acting on the bearing of the drive shaft.
- Impact or blows to motor, gearbox or encoder.
- Mechanical work on the shaft, flange, plug or encoder housing.

1.4 Overview: Product-specific documentation related to Jetter AG motion systems

Jetter motors and drives				
	Document category	**Content**	**Format**	**Storage location**
1	User Manual	Engineering/selection of the servo motor, installation and commissioning	*.pdf	On the Jetter homepage: *Downloads - Drives - Servomotors*
2	CAD- drawings for motors		*.pdf, *.dxf and *.stp	On the Jetter homepage: *Downloads - Drives - Servomotors*
3	Installation manual	Installation and commissioning of motors	*.pdf	On the Jetter homepage: *Downloads - Drives - Servomotors*
4	Gearing catalogs	Selecting planetary gear boxes, mounting on Jetter motors, servicing of gearboxes, etc.	*.pdf	To be obtained from Jetter AG on request
5	CAD-drawings and datasheets for gearings		*.pdf, *.dxf and *.stp	To be obtained from Jetter AG on request
6	Catalog "Industrial Automation"	Products and Services	*.pdf	On the Jetter homepage: *Downloads*

JetMove				
	Document category	**Content**	**Format**	**Storage location**
1	User and installation manuals of the respective JetMove	Engineering/selection of the servo amplifier, dimensions, technical data, ...	*.pdf	In hard-copy or for download from the Jetter homepage or on CD (Documentation Set - JM-1000/3000)
2	CAD-drawings and datasheets, if needed		*.pdf, *.dxf and *.stp	On the Jetter homepage for download or on CD (Documentation Set - JM-1000/3000)

JetControl - Safety, JX4 Interface				
	Document category	**Content**	**Format**	**Storage location**
1	User and installation manuals on motion controllers JC-440MC and JC-945MC, as well as on Safety controllers JSC-110, JSC-210, JSC-220 and JSC-240	Engineering/selecting a controller which is equipped with the corresponding X4 interface for connecting JetMove devices	*.pdf	In hard-copy or for download from the Jetter homepage or on CD (Documentation Set - JM-1000/3000)
2	CAD-drawings and datasheets, if needed		*.pdf, *.dxf and *.stp	On the Jetter AG homepage for download

1.5 Overview: General product documentation and tools

Hardware				
	Document category	**Content**	**Format**	**Storage location**
1	Application Note 016 for control cabinet manufacturing and installation	EMC-compliant installation of servo amplifiers and other components, wiring and shielding in the control cabinet	*.pdf	On the Jetter homepage: *Downloads – Product-independent documentation - Application Notes*
2	User manuals	Peripherals	*.pdf	On the Jetter AG homepage for download

Engineering and commissioning tools				
	Document category	**Content**	**Format**	**Storage location**
1	JetSym software	Jetter AG programming and commissioning tool		For download from the Jetter homepage or on product-specific CD, licensing key included
2	Motor database in JetSym	Characteristic curves and electrical data of all Jetter motors	*.pdf	JetSym programming software
3	Sizing tool SERVOsoft®	Engineering and selecting Jetter motors, gearboxes, servo amplifiers and further accessories		A license can be obtained from SERVOsoft® or ordered via Jetter AG
4	Sizing tool NCP for Neugart gear units	Selecting a Neugart planetary gear unit and connecting it with a Jetter motor		Free software download from the Neugart homepage
5	JetSym online help	Information on error messages and status display	*.html	

1.6 Jetter AG in a nutshell

1.6.1 The company

Jetter AG has been a competent industrial automation provider for more than 30 years. A distinctive feature of Jetter technology is the integration of all automation functions into one system and one programming language. This means that you will not need additional third party software or hardware. Instead, you can meet any of your automation requirements by Jetter AG technology.

This holistic approach eliminates cumbersome software and hardware interfaces to give you an integrated, optimally coordinated system. The result is simplified programming which grants earlier commissioning of your systems. That will surely boost time-to-market! As early as in the nineties, Jetter AG was the first enterprise in electronics industry vertical to consequently rely on networking by standard Ethernet TCP/IP and by using Web technology (at Jetter AG, this is JetWeb technology).
This made merging corporate IT network and production IT possible for the first time. Subsequently, processes could be simplified, while forward-looking features such as remote maintenance, could be implemented. Since the introduction of JetWeb technology thousands of Jetter AG control solutions have been implemented in a wide range of applications in mechanical and plant engineering - an expertise which now gives our customers the benefit of perfected products and first-class service. Spurred by multiple success, Jetter AG keeps searching for, and developing, new solutions and technologies to make automation still easier for you. Introducing a new, even more powerful controller series, has been another milestone for Jetter AG proving it to be a both competent and innovative partner in automation technology.

1.6.2 Jetter motors - Power in every size

The correct choice and design of a servo motor is key to optimal drive and machine performance. The long-term experience and the large product portfolio of Jetter AG help you find the motor most fit for your specific application. Going with the JetMove servo amplifiers are Jetter motors featuring DC link voltages of DC 24 to 560 V and a great selection of motor windings. The right combination will produce the optimal speed for the application while also optimizing use of the servo amplifier's rated current. All Jetter AG servo motors are extremely rugged 3-phase synchronous motors with UL certification, which are available in the series JHN, JHQ, and JL.

- A specific feature of JHN and JHQ motors is their automated segmented winding technology and further optimized motor design, which result in high power density at very low space requirements.
- JHN motors are available in flange sizes 2 to 7 from 0.28 Nm to 60 Nm (flange 2 = 6-pole, flange 3 or larger = 10-pole).
- The JHQ motor series has the largest selection of flanges and encoders. From flange size 12 to 8, a torque range from 0.18 Nm to 120 Nm is supplied in 6-, 8- or 10-pole versions.
- JL in classical winding technology are 6-pole motors and cover the range from 0.1 Nm (JL1) to 115 Nm (JL8).

A large number of options for connector models, degree of protection or encoder design round off the range and leave nothing to be desired when looking for a suitable servo motor. In addition to the extensive range of motors, Jetter AG also offers pre-assembled and tested servo cables, as well as ready installed suitable gear boxes. This saves you time and guarantees you a safe system!

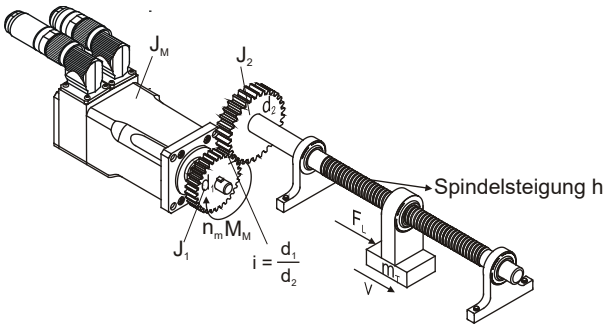
1.7 Definitions of terms and calculation formulas

1.7.1 Definitions of terms

Continuous stall torque M_o [Nm]	Thermal limit torque that can be output for any length of time at standstill of the motor and under rated ambient conditions.
Rated torque M_n [Nm]	When the motor is drawing its rated current at its rated speed of n_n, the rated torque can be delivered for an unlimited period of time in S1 operating mode.
Continuous stall current I_o [A]	Required rms current for the development of the standstill torque M_o. The value refers to the sinusoidal rms current.
Continuous rated current I_n [A]	At a rated speed n_n and at output of the rated torque, the motor will draw the continuous rated current. This parameter refers to the sine-effective current value.
Peak current I_{max} [A]	Permitted peak current for 5 s max.! The peak current should not exceed 3.5 times the value of the continuous rated current.
Torque constant K_T [Nm/A]	This constant specifies the amount of torque [Nm] that is output by the motor at an RMS current of 1 A ($M = I * K_T$).
Back EMF constant K_E [V/1000 RPM]	This constant specifies the induced electro-magnetic force of the motor related to 1000 RPM as an RMS value between two motor phases.
Mass moment of inertia J_M [kgcm^2]	The mass moment of inertia is given only for the rotor with standard equipment, i.e. resolver feedback. Internal or external accessories (holding brake, encoder, clutch) or a load may affect the values specified in this manual. Therefore, for calculating the dynamic motor situation the mass moment of inertia has to be taken into account in its entirety.
Axial load F_A [N]	Rated axial load of the bare shaft end at the given speed and a ball bearing service life of 20,000 hours.
Radial load F_R [N]	Rated radial load of the bare shaft end at the given mean speed and a ball bearing service life of 20,000 hours. The point where the radial load acts is in the center of the shaft end.

1.7.2 Formulas for spindle drive calculations

Schematic of a spindle drive:

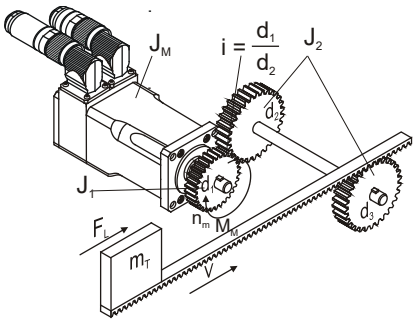


Formulas

Engine RPM	$n_m = (v \times 6 \times 10^4)/(h \times i)$	[RPM]
Load torque	$M_L = h \times i \times (F_L/(2.000 \times \pi))$	[Nm]
Translatory mass moment of inertia	$J_T = m_T \times (h/(2 \times \pi))^2 \times 10^{-6}$	[kg m^2]
Rotatory mass moment of inertia	$J_R = (\pi/32) \times 10^{-15} \times d^4 \times l \times \rho$	[kg m^2]
To steel the following formula applies:	$J_R = 7{,}7 \times d^4 \times l \times 10^{-13}$	[kg m^2]
To aluminum the following formula applies:	$J_R = 2{,}7 \times d^4 \times l \times 10^{-13}$	[kg m^2]
Sum of reduced mass moments of inertia	$J = J_M + J_1 + i^2 \times (J_R + J_T)$	[kg m^2]
Acceleration or deceleration torque M_B = f(nM)	$M_B = (2 \times \pi \times n_m \times J)/(60 \times t_B) = (n_M \times J)/(9{,}55 \times t_B)$	[Nm]
Acceleration or deceleration torque M_B = f(sM)	$M_B = (4 \times \pi \times s_B \times J)/(h \times i \times t_B^2)$	[Nm]
Acceleration or deceleration time t_B = f(nM)	$t_B = (2 \times \pi \times n_M \times J)/(60 \times M_B) = (n_M \times J)/(9{,}55 \times M_B)$	[s]
Acceleration or deceleration time t_B = f(sB)	$t_B = \sqrt{(4 \times \pi \times s_B \times J)/(h \times i \times M_B)}$	[s]
Speed reached after acceleration	$n_M = (120 \times s_B)/(h \times i \times t_B)$	[RPM]
Acceleration or deceleration distance	$s_B = (n_M \times t_B \times h \times i)/120$	[mm]
Output	$P_A = (M_M \times n_M)/9{,}55$	[W]

1.7.3 Formulas for rack-and-pinion drive or belt drive calculations

Schematic of a rack-and-pinion drive:



Formulas

Engine RPM	$n_m = (v \times 6 \times 10^4)/(\pi \times d_3 \times i)$	[RPM]
Load torque	$M_L = d_3 \times i \times (F_L/2.000)$	[Nm]
Translatory mass moment of inertia	$J_T = m_T \times (d_3/2)^2 \times 10^{-6}$	[kg m^2]
Rotatory mass moment of inertia	$J_R = (\pi/32) \times 10^{-15} \times d^4 \times l \times \rho$	[kg m^2]
To steel the following formula applies:	$J_R = 7{,}7 \times d^4 \times l \times 10^{-13}$	[kg m^2]
To aluminum the following formula applies:	$J_R = 2{,}7 \times d^4 \times l \times 10^{-13}$	[kg m^2]
Sum of reduced mass moments of inertia	$J = J_M + J_1 + i^2 \times (J_R + J_T)$	[kg m^2]
Acceleration or deceleration torque M_B = f(nM)	$M_B = (2 \times \pi \times n_m \times J)/(60 \times t_B) = (n_M \times J)/(9{,}55 \times t_B)$	[Nm]
Acceleration or deceleration torque M_B = f(sM)	$M_B = (4 \times s_B \times J)/(d_3 \times i \times t_B^2)$	[Nm]
Acceleration or deceleration time t_B = f(nM)	$t_B = (2 \times \pi \times n_M \times J)/(60 \times M_B) = (n_M \times J)/(9{,}55 \times M_B)$	[s]
Acceleration or deceleration time t_B = f(sB)	$t_B = \sqrt{(4 \times s_B \times J)/(d_3 \times i \times M_B)}$	[s]
Speed reached after acceleration	$n_M = (120 \times s_B)/(d_3 \times \pi \times i \times t_B)$	[RPM]
Acceleration or deceleration distance	$s_B = (n_M \times t_B \times d_3 \times \pi \times i)/120$	[mm]
Output	$P_A = (M_M \times n_M)/9{,}55$	[W]

1.7.4 Legend

Legend for the formulas for calculating the spindle, rack-and-pinion or belt drive

d	=	Cylinder diameter [mm]
d_1	=	Diameter of driving gear [mm]
d_2	=	Diameter of driven gear [mm]
d_3	=	Pinion or pulley diameter [mm]
F_L	=	Feed force [N]
h	=	Spindle lead [mm]
i	=	Reduction ratio
l	=	Cylinder length [mm]
m	=	Cylinder weight [kg]
m_T	=	Weight of linearly moved parts [kg]
M_B	=	Acceleration, resp. deceleration torque [Nm]
M_D	=	Continuous torque [Nm]
M_I	=	Peak torque [Nm]
M_L	=	Load torque [Nm]
M_M	=	Motor torque [Nm]
M_R	=	Friction torque [Nm]
n_M	=	Motor speed [RPM]
P_A	=	Output [W]
J	=	Mass moment of inertia [kg m^2]
J_M	=	Motor mass moment of inertia [kg m^2]
J_R	=	Rotatory mass moment of inertia [kg m^2]
J_T	=	Translatory mass moment of inertia [kg m^2]
s_B	=	Acceleration, resp. deceleration distance [mm]
t_B	=	Acceleration, resp. deceleration time [s]
v	=	Feed rate [m/s]
h	=	Mechanical efficiency related to motor shaft
ρ	=	Density [kg/m^3]

All motor calculations should be carried out on the basis of the most severe operating conditions.

2 Safety advices

2.1 General information

At the time of placing on the market, this product corresponds to the current state of the art and meets the recognized safety rules.
Besides this user manual, laws and regulations in the operator's country are relevant to the operation of the product. The operator is responsible for complying with the directives mentioned below:

- Applicable legislation, rules, and regulations
- Relevant accident prevention regulations
- Accepted safety rules
- EU directives and other country-specific regulations

2.2 Purpose

2.2.1 Intended use

The servo motors are intended for industrial or commercial applications.
They comply with the relevant parts of the harmonized series of standards EN 60034. If in special cases, that is when motors are used in non-industrial or non-commercial plants increased requirements apply, these requirements must be complied with on the part of the plant.

Typical applications are robotics and handling, machine tools, packaging and food processing machinery and similar machines.

The servomotors may only be operated within the operating and environmental conditions specified in the documentation (installation altitude, degree of protection, temperature range, electrical and mechanical data, etc.).

Before commissioning systems and machines in which the servomotors are installed, the system or machine must conform to the Machinery Directive, Low Voltage Directive and EMC Directive.

The rated AC voltage of the servo motors is 170 V or 310 V. The winding isolation is rated at DC 750 V. During braking operation, for example, the DC link voltage of the servo amplifier, however, can amount up to DC 850 V. Thus, servo motors are subject to the EC Low Voltage Directive.

Systems and machines with inverter-fed three-phase motors must meet the protection requirements of the EMC directive. It is the responsibility of the system installer to carry out the correct installation. Use only shielded signal and power lines. Observe the instructions of the inverter manufacturer for EMC-compliant installation.

The servomotors may only be put into operation after the EMC-compliant installation of the overall system.

2.2.2 Usage other than intended

The use of the servo drives and motors outside the aforementioned areas of application or under operating ranges and environmental conditions other than those described in the documentation is considered improper operation.

The JL, JHN and JHQ servo motors are not to be regarded as safety-related parts as per Machinery Directive 2006/42/EC. The motors do not provide safety-related features. When used in safety functions, a higher-level safety system is required and an additional monitoring and protective device must be provided in accordance with the applicable safety regulations.

These servo motors must not be used in technical systems which to a high degree have to be fail-safe. The following areas of application are not intended applications:

- Aviation and aerospace
- Machinery specially designed or used for nuclear applications the failure of which may result in the emission of radioactivity.
- Medical devices that come into direct contact with the human body.
- Machines for transporting and lifting persons.
- Special facilities for use at fairs and amusement parks.
- Devices for domestic use

NOTICE **Destruction of the servomotor!**

A servomotor is not intended for direct connection to the three-phase mains. Direct connection to the mains will destroy it.

- Servomotors have explicitly been designed for being torque, speed, and/or position controlled by specific servo amplifiers, such as the JetMove series by Jetter AG.

2.3 Hazard levels

DANGER **High risk**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING **Medium risk**

Indicates a potential hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION **Low risk**

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE **Material damage**

Indicates a situation which, if not avoided, could result in malfunctions or material damage.

2.4 Residual dangers

Consider the residual dangers mentioned in this chapter when assessing the risks associated with your machine.

DANGER

Hazard caused by high operating voltage!
Extremely hazardous voltages of up to DC 900 V may occur!
The high operating voltage may cause muscle cramps, burns, unconsciousness, respiratory standstill, or death.

- Do not remove any cover plates and keep all control cabinet doors closed during operation.
- Check that all live connections are protected against contact.
- Do not open the device.
- **While the motor is in operation, do not touch the following terminals: Power supply, motor voltage and DC link voltage.**

DANGER

Danger in potentially explosive atmospheres!
Do not disconnect any plugs during operation!
The drive can become an ignition source in potentially explosive areas if you disconnect the control or power plugs of the drive during operation.

- Never pull the motor connector while the motor is energized.
- Do not disconnect any connectors on the servo amplifier and the control unit while higher currents are flowing.

DANGER

Danger in potentially explosive atmospheres!
Motor power limitations!
The motor can become an ignition source in potentially explosive areas if the following instructions are not followed during operation.

- Limit electrical disturbances and vibrations by fine-tuning the control parameters.
- The maximum speed must never be exceeded.
- The RMS value of the rated current must not exceed the specifications on the nameplate.
- For a rated speed close to 0, the RMS value for rated current indicated on the nameplate must be halved.

DANGER

Danger for persons with pacemakers and implants!
Electromagnetic fields caused by the drive!
Electric, magnetic and electromagnetic fields pose a particular hazard to people with pacemakers, implants or similar devices.

- You must not be in the immediate vicinity of the drive if you belong to the above group of persons.

WARNING

Warning of unguarded moving machine parts!

The drive shaft of the motor moves mechanical parts, some of which have sharp edges.
You could get caught in the rotating drive shaft and incur crushes and cuts.

- Never touch a rotating drive shaft.
- Do not wear lose-fitting clothing.
- Do not wear gloves.
- Monitoring and protective devices in accordance with the applicable safety regulations must be provided.
- Before working on the motor, disconnect it from the power supply and make sure that the motor cannot move.
- Make sure that there will be no danger to persons or damage to property even if the drive starts moving unintentionally.

WARNING

Warning of feather key coming loose!

If the feather key is mounted on the motor shaft without drive element, the feather key may come loose.

- Operate the motor only with the drive element fitted or with the yellow or black protective cap supplied with the motor.
- Wear goggles.

WARNING

Warning of suspended loads!

Suspended loads can fall because the holding brakes installed in the motor do not provide functional safety. If the load hits you, you may be injured or killed.

- Functional safety can only be achieved with an additional external mechanical brake.

2.5 Instructions on EMC

The EU Electromagnetic Compatibility Directive (2004/108/EC) applies to equipment that may cause electromagnetic emissions or whose operation may be affected by such emissions.

The instructions for ensuring EMC must be followed in order to guarantee EMC safety of the machine.

Applicable special standard:
DIN EN IEC 61800-3: Adjustable speed electrical power drive systems
Part 3: EMC requirements including specific test procedures

Special measures to increase the immunity to interference in plants are listed below:

- Ground the panel and the frame:
  - via the mounting flange - the D end is not grounded
  - via machine
  - via PE of the motor line connected to the servo amplifier
  - via grounding terminals in the control cabinet
- Connect the resolver or the HIPERFACE®
- Connect the motor lines. The toroidal cores or the motor choke must be placed near the servo amplifier. Shield cables on both ends.
- Connect holding brake, if available, and connect the shield on both ends of the cable.
- If you use a motor power cable which includes conductors for brake control, the brake control conductors must be shielded separately. Ground the shielding braid on both ends.

Follow the instructions given in Application Note 016 *EMC-Compatible Installation of the Electric Cabinet*. It can be downloaded from the download area of our homepage:

Application Notes | Jetter - We automate your success

3 Product description

3.1 Motor series - Comparison

3.1.1 JHN series

The JHN motors from Jetter AG are characterized by a very compact design and a high torque at the same time. This way, the machines can be kept small.
JHN motors also replace the JH and JK series.
The JHN motors can be wired in 1-cable and 2-cable technology.

The following illustration shows a JHN2 motor featuring 2-cable technology:

3.1.2 Servo motors of the JHQ series

JHQ motors from Jetter AG are available in sizes from 2 to 5 (JH) and 2 to 8 (JL). Intermediate sizes (23, 45, 51, 71) and compact sizes 12, 22, 24 with Y-plug are also available. Their high torque constant makes them an alternative to the so far used JL and JH motors if an adequate quantity of them is ordered.
As of JetSym Version 5.3 the characteristic data of the JHQ motors are also available in the Motion Setup database for commissioning.

The JHQ motors can be wired in 1-cable and 2-cable technology.

The following illustration shows a JHQ3 motor featuring 2-cable technology:

The following illustration shows a JHQ2 motor featuring 1-cable technology:

The following illustration shows a JHQ12 motor with Y-plug:

3.1.3 JL series

The JL motor series comprises synchronous servo motors featuring classic winding technology. These motors are very rugged and cover the range from 0.1 Nm (JL1) to 115 Nm (JL8). All motors have a pole pair number of 3 and are therefore 6-pole motors. In the data sheets, for example, the number of motor poles is then 6.

The following illustration shows a JL5 motor:

The following illustration shows a JL1 motor with Y-plug:

3.2 Configurations

3.2.1 Resolver

As standard, a 2-pole hollow shaft resolver is built into the motor as a feedback unit. The rotor of the resolver is firmly connected to the motor shaft. The resolver is used for electronic commutation. In addition to commutation, the resolver serves for speed and position value feedback. A resolver is a position transducer continuously measuring motor shaft position.
The rotor position is evaluated and then supplies the following information necessary for motor control:

- The actual speed value via angular velocity
- The actual position value per revolution
- 4096 pulses per revolution

The resolver itself does not contain any electronic components. One of the remarkable features of a resolver is its rugged design which is insensitive to higher temperatures and vibrations. This makes the resolver the ideal and reliable sensor for use in harsh environments. The motor needs to be referenced.

3.2.2 HIPERFACE®

The SinCos motor feedback system with the standardized **Hi**gh **Per**formance Inter**face**, HIPERFACE for short, is often used in digital drive technology because of its high and absolute position resolution. In this case, search for reference is not required. The features of this system are as follows:

- Up to 1024 sine/cosine cycles per revolution.
- Absolute positioning with a resolution of 32768 increments per revolution
- 4096 revolutions can be measured in multiturn mode (SRM)

Unlike the resolver, the SinCos motor feedback system with HIPERFACE® interface contains electronic components. The system still distinguishes itself by high thermostability and high immunity to noise.

3.2.3 HIPERFACE DSL®

The SinCos motor feedback system HIPERFACE DSL® is a digital extension of the hybrid (digital/analog) HIPERFACE system. There is mere digital data transfer. DSL is short for **D**igital **S**ervo **L**ink interface. The encoder signal and the power supply for the encoder are transmitted via two lines and wired in the power connector.

3.2.4 Temperature sensor in the motor

The temperature of the stator windings in the winding heads of the motor must be recorded and monitored by the servo amplifier. The monitoring system shall be designed to protect the engine to temperature class F.

If an early warning temperature threshold is reached, an increased temperature is indicated. If this temperature threshold is exceeded, the motor is switched off. This prevents thermal overload of the motor in continuous operation.

For JetMove 2xx, a KTY-83-110 is installed as standard temperature sensor.
The PT1000 is the preferred choice for the new drive generation or motors with HIPERFACE DSL® encoders. For sizes JL1 and JHQ12 only a PTC is available as temperature sensor. Motors with built-in thermostatic circuit breaker (140 °C) are only available as spare parts. The built-in thermostatic circuit-breaker has a tolerance of ± 10 °C and can be operated up to a maximum temperature of 150 °C.

3.2.5 Holding brake

All motors can also be supplied with a holding brake. If you apply DC 24 V to the holding brake, a magnet winding is activated which counteracts the spring force of the brake by magnetic force and thus cancels out the braking effect. The brake is a mere holding brake for keeping the motor shaft at standstill. It is not designed for permanent slowing down the motor.

3.2.6 Gearings

Due to their standardized interface, all conventional speed reducers, such as planetary gear units, can be attached to our servo motors. JetterAG offer a wide range of gearbox servo motors.

3.2.7 Further options

Other options for the motors can be supplied on request.

3.3 Scope of delivery

When ordering a motor/gearbox combination, the motor is delivered with mounted gearbox. Motors with feather keys are delivered with the feather key in the keyway of the motor shaft. If only the feather key is mounted (without drive element), the feather key must be covered with the protective cap. To avoid the risk of injury, the key protection cap is an essential part of the scope of delivery. The delivery also includes plastic caps, which are plugged onto the plug connections for protection. Please notify us if one of the protective caps is not included in the delivery.

WARNING

Warning of feather key coming loose!

If the feather key is mounted on the motor shaft without drive element, the feather key may come loose.

- Operate the motor only with the drive element fitted or with the yellow or black protective cap supplied with the motor.
- Wear goggles.

3.4 Nameplate

The nameplate contains important information about the motor. The nameplate attached to the packaging and the motor lets you identify the motor. Please check the part number on the motor nameplate with the part number you specified when ordering.
The operating conditions must correspond to the data on the nameplate.

If you wish to contact the hotline of Jetter AG regarding a motor, please have the following information ready:

- Type designation
- Serial number

3.4.1 Nameplate of JHN and JL motors with UL Certification Mark

This name plate with UL Certification Mark is affixed to the motor and outer carton of motors after successful UL certification:

Jetter automation

c US 0 1 1 6 0 7 8 5 CE

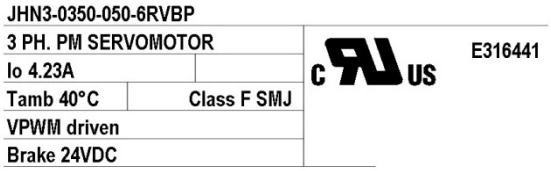
Typ	JHN3-0350-050-6RVBP					24/19
SN	1160785	AN	60881602_2		103460-R02	
M_o	3.5Nm	U_{dc}	320/560V	P_n	0.942kW	
N_n	3000r/min	I_n	4.31A	Class F	IP65	

Made in EU D-71642 Ludwigsburg

The information on the above nameplate can be broken down as follows:

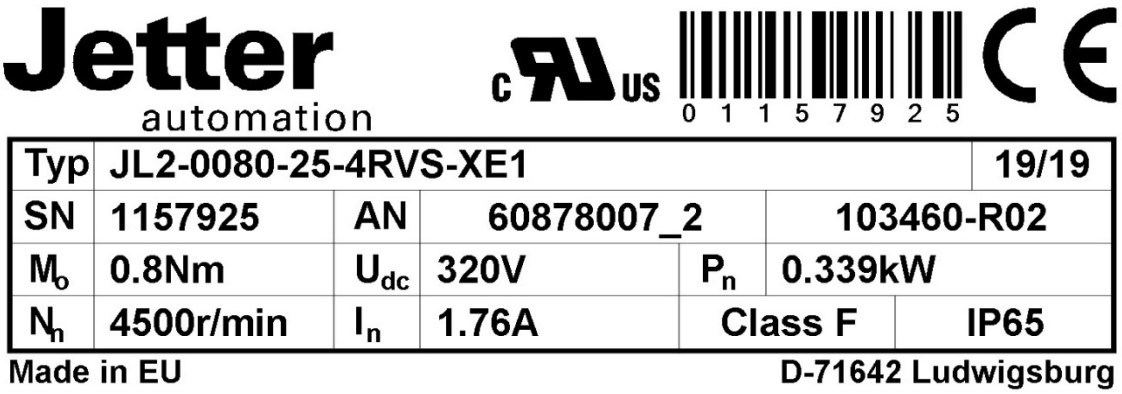
Type	Product designation	JHN3-0350-050-6RVBP
AN	Item number	60881602_2
24/19	Date of manufacture	Week 24/year 2019
SN	Serial number	1160785
M_o	Continuous stall torque [Nm]	3.5
U_{dc}	Winding supply voltage [VDC]	320/560V
N_n	Rated speed [RPM]	3000
I_n	Rated current [A]	4.31
P_n	Rated power [kW]	0,942
Class	Insulation class	F
IP	Degree of protection	IP65

This nameplate with UL certification mark is attached to the motor on the center right:

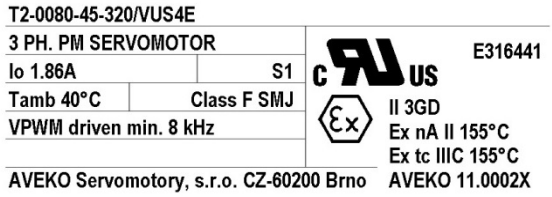


3.4.2 Nameplate of JL motors with UL and ATEX approval

The nameplate with UL and ATEX certification marks is attached to the motor and to the outer carton after successful UL and ATEX certification:

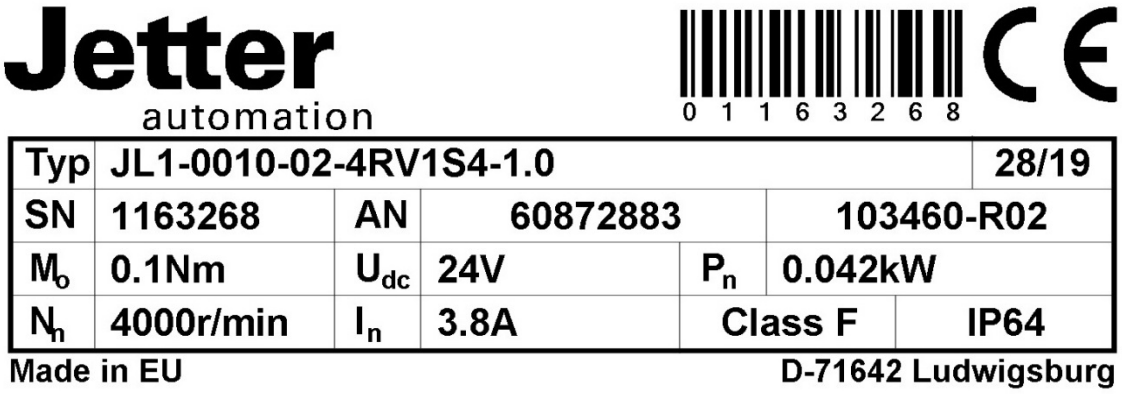


This nameplate with UL and ATEX certification marks is attached to the motor on the center right:



3.4.3 Nameplate of JL1 motors

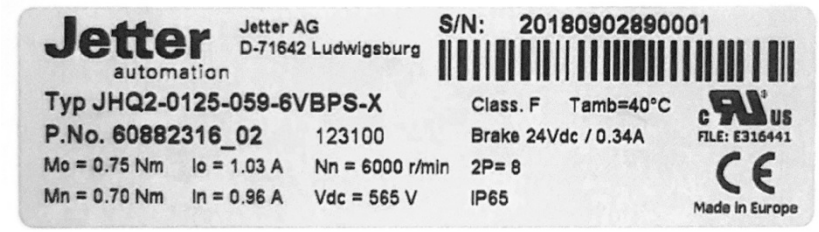
The nameplate is attached to the motor and outer carton of JL1 motors:



The JL1 motor has no UL or ATEX approval.

3.4.4 Nameplate of JHQ motors with UL Certification Mark

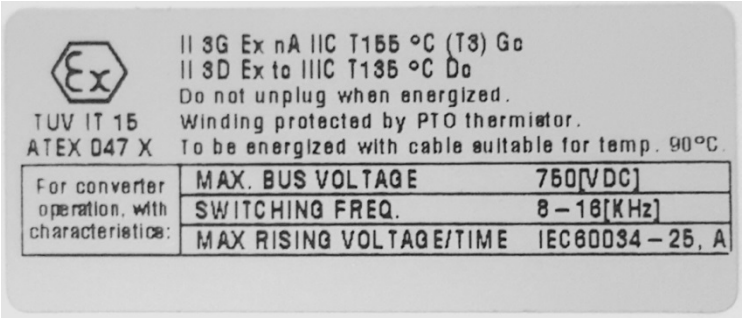
This name plate with UL Certification Mark is affixed to the motor and outer carton of motors after successful UL certification:



The information on the above nameplate can be broken down as follows:

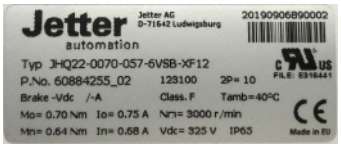
Type	Product designation	JHQ2-0125-059-6VBPS-X
P.No.	Item number	60882316_02
S/N	Serial number	20180902890001
M_o	Continuous stall torque [Nm]	0.75
M_n	Rated torque [Nm]	0.70
I_O	Continuous stall current [A]	1.03
I_n	Rated current [A]	0.96
N_n	Rated speed [RPM]	6000
V_{dc}	Winding supply voltage [VDC]	565 V
Brake	Brake	DC 24 V 0.34A
2P	Number of motor poles	8
Class	Insulation class	F
Tamb	Ambient temperature	40 °C
IP	Degree of protection	IP65

3.4.5 Additional nameplate on JHQ motors with ATEX approval



3.4.6 Nameplate of JHQ22 motors with UL Certification Mark

This nameplate with UL Certification mark is attached to the motor and outer carton of smaller motors:



3.4.7 Model code number

JHN	3	0250	045	6	R	V	B	P	S-X	C	F	E	L	K	X
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1: Series	
JHN 3 - 0250-045-6 R V B P S-X C F E L K X	
Series	JHQ
	JHN
	JL
2: Frame size	
JHN **3** - 0250-045-6 R V B P S-X C F E L K X	
Frame size	1, 12, 2, 22, 23, 24, 3, 4, 45, 5, 51, 6, 7, 71, 8
3: Holding torque	
JHN 3 - **0250**-045-6 R V B P S-X C F E L K X	
Holding torque	Value in Ncm Example: 0250 means 2.5 Nm
4: Speed constant	
JHN 3 - 0250-**045**-6 R V B P S-X C F E L K X	
Speed constant	Value in V/k min^{-1} Example: 45 V/1000 min^{-1}
5: Thermal sensor	
JHN 3 - 0250-045-**6** R V B P S-X C F E L K X	
3	Thermal circuit breaker 140 °C (only for spare part)
4	PTC (for JL1 or JHQ12 only)
6	KTY83-110 (for JetMove 2xx)
8	PT-1000 (for JM-1000, JM-3000 and motors in 1-cable technology)
6: Shaft tolerance	
JHN 3 - 0250-045-6 **R** V B P S-X C F E L K X	
R	Concentricity tolerance of the shaft ends according to DIN 42955R
7: Degree of protection	
JHN 3 - 0250-045-6 R **V** B P S-X C F E L K X	
V	Degree of protection: IP65 (without shaft seal)
V1	Degree of protection: IP64 (without shaft seal)
V4	Degree of protection: IP67 with shaft seal (size 2 ... 8)
8: Brake	
JHN 3 - 0250-045-6 R V **B** P S-X C F E L K X	
B	Brake DC 24 V
9: Shaft	
JHN 3 - 0250-045-6 R V B **P** S-X C F E L K X	
P	Keyway/feather key to DIN 6885

10: Electrical connection	
JHN 3 - 0250-045-6 R V B P **S-X** C F E L K X	
S	Electrical connection
_	Vertical connector output
S-A	90° angled (not rotatable) towards D end (only for spare parts)
S-B	90° angled (not rotatable) towards ND end (only for spare parts)
S-X	**90° angled rotatable, preferred**
SA-X	Rotatable 90° angle Y- or I-Tec (M17 quick-release). Mounted towards D end. Can be rotated towards ND end by customer.
SB-X	Rotatable 90° angle Y- or I-Tec (M17 quick release). Mounted towards ND end. Can be rotated to D end by customer.
S3-x.xx	Cable gland and cable, cable length x.xx in m, e.g. 1.10 = 1.10 m, without connector
S4-x.xx	Cable gland and cable, cable length x.xx in m, e.g. 1.10 = 1.10 m, with connector
S-41-x.xx	Cable gland and cable, cable length x.xx in m, e.g. 1.10 = 1.10 m, with plug for central mounting
11: Connector type	
JHN 3 - 0250-045-6 R V B P S-X **C** F E L K X	
C	Connector type
_	**Size M23 x 1 for JHN2 ... JHN7, JHQ2 ... JHQ7, JL2 ... JL4:** • Encoder and motor connector (2-cable technology) • Motor connector (1-cable technology) **Size M40 x 1.5 motor connector for:** • JL5 ... JL8, JHQ8 (2-cable technology), • JHQ8 (1-cable technology)
C1	Encoder and power connector size 1 (only for JL5)
12a: Standard encoder type (without using a functional safety controller, e.g. JSC)	
JHN 3 - 0250-045-6 R V B P S-X C **F** E L K X	
-	Resolver, 2-pole
F2	JL series: HIPERFACE®, singleturn, size 2 = SKS36; from size 3 = SRS50
F3	JL series: HIPERFACE®, multiturn, size 2 = SKM36; from size 3 = SRM50
F11	JHN and JHQ series: HIPERFACE®, singleturn SEK34, SEK37 or SEK52
F12	JHN and JHQ series: HIPERFACE®, multiturn SEL34, SEL37 or SEL52
F13	JHN and JHQ series: HIPERFACE®, singleturn SKS36 (from size 2)
F14	JHN and JHQ series: HIPERFACE®, multiturn SKM36 (from size 2)
F15	JHN and JHQ series: HIPERFACE®, singleturn SRS50 (from size 3)
F16	JHN and JHQ series: HIPERFACE®, multiturn SRM50 (from size 3)
F17	JHN and JHQ series: HIPERFACE DSL®, singleturn EES37 (HIPERFACE DSL® EES34 in preparation)
F18	JHN and JHQ series: HIPERFACE DSL®, multiturn EEM37 (HIPERFACE DSL® EEM34 in preparation)
F19	JHN and JHQ series: HIPERFACE DSL®, singleturn EKS36 (from size 2)
F20	JHN and JHQ series: HIPERFACE DSL®, multiturn EKM36 (from size 2)
12b: Encoder type when using a functional safety controller, e.g. JSC	
JHN 3 - 0250-045-6 R V B P S-X C **F** E L K X	

Y	Resolver, 2-pole, safely mounted
F17S	JHN and JHQ series: HIPERFACE DSL®, singleturn EES37 S
F18S	JHN and JHQ series: HIPERFACE DSL®, multiturn EEM37 S
13: Potentially explosive areas	
JHN 3 - 0250-045-6 R V B P S-X C F **E** L K X	
E	Potentially explosive area (frame sizes 2 ... 8 are possible)
E1	Potentially explosive area, ATEX (zone 2) II 3 G EEx nA II T3
14: Bearings	
JHN 3 - 0250-045-6 R V B P S-X C F E **L** K X	
L	Bearings
L1	Reinforced bearings at D end
15: Cooling	
JHN 3 - 0250-045-6 R V B P S-X C F E L **K** X	
_	Natural air cooling (standard design)
K1	Forced ventilation at ND end
16: Further options	
JHN 3 - 0250-045-6 R V B P S-X C F E L K **X**	
X	Further options

3.4.8 Notes on operating the motors on safety controllers

When motors with resolvers are used in combination with safety controllers, e.g. Jetter Safety Control JSC, there is the option **Y - Safe encoder mounting according to EN 61800-5-2, Table D.8**.

The MTTFd value is 780 years at an ambient temperature of the motor of 85 °C.

For the EEM37 S HDSL encoder, for example, this would be the order code F18S.

3.4.9 Notes on operating the motors in potentially explosive areas

In potentially explosive areas there are the following potential ignition sources:

- There is a **danger from sparks, flames, high surface temperatures, sound energy, electromagnetic waves and radiation**.
  Do not unplug the drive during operation. Observe the hazard warning in chapter 2.4 Residual dangers, page 20.
  Limit electrical disturbances, currents and speed. Observe the hazard warning in chapter 2.4 Residual dangers, page 20.
- There is a **danger from electrostatic discharge**.
  Make sure you have suitable drive belts. Observe the hazard warning in chapter 8.2.3 Clutch, timing belts, timing belt pulleys, radial and axial load, page 205.
- There is a **danger from electrical leakage and stray currents**.
  Make sure you have balanced voltage potentials. Observe the hazard warning in chapter 8.3.4 Danger from electrical leakage and stray currents, page 208.
- There is a **danger due to inadmissible heating**.
  Monitor the heat generated during operation by evaluating temperature sensors. Observe the hazard warning in chapter 8.3.1 Heat build-up of the motor during operation - Temperature monitoring, page 207.
  Avoid surfaces that are too hot by dissipating heat sufficiently. Observe the hazard warning in chapter 8.3.2 Heat build-up of the motor during operation - Heat dissipation, page 208.
- There is a **danger due to a too high dust layer on the surface of the motor**.
  Ensure that the motor is sufficiently cleaned. Observe the hazard warning in chapter 9.1 Maintenance, page 223.

3.5 Hardware revision

The hardware revision number is either indicated in the product code (Rev. B) or is also indicated in the Jetter item number 6xxxxxxx_yy by the last two digits.

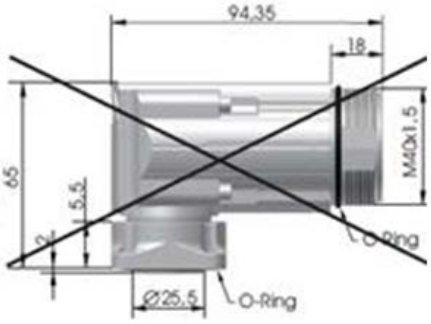
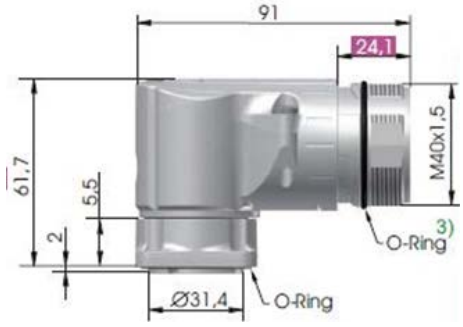
Example:
Revision index _00 means revision 0.
Revision index _02 means revision 2.
No revision index also means revision 2, because the first articles in our ERP system were created without revision index.

For Jetter item numbers of motors without the **_yy** specification, the revision number on the nameplate is indicated by **-Rxx** .

Example:
JL2 motor from the year 2011 with **R01**.

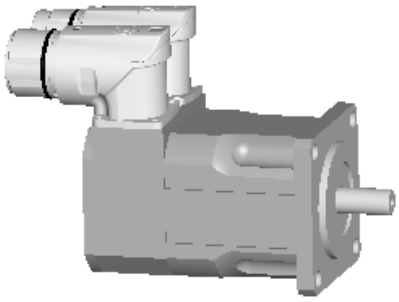
Due to a change of the connector dimensions by the manufacturer, it was necessary to change over to revision **R02** for all motors.

The following table shows a comparison of the connector dimensions for revisions R01 and R02:

	R01	**R02**
Motor connector M23 x 1 in version S-X	Height: 39 mm	Height: 41.5 mm
Motor connector M40 x 1.5 in version S-X	 Height: 65 mm	 Height: 61.7 mm

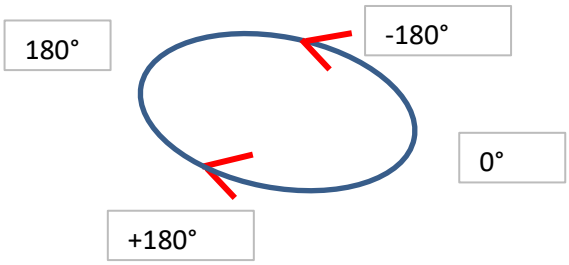
3.6 Changing the outlet direction of the rotatable connector S-X

Step 1:
How can I tell if the motor has a rotatable connector?

 Illustration of a motor with rotatable S-X connector pointing to the D end.	 Illustration of a motor with an elbow connector pointing to the ND end (S-B).
The S-X version is higher than the S-A or S-B versions. No screws must be unscrewed for the S-X version! The customer can change the direction of the connector by max. +/- 180 degrees.	For the S-A version, screws and nameplate must be replaced at the Jetter AG factory. The plug cannot be rotated as with the S-X variant.

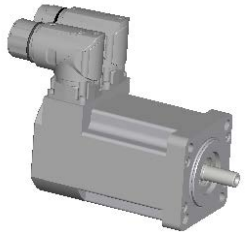
Step 2:
Screw the mating connector to the motor connector of the S-X version to have a larger lever arm for twisting the outlet direction.

Step 3:
Change the outlet direction by turning to the left or right by max. +/- 180°.



Step 4:

The illustration below shows the position of the S-X connector with outlet direction to the ND end.



4 General technical data

4.1 Compatibility of the series

The tolerance of the connector thread of the motors corresponds to DIN 13, class 6g - 6H. The motors are supplied with Intercontec connectors. The thread tolerance of the Intercontec connectors is the same as that of the motor connectors. For motors with the cable without connector option, the customer must select and install connectors with this tolerance.
The wiring of the motor and encoder connectors of all series is identical.
Since the hole circle, centering and shaft are also the same within one flange size, series can be exchanged. E.g. JHN4, JHQ4 and JL4 This does not apply to the discontinued JK motor series.

4.2 Flange sizes - Overview

The table below gives an overview of centering, hole circle, shaft, key size, continuous stall torque Mo and length with constant flange size:

Flange	JHN JL	JHQ	Cent-ering	Hole circle	Shaft (x1)	With feather key	Feather key to DIN 6885-A (x1)	JHN M_o/length	JHQ M_o/length	JL M_o/length
1	37		25	41.5	6x20	2P9	2x2x10			0.1 ... 0.2/ 81 ... 111
12		40	30	46	8x25	3P9	3x3x12		0.18 ... 0.32/ 63 ... 77	
2	55	58	40	63	9x24	3P9	3x3x15	0.28 ... 0.95/ 67 ... 112	0.25 ... 1.25/ 87 ... 135	0.25 ... 1.25/ 98 ... 143
22		60	50	70	14x30	5P9	5x5x20		0.7 ... 1.4/ 84 ... 104	
23		70	60	75	11x23 14x30	4P9 5P9	4x4x15 5x5x20		0.6 ... 3.0/ 112 ... 182	
24		80	70	90	16x40	5P9	5x5x25		0.7 ... 2.7/ 86 ... 120	
3	86	91.3	80	100	14x30	5P9	5x5x20	1.15 ... 4.8/ 82 ... 172	1.35 ... 4.5/ 122 ... 180	0.65 ... 3.0/ 109 ... 181
4	98	100	95	115	19x40	6P9	6x6x32	5.1 ... 11.3/ 113 ... 203	4 … 10/ 150 ... 214	5.3 ... 7.5/ 176 ... 221
45		116	110	130	19x40 24x50	6P9 8P9	6x6x32 8x7x40		6 ... 14/ 168 ... 233	
5	142	142	130	165	24x50	8P9	8x7x40	12 ... 24/ 157 ... 247	4.5 ... 26/ 148 ... 298	12 ... 24/ 226 ... 311
51		142	130	165	28x58	8P9	8x7x40	29 ... 38/ 338 ... 405		
6	190	190	180	215	24x50	8P9	8x7x40	18 ... 44/ 158 ... 258	20 ... 28/ 195 ... 218	19 ... 29/ 242 ... 317
7	190	190	180	215	28x58	8P9	8x7x40	30 ... 60/ 181 ... 271	36 ... 42/ 240 ... 263	32 ... 40/ 264 ... 294
71		190	180	215	38x80	10P9	10x8x70		56 ... 80/ 308 ... 414	
8	240	240	230	265	38x80 42x110	10P9 12P9	10x6x63 12x8x63		42 ... 120/ 293 ... 493	40 ... 115/ 310 ... 514

M_o: Continuous stall torque in Nm
Length: With resolver without brake in mm
Length of shaft and feather key x1:
May vary slightly between the JHN, JHQ and JL series. Please refer to the 2D drawing for details.

Further details on Jetter AG servo motors can also be found in the Industrial Automation Catalog, Products and Services. For more information refer to chapter 1.2 Availability of information, page 10.

4.3 Possible encoder/motor combinations (partly dependent on flange size)

Type	Single/Multiturn	JHN	JHQ	JL
Resolver	Size 15/21	JHN2 … 7	JHQ12 (size 8) JHQ12 … 8	JL1 (size 10) JL2 … 8
F11/F12:	SEK/SEL37	JHN2 … 3	JHQ12 … 45	JL2
F11/F12:	SEK/SEL37		JHQ5 … 8 on request	
F13/F14:	SKS/SKM36	JHN2 … 7	JHQ22 … 8	JL2
F15/F16:	SRS/SRM50	JHN3 … 7	JHQ4 … 8	JL3 … 8
F17/F18:	EES/EEM34		In preparation	
F17/F18:	EES/EEM37	JHN2 … 7	JHQ12 … 8	
F19/F20:	EKS/EKM36	JHN3 … 7	JHQ22 … 8	

4.4 Resolver

Parameter	Description
Input voltage	7 V
Input frequency	10 kHz
Number of pins	2
Speed ratio	0.5
Accuracy	± 10 arcmin

The resolver is mounted and wired together with the JetMoves from Jetter AG in such a way that the commutation offset equals 0°. The position values increase with positive setpoints when the motor shaft (front view on motor shaft) rotates clockwise.

Different resolver sizes are used for different flange sizes. The electrical values are independent of the resolver size.

The 2D drawings of the flange sizes JHNxx, JHQxx and JLxx show the dimensions for motors with resolvers. The length changes with the brake option or other encoder types.

Jetter AG provides 2D and 3D drawings of motors with resolvers or other encoder options on their homepage:

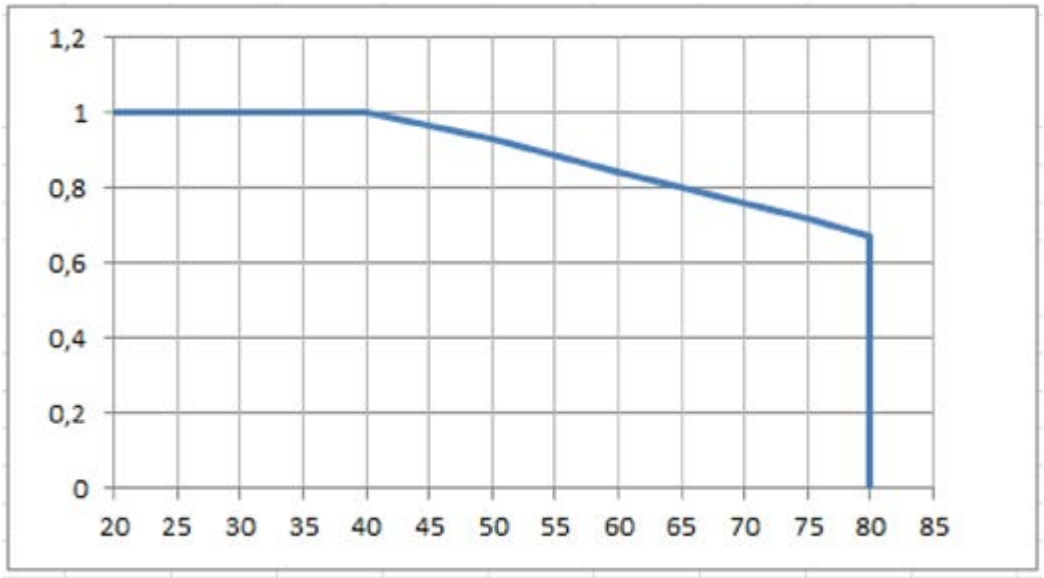
Servo Motors | Jetter - We automate your success.

4.5 Derating at ambient temperatures higher than 40 °C

The speed/torque diagrams of the servo motors are given for an ambient temperature of up to 40 °C. For higher ambient temperatures, the values from this diagram must be multiplied by a derating factor which can be taken from the derating table as a function of the temperature.
This also applies if the motor is mounted to a gear unit or if the mechanical flange is smaller than the calculated one. All torque data were also determined using cold plates. The size of the cold plates was calculated according to chapter 8.2.4. Cooling plate.

If the ambient temperature exceeds 40 °C, the derating factor is automatically taken into account in the calculations.
A cooling device or a fan is needed when applying the motors at an ambient temperature greater than 80 °C.

- y-axis: Derating factor
- x-axis: Ambient temperature in [°C]



Points	**P0**		**P1**						**P2**	
°C	20	30	**40**	50	60	65	70	75	**80**	80
Factor	1	1	**1**	0.93	0.845	0.8	0.76	0.72	**0.67**	0

4.6 Design of the JHN and JL series

Parameter	**Description**
Design	B5, V1, V3
Coating	Matt black to RAL 9005
Ball bearing service life	> 20,000 operating hours
Flange	Flange size to IEC standard, fit j6, accuracy to DIN 42955, tolerance class: R
Degree of protection	IP65 (without shaft seal)
Insulation class	F acc. to VDE 0350
Coolant	Natural air cooling
Cooling plate	Length of cooling plate in mm = 2.5 x motor flange size in mm; cooling plate thickness = 3.5 mm Cooling plate width = cooling plate length

Parameter	Description
Ambient temperature	-15 ... +40 °C
Thermal motor protection	KTY 83-110; alternative: PTC, or PT-1000

4.6.1 Standard configuration

- KTY83-110; for JL1 only PTC can be used
- No brake
- Plain shaft
- Two straight flange sockets for power and signal
- Resolver
- Reduced runout tolerance = R
- Degree of protection: IP65
- Degree of protection IP64 with JL1 motors

4.6.2 Derating at altitudes higher than 1000 m above sea level

Derating for operation at altitudes higher than 1000 m above sea level and at standstill of the motor and a standard ambient temperature	
2000 m above sea level	6 %
3000 m above sea level	11 %
4000 m above sea level	17 %
To calculate the holding torque, the permitted torque is to be derated by the following formula: $M_{red} = M_0 * \text{sqrt}\ (1-(H-1000)/(10000))$.	

4.7 Design of the JHQ series

Parameter	Description
Design	B5, V1, V3
Coating	Matt black to RAL 9005
Ball Bearing Service Life	> 20,000 operating hours
Flange	Flange dimensions according to IEC standard, flange concentricity **N**; Balancing: Vibration class **N**; dynamic balancing with half of the feather key. Option: Reduced runout tolerance **R**
Degree of protection	IP65 (without shaft seal)
Insulation class	F acc. to VDE 0350
Coolant	Natural air cooling
Cooling plate	Length of cooling plate in mm = 2.5 x motor flange size in mm; cooling plate thickness = 3.5 mm Cooling plate width = cooling plate length
Ambient temperature	-15 ... +40 °C
Thermal motor protection	KTY 83-110; alternative: PTC, or PT-1000
Rotor	Rare earth permanent magnets. Excellent rotor magnetic field distribution to eliminate torque variations at low speed.

4.7.1 Standard configuration

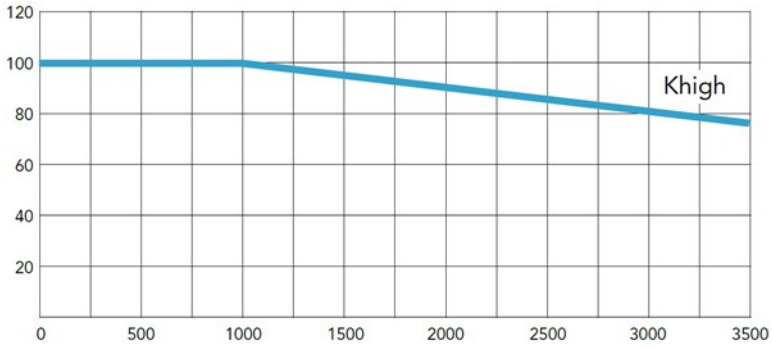
- KTY83-110
- No brake
- Plain shaft
- Rotatable connector S-X
- Resolver
- Runout tolerance = N
- Without shaft seal
- Degree of protection: IP65
- Degree of protection IP64 for JHQ2, drive end

Other than it is the case with JL and JHN motors, the default connector configuration of JHQ motors is angled and rotatable (option S-X).

4.7.2 Derating

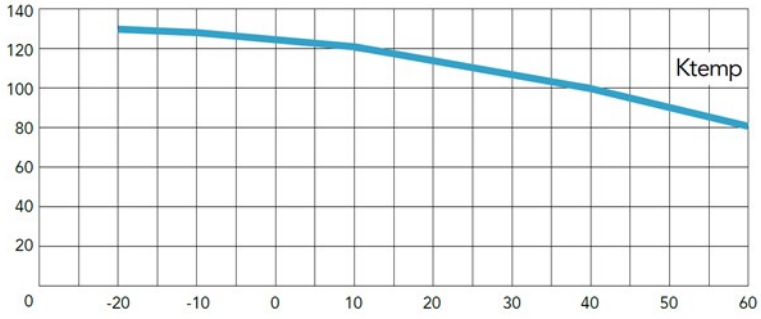
Derating, depending on the altitude above sea level

- y-axis: Available torque in % of the rated torque
- x-axis: Altitude above sea level



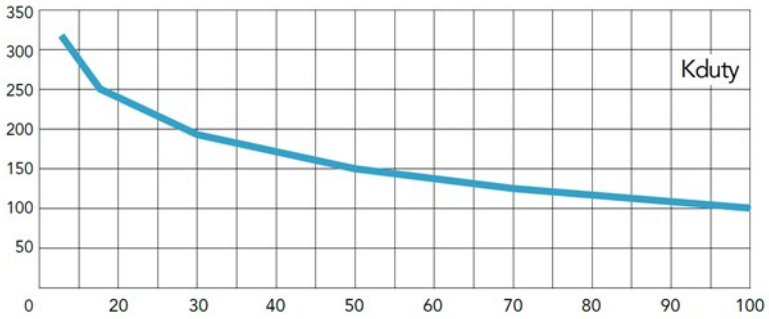
Derating, depending on the ambient temperature:

- y-axis: Available torque in % of the rated torque
- x-axis: Ambient temperature



Derating, depending on the duty cycle:

- y-axis: Available torque in % of the rated torque
- x-axis: Duty cycle in per cent



5 Servo motors of the JHN series

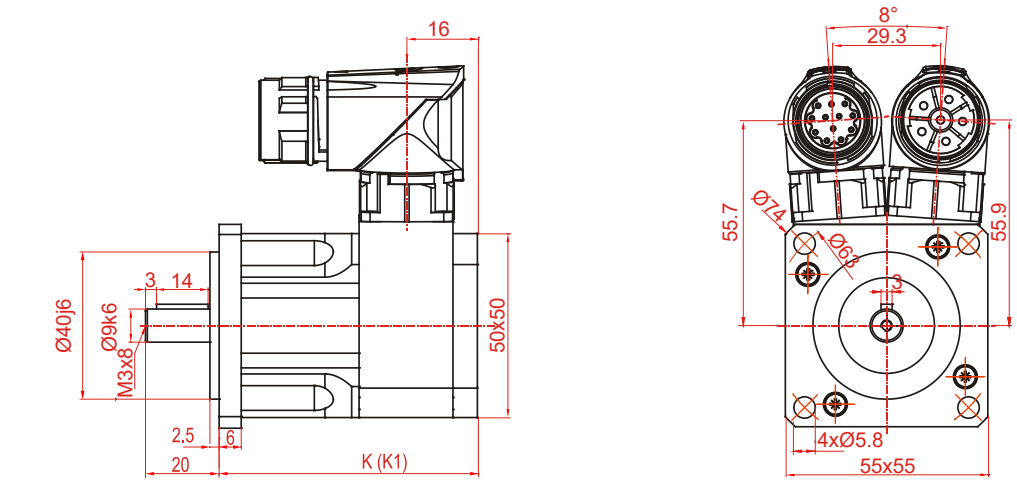
The table below lists the tolerance of the shaft length according to DIN ISO 2768-1, Table 1, for longitudinal dimensions of the JHN series:

Tolerance class	Limit deviations in mm for nominal dimension range in mm									
	up to 0.5	0.5 through 3	over 3 to 6	over 6 to 30	over 30 to 120	over 120 to 400	over 400 to 1000	over 1000 to 2000	over 2000 to 4000	over 4000 to 8000
v (very coarse)	See below[1)]	-	± 0.5	± 1	± 1.5	± 2.5	± 4	± 6	± 8	± 8

[1)]: For nominal dimensions below 0.5 mm, the limit deviations must be indicated directly on the nominal dimension.

The following illustrations of flange sizes show the dimensions in millimeters of motors equipped with a resolver.

5.1 Flange size - JHN2



Option with feather key 3x3x14

P = Power connector size K = Dimension without brake K1 = Dimension with brake	**P**	**K**	**K1**	**K**	**K1**
Type		**Resolver**		**SKx36/EKx36:**	
JHN2-0028	M23	67	105	94	128
JHN2-0054	M23	82	120	109	143
JHN2-0075	M23	97	135	124	158
JHN2-0095	M23	112	150	139	173

5.1.1 Technical data of the brake

The technical data of the brake for motor type JHN2 are listed below:

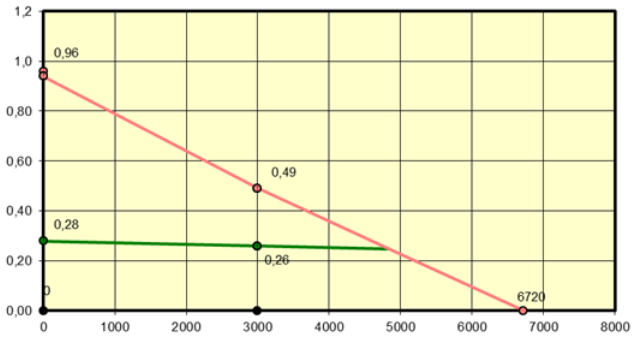
Technical specifications	Values		
Holding torque	M_{BR}	Nm	2
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	11
Rotor inertia	J_{BR}	kg*cm^2	0.068
Weight	m_{BR}	kg	0.44

5.1.2 Specific technical data (DC link voltage DC 48 V)

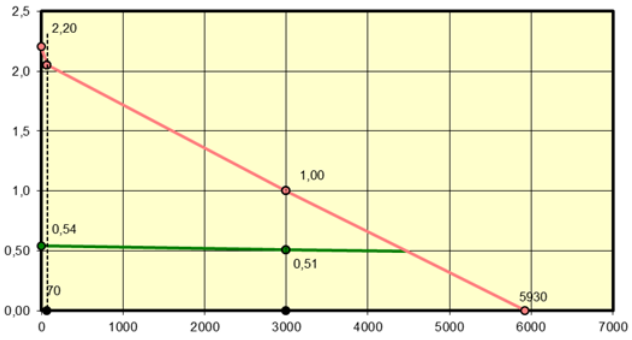
Motor type			**JHN2-0028-005**	**JHN2-0054-006**	**JHN2-0075-006**	**JHN2-0095-008**
Rated speed	N_n	RPM	3000	3000	3000	3000
Rated torque	M_n	Nm	0.26	0.51	0.71	0.91
Rated current	I_n	A	3.5	6.0	7.7	7.3
Holding torque	M_o	Nm	0.28	0.54	0.75	0.95
Continuous stall current	I_o	A	3.5	6.0	7.7	7.3
Max. torque	M_{max}	Nm	0.96	2.2	3.0	3.8
Max. current	I_{max}	A	13.0	27	36	33
Max. speed	N_{max}	RPM	12000	12000	12000	12000
Back EMF constant	K_E	V/kRPM	4.9	5.5	5.9	7.8
Torque constant	K_T	Nm/A	0.08	0.09	0.10	0.13
Winding resistance	R_{2ph}	Ω	2.2	0.99	0.66	0.82
Winding inductance	L_{2ph}	mH	2.2	1.24	0.89	1.18
Number of motor poles	P_{mot}		6	6	6	6
Idling speed	N_o	RPM	6720	5930	5560	4180
Max. torque at sea level	M_x	Nm	0.49	1.0	1.5	1.1
Thermal time constant - Copper winding	T_{ther_CU}	s	16	16	16	16
Electrical time constant	T_{el}	ms	0.98	1.2	1.3	1.4
Mechanical time constant	T_{mech}	ms	2.8	1.5	1.1	0.94
Thermal time constant	T_{th}	min	10.0	12.0	12.0	18.0
Rotor inertia without brake	J	$kg*cm^2$	0.05	0.07	0.09	0.11
Weight without brake	m	kg	0.74	0.93	1.1	1.3
Axial load	F_A	N	41	45	47	48
Radial load	F_R	N	216	234	246	254

5.1.3 Torque/speed characteristic (DC link voltage DC 48 V)

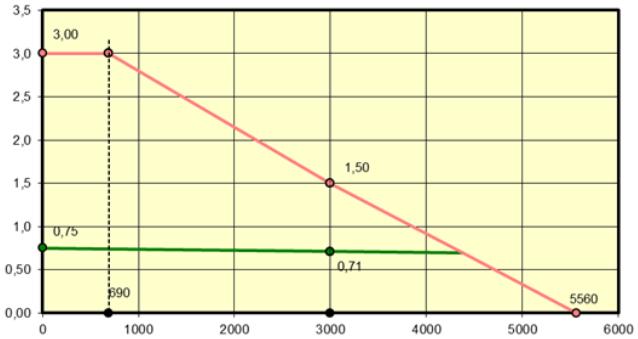
JHN2-0028-005



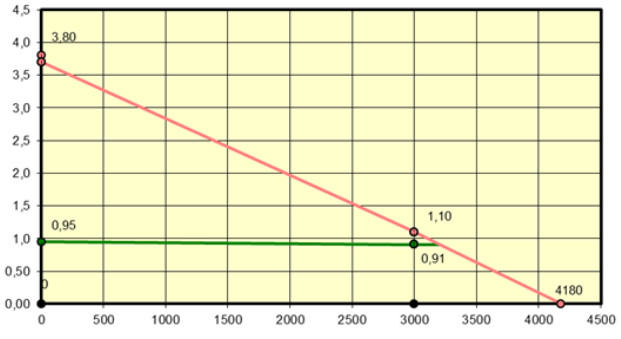
JHN2-0054-006



JHN2-0075-006



JHN2-0095-008

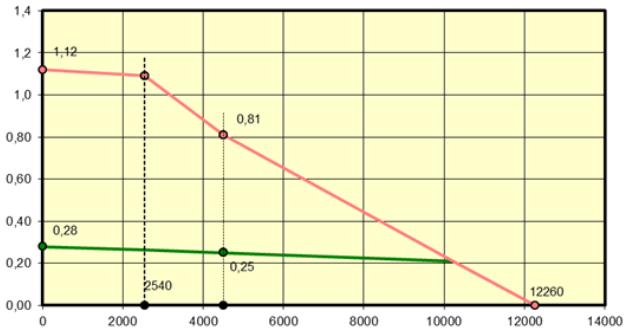


5.1.4 Specific technical data (DC link voltage DC 320 V)

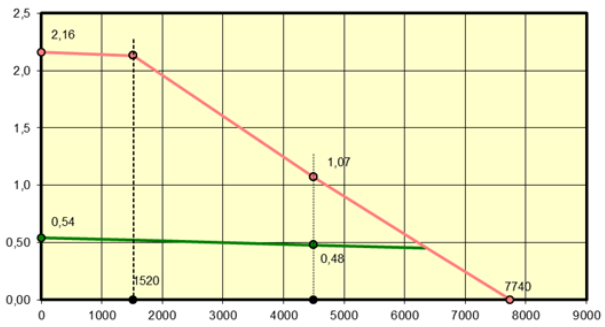
Motor type			**JHN2-0028-018**	**JHN2-0054-028**	**JHN2-0075-027**	**JHN2-0095-032**
Rated speed	N_n	RPM	4500	4500	6000	4500
Rated torque	M_n	Nm	0.25	0.48	0.64	0.85
Rated current	I_n	A	0.96	1.12	1.57	1.70
Holding torque	M_o	Nm	0.28	0.54	0.75	0.95
Continuous stall current	I_o	A	0.97	1.17	1.71	1.82
Max. torque	M_{max}	Nm	1.1	2.2	3.0	3.8
Max. current	I_{max}	A	4.4	5.4	7.9	8.4
Max. speed	N_{max}	RPM	12000	12000	12000	12000
Back EMF constant	K_E	V/kRPM	17.5	28.0	26.5	31.5
Torque constant	K_T	Nm/A	0.29	0.46	0.44	0.52
Winding resistance	R_{2ph}	Ω	28.3	25.9	13.4	13.1
Winding inductance	L_{2ph}	mH	28.4	32.3	18.0	19.0
Number of motor poles	P_{mot}		6	6	6	6
Idling speed	N_o	RPM	12260	7740	8220	6950
Max. torque at sea level	M_x	Nm	0.81	1.1	1.2	2.0
Thermal time constant - Copper winding	T_{ther_CU}	s	16	16	16	16
Electrical time constant	T_{el}	ms	1.0	1.2	1.3	1.5
Mechanical time constant	T_{mech}	ms	2.9	1.5	1.1	0.92
Thermal time constant	T_{th}	min	10.0	12.0	12.0	18.0
Rotor inertia without brake	J	$kg*cm^2$	0.05	0.07	0.09	0.11
Weight without brake	m	kg	0.74	0.93	1.1	1.3
Axial load	F_A	N	41	45	47	48
Radial load	F_R	N	216	234	246	254

5.1.5 Torque/speed characteristic (DC link voltage DC 320 V)

JHN2-0028-018



JHN2-0054-028



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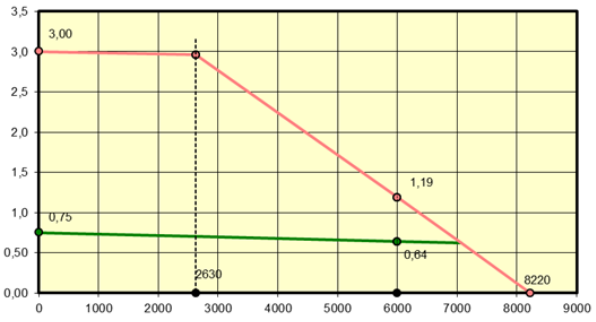

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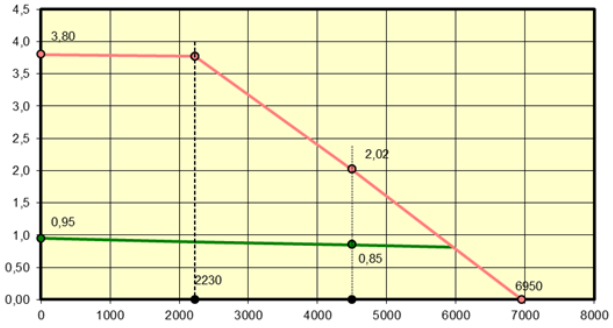
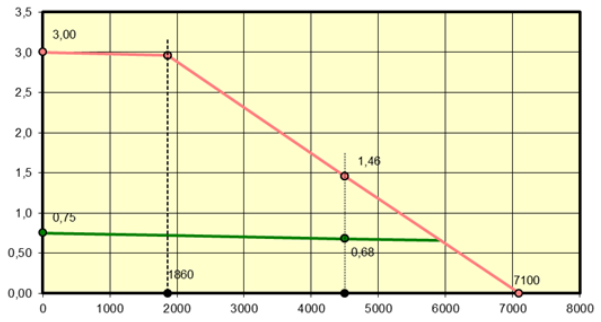


5.1.6 Specific technical data (DC link voltage DC 560 V)

Motor type			**JHN2-0075-053**	**JHN2-0095-050**
Rated speed	N_n	RPM	4500	4500
Rated torque	M_n	Nm	0.68	0.85
Rated current	I_n	A	0.83	1.07
Holding torque	M_o	Nm	0.75	0.95
Continuous stall current	I_o	A	0.86	1.15
Max. torque	M_{max}	Nm	3.0	3.8
Max. current	I_{max}	A	3.9	5.3
Max. speed	N_{max}	RPM	12000	12000
Back EMF constant	K_E	V/kRPM	53.0	50.0
Torque constant	K_T	Nm/A	0.88	0.83
Winding resistance	R_{2ph}	Ω	54	33.6
Winding inductance	L_{2ph}	mH	72	48.5
Number of motor poles	P_{mot}		6	6
Idling speed	N_o	RPM	7100	7560
Max. torque at sea level	M_x	Nm	1.5	2.4
Thermal time constant - Copper winding	T_{ther_CU}	s		
Electrical time constant	T_{el}	ms	1.3	1.4
Mechanical time constant	T_{mech}	ms	1.1	0.93
Thermal time constant	T_{th}	min	12.0	18.0
Rotor inertia without brake	J	$kg*cm^2$	0.09	0.11
Weight without brake	m	kg	1.1	1.3
Axial load	F_A	N	47	48
Radial load	F_R	N	246	254

5.1.7 Torque/speed characteristic (DC link voltage DC 560 V)

JHN2-0075-053



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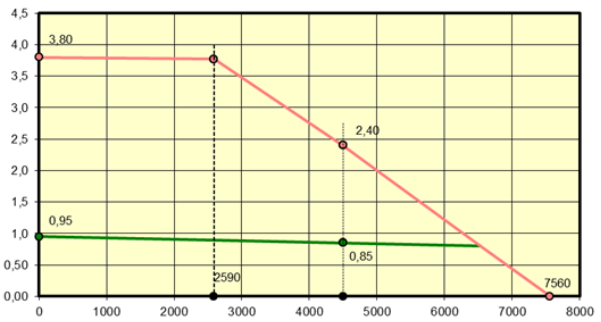
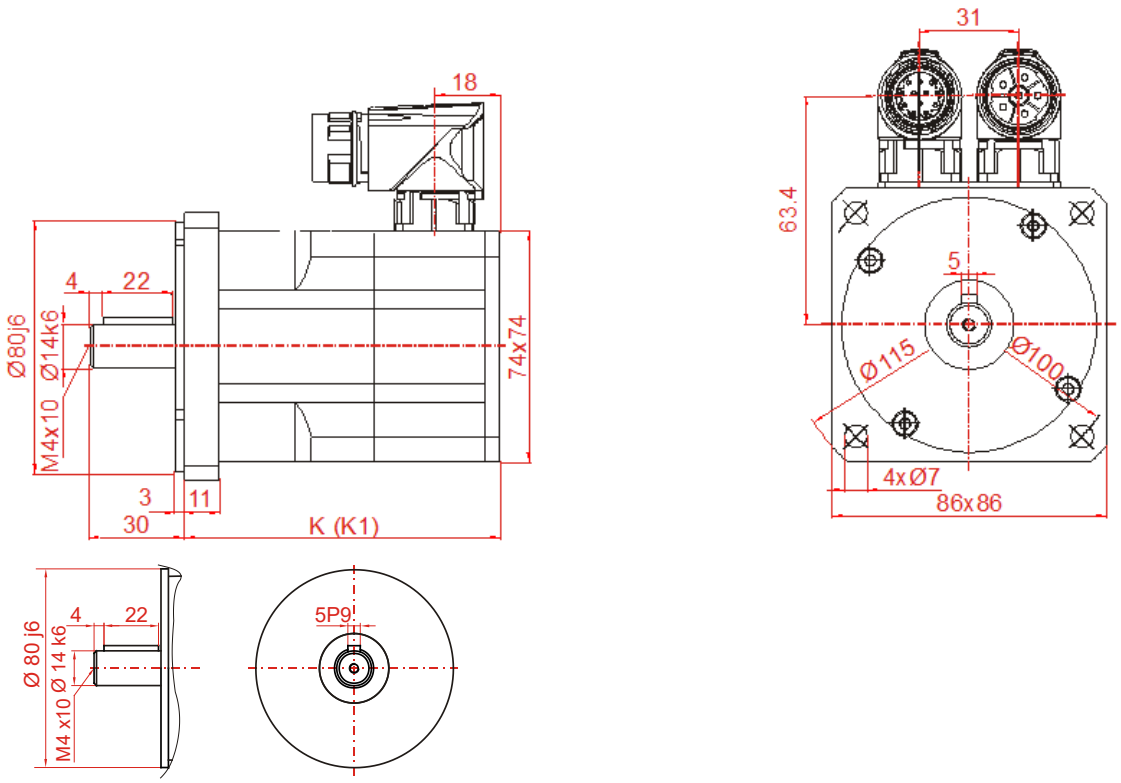


5.2 Flange size - JHN3



Option with feather key 5x5x22

P = Power connector size K = Dimension without brake K1 = Dimension with brake	**P**	**K**	**K1**	**K**	**K1**	**K**	**K1**
Type		**Resolver**		**SKx36/EKx36:**		**SRx50**	
JHN3-0115	M23	82	120	99	144	101.5	148
JHN3-0205	M23	100	138	117	162	119.5	166
JHN3-0350	M23	136	174	153	198	155.5	202
JHN3-0480	M23	172	210	189	234	191.5	238

5.2.1 Technical data of the brake

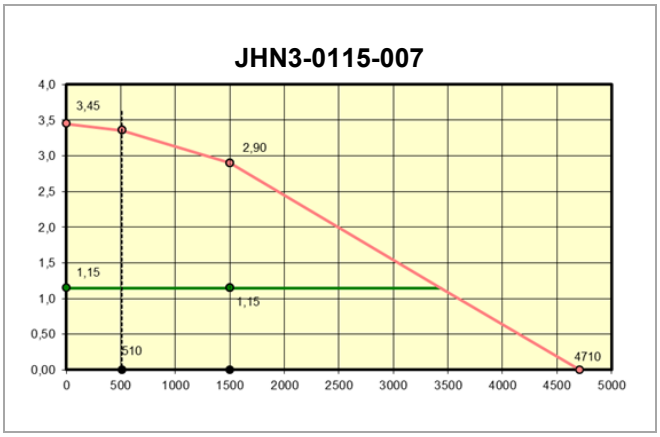
The technical data of the brake for motor type JHN3 are listed below:

Technical specifications	**Values**		
Holding torque	M_{BR}	Nm	4.5
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	12
Rotor inertia	J_{BR}	kg*cm^2	0.18
Weight	m_{BR}	kg	0.59

5.2.2 Specific technical data (DC link voltage DC 24 V/DC 48 V)

Motor type			**JHN3-0115-007**
Rated speed	N_n	RPM	1500
Rated torque	M_n	Nm	1.15
Rated current	I_n	A	11.3
Holding torque	M_o	Nm	1.15
Continuous stall current	I_o	A	10.0
Max. torque	M_{max}	Nm	3.5
Max. current	I_{max}	A	44
Max. speed	N_{max}	RPM	12000
Back EMF constant	K_E	V/kRPM	6.9
Torque constant	K_T	Nm/A	0.11
Winding resistance	R_{2ph}	Ω	0.34
Winding inductance	L_{2ph}	mH	0.75
Number of motor poles	P_{mot}		10
Idling speed	N_o	RPM	4710
Max. torque at sea level	M_x	Nm	2.9
Thermal time constant - Copper winding	T_{ther_CU}	s	30
Electrical time constant	T_{el}	ms	2.2
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	21
Rotor inertia without brake	J	$kg*cm^2$	0.31
Weight without brake	m	kg	1.5
Axial load	F_A	N	54
Radial load	F_R	N	283

5.2.3 Torque/speed characteristic (DC link voltage DC 24 V/DC 48 V)

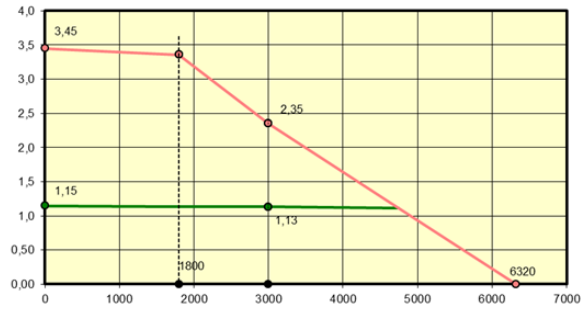


5.2.4 Specific technical data (DC link voltage DC 320 V)

Motor type			**JHN3-0115-035**	**JHN3-0205-025**	**JHN3-0205-045**	**JHN3-0350-035**	**JHN3-0350-050**	**JHN3-0480-060**
Rated speed	N_n	RPM	3000	6000	3000	4500	3000	3000
Rated torque	M_n	Nm	1.13	1.65	1.90	2.8	3.0	3.7
Rated current	I_n	A	2.3	5.5	3.1	6.1	4.3	4.5
Holding torque	M_o	Nm	1.15	2.1	2.1	3.5	3.5	4.8
Continuous stall current	I_o	A	2.0	5.1	2.8	6.0	4.2	4.8
Max. torque	M_{max}	Nm	3.5	6.2	6.2	10.5	10.5	14.4
Max. current	I_{max}	A	9.2	21	12.7	28	19.4	17.3
Max. speed	N_{max}	RPM	12000	12000	12000	12000	12000	12000
Back EMF constant	K_E	V/kRPM	34.5	24.5	44.5	35.0	50.0	60.0
Torque constant	K_T	Nm/A	0.57	0.41	0.74	0.58	0.83	0.99
Winding resistance	R_{2ph}	Ω	8.4	1.68	5.4	1.36	2.8	2.5
Winding inductance	L_{2ph}	mH	18.0	4.1	13.3	3.9	8.1	7.5
Number of motor poles	P_{mot}		10	10	10	10	10	10
Idling speed	N_o	RPM	6320	8950	4920	6270	4390	3660
Max. torque at sea level	M_x	Nm	2.4	3.9	3.8	6.5	6.6	7.1
Thermal time constant - Copper winding	T_{ther_CU}	s	30	30	30	30	30	30
Electrical time constant	T_{el}	ms	2.1	2.4	2.5	2.9	2.9	3.0
Mechanical time constant	T_{mech}	ms	1.4	0.97	0.95	0.73	0.74	0.67
Thermal time constant	T_{th}	min	21	23	23	27	27	30
Rotor inertia without brake	J	$kg*cm^2$	0.31	0.55	0.55	1.0	1.0	1.5
Weight without brake	m	kg	1.5	2.0	2.0	2.9	2.9	3.8
Axial load	F_A	N	54	62	62	68	68	75
Radial load	F_R	N	283	327	327	356	356	392

5.2.5 Torque/speed characteristic (DC link voltage DC 320 V)

JHN3-0115-035



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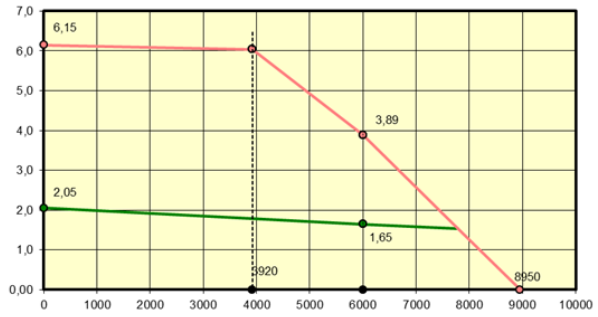

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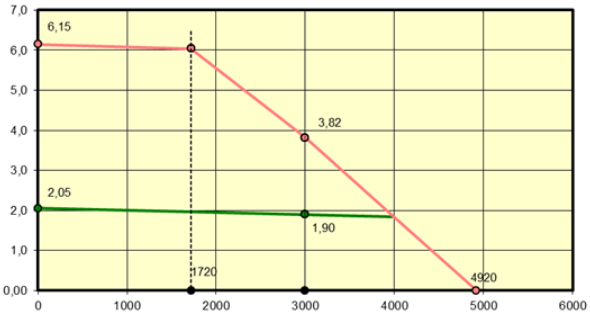

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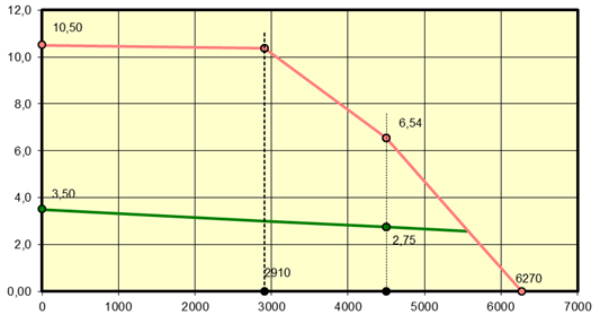

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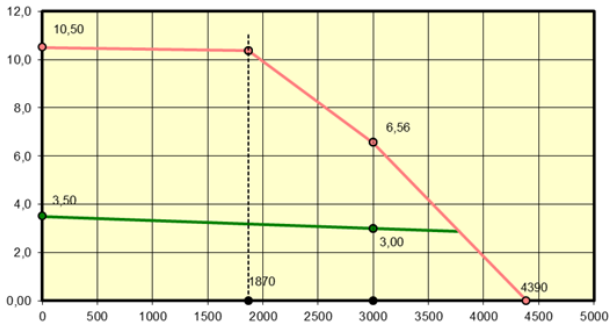

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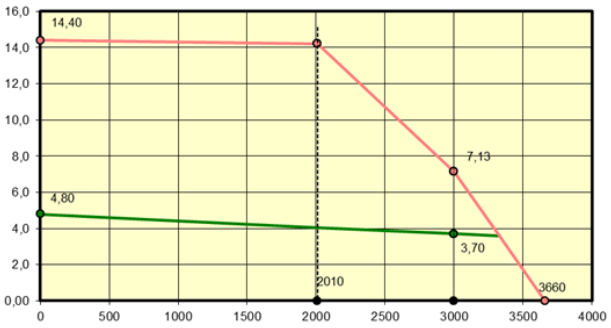
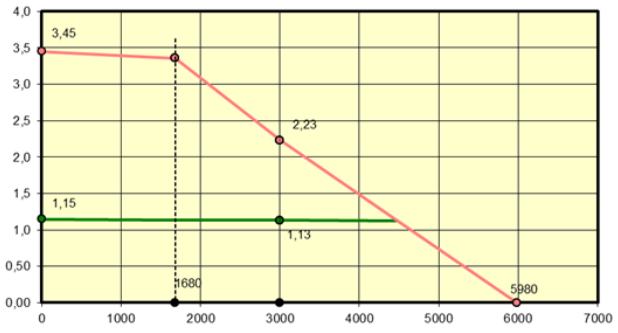


5.2.6 Specific technical data (DC link voltage DC 560 V)

Motor type			**JHN3-0115-063**	**JHN3-0115-039**	**JHN3-0205-079**	**JHN3-0350-050**	**JHN3-0350-070**	**JHN3-0350-089**	**JHN3-0480-103**
Rated speed	N_n	RPM	3000	6000	3000	3000	4500	3000	3000
Rated torque	M_n	Nm	1.13	1.01	1.90	3.0	2.8	3.0	3.7
Rated current	I_n	A	1.26	1.99	1.72	4.3	3.0	2.4	2.6
Holding torque	M_o	Nm	1.15	1.15	2.1	3.5	3.5	3.5	4.8
Continuous stall current	I_o	A	1.10	1.78	1.57	4.2	3.0	2.4	2.8
Max. torque	M_{max}	Nm	3.5	3.5	6.2	10.5	10.5	10.5	14.4
Max. current	I_{max}	A	5.0	7.8	7.2	19.4	10.9	10.9	10.1
Max. speed	N_{max}	RPM	12000	12000	12000	12000	12000	12000	12000
Back EMF constant	K_E	V/kRPM	63.0	39.0	79.0	50.0	70.0	89.0	103.0
Torque constant	K_T	Nm/A	1.04	0.65	1.31	0.83	1.16	1.47	1.70
Winding resistance	R_{2ph}	Ω	27.8	10.7	17.3	2.8	5.5	8.9	7.5
Winding inductance	L_{2ph}	mH	59	23.0	42.4	8.1	15.9	25.5	22.7
Number of motor poles	P_{mot}		10	10	10	10	10	10	10
Idling speed	N_o	RPM	5980	9680	4790	4390	5420	4260	3680
Max. torque at sea level	M_x	Nm	2.2	1.9	3.6	6.6	4.9	6.2	7.1
Thermal time constant - Copper winding	T_{ther_CU}	s	30	30	30	30	30	30	30
Electrical time constant	T_{el}	ms	2.1	2.1	2.5	2.9	2.9	2.9	3.0
Mechanical time constant	T_{mech}	ms	1.4	1.4	0.96	0.74	0.73	0.74	0.68
Thermal time constant	T_{th}	min	21	21	23	27	27	27	30
Rotor inertia without brake	J	$kg*cm^2$	0.31	0.31	0.55	1.0	1.0	1.0	1.5
Weight without brake	m	kg	1.5	1.5	2.0	2.9	2.9	2.9	3.8
Axial load	F_A	N	54	54	62	68	68	68	75
Radial load	F_R	N	283	283	327	356	356	356	392

5.2.7 Torque/speed characteristic (DC link voltage DC 560 V)

JHN3-0115-063



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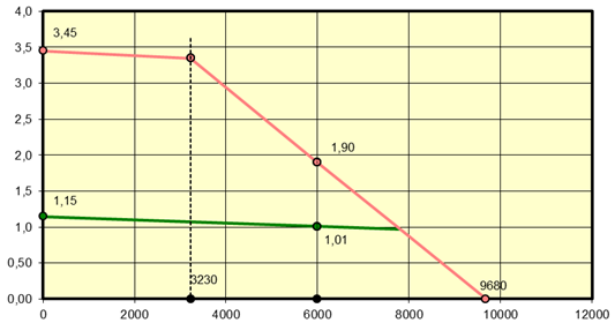
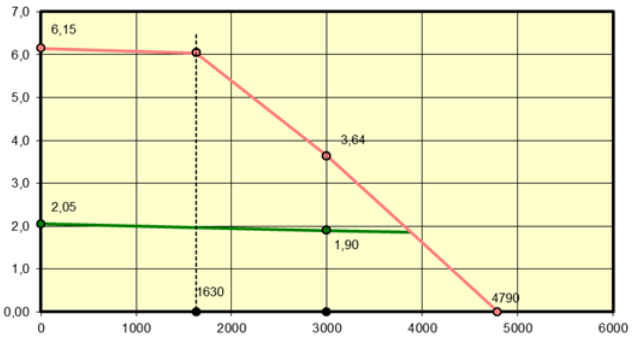
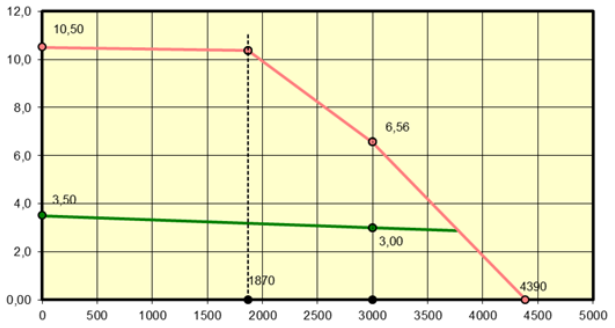


JHN3-0205-079



JHN3-0350-050



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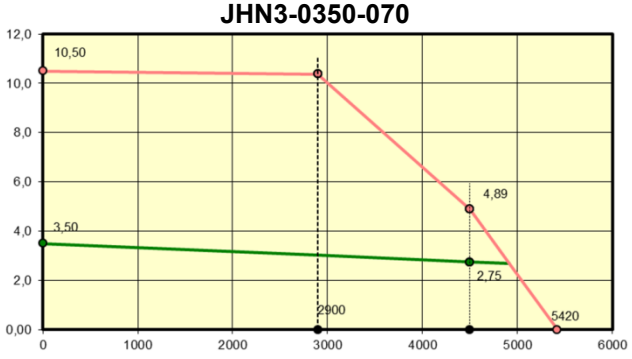

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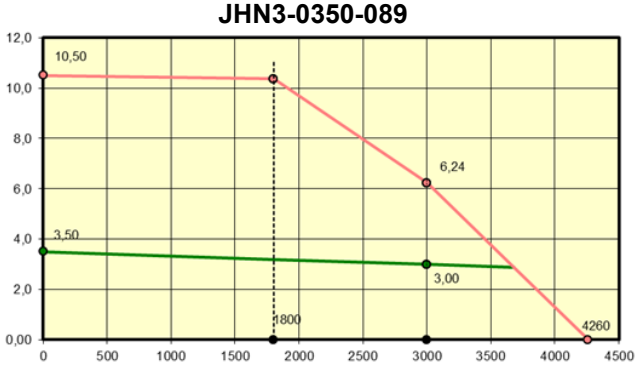
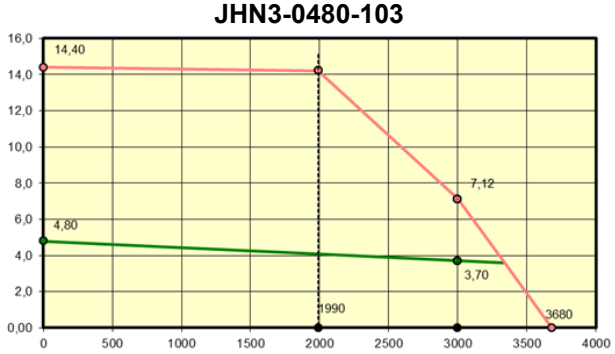
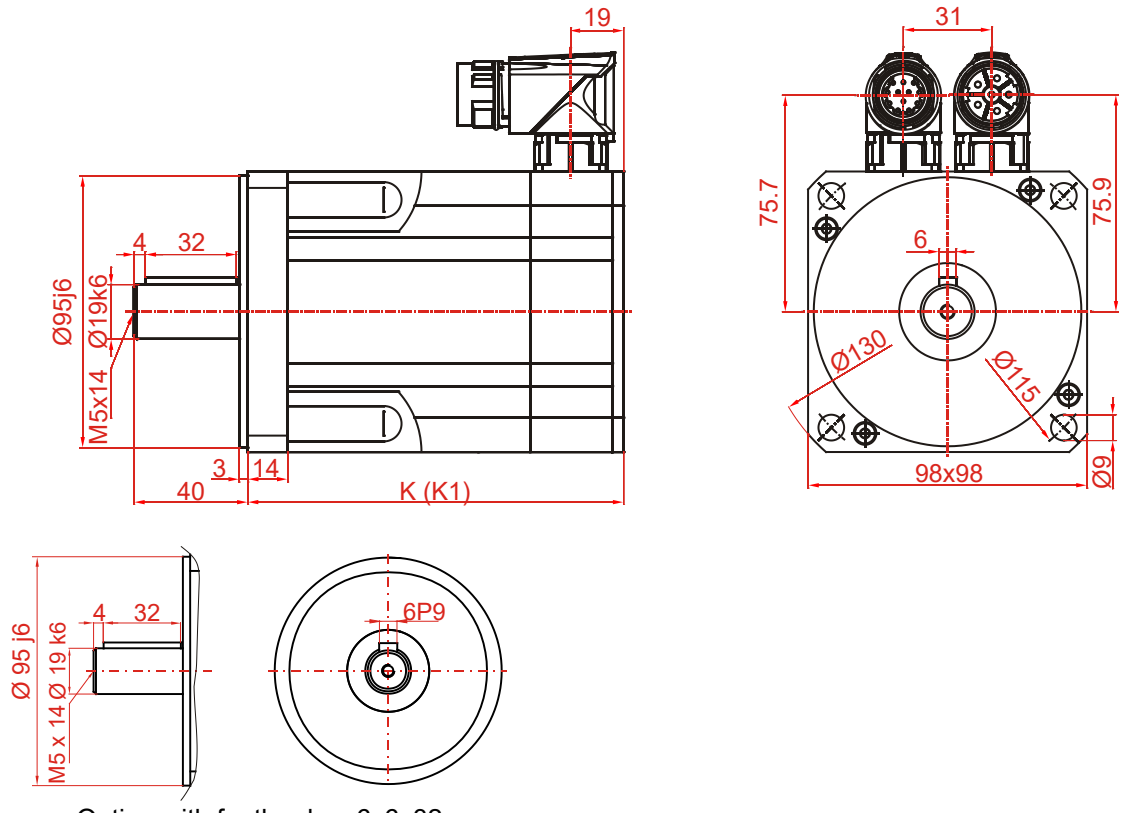


JHN3-0480-103



5.3 Flange size - JHN4



Option with feather key 6x6x32

P = Power connector size K = Dimension without brake K1 = Dimension with brake	P	K	K1	K	K1	K	K1
Type		**Resolver**		**SKx36/EKx36:**		**SRx50**	
JHN4-0510	M23	113	154	132	182.5	135	184
JHN4-0750	M23	143	184	162	212.5	165	214
JHN4-0960	M23	173	214	192	242.5	195	244
JHN4-1130	M23	203	244	222	272.5	225	274

5.3.1 Technical data of the brake

The technical data of the brake for motor type JHN4 are listed below:

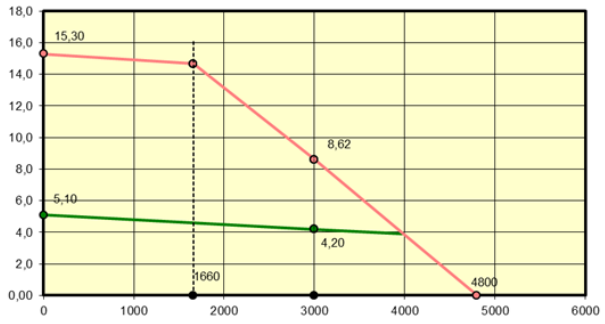
Technical specifications	Values		
Holding torque	M_{BR}	Nm	9
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	18
Rotor inertia	J_{BR}	kg*cm^2	0.54
Weight	m_{BR}	kg	0.82

5.3.2 Specific technical data (DC link voltage DC 320 V)

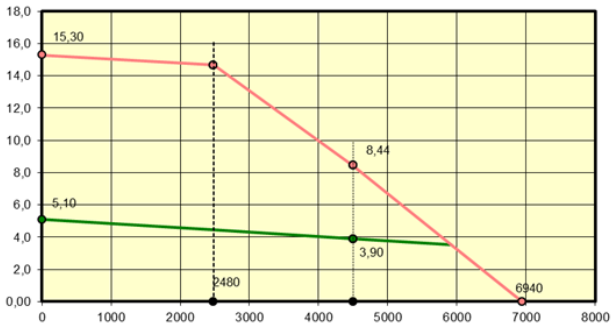
Motor type			**JHN4-0510-046**	**JHN4-0510-032**	**JHN4-0750-051**	**JHN4-0960-054**	**JHN4-1130-062**
Rated speed	N_n	RPM	3000	4500	3000	3000	3000
Rated torque	M_n	Nm	4.2	3.9	6.1	7.7	8.8
Rated current	I_n	A	7.0	9.9	8.8	10.8	10.7
Holding torque	M_o	Nm	5.1	5.1	7.5	9.6	11.3
Continuous stall current	I_o	A	6.8	9.8	8.9	10.7	11.0
Max. torque	M_{max}	Nm	15.3	15.3	23	29	34
Max. current	I_{max}	A	31	45	41	49	41
Max. speed	N_{max}	RPM	9000	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	45.5	31.5	51.0	54.0	62.0
Torque constant	K_T	Nm/A	0.75	0.52	0.84	0.89	1.03
Winding resistance	R_{2ph}	Ω	1.24	0.61	0.79	0.62	0.61
Winding inductance	L_{2ph}	mH	6.8	3.3	4.8	3.6	3.8
Number of motor poles	P_{mot}		10	10	10	10	10
Idling speed	N_o	RPM	4800	6940	4300	4060	3540
Max. torque at sea level	M_x	Nm	8.6	8.4	12.7	16.6	16.0
Thermal time constant - Copper winding	T_{ther_CU}	s	48	48	48	48	48
Electrical time constant	T_{el}	ms	5.5	5.4	6.1	5.8	6.2
Mechanical time constant	T_{mech}	ms	0.77	0.79	0.63	0.60	0.57
Thermal time constant	T_{th}	min	25	25	30	35	40
Rotor inertia without brake	J	$kg*cm^2$	2.0	2.0	3.3	4.5	5.7
Weight without brake	m	kg	3.9	3.9	5.2	6.5	7.8
Axial load	F_A	N	113	113	124	131	135
Radial load	F_R	N	595	595	653	689	713

5.3.3 Torque/speed characteristic (DC link voltage DC 320 V)

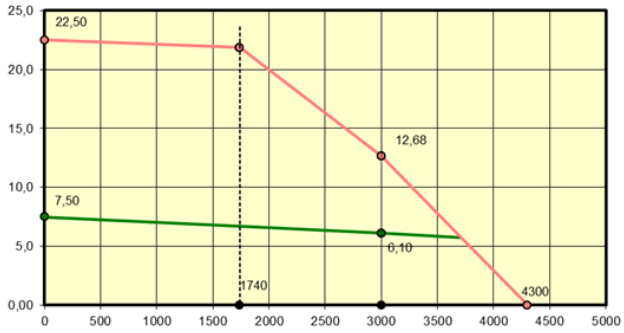
JHN4-0510-046



JHN4-0510-032



JHN4-0750-051



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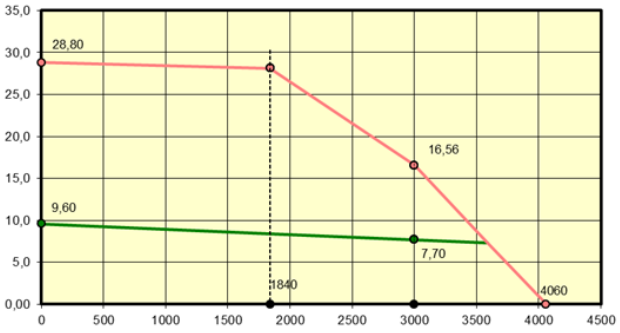
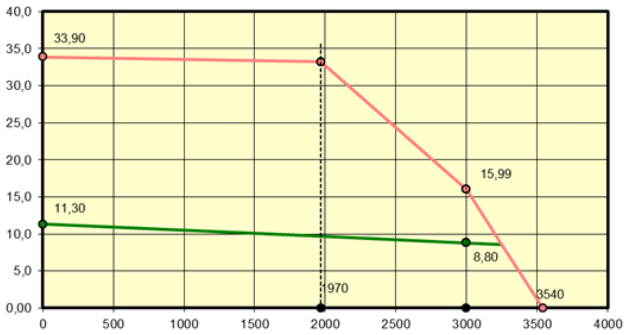


JHN4-1130-062

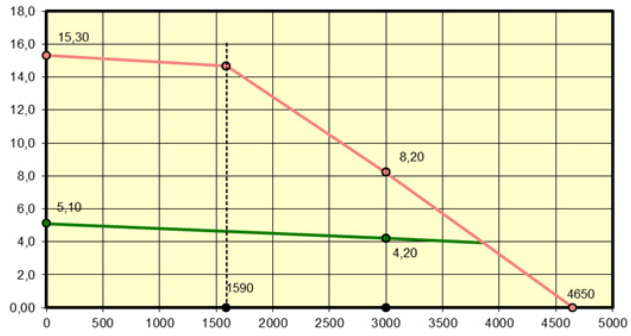


5.3.4 Specific technical data (DC link voltage DC 560 V)

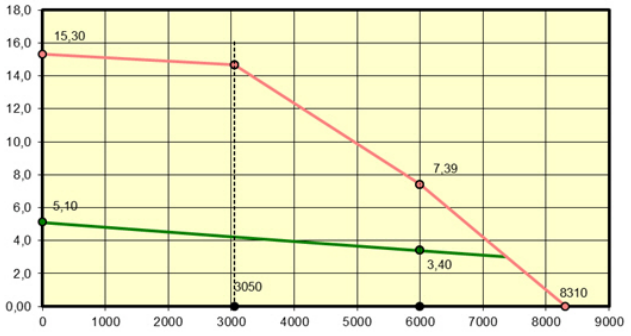
Motor type			**JHN4-0510-081**	**JHN4-0510-046**	**JHN4-0750-051**	**JHN4-0750-062**	**JHN4-0750-087**	**JHN4-0960-054**	**JHN4-1130-062**
Rated speed	N_n	RPM	3000	6000	3000	4500	3000	3000	3000
Rated torque	M_n	Nm	4.2	3.4	6.1	5.5	6.1	7.7	8.8
Rated current	I_n	A	3.9	6.4	8.8	6.9	5.1	10.8	10.7
Holding torque	M_o	Nm	5.1	5.1	7.5	7.5	7.5	9.6	11.3
Continuous stall current	I_o	A	3.8	6.8	8.9	7.3	5.2	10.7	11.0
Max. torque	M_{max}	Nm	15.3	15.3	23	23	23	29	34
Max. current	I_{max}	A	17.4	31	41	31	24	49	41
Max. speed	N_{max}	RPM	9000	9000	9000	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	81.0	45.5	51.0	62.0	87.0	54.0	62.0
Torque constant	K_T	Nm/A	1.34	0.75	0.84	1.03	1.44	0.89	1.03
Winding resistance	R_{2ph}	Ω	4.0	1.24	0.79	1.15	2.3	0.62	0.61
Winding inductance	L_{2ph}	mH	21.7	6.8	4.8	7.1	13.5	3.6	3.8
Number of motor poles	P_{mot}		10	10	10	10	10	10	10
Idling speed	N_o	RPM	4650	8310	4300	6110	4350	4060	3540
Max. torque at sea level	M_x	Nm	8.2	7.4	12.7	12.3	12.8	16.6	16.0
Thermal time constant - Copper winding	T_{ther_CU}	s	48	48	48	48	48	48	48
Electrical time constant	T_{el}	ms	5.5	5.5	6.1	6.2	5.9	5.8	6.2
Mechanical time constant	T_{mech}	ms	0.78	0.77	0.63	0.62	0.62	0.60	0.57
Thermal time constant	T_{th}	min	25	25	30	30	30	35	40
Rotor inertia without brake	J	$kg*cm^2$	2.0	2.0	3.3	3.3	3.3	4.5	5.7
Weight without brake	m	kg	3.9	3.9	5.2	5.2	5.2	6.5	7.8
Axial load	F_A	N	113	113	124	124	124	131	135
Radial load	F_R	N	595	595	653	653	653	689	713

5.3.5 Torque/speed characteristic (DC link voltage DC 560 V)

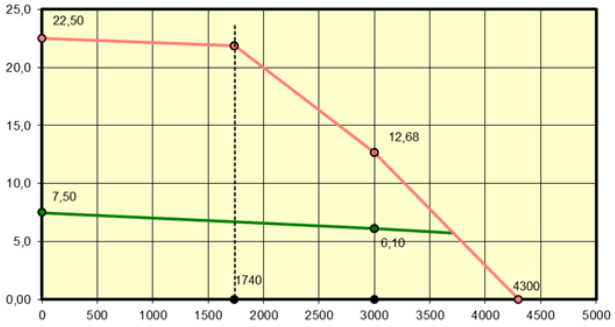
JHN4-0510-081



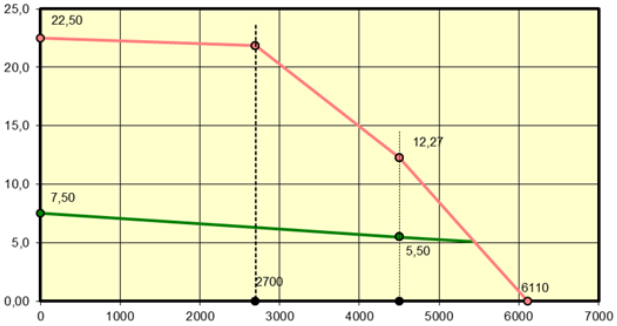
JHN4-0510-046



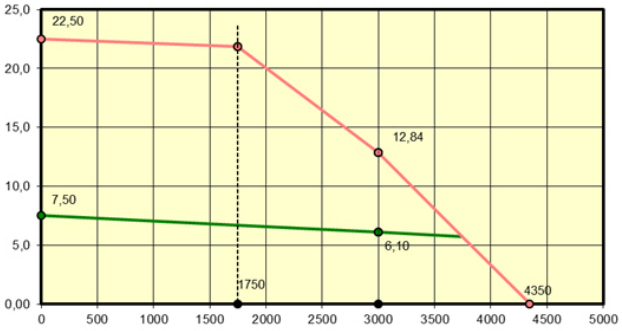
JHN4-0750-051



JHN4-0750-062



JHN4-0750-087



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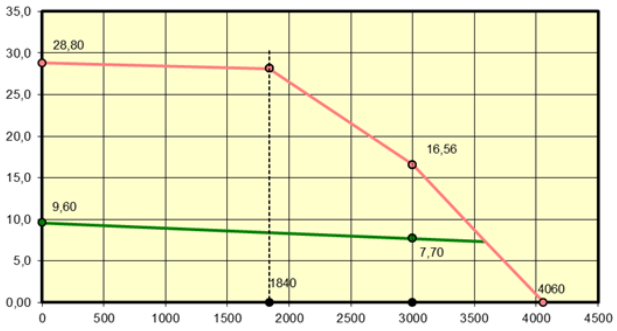
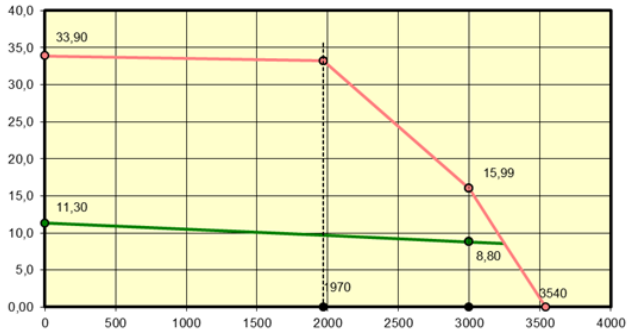
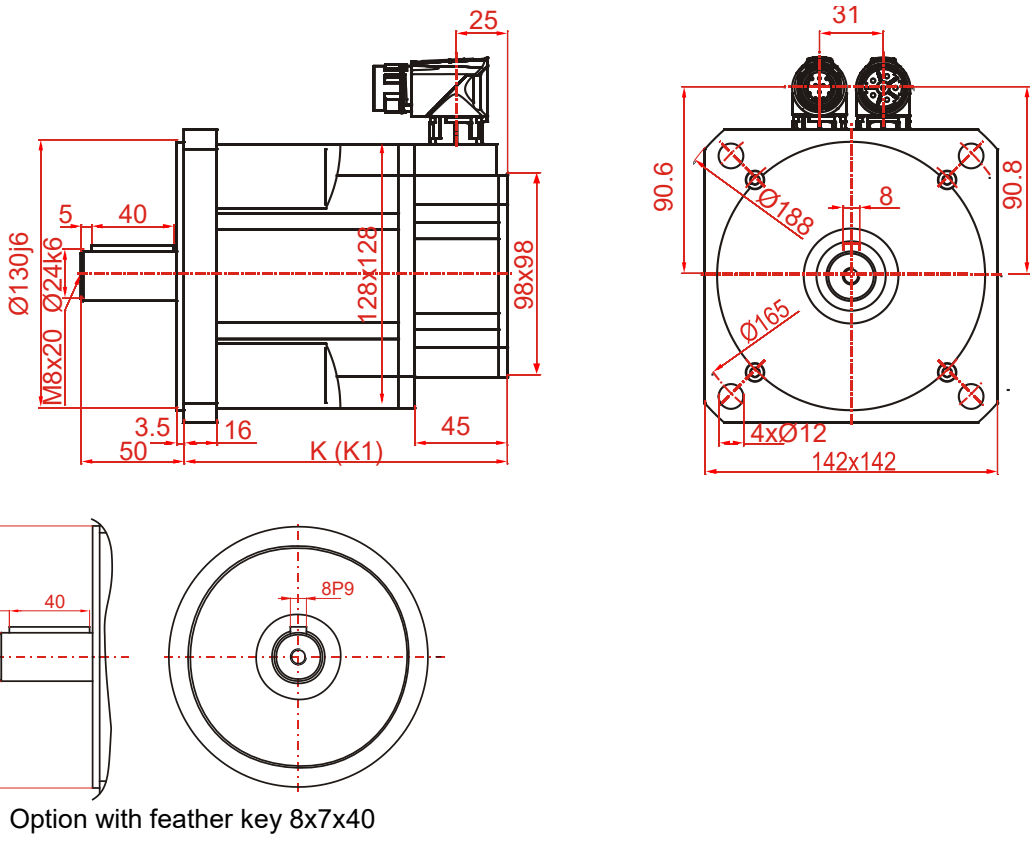


JHN4-1130-062



5.4 Flange size - JHN5



Option with feather key 8x7x40

P = Power connector size K = Dimension without brake K1 = Dimension with brake	P	K	K1	K	K1	K	K1
Type		**Resolver**		**SKx36/EKx36:**		**SRx50**	
JHN5-1200	M23	157	193	157	206	160	209
JHN5-1600	M23	187	223	187	236	190	239
JHN5-2000	M23	217	253	217	266	220	269
JHN5-2400	M23	247	283	247	296	250	299

5.4.1 Technical data of the brake

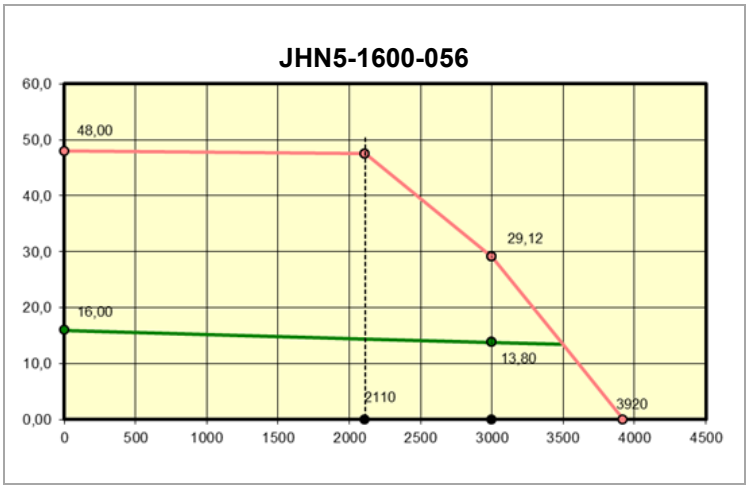
The technical data of the brake for motor type JHN5 are listed below:

Technical specifications	Values		
Holding torque	M_{BR}	Nm	18
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	24
Rotor inertia	J_{BR}	kg*cm^2	1.66
Weight	m_{BR}	kg	1.08

5.4.2 Specific technical data (DC link voltage DC 320 V)

Motor type			**JHN5-1600-056**
Rated speed	N_n	RPM	3000
Rated torque	M_n	Nm	13.8
Rated current	I_n	A	17.0
Holding torque	M_o	Nm	16.0
Continuous stall current	I_o	A	17.3
Max. torque	M_{max}	Nm	48
Max. current	I_{max}	A	61
Max. speed	N_{max}	RPM	9000
Back EMF constant	K_E	V/kRPM	56.0
Torque constant	K_T	Nm/A	0.93
Winding resistance	R_{2ph}	Ω	0.30
Winding inductance	L_{2ph}	mH	2.5
Number of motor poles	P_{mot}		10
Idling speed	N_o	RPM	3920
Max. torque at sea level	M_x	Nm	29
Thermal time constant - Copper winding	T_{ther_CU}	s	40
Electrical time constant	T_{el}	ms	8.3
Mechanical time constant	T_{mech}	ms	0.70
Thermal time constant	T_{th}	min	55
Rotor inertia without brake	J	$kg*cm^2$	11.5
Weight without brake	m	kg	9.5
Axial load	F_A	N	136
Radial load	F_R	N	713

5.4.3 Torque/speed characteristic (DC link voltage DC 320 V)

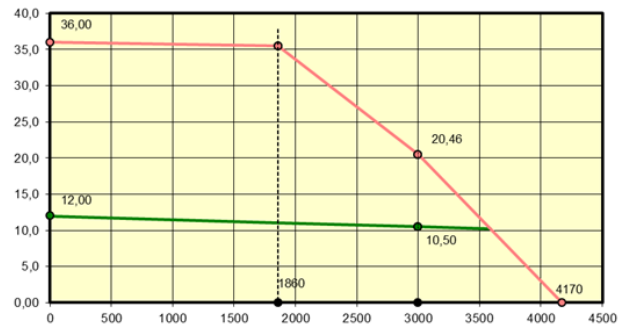


5.4.4 Specific technical data (DC link voltage DC 560 V)

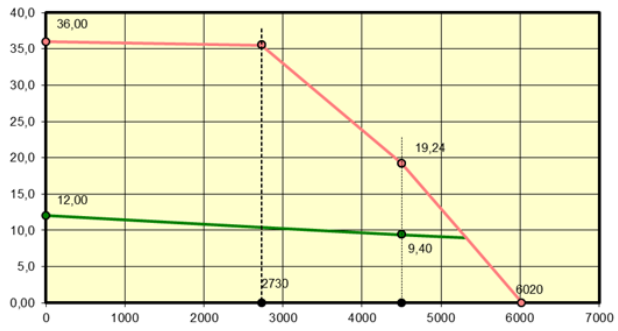
Motor type			**JHN5-1200-091**	**JHN5-1200-063**	**JHN5-1600-096**	**JHN5-2000-104**	**JHN5-2400-104**
Rated speed	N_n	RPM	3000	4500	3000	3000	3000
Rated torque	M_n	Nm	10.5	9.4	13.8	16.0	20.0
Rated current	I_n	A	8.3	11.5	9.9	11.5	14.4
Holding torque	M_o	Nm	12.0	12.0	16.0	20.0	24.0
Continuous stall current	I_o	A	8.0	11.5	10.1	11.6	14.0
Max. torque	M_{max}	Nm	36	36	48	60	72
Max. current	I_{max}	A	29	43	36	40	48
Max. speed	N_{max}	RPM	9000	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	91.0	63.0	96.0	104.0	104.0
Torque constant	K_T	Nm/A	1.51	1.04	1.59	1.72	1.72
Winding resistance	R_{2ph}	Ω	1.33	0.65	0.88	0.72	0.56
Winding inductance	L_{2ph}	mH	10.9	5.3	7.5	6.3	5.0
Number of motor poles	P_{mot}		10	10	10	10	10
Idling speed	N_o	RPM	4170	6020	3950	3650	3650
Max. torque at sea level	M_x	Nm	20	19.2	29	33	41
Thermal time constant - Copper winding	T_{ther_CU}	s	40	40	40	40	40
Electrical time constant	T_{el}	ms	8.2	8.2	8.5	8.8	8.9
Mechanical time constant	T_{mech}	ms	0.80	0.82	0.70	0.64	0.61
Thermal time constant	T_{th}	min	45	45	55	65	75
Rotor inertia without brake	J	$kg*cm^2$	7.9	7.9	11.5	15.1	18.7
Weight without brake	m	kg	7.4	7.4	9.5	11.6	13.7
Axial load	F_A	N	126	126	136	142	146
Radial load	F_R	N	665	665	713	746	770

5.4.5 Torque/speed characteristic (DC link voltage DC 560 V)

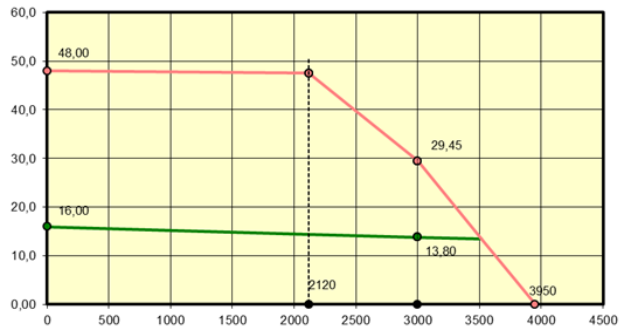
JHN5-1200-091



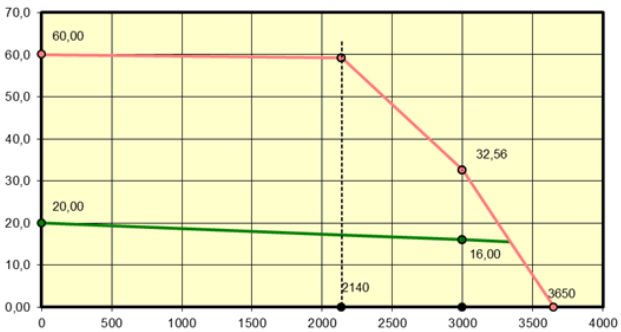
JHN5-1200-063



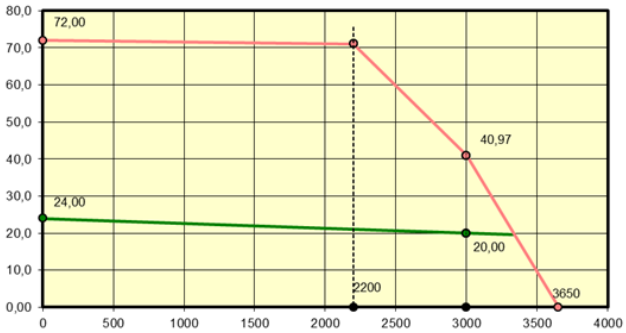
JHN5-1600-096



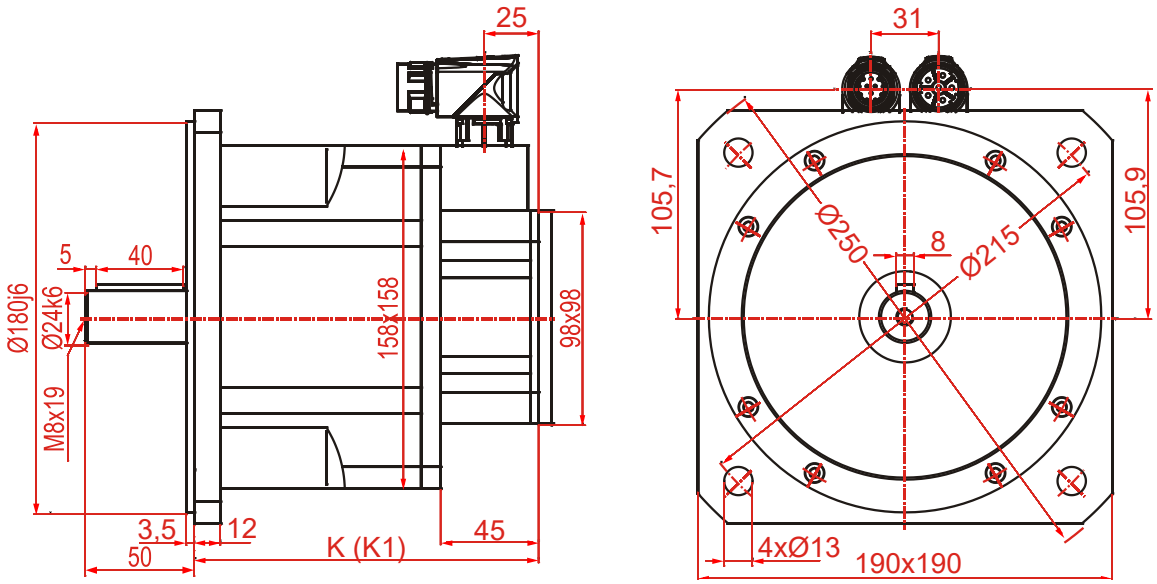
JHN5-2000-104

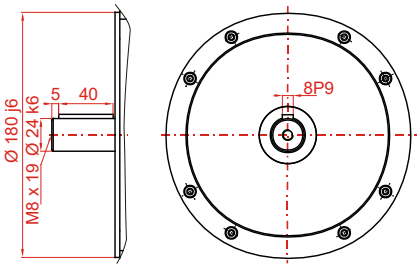


JHN5-2400-104



5.5 Flange size - JHN6





Option with feather key 8x7x40

P = Power connector size K = Dimension without brake K1 = Dimension with brake	P	K	K1	K	K1	K	K1
Type		**Resolver**		**SKx36/EKx36:**		**SRx50**	
JHN6-1800	M23	158	222	158	222	161	225
JHN6-2400	M23	183	247	183	247	186	250
JHN6-3000	M23	208	272	208	272	211	275
JHN6-3800	M23	233	297	233	297	236	300
JHN6-4400	M23	258	322	258	322	261	325

5.5.1 Technical data of the brake

The technical data of the brake for motor type JHN6 are listed below:

Technical specifications	**Values**		
Holding torque	M_{BR}	Nm	36
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	26
Rotor inertia	J_{BR}	kg*cm^2	5.56
Weight	m_{BR}	kg	2.86

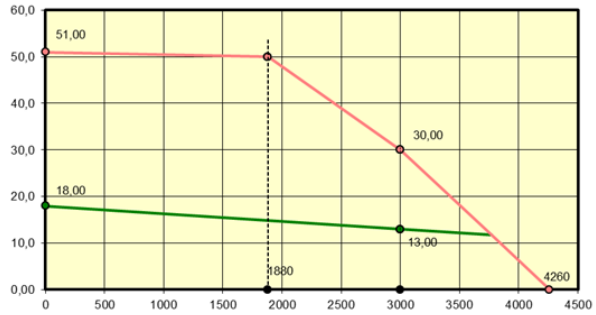
5.5.2 Specific technical data (DC link voltage DC 560 V)

Motor type			**JHN6-1800-089**	**JHN6-2400-095**	**JHN6-3000-142**	**JHN6-3000-102**
Rated speed	N_n	RPM	3000	3000	2000	3000
Rated torque	M_n	Nm	13.0	17.0	25.3	21.0
Rated current	I_n	A	11.0	13.8	12.4	16.2
Holding torque	M_o	Nm	18.0	24.0	30.0	30.0
Continuous stall current	I_o	A	12.2	15.3	12.8	17.8
Max. torque	M_{max}	Nm	51	72	90	90
Max. current	I_{max}	A	45	60	46	64
Max. speed	N_{max}	RPM	6000	6000	6000	6000
Back EMF constant	K_E	V/kRPM	89.0	95.0	142.0	102.0
Torque constant	K_T	Nm/A	1.47	1.57	2.4	1.69
Winding resistance	R_{2ph}	Ω	0.62	0.41	0.63	0.33
Winding inductance	L_{2ph}	mH	7.2	5.5	9.2	4.7
Number of motor poles	P_{mot}		10	10	10	10
Idling speed	N_o	RPM	4260	4000	2670	3720
Max. torque at sea level	M_x	Nm	30	42	55	46
Thermal time constant - Copper winding	$T_{ther\ CU}$	s	90	90	90	90
Electrical time constant	T_{el}	ms	11.6	13.4	14.5	14.2
Mechanical time constant	T_{mech}	ms	0.92	0.74	0.65	0.66
Thermal time constant	T_{th}	min	42	47	52	52
Rotor inertia without brake	J	$kg*cm^2$	18.5	26	33	33
Weight without brake	m	kg	10.1	12.8	15.5	15.5
Axial load	F_A	N	121	130	136	136
Radial load	F_R	N	637	684	717	717

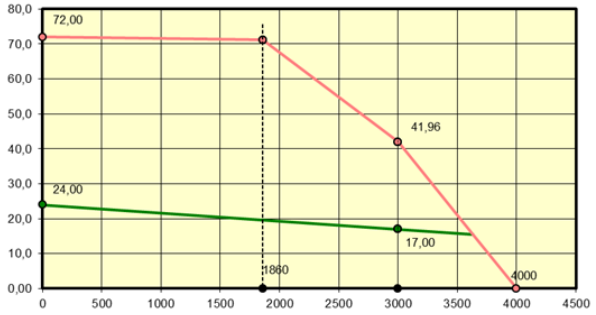
Motor type			**JHN6-3000-070**	**JHN6-3800-096**	**JHN6-4400-150**	**JHN6-4400-094**
Rated speed	N_n	RPM	4500	3000	2000	3000
Rated torque	M_n	Nm	15.0	25.0	36.5	30.0
Rated current	I_n	A	19.4	19.7	17.3	24.4
Holding torque	M_o	Nm	30.0	38.0	44.0	44.0
Continuous stall current	I_o	A	25.9	23.9	17.7	28.3
Max. torque	M_{max}	Nm	90	114	132	132
Max. current	I_{max}	A	93	93	64	102
Max. speed	N_{max}	RPM	6000	6000	6000	6000
Back EMF constant	K_E	V/kRPM	70.0	96.0	150.0	94.0
Torque constant	K_T	Nm/A	1.16	1.59	2.5	1.55
Winding resistance	R_{2ph}	Ω	0.16	0.25	0.49	0.19
Winding inductance	L_{2ph}	mH	2.2	3.5	7.0	2.8
Number of motor poles	P_{mot}		10	10	10	10
Idling speed	N_o	RPM	5420	3950	2530	4040
Max. torque at sea level	M_x	Nm	43	64	68	84
Thermal time constant - Copper winding	T_{ther_CU}	s	90	90	90	90
Electrical time constant	T_{el}	ms	13.9	14.0	14.4	14.7
Mechanical time constant	T_{mech}	ms	0.68	0.69	0.65	0.64
Thermal time constant	T_{th}	min	52	57	62	62
Rotor inertia without brake	J	$kg*cm^2$	33	40	47	47
Weight without brake	m	kg	15.5	18.3	21	21
Axial load	F_A	N	136	141	145	145
Radial load	F_R	N	717	741	761	761

5.5.3 Torque/speed characteristic (DC link voltage DC 560 V)

JHN6-1800-089



JHN6-2400-095



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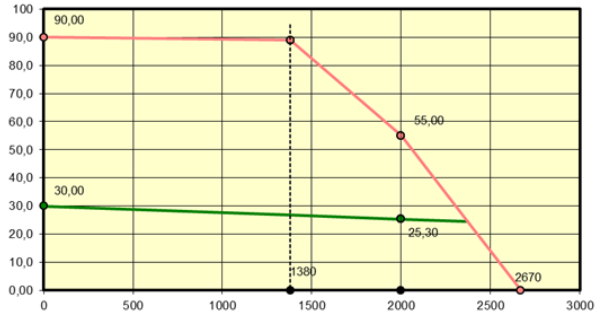

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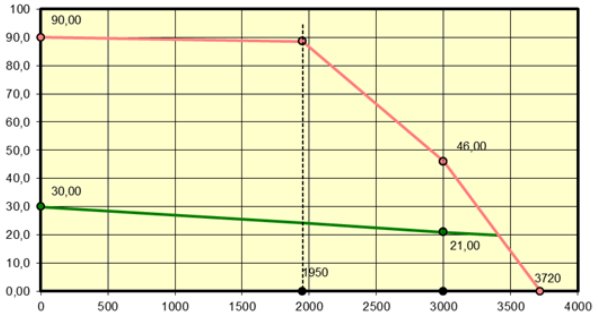
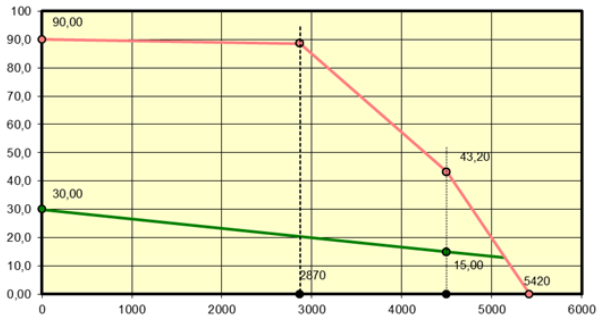


JHN6-3000-070



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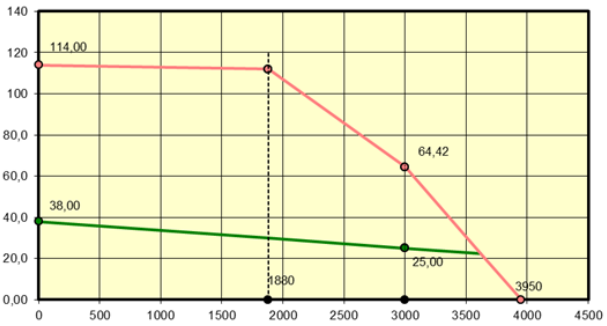

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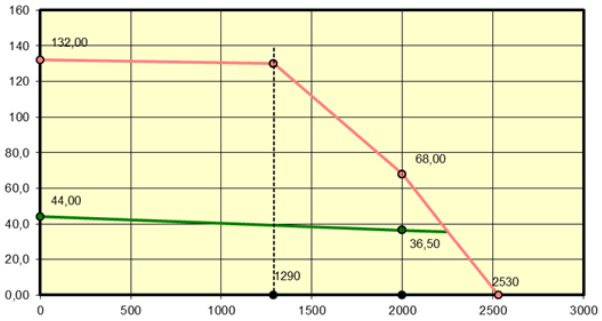
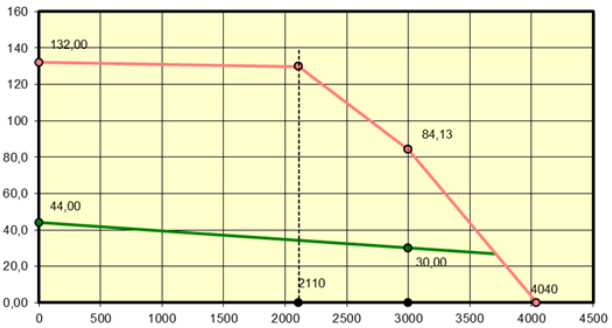
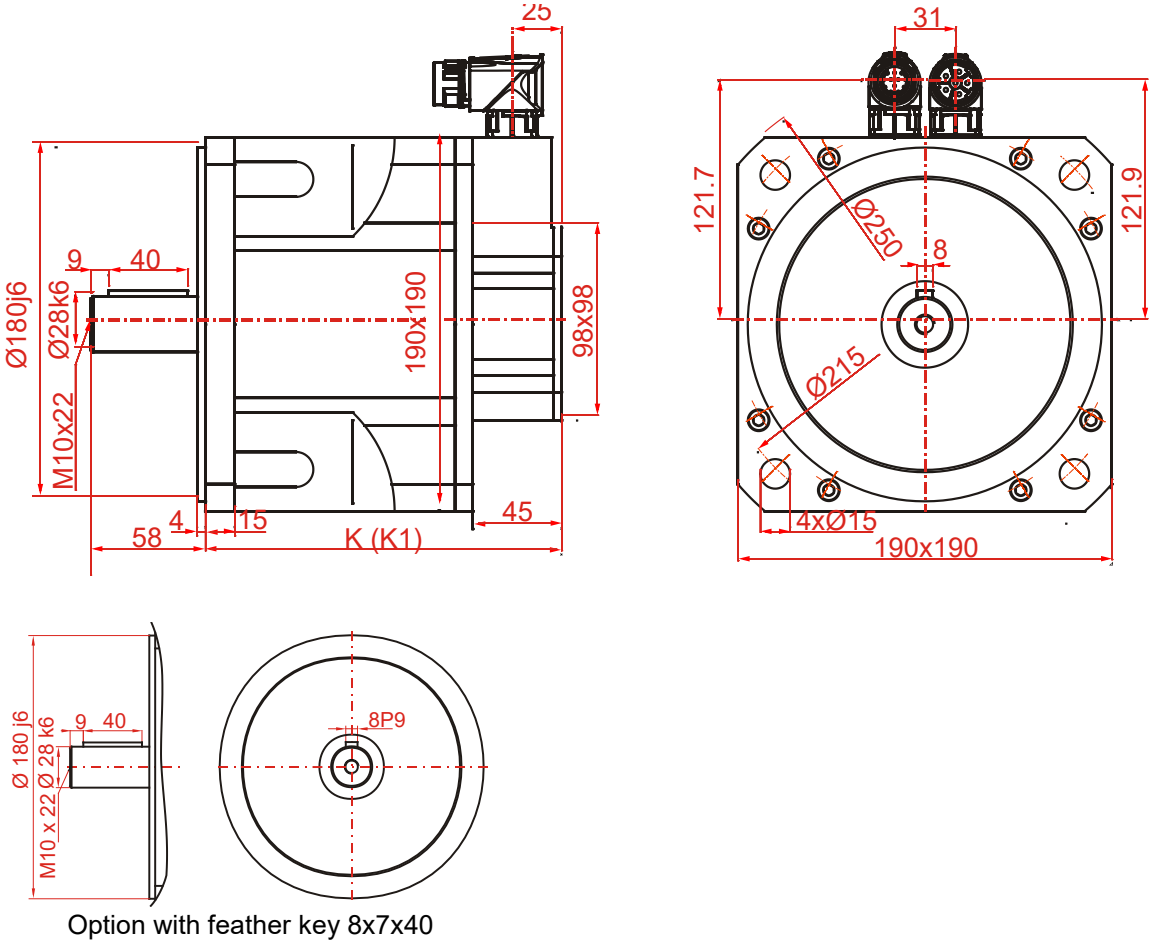


JHN6-4400-094



5.6 Flange size - JHN7



Option with feather key 8x7x40

P = Power connector size K = Dimension without brake K1 = Dimension with brake	P	K	K1	K	K1	K	K1
Type		**Resolver**		**SKx36/EKx36:**		**SRx50**	
JHN7-3000	M23	181	240	181	240	184	243
JHN7-4000	M23	211	270	211	270	214	273
JHN7-5000	M23	241	300	241	300	244	303
JHN7-6000	M23	271	330	271	330	274	333

5.6.1 Technical data of the brake

The technical data of the brake for motor type JHN7 are listed below:

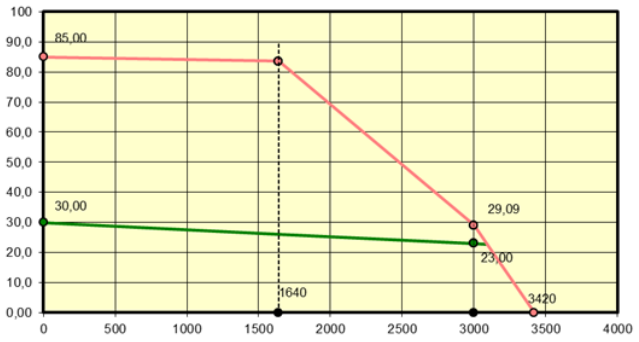
Technical specifications	**Values**		
Holding torque	M_{BR}	Nm	36
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	26
Rotor inertia	J_{BR}	kg*cm^2	5.56
Weight	m_{BR}	kg	2.86

5.6.2 Specific technical data (DC link voltage DC 560 V)

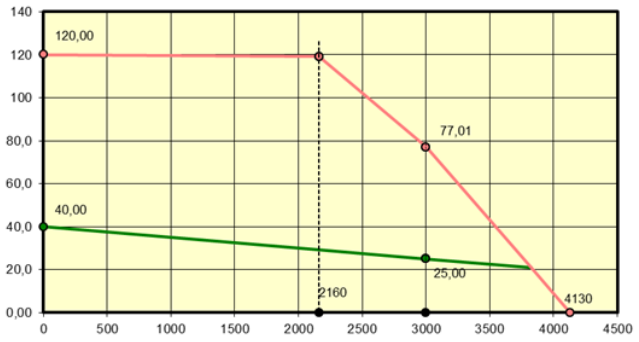
Motor type			**JHN7-3000-111**	**JHN7-4000-092**	**JHN7-5000-133**	**JHN7-5000-096**	**JHN7-6000-121**
Rated speed	N_n	RPM	3000	3000	2000	3000	2500
Rated torque	M_n	Nm	23.0	25.0	40.4	30.0	36.2
Rated current	I_n	A	15.5	20.1	21.8	24.4	20.7
Holding torque	M_o	Nm	30.0	40.0	50	50	60
Continuous stall current	I_o	A	16.3	26.3	22.7	31.5	30.0
Max. torque	M_{max}	Nm	85	120	150	150	180
Max. current	I_{max}	A	58	90	79	109	102
Max. speed	N_{max}	RPM	6000	6000	6000	6000	6000
Back EMF constant	K_E	V/kRPM	111.0	92.0	133.0	96.0	121.0
Torque constant	K_T	Nm/A	1.84	1.52	2.2	1.59	2.0
Winding resistance	R_{2ph}	Ω	0.41	0.17	0.25	0.13	0.16
Winding inductance	L_{2ph}	mH	6.4	3.1	4.9	2.6	3.3
Number of motor poles	P_{mot}		10	10	10	10	10
Idling speed	N_o	RPM	3420	4130	2850	3950	3140
Max. torque at sea level	M_x	Nm	29	77	104	90	99
Thermal time constant - Copper winding	T_{ther_CU}	s	100	100	100	100	100
Electrical time constant	T_{el}	ms	15.6	18.2	19.6	20	21
Mechanical time constant	T_{mech}	ms	1.0	0.88	0.79	0.79	0.74
Thermal time constant	T_{th}	min	80	90	100	100	108
Rotor inertia without brake	J	$kg*cm^2$	50	69	88	88	107
Weight without brake	m	kg	16.5	22	27	27	32
Axial load	F_A	N	231	245	256	256	264
Radial load	F_R	N	1214	1291	1346	1346	1388

5.6.3 Torque/speed characteristic (DC link voltage DC 560 V)

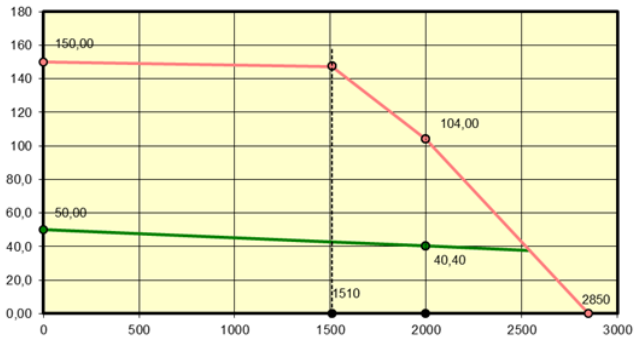
JHN7-3000-111



JHN7-4000-092



JHN7-5000-133



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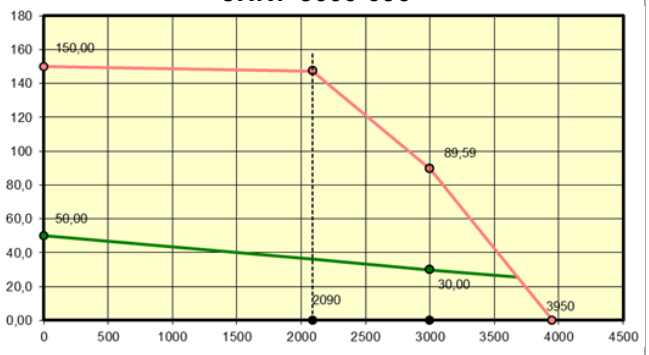
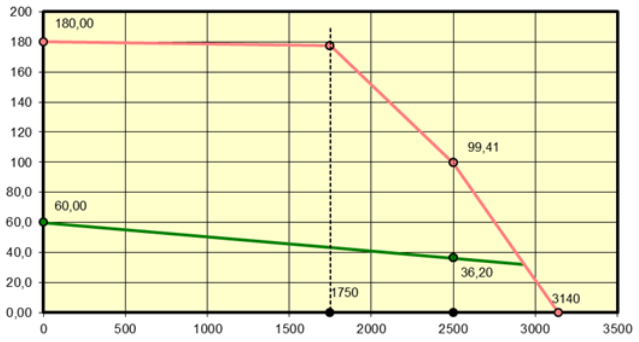


JHN7-6000-121



6 Servo motors of the JHQ series

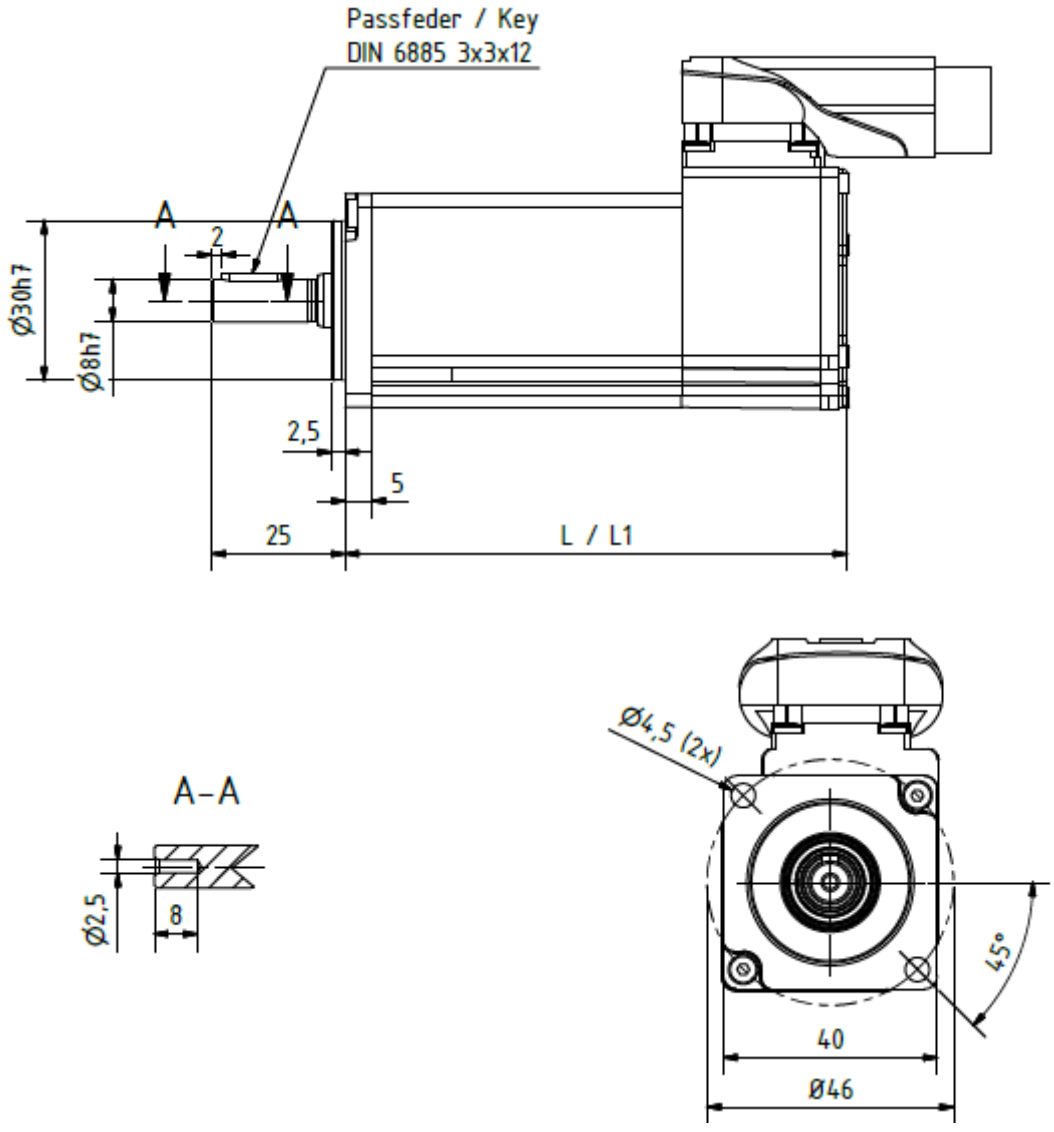
The table below lists the tolerance of the shaft length according to DIN ISO 2768-1, Table 1, for longitudinal dimensions of the JHQ series:

Tolerance class	Limit deviations in mm for nominal dimension range in mm									
	up to 0.5	0.5 through 3	over 3 to 6	over 6 to 30	over 30 to 120	over 120 to 400	over 400 to 1000	over 1000 to 2000	over 2000 to 4000	over 4000 to 8000
f (fine)	See below[1)]	± 0.05	± 0.05	± 0.10	± 0.15	± 0.20	± 0.30	± 0.50	-	-

[1)]: For nominal dimensions below 0.5 mm, the limit deviations must be indicated directly on the nominal dimension.

The following illustrations of flange sizes show the dimensions in millimeters of motors equipped with a resolver.

6.1 Flange size - JHQ12



P = Power connector size L = Length without brake L1 = Length with brake	**P**	**L**	**L1**	**L**	**L1**
Type		**Resolver/SEx37**		**EEx37**	
JHQ12-0018	Y/I	79	102	88.5	110.5
JHQ12-0032	Y/I	94	117	102.5	125.5

6.1.1 Technical data of the brake

The technical data of the brake for motor type JHQ12 are listed below:

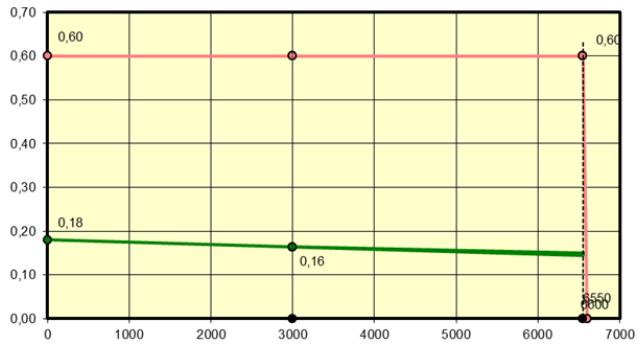
Technical specifications	**Values**		
Holding torque	M_{BR}	Nm	0.4
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	8
Rotor inertia	J_{BR}	kg*cm^2	0.013
Weight	m_{BR}	kg	0.08

6.1.2 Specific technical data (DC link voltage DC 320 V)

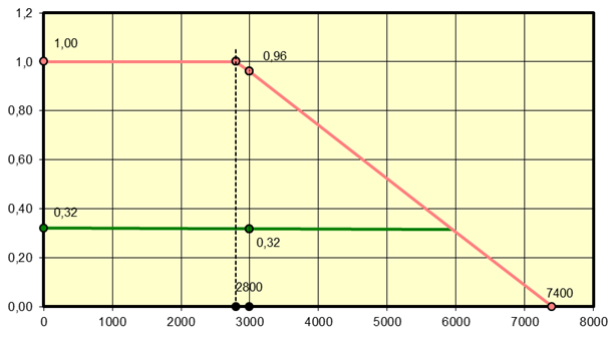
Motor type			**JHQ12-0018-018**	**JHQ12-0032-028**
Rated speed	N_n	RPM	3000	3000
Rated torque	M_n	Nm	0.16	0.32
Rated current	I_n	A	0.62	0.67
Holding torque	M_o	Nm	0.18	0.32
Continuous stall current	I_o	A	0.62	0.68
Max. torque	M_{max}	Nm	0.60	1.0
Max. current	I_{max}	A	2.2	2.4
Max. speed	N_{max}	RPM	9000	9000
Back EMF constant	K_E	V/kRPM	17.8	28.3
Torque constant	K_T	Nm/A	0.29	0.47
Winding resistance	R_{2ph}	Ω	29.1	44.4
Winding inductance	L_{2ph}	mH	22.1	48.9
Number of motor poles	P_{mot}		8	8
Idling speed	N_o	RPM	6600	7400
Max. torque at sea level	M_x	Nm	0.60	0.96
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35
Electrical time constant	T_{el}	ms	0.76	1.1
Mechanical time constant	T_{mech}	ms	1.2	1.0
Thermal time constant	T_{th}	min	7.0	13.0
Rotor inertia without brake	J	kg*cm^2	0.02	0.03
Weight without brake	m	kg	0.40	0.50
Axial load	F_A	N	5.0	6.0
Radial load	F_R	N	50	60

6.1.3 Torque/speed characteristic (DC link voltage DC 320 V)

JHQ12-0018-018



JHQ12-0032-028

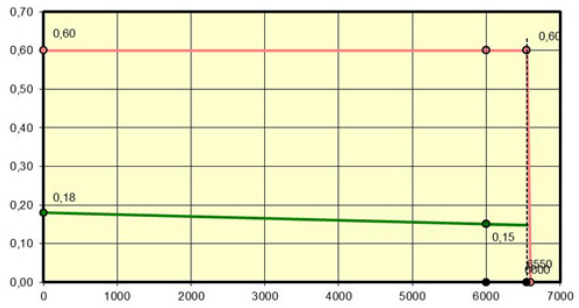


6.1.4 Specific technical data (DC link voltage DC 560 V)

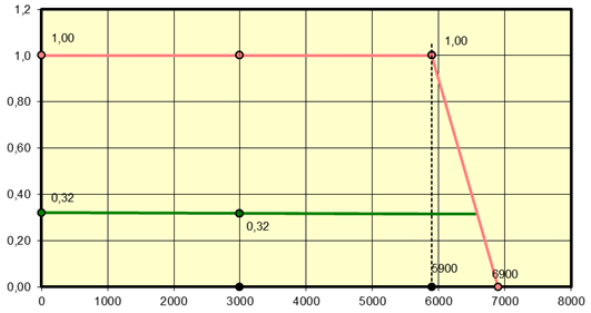
Motor type			**JHQ12-0018-018**	**JHQ12-0032-028**	**JHQ12-0032-031**
Rated speed	N_n	RPM	6000	3000	6000
Rated torque	M_n	Nm	0.15	0.32	0.32
Rated current	I_n	A	0.52	0.67	0.61
Holding torque	M_o	Nm	0.18	0.32	0.32
Continuous stall current	I_o	A	0.62	0.68	0.62
Max. torque	M_{max}	Nm	0.60	1.0	1.0
Max. current	I_{max}	A	2.2	2.4	2.5
Max. speed	N_{max}	RPM	9000	9000	6600
Back EMF constant	K_E	V/kRPM	17.8	28.3	31.4
Torque constant	K_T	Nm/A	0.29	0.47	0.52
Winding resistance	R_{2ph}	Ω	29.1	44.4	45.7
Winding inductance	L_{2ph}	mH	22.1	48.9	48.9
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	6600	6900	7500
Max. torque at sea level	M_x	Nm	0.60	1.0	1.0
Thermal time constant - Copper winding	T_{ther_CU}	s	0.76	1.1	1.1
Electrical time constant	T_{el}	ms	0.76	1.1	1.1
Mechanical time constant	T_{mech}	ms	1.2	1.0	0.88
Thermal time constant	T_{th}	min	7.0	13.0	13.0
Rotor inertia without brake	J	$kg*cm^2$	0.02	0.03	0.03
Weight without brake	m	kg	0.40	0.50	0.50
Axial load	F_A	N	5.0	6.0	6.0
Radial load	F_R	N	50	60	60

6.1.5 Torque/speed characteristic (DC link voltage DC 560 V)

JHQ12-0018-018



JHQ12-0032-028



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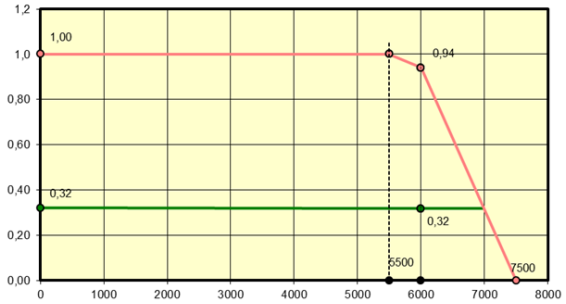
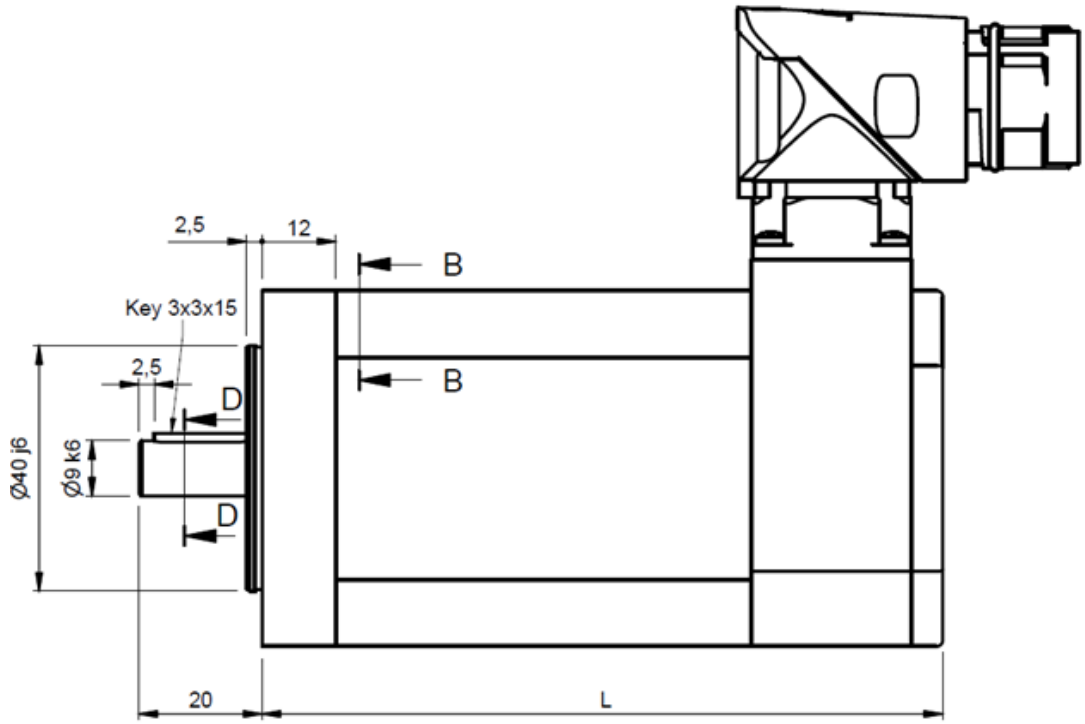
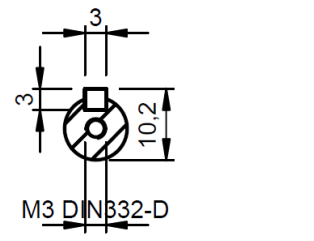
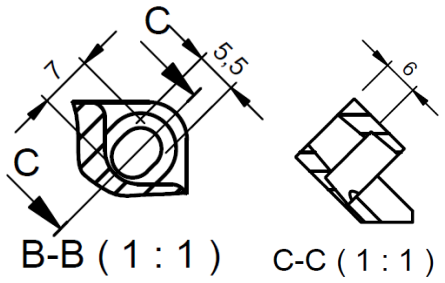


6.2 Flange size - JHQ2



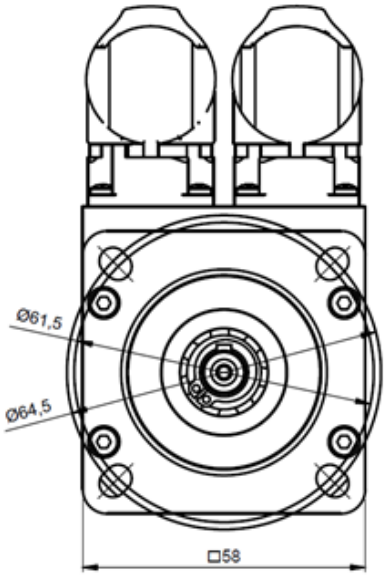


D-D (1 : 1)



B-B (1 : 1)

C-C (1 : 1)



P = Power connector size L = Length without brake L1 = Length with brake	P	L	L1	L	L1	L	L1
Type		**Resolver/SEx37**		**SKx36**		**EEx37/EKx36:**	
JHQ2-0025	M23	86.5	116.5	106.5	136.5	106.5	136.5
JHQ2-0050	M23	98.5	128.5	118.5	148.5	118.5	148.5
JHQ2-0075	M23	110.5	140.5	130.5	160.5	130.5	160.5
JHQ2-0100	M23	122.5	152.5	142.5	172.5	142.5	172.5
JHQ2-0125	M23	134.5	164.5	154.5	184.5	154.5	184.5

6.2.1 Technical data of the brake

The technical data of the brake for motor type JHQ2 are listed below:

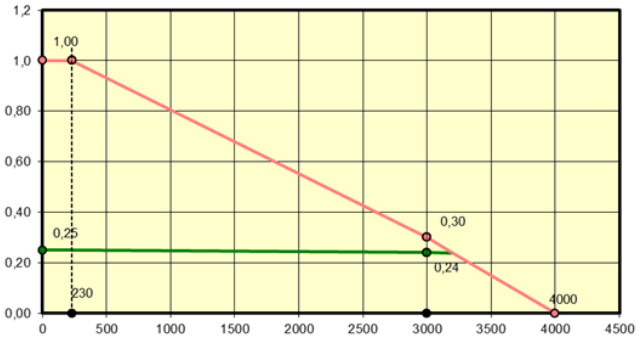
Technical specifications	Values		
Holding torque	M_{BR}	Nm	2.2
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	8.2
Rotor inertia	J_{BR}	kg*cm^2	0.12
Weight	m_{BR}	kg	0.5

6.2.2 Specific technical data (DC link voltage DC 24 V/DC 48 V)

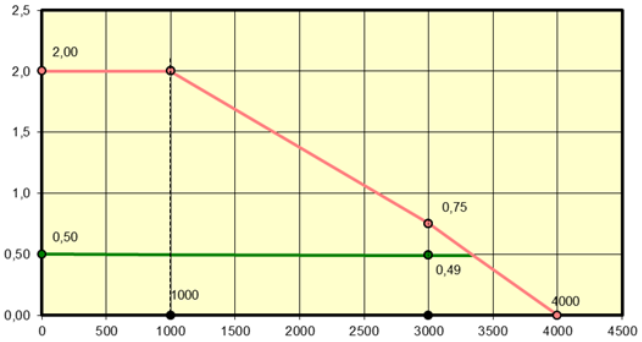
Motor type			JHQ2-0025-007	JHQ2-0050-007	JHQ2-0075-007	JHQ2-0100-007
Rated speed	N_n	RPM	3000	3000	3000	3000
Rated torque	M_n	Nm	0.24	0.49	0.73	0.97
Rated current	I_n	A	1.98	4.0	6.0	8.0
Holding torque	M_o	Nm	0.25	0.50	0.75	1.00
Continuous stall current	I_o	A	2.1	4.1	6.2	8.3
Max. torque	M_{max}	Nm	1.0	2.0	3.0	4.0
Max. current	I_{max}	A	9.7	19.4	29	39
Max. speed	N_{max}	RPM	6600	6600	6600	6600
Back EMF constant	K_E	V/kRPM	7.3	7.3	7.3	7.3
Torque constant	K_T	Nm/A	0.12	0.12	0.12	0.12
Winding resistance	R_{2ph}	Ω	3.5	1.24	0.70	0.52
Winding inductance	L_{2ph}	mH	3.3	1.70	1.10	0.78
Number of motor poles	P_{mot}		8	8	8	8
Idling speed	N_o	RPM	4000	4000	4200	4200
Max. torque at sea level	M_x	Nm	0.30	0.75	1.3	1.7
Thermal time constant - Copper winding	T_{ther_CU}	s	16	16	16	16
Electrical time constant	T_{el}	ms	0.95	1.4	1.6	1.5
Mechanical time constant	T_{mech}	ms	2.9	1.9	1.6	1.5
Thermal time constant	T_{th}	min	31	34	36	38
Rotor inertia without brake	J	kg*cm^2	0.07	0.13	0.19	0.25
Weight without brake	m	kg	1.0	1.2	1.5	1.7
Axial load	F_A	N	11.0	12.0	13.0	14.0
Radial load	F_R	N	105	115	125	135

6.2.3 Torque/speed characteristic (DC link voltage DC 24 V/DC 48 V)

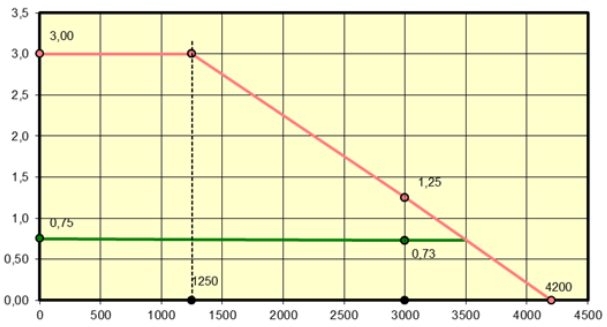
JHQ2-0025-007



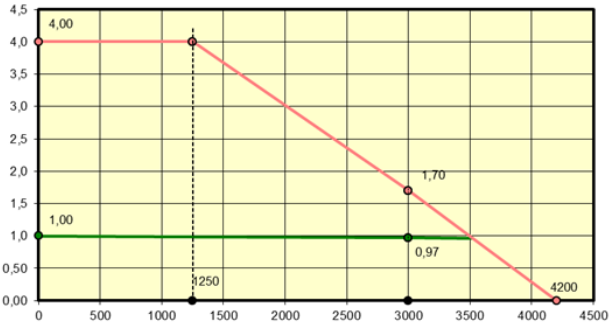
JHQ2-0050-007



JHQ2-0075-007



JHQ2-0025-007



6.2.4 Specific technical data (DC link voltage DC 320 V)

Motor type			**JHQ2-0025-051**	**JHQ2-0025-035**	**JHQ2-0025-025**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	0.24	0.24	0.24
Rated current	I_n	A	0.29	0.42	0.57
Holding torque	M_o	Nm	0.25	0.25	0.25
Continuous stall current	I_o	A	0.30	0.44	0.60
Max. torque	M_{max}	Nm	1.0	1.0	1.0
Max. current	I_{max}	A	1.4	2.1	2.8
Max. speed	N_{max}	RPM	6600	6600	6600
Back EMF constant	K_E	V/kRPM	51.3	34.6	25.1
Torque constant	K_T	Nm/A	0.84	0.57	0.42
Winding resistance	R_{2ph}	Ω	158	69	36.7
Winding inductance	L_{2ph}	mH	165	67	42.9
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4200	6000	8300
Max. torque at sea level	M_x	Nm	0.30	0.36	0.40
Thermal time constant - Copper winding	$T_{ther\ CU}$	s	35	35	35
Electrical time constant	T_{el}	ms	1.0	0.96	1.2
Mechanical time constant	T_{mech}	ms	0.69	2.6	2.5
Thermal time constant	T_{th}	min	31	31	31
Rotor inertia without brake	J	$kg*cm^2$	0.07	0.07	0.07
Weight without brake	m	kg	1.0	1.0	1.0
Axial load	F_A	N	11.0	11.0	11.0
Radial load	F_R	N	105	105	105

Motor type			**JHQ2-0050-051**	**JHQ2-0050-035**	**JHQ2-0050-025**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	0.49	0.48	0.47
Rated current	I_n	A	0.58	0.84	1.12
Holding torque	M_o	Nm	0.50	0.50	0.50
Continuous stall current	I_o	A	0.60	0.88	1.19
Max. torque	M_{max}	Nm	2.0	2.0	2.0
Max. current	I_{max}	A	2.8	4.2	5.6
Max. speed	N_{max}	RPM	6600	6600	6600
Back EMF constant	K_E	V/kRPM	51.3	34.6	25.1
Torque constant	K_T	Nm/A	0.84	0.57	0.42
Winding resistance	R_{2ph}	Ω	48.3	25.6	13.0
Winding inductance	L_{2ph}	mH	75	34.5	18.6
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4100	6000	8300
Max. torque at sea level	M_x	Nm	0.75	0.80	1.0
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	1.6	1.3	1.4
Mechanical time constant	T_{mech}	ms	1.5	1.8	1.7
Thermal time constant	T_{th}	min	34	34	34
Rotor inertia without brake	J	$kg*cm^2$	0.13	0.13	0.13
Weight without brake	m	kg	1.2	1.2	1.2
Axial load	F_A	N	12.0	12.0	12.0
Radial load	F_R	N	115	115	115

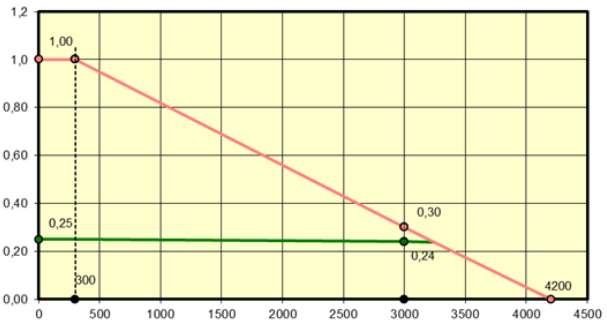
Motor type			**JHQ2-0075-051**	**JHQ2-0075-035**	**JHQ2-0075-025**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	0.73	0.71	0.70
Rated current	I_n	A	0.87	1.25	1.67
Holding torque	M_o	Nm	0.75	0.75	0.75
Continuous stall current	I_o	A	0.89	1.32	1.79
Max. torque	M_{max}	Nm	3.0	3.0	3.0
Max. current	I_{max}	A	4.2	6.3	8.4
Max. speed	N_{max}	RPM	6600	6600	6600
Back EMF constant	K_E	V/kRPM	51.3	34.6	25.1
Torque constant	K_T	Nm/A	0.84	0.57	0.42
Winding resistance	R_{2ph}	Ω	26.9	16.8	8.1
Winding inductance	L_{2ph}	mH	44.0	25.5	12.9
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4100	6100	8300
Max. torque at sea level	M_x	Nm	1.3	1.2	1.5
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	1.6	1.5	1.6
Mechanical time constant	T_{mech}	ms	1.2	1.7	1.5
Thermal time constant	T_{th}	min	36	36	36
Rotor inertia without brake	J	$kg*cm^2$	0.19	0.19	0.19
Weight without brake	m	kg	1.5	1.5	1.5
Axial load	F_A	N	13.0	13.0	13.0
Radial load	F_R	N	125	125	125

Motor type			**JHQ2-0100-051**	**JHQ2-0100-035**	**JHQ2-0100-025**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	0.97	0.94	0.93
Rated current	I_n	A	1.15	1.65	2.2
Holding torque	M_o	Nm	1.00	1.00	1.00
Continuous stall current	I_o	A	1.19	1.75	2.4
Max. torque	M_{max}	Nm	4.0	4.0	4.0
Max. current	I_{max}	A	5.6	8.4	11.2
Max. speed	N_{max}	RPM	6600	6600	6600
Back EMF constant	K_E	V/kRPM	51.3	34.6	25.1
Torque constant	K_T	Nm/A	0.84	0.57	0.42
Winding resistance	R_{2ph}	Ω	21.3	9.9	5.1
Winding inductance	L_{2ph}	mH	37.5	16.4	8.9
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4100	6100	8300
Max. torque at sea level	M_x	Nm	1.6	1.8	2.1
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	1.8	1.7	1.7
Mechanical time constant	T_{mech}	ms	1.3	1.3	1.3
Thermal time constant	T_{th}	min	38	38	38
Rotor inertia without brake	J	$kg*cm^2$	0.25	0.25	0.25
Weight without brake	m	kg	1.7	1.7	1.7
Axial load	F_A	N	14.0	14.0	14.0
Radial load	F_R	N	135	135	135

Motor type			**JHQ2-0125-051**	**JHQ2-0125-035**	**JHQ2-0125-025**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	1.21	1.18	1.16
Rated current	I_n	A	1.44	2.1	2.8
Holding torque	M_o	Nm	1.25	1.25	1.25
Continuous stall current	I_o	A	1.49	2.2	3.0
Max. torque	M_{max}	Nm	5.0	5.0	5.0
Max. current	I_{max}	A	7.0	10.5	14.0
Max. speed	N_{max}	RPM	6600	6600	6600
Back EMF constant	K_E	V/kRPM	51.3	34.6	25.1
Torque constant	K_T	Nm/A	0.84	0.57	0.42
Winding resistance	R_{2ph}	Ω	19.4	8.2	4.5
Winding inductance	L_{2ph}	mH	29.4	14.2	7.9
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4100	6100	8300
Max. torque at sea level	M_x	Nm	1.9	2.2	2.5
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	1.5	1.7	1.8
Mechanical time constant	T_{mech}	ms	1.5	1.3	1.4
Thermal time constant	T_{th}	min	40	40	40
Rotor inertia without brake	J	$kg*cm^2$	0.31	0.31	0.31
Weight without brake	m	kg	2.0	2.0	2.0
Axial load	F_A	N	15.0	15.0	15.0
Radial load	F_R	N	145	145	145

6.2.5 Torque/speed characteristic (DC link voltage DC 320 V)

JHQ2-0025-051



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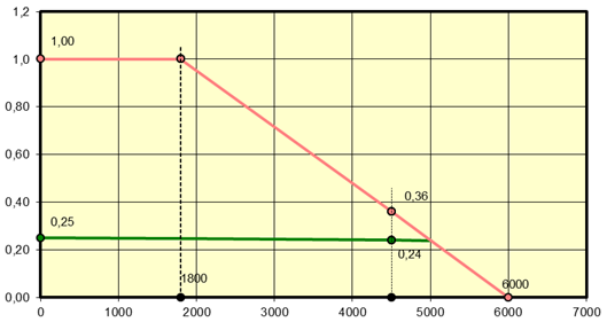

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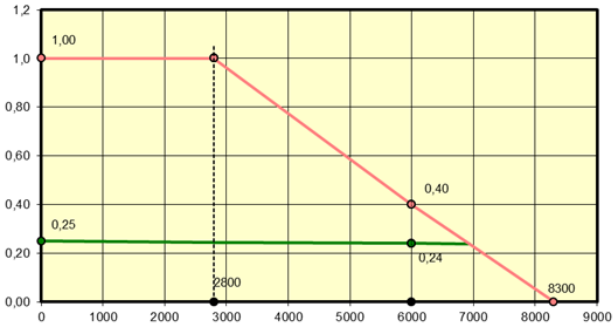

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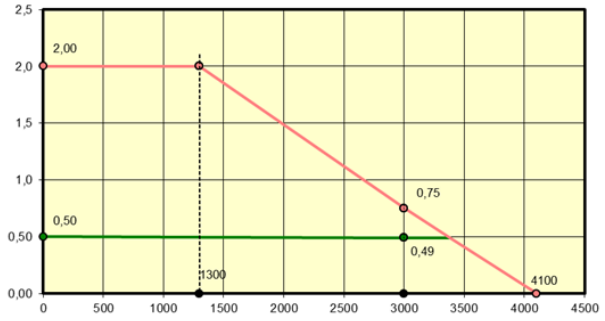

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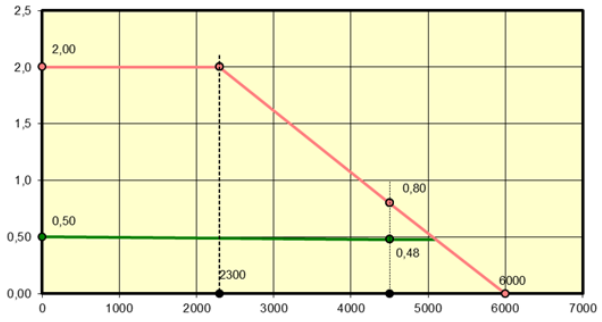

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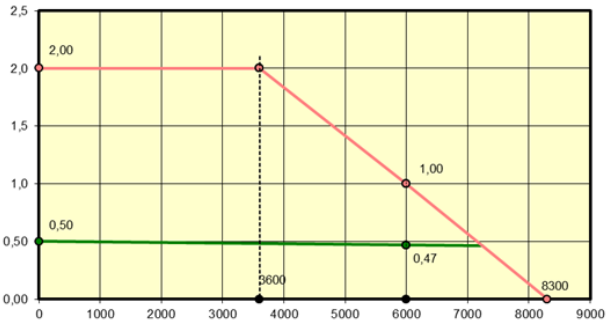

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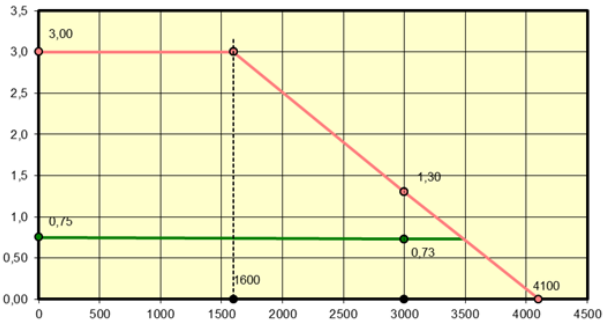

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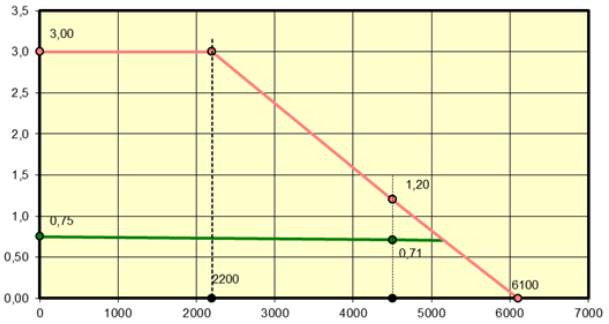

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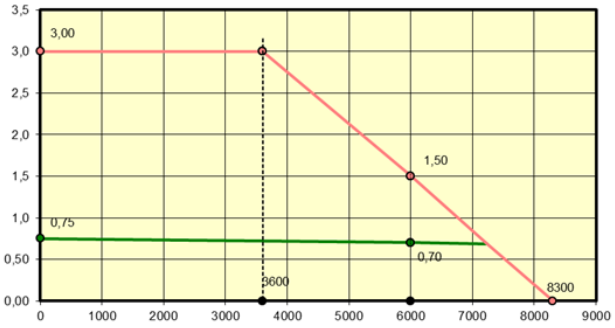

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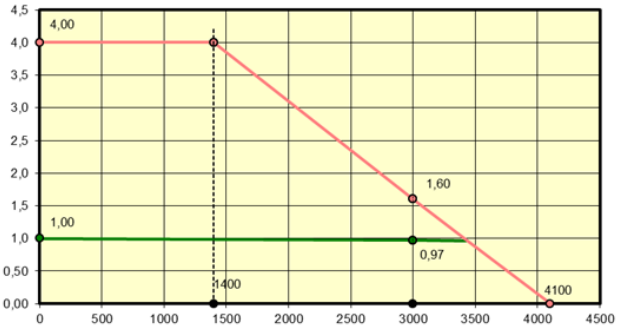

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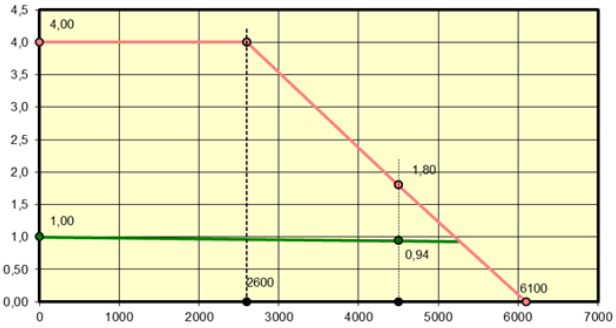

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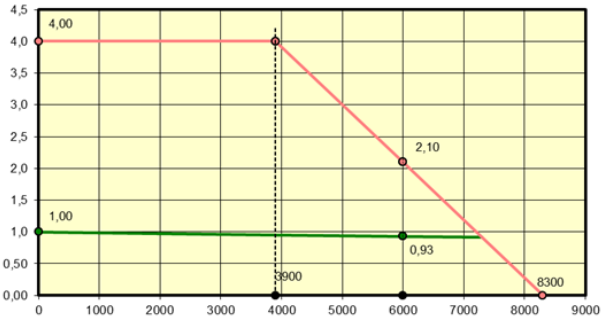

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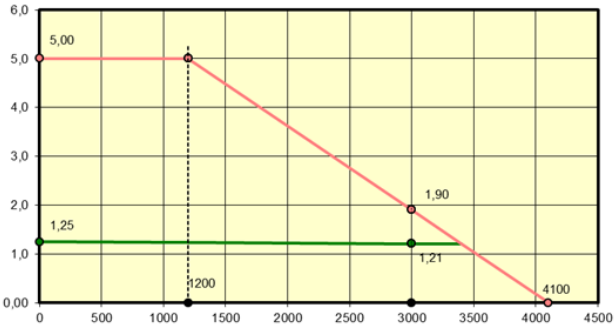

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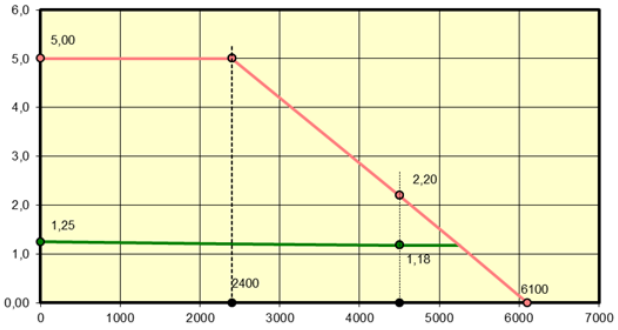

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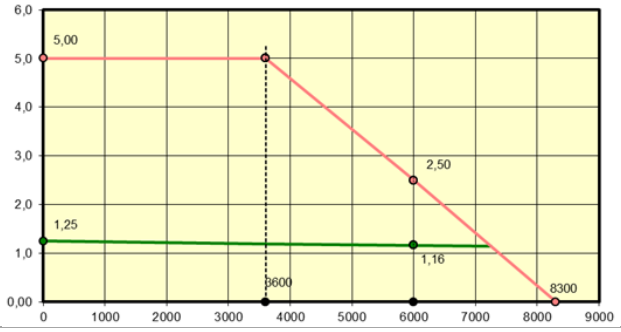


6.2.6 Specific technical data (DC link voltage DC 560 V)

Motor type			**JHQ2-0025-044**	**JHQ2-0050-088**	**JHQ2-0050-059**	**JHQ2-0050-044**
Rated speed	N_n	RPM	6000	3000	4500	6000
Rated torque	M_n	Nm	0.24	0.49	0.48	0.47
Rated current	I_n	A	0.33	0.34	0.49	0.65
Holding torque	M_o	Nm	0.25	0.50	0.50	0.50
Continuous stall current	I_o	A	0.33	0.34	0.49	0.65
Max. torque	M_{max}	Nm	1.0	2.0	2.0	2.0
Max. current	I_{max}	A	1.7	1.6	2.6	3.3
Max. speed	N_{max}	RPM	6600	6600	6600	6600
Back EMF constant	K_E	V/kRPM	44.0	88.0	58.6	44.0
Torque constant	K_T	Nm/A	0.73	1.45	0.97	0.73
Winding resistance	R_{2ph}	Ω	110	145	64	38.9
Winding inductance	L_{2ph}	mH	129	226	89	56
Number of motor poles	P_{mot}		8	8	8	8
Idling speed	N_o	RPM	8000	4050	6100	8500
Max. torque at sea level	M_x	Nm	0.40	0.70	0.92	1.0
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	35
Electrical time constant	T_{el}	ms	1.2	1.6	1.4	1.4
Mechanical time constant	T_{mech}	ms	2.5	1.5	1.5	1.6
Thermal time constant	T_{th}	min	31	34	34	34
Rotor inertia without brake	J	$kg*cm^2$	0.07	0.13	0.13	0.13
Weight without brake	m	kg	1.0	1.2	1.2	1.2
Axial load	F_A	N	11.0	12.0	12.0	12.0
Radial load	F_R	N	105	115	115	115

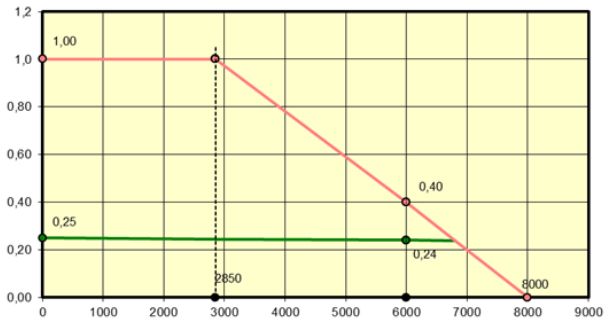
Motor type			**JHQ2-0075-088**	**JHQ2-0075-059**	**JHQ2-0075-044**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	0.73	0.71	0.70
Rated current	I_n	A	0.50	0.73	0.96
Holding torque	M_o	Nm	0.75	0.75	0.75
Continuous stall current	I_o	A	0.50	0.73	0.65
Max. torque	M_{max}	Nm	3.0	3.0	3.0
Max. current	I_{max}	A	2.5	3.6	5.0
Max. speed	N_{max}	RPM	6600	6600	6600
Back EMF constant	K_E	V/kRPM	88.0	58.6	44.0
Torque constant	K_T	Nm/A	1.45	0.97	0.73
Winding resistance	R_{2ph}	Ω	81	51	24.2
Winding inductance	L_{2ph}	mH	132	78	38.8
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4100	6100	8500
Max. torque at sea level	M_x	Nm	1.3	1.2	1.5
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	1.6	1.5	1.6
Mechanical time constant	T_{mech}	ms	1.3	1.8	1.5
Thermal time constant	T_{th}	min	36	36	36
Rotor inertia without brake	J	kg*cm^2	0.19	0.19	0.19
Weight without brake	m	kg	1.5	1.5	1.5
Axial load	F_A	N	13.0	13.0	13.0
Radial load	F_R	N	125	125	125

Motor type			**JHQ2-0100-088**	**JHQ2-0100-059**	**JHQ2-0100-044**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	0.97	0.94	0.93
Rated current	I_n	A	0.67	0.97	1.28
Holding torque	M_o	Nm	1.00	1.00	1.00
Continuous stall current	I_o	A	0.67	0.97	1.28
Max. torque	M_{max}	Nm	4.0	4.0	4.0
Max. current	I_{max}	A	3.3	4.8	6.6
Max. speed	N_{max}	RPM	6600	6600	6600
Back EMF constant	K_E	V/kRPM	88.0	58.6	44.0
Torque constant	K_T	Nm/A	1.45	0.97	0.73
Winding resistance	R_{2ph}	Ω	64	31.3	15.4
Winding inductance	L_{2ph}	mH	112	53	26.7
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4050	6100	8500
Max. torque at sea level	M_x	Nm	1.6	1.8	2.2
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	1.8	1.7	1.7
Mechanical time constant	T_{mech}	ms	1.3	1.4	1.3
Thermal time constant	T_{th}	min	38	38	38
Rotor inertia without brake	J	$kg*cm^2$	0.25	0.25	0.25
Weight without brake	m	kg	1.7	1.7	1.7
Axial load	F_A	N	14.0	14.0	14.0
Radial load	F_R	N	135	135	135

Motor type			**JHQ2-0125-088**	**JHQ2-0125-059**	**JHQ2-0125-044**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	1.21	1.18	1.16
Rated current	I_n	A	0.83	1.22	1.59
Holding torque	M_o	Nm	1.25	1.25	1.25
Continuous stall current	I_o	A	0.83	1.22	1.59
Max. torque	M_{max}	Nm	5.0	5.0	5.0
Max. current	I_{max}	A	4.1	6.0	8.3
Max. speed	N_{max}	RPM	6600	6600	6600
Back EMF constant	K_E	V/kRPM	88.0	58.6	44.0
Torque constant	K_T	Nm/A	1.45	0.97	0.73
Winding resistance	R_{2ph}	Ω	58	24.5	13.5
Winding inductance	L_{2ph}	mH	88	42.5	23.6
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4050	6100	8500
Max. torque at sea level	M_x	Nm	2.0	2.3	2.6
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	1.5	1.7	1.7
Mechanical time constant	T_{mech}	ms	1.5	1.4	1.4
Thermal time constant	T_{th}	min	40	40	40
Rotor inertia without brake	J	$kg*cm^2$	0.31	0.31	0.31
Weight without brake	m	kg	2.0	2.0	2.0
Axial load	F_A	N	15.0	15.0	15.0
Radial load	F_R	N	145	145	145

6.2.7 Torque/speed characteristic (DC link voltage DC 560 V)

JHQ2-0025-044



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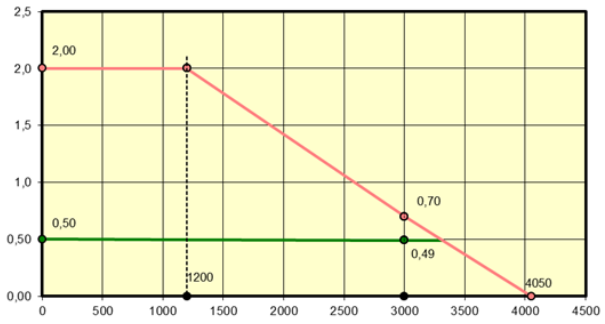

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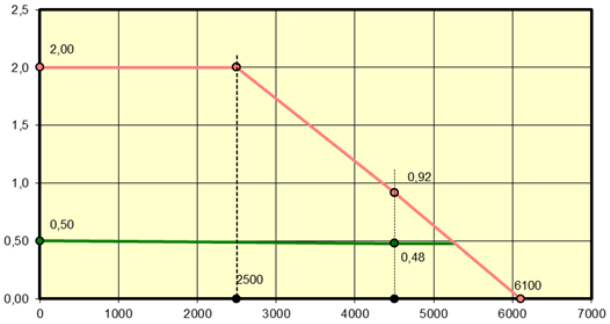

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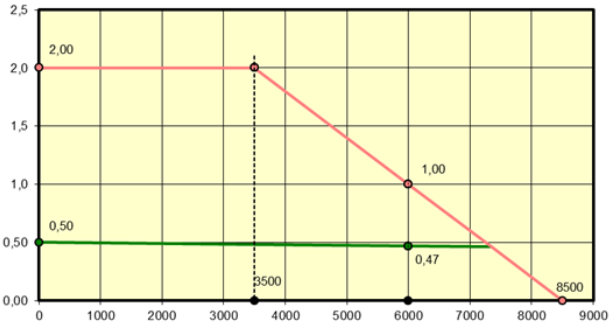

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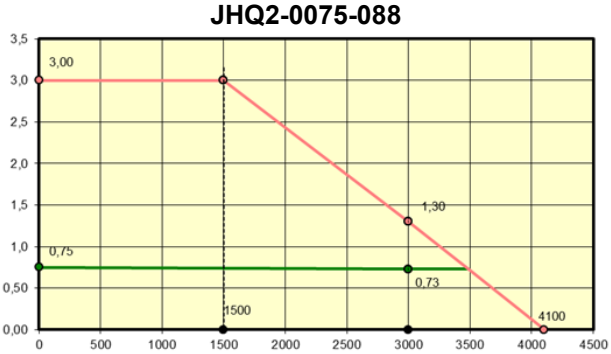

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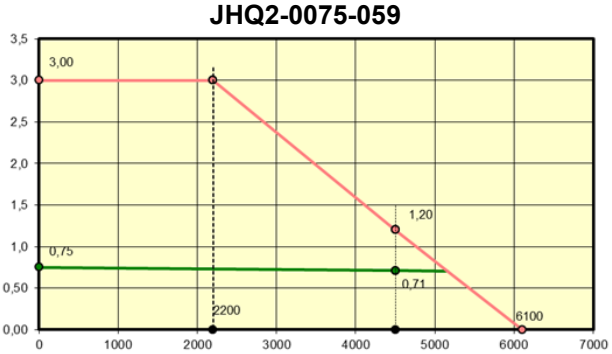

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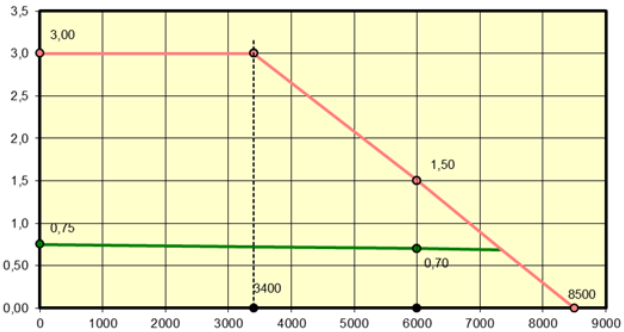

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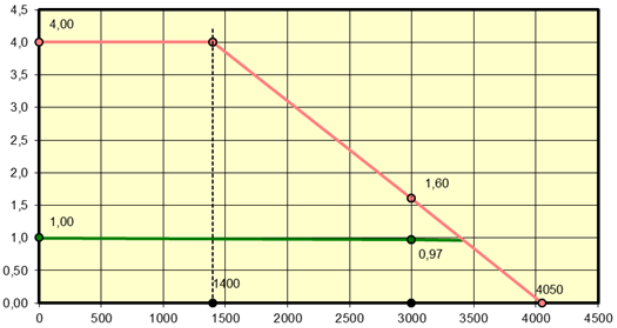

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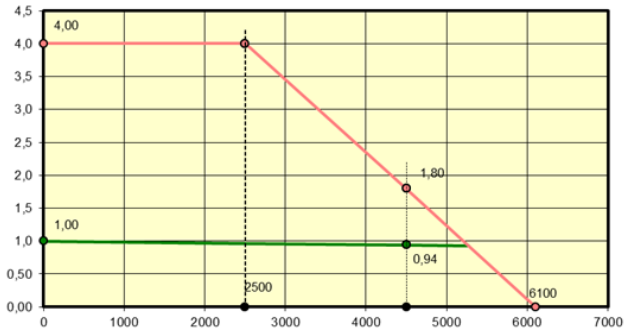

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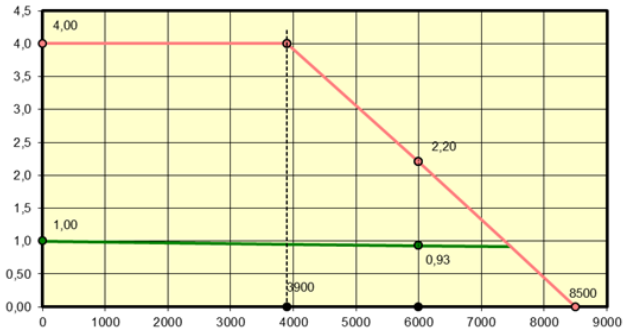

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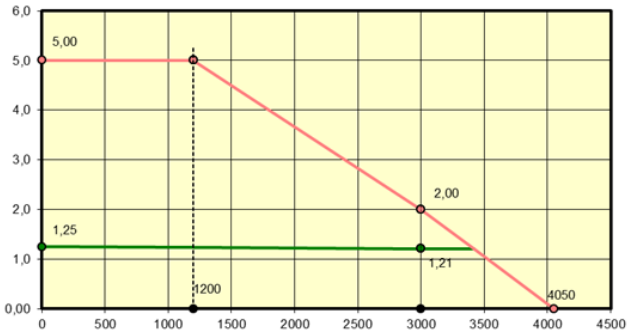

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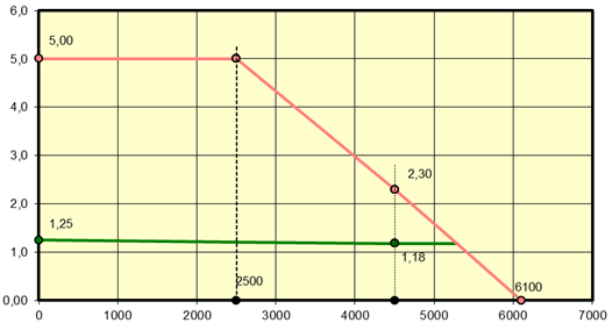

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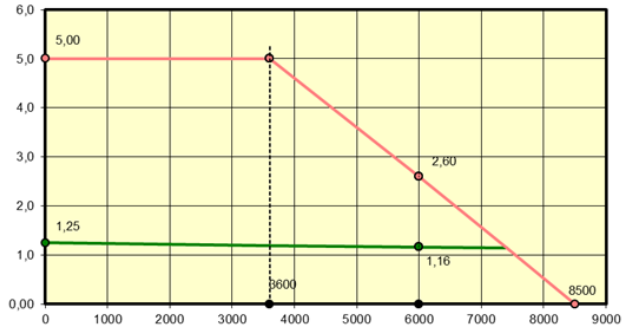

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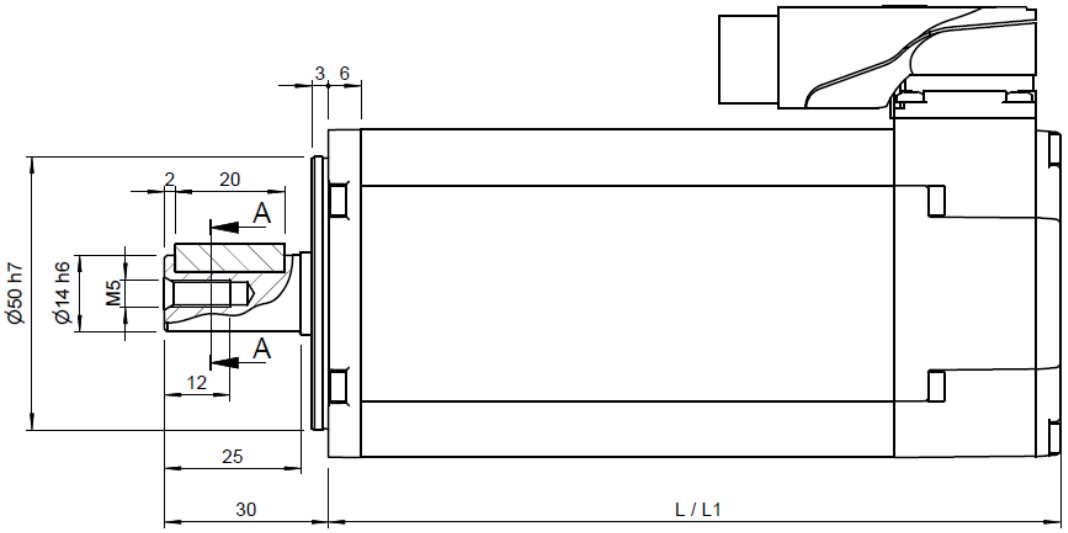
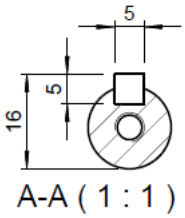
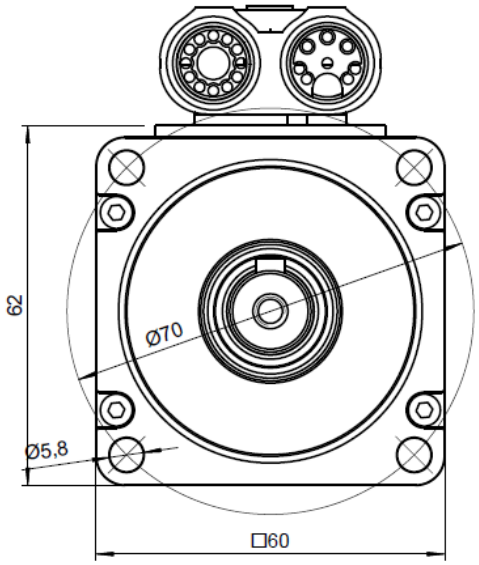






P = Power connector size L = Length without brake L1 = Length with brake	**P**	**L**	**L1**	**L**	**L1**
Type		**Resolver/SEx37**		**EEx37**	
JHQ22-0070	Y/I	84.5	113.5	88.5	117.5
JHQ22-0140	Y/I	105	134	109	138

6.3.1 Technical data of the brake

The technical data of the brake for motor type JHQ22 are listed below:

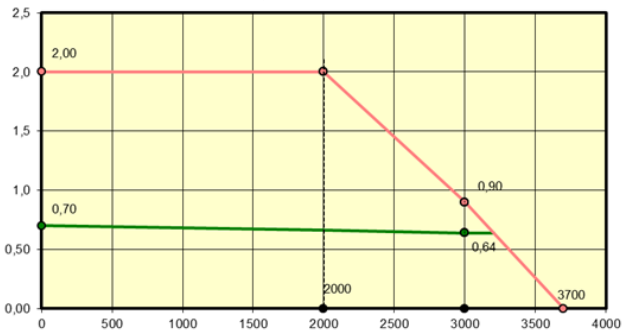
Technical specifications	Values		
Holding torque	M_{BR}	Nm	0.4
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	8
Rotor inertia	J_{BR}	kg*cm^2	0.013
Weight	m_{BR}	kg	0.08

6.3.2 Specific technical data (DC link voltage DC 320 V)

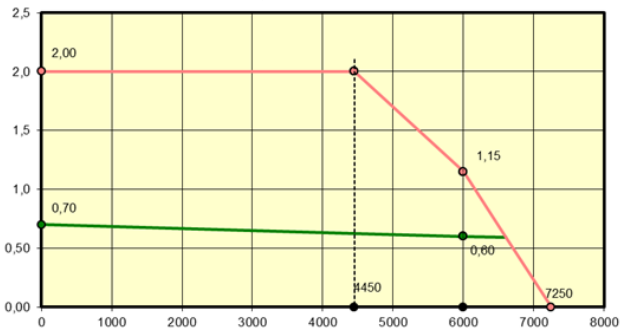
Motor type			**JHQ22-0070-057**	**JHQ22-0070-028**	**JHQ22-0140-057**	**JHQ22-0140-028**
Rated speed	N_n	RPM	3000	6000	3000	6000
Rated torque	M_n	Nm	0.64	0.60	1.27	1.10
Rated current	I_n	A	0.68	1.28	1.35	2.4
Holding torque	M_o	Nm	0.70	0.70	1.40	1.40
Continuous stall current	I_o	A	0.75	1.49	1.49	3.0
Max. torque	M_{max}	Nm	2.0	2.0	4.8	4.8
Max. current	I_{max}	A	2.7	5.5	6.0	11.9
Max. speed	N_{max}	RPM	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	56.6	28.3	56.6	28.3
Torque constant	K_T	Nm/A	0.94	0.47	0.94	0.47
Winding resistance	R_{2ph}	Ω	33.4	10.2	15.0	3.9
Winding inductance	L_{2ph}	mH	33.7	10.0	15.0	5.0
Number of motor poles	P_{mot}		10	10	10	10
Idling speed	N_o	RPM	3700	7250	3700	7250
Max. torque at sea level	M_x	Nm	0.90	1.2	2.2	2.7
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	35
Electrical time constant	T_{el}	ms	1.0	0.98	1.0	1.3
Mechanical time constant	T_{mech}	ms	1.4	1.8	1.2	1.3
Thermal time constant	T_{th}	min	18.0	18.0	18.0	18.0
Rotor inertia without brake	J	kg*cm^2	0.22	0.22	0.41	0.41
Weight without brake	m	kg	0.80	0.80	0.80	0.80
Axial load	F_A	N	7.0	7.0	7.0	7.0
Radial load	F_R	N	62	62	62	62

6.3.3 Torque/speed characteristic (DC link voltage DC 320 V)

JHQ22-0070-057



JHQ22-0070-028



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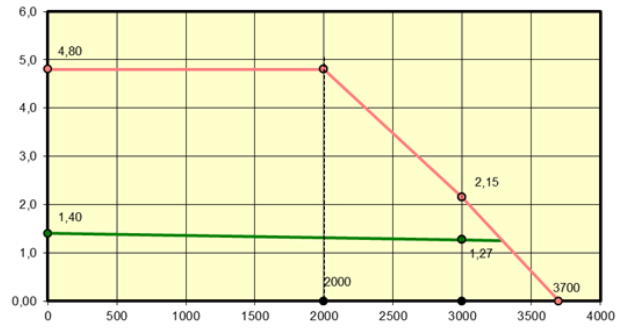

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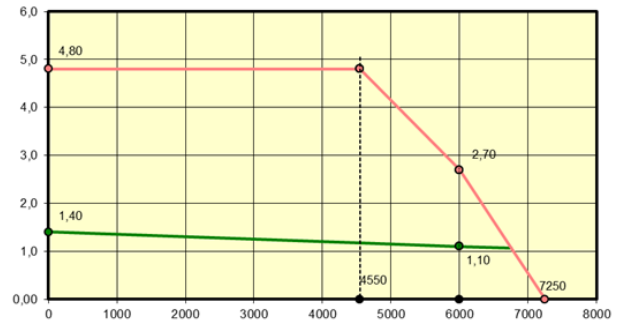
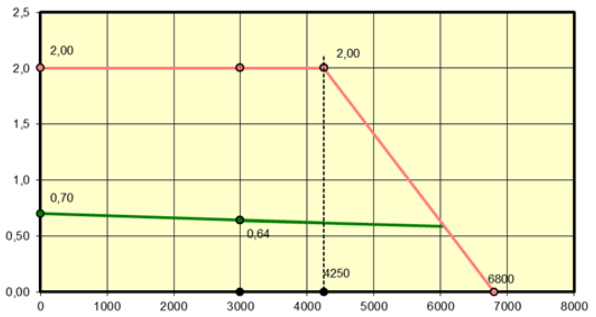


6.3.4 Specific technical data (DC link voltage DC 560 V)

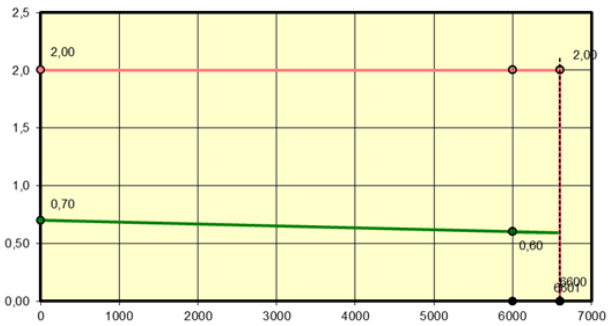
Motor type			**JHQ22-0070-057**	**JHQ22-0070-028**	**JHQ22-0140-057**	**JHQ22-0140-028**
Rated speed	N_n	RPM	3000	6000	3000	6000
Rated torque	M_n	Nm	0.64	0.60	1.27	1.10
Rated current	I_n	A	0.68	1.28	1.35	2.4
Holding torque	M_o	Nm	0.70	0.70	1.40	1.40
Continuous stall current	I_o	A	0.75	1.49	1.49	3.0
Max. torque	M_{max}	Nm	2.0	2.0	4.8	4.8
Max. current	I_{max}	A	2.7	5.5	6.0	11.9
Max. speed	N_{max}	RPM	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	56.6	28.3	56.6	28.3
Torque constant	K_T	Nm/A	0.94	0.47	0.94	0.47
Winding resistance	R_{2ph}	Ω	33.4	10.2	15.0	3.9
Winding inductance	L_{2ph}	mH	33.7	10.0	15.0	5.0
Number of motor poles	P_{mot}		10	10	10	10
Idling speed	N_o	RPM	6800	6601	6800	6601
Max. torque at sea level	M_x	Nm	2.0	2.0	4.8	4.8
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	35
Electrical time constant	T_{el}	ms	1.0	0.98	1.0	1.3
Mechanical time constant	T_{mech}	ms	1.4	1.8	1.2	1.3
Thermal time constant	T_{th}	min	18.0	18.0	20	20
Rotor inertia without brake	J	$kg*cm^2$	0.22	0.22	0.41	0.41
Weight without brake	m	kg	0.80	0.80	0.80	0.80
Axial load	F_A	N	7.0	7.0	7.0	7.0
Radial load	F_R	N	62	62	62	62

6.3.5 Torque/speed characteristic (DC link voltage DC 560 V)

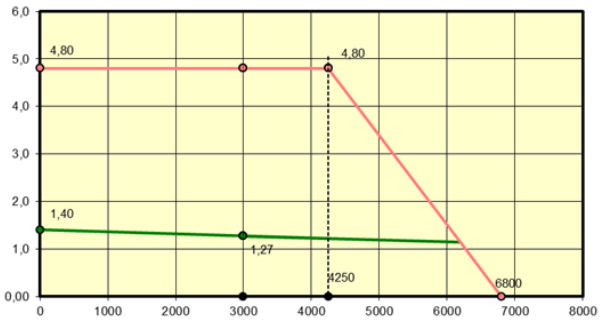
JHQ22-0070-057



JHQ22-0070-028



JHQ22-0140-057



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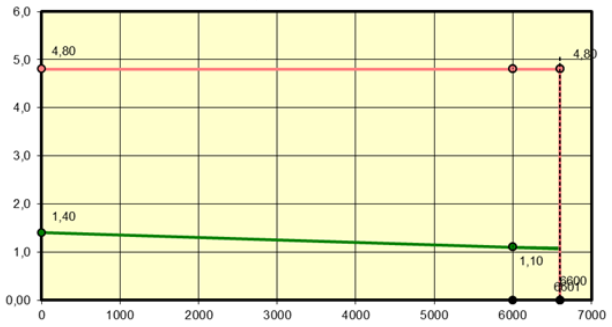
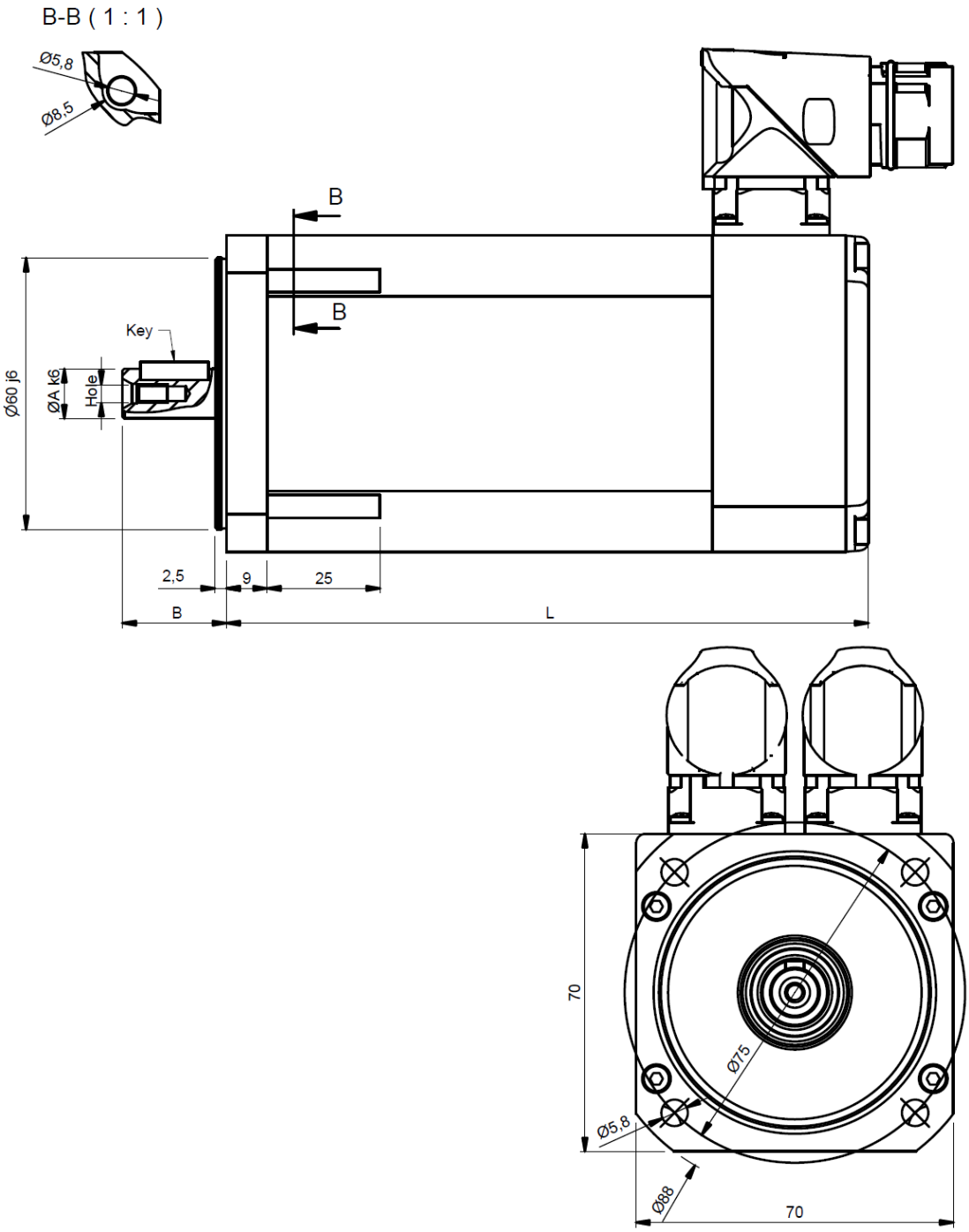


6.4 Flange size - JHQ23



P = Power connector size L = Length without brake L1 = Length with brake	**P**	**L**	**L1**	**L**	**L1**	**L**	**L1**	**Shaft (AxB)/ feather key/ internal thread (hole)**
Type		**Resolver/SEx37**		**SKx36**		**EEx37/EKx36:**		**mm**
JHQ23-0060	M23	112	147	122.5	157.5	122.5	157.5	Ø11x23/ 4x4x15/ M4 DIN 332-D
JHQ23-0120	M23	127	162	137.5	172.5	137.5	172.5	
JHQ23-0180	M23	142	177	152.5	187.5	152.5	187.5	
JHQ23-0240	M23	167	198	179.5	210.5	179.5	210.5	Ø14x30/ 5x5x20/ M5 DIN 332-D
JHQ23-0300	M23	182	213	194.5	225.5	194.5	225.5	

6.4.1 Technical data of the brake

The technical data of the brake for motor type JHQ23 are listed below:

Technical specifications	Values		
Holding torque	M_{BR}	Nm	3.2
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	10.8
Rotor inertia	J_{BR}	kg*cm^2	0.38
Weight	m_{BR}	kg	0.6

6.4.2 Specific technical data (DC link voltage DC 320 V)

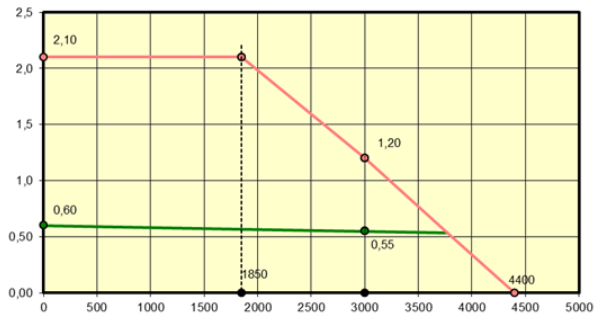
Motor type			JHQ23-0060-051	JHQ23-0060-025	JHQ23-0120-051	JHQ23-0120-025
Rated speed	N_n	RPM	3000	6000	3000	6000
Rated torque	M_n	Nm	0.55	0.50	1.10	1.00
Rated current	I_n	A	0.40	0.70	0.80	1.40
Holding torque	M_o	Nm	0.60	0.60	1.20	1.20
Continuous stall current	I_o	A	0.70	1.40	1.40	2.9
Max. torque	M_{max}	Nm	2.1	2.1	4.2	4.2
Max. current	I_{max}	A	3.2	6.4	6.3	12.8
Max. speed	N_{max}	RPM	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	51.3	25.1	51.3	25.1
Torque constant	K_T	Nm/A	0.85	0.42	0.85	0.42
Winding resistance	R_{2ph}	Ω	35.0	8.8	12.1	3.0
Winding inductance	L_{2ph}	mH	48.0	12.0	23.2	5.8
Number of motor poles	P_{mot}		8	8	8	8
Idling speed	N_o	RPM	4400	9000	4500	9000
Max. torque at sea level	M_x	Nm	1.2	1.6	2.6	3.2
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	35
Electrical time constant	T_{el}	ms	1.4	1.4	1.9	1.9
Mechanical time constant	T_{mech}	ms	2.1	2.2	1.3	1.3
Thermal time constant	T_{th}	min	34	34	34	34
Rotor inertia without brake	J	kg*cm^2	0.25	0.25	0.44	0.44
Weight without brake	m	kg	2.0	2.0	2.2	2.2
Axial load	F_A	N	16.0	16.0	17.0	17.0
Radial load	F_R	N	155	155	165	165

Motor type			**JHQ23-0180-051**	**JHQ23-0180-025**	**JHQ23-0240-051**	**JHQ23-0240-025**
Rated speed	N_n	RPM	3000	6000	3000	6000
Rated torque	M_n	Nm	1.65	1.50	2.2	2.0
Rated current	I_n	A	1.10	2.1	1.50	2.7
Holding torque	M_o	Nm	1.80	1.80	2.4	2.4
Continuous stall current	I_o	A	2.1	4.3	2.8	5.8
Max. torque	M_{max}	Nm	6.3	6.3	8.5	8.5
Max. current	I_{max}	A	9.5	19.2	12.7	26
Max. speed	N_{max}	RPM	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	51.3	25.1	51.3	25.1
Torque constant	K_T	Nm/A	0.85	0.42	0.85	0.42
Winding resistance	R_{2ph}	Ω	6.4	1.75	5.0	1.25
Winding inductance	L_{2ph}	mH	15.5	3.9	12.0	3.0
Number of motor poles	P_{mot}		8	8	8	8
Idling speed	N_o	RPM	4500	9000	4500	9000
Max. torque at sea level	M_x	Nm	4.2	5.0	5.6	6.6
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	35
Electrical time constant	T_{el}	ms	2.4	2.2	2.4	2.4
Mechanical time constant	T_{mech}	ms	0.97	1.1	0.98	1.0
Thermal time constant	T_{th}	min	34	34	34	34
Rotor inertia without brake	J	$kg*cm^2$	0.63	0.63	0.82	0.82
Weight without brake	m	kg	2.6	2.6	3.6	3.6
Axial load	F_A	N	18.0	18.0	19.0	19.0
Radial load	F_R	N	175	175	185	185

Motor type			**JHQ23-0300-051**
Rated speed	N_n	RPM	3000
Rated torque	M_n	Nm	2.7
Rated current	I_n	A	1.90
Holding torque	M_o	Nm	3.0
Continuous stall current	I_o	A	3.5
Max. torque	M_{max}	Nm	10.5
Max. current	I_{max}	A	15.9
Max. speed	N_{max}	RPM	9000
Back EMF constant	K_E	V/kRPM	51.3
Torque constant	K_T	Nm/A	0.85
Winding resistance	R_{2ph}	Ω	3.8
Winding inductance	L_{2ph}	mH	9.3
Number of motor poles	P_{mot}		8
Idling speed	N_o	RPM	4500
Max. torque at sea level	M_x	Nm	7.1
Thermal time constant - Copper winding	T_{ther_CU}	s	35
Electrical time constant	T_{el}	ms	2.4
Mechanical time constant	T_{mech}	ms	0.93
Thermal time constant	T_{th}	min	34
Rotor inertia without brake	J	$kg*cm^2$	1.0
Weight without brake	m	kg	3.8
Axial load	F_A	N	20
Radial load	F_R	N	195

6.4.3 Torque/speed characteristic (DC link voltage DC 320 V)

JHQ23-0060-051



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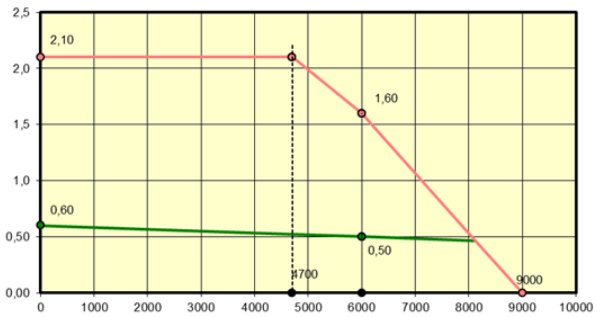

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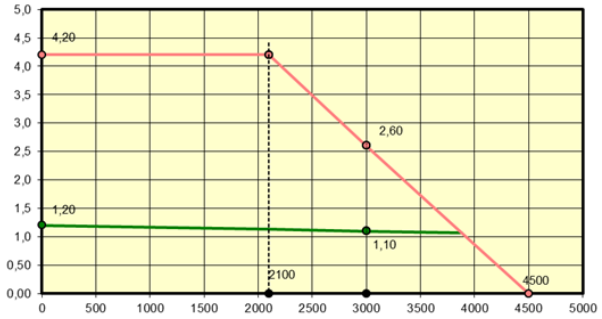

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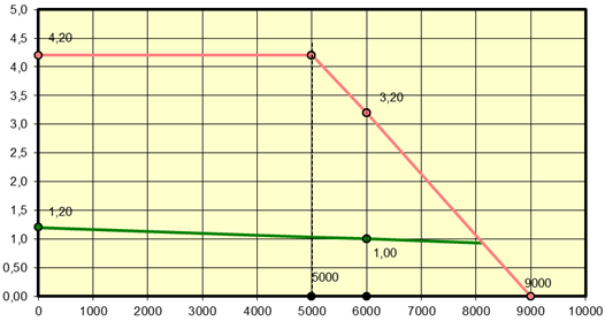

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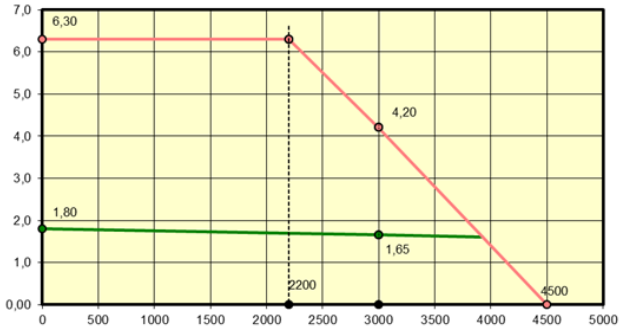

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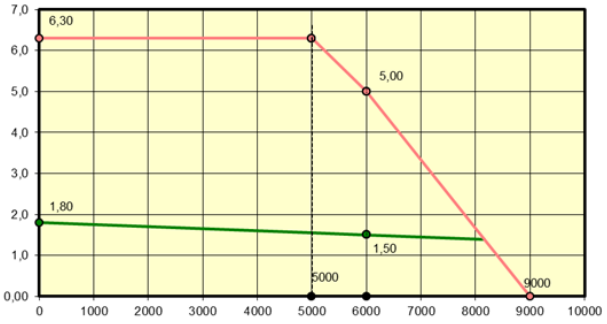
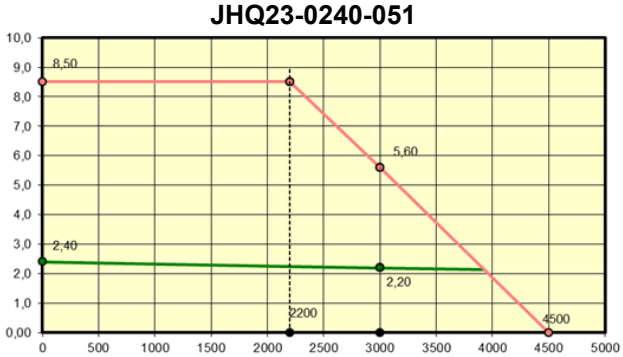


JHQ23-0240-051



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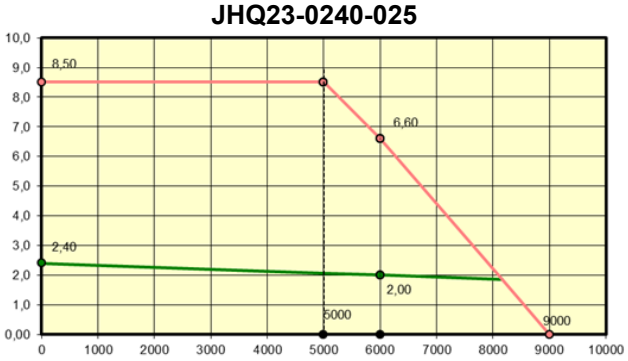
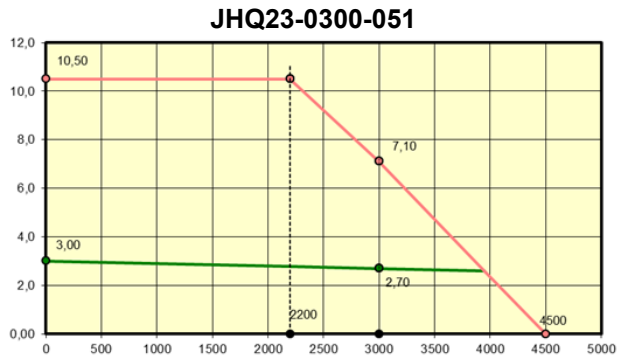




6.4.4 Specific technical data (DC link voltage DC 560 V)

Motor type			**JHQ23-0060-088**	**JHQ23-0060-059**	**JHQ23-0060-044**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	0.55	0.52	0.50
Rated current	I_n	A	0.40	0.54	0.70
Holding torque	M_o	Nm	0.60	0.60	0.60
Continuous stall current	I_o	A	0.40	0.62	0.80
Max. torque	M_{max}	Nm	2.1	2.1	2.1
Max. current	I_{max}	A	1.8	2.7	3.6
Max. speed	N_{max}	RPM	9000	9000	9000
Back EMF constant	K_E	V/kRPM	88.0	58.6	44.0
Torque constant	K_T	Nm/A	1.45	0.97	0.73
Winding resistance	R_{2ph}	Ω	105	38.2	26.3
Winding inductance	L_{2ph}	mH	144	57	36.1
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4300	6700	9000
Max. torque at sea level	M_x	Nm	1.2	1.5	1.5
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	1.4	1.5	1.4
Mechanical time constant	T_{mech}	ms	2.2	1.8	2.1
Thermal time constant	T_{th}	min	34	34	34
Rotor inertia without brake	J	$kg*cm^2$	0.25	0.25	0.25
Weight without brake	m	kg	2.0	2.0	2.0
Axial load	F_A	N	16.0	16.0	16.0
Radial load	F_R	N	155	155	155

Motor type			**JHQ23-0120-088**	**JHQ23-0120-059**	**JHQ23-0120-044**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	1.10	1.05	1.00
Rated current	I_n	A	0.80	1.08	1.40
Holding torque	M_o	Nm	1.20	1.20	1.20
Continuous stall current	I_o	A	0.80	1.24	1.60
Max. torque	M_{max}	Nm	4.2	4.2	4.2
Max. current	I_{max}	A	3.6	5.4	7.2
Max. speed	N_{max}	RPM	9000	9000	9000
Back EMF constant	K_E	V/kRPM	88.0	58.6	44.0
Torque constant	K_T	Nm/A	1.45	0.97	0.73
Winding resistance	R_{2ph}	Ω	36.2	16.6	9.0
Winding inductance	L_{2ph}	mH	70	33.3	17.4
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4400	6700	9000
Max. torque at sea level	M_x	Nm	2.7	2.8	3.2
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	1.9	2.0	1.9
Mechanical time constant	T_{mech}	ms	1.3	1.3	1.3
Thermal time constant	T_{th}	min	34	34	34
Rotor inertia without brake	J	kg*cm^2	0.44	0.44	0.44
Weight without brake	m	kg	2.2	2.2	2.2
Axial load	F_A	N	17.0	17.0	17.0
Radial load	F_R	N	165	165	165

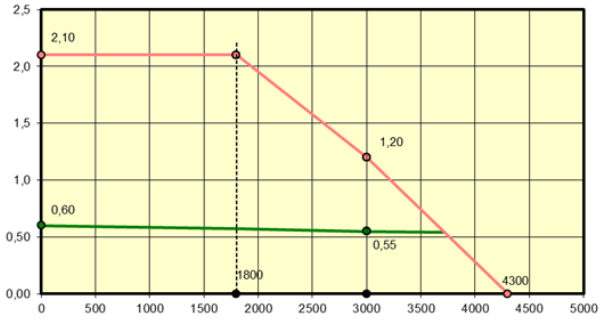
Motor type			**JHQ23-0180-088**	**JHQ23-0180-059**	**JHQ23-0180-044**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	1.65	1.60	1.50
Rated current	I_n	A	1.10	1.65	2.1
Holding torque	M_o	Nm	1.80	1.80	1.80
Continuous stall current	I_o	A	1.20	1.86	2.5
Max. torque	M_{max}	Nm	6.3	6.3	6.3
Max. current	I_{max}	A	5.4	7.9	10.8
Max. speed	N_{max}	RPM	9000	9000	9000
Back EMF constant	K_E	V/kRPM	88.0	58.6	44.0
Torque constant	K_T	Nm/A	1.45	0.97	0.73
Winding resistance	R_{2ph}	Ω	19.2	11.1	5.3
Winding inductance	L_{2ph}	mH	46.4	24.7	11.6
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4400	6700	9000
Max. torque at sea level	M_x	Nm	4.3	4.2	5.0
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	2.4	2.2	2.2
Mechanical time constant	T_{mech}	ms	0.99	1.3	1.1
Thermal time constant	T_{th}	min	34	34	34
Rotor inertia without brake	J	$kg*cm^2$	0.63	0.63	0.63
Weight without brake	m	kg	2.6	2.6	2.6
Axial load	F_A	N	18.0	18.0	18.0
Radial load	F_R	N	175	175	175

Motor type			**JHQ23-0240-088**	**JHQ23-0240-059**	**JHQ23-0240-044**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	2.2	2.1	2.0
Rated current	I_n	A	1.50	2.2	2.7
Holding torque	M_o	Nm	2.4	2.4	2.4
Continuous stall current	I_o	A	1.70	2.5	3.3
Max. torque	M_{max}	Nm	8.5	8.5	8.5
Max. current	I_{max}	A	7.3	10.6	14.7
Max. speed	N_{max}	RPM	9000	9000	9000
Back EMF constant	K_E	V/kRPM	88.0	58.6	44.0
Torque constant	K_T	Nm/A	1.45	0.97	0.73
Winding resistance	R_{2ph}	Ω	15.0	7.7	3.8
Winding inductance	L_{2ph}	mH	36.0	18.5	9.0
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4400	6700	9000
Max. torque at sea level	M_x	Nm	5.5	5.5	6.4
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	2.4	2.4	2.4
Mechanical time constant	T_{mech}	ms	1.0	1.2	1.0
Thermal time constant	T_{th}	min	34	34	34
Rotor inertia without brake	J	$kg*cm^2$	0.82	0.82	0.82
Weight without brake	m	kg	3.6	3.6	3.6
Axial load	F_A	N	19.0	19.0	19.0
Radial load	F_R	N	185	185	185

Motor type			**JHQ23-0300-088**	**JHQ23-0300-059**	**JHQ23-0300-044**
Rated speed	N_n	RPM	3000	4500	6000
Rated torque	M_n	Nm	2.7	2.6	2.4
Rated current	I_n	A	1.90	2.6	3.3
Holding torque	M_o	Nm	3.0	3.0	3.0
Continuous stall current	I_o	A	2.1	3.1	4.1
Max. torque	M_{max}	Nm	10.5	10.5	10.5
Max. current	I_{max}	A	9.1	13.6	18.0
Max. speed	N_{max}	RPM	9000	9000	9000
Back EMF constant	K_E	V/kRPM	88.0	58.6	44.0
Torque constant	K_T	Nm/A	1.45	0.97	0.73
Winding resistance	R_{2ph}	Ω	11.5	5.3	2.9
Winding inductance	L_{2ph}	mH	28.0	13.4	7.0
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4400	6700	9000
Max. torque at sea level	M_x	Nm	7.1	7.5	8.2
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35
Electrical time constant	T_{el}	ms	2.4	2.5	2.4
Mechanical time constant	T_{mech}	ms	0.96	0.99	0.96
Thermal time constant	T_{th}	min	34	34	34
Rotor inertia without brake	J	$kg*cm^2$	1.0	1.0	1.0
Weight without brake	m	kg	3.8	3.8	3.8
Axial load	F_A	N	20	20	20
Radial load	F_R	N	195	195	195

6.4.5 Torque/speed characteristic (DC link voltage DC 560 V)

JHQ23-0060-088



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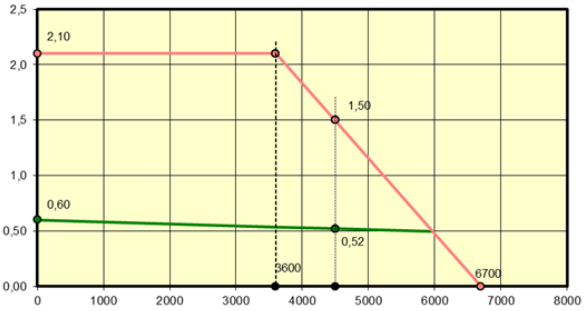

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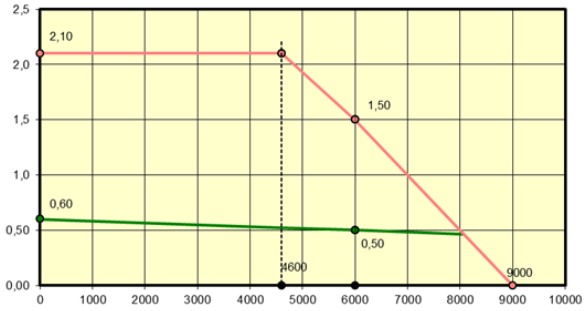

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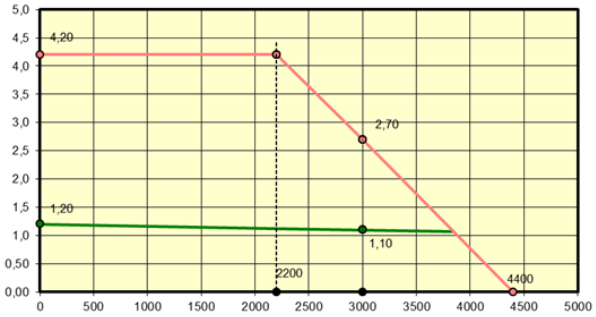

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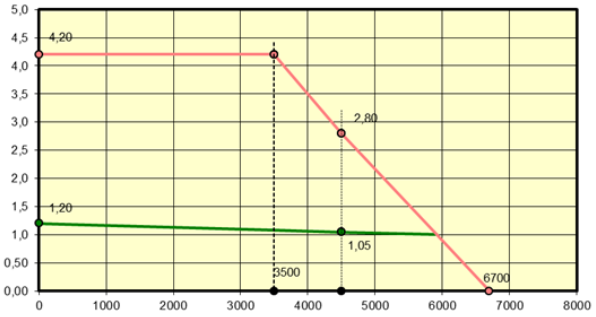

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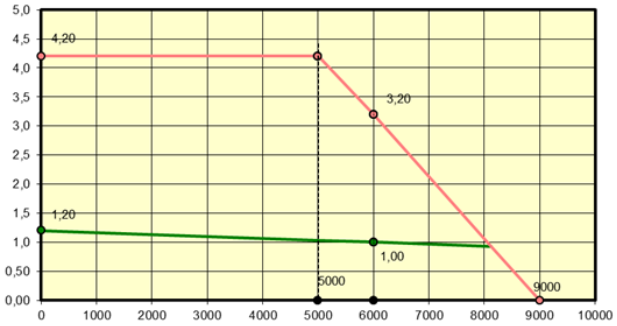

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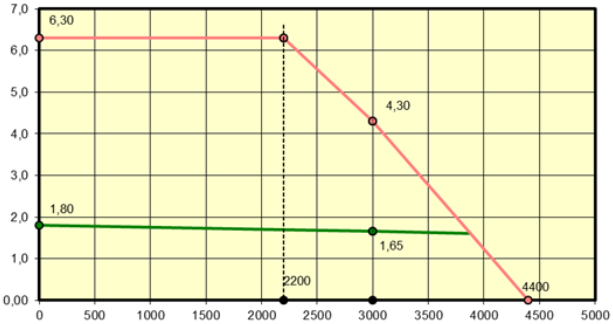

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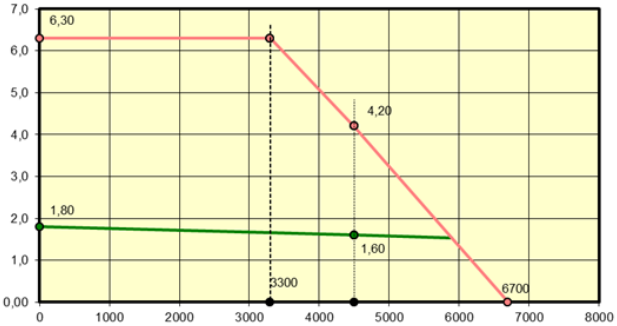

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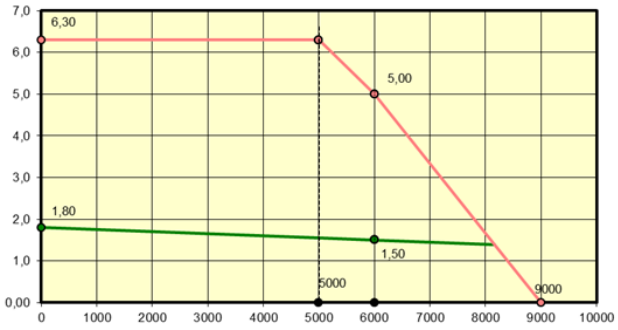

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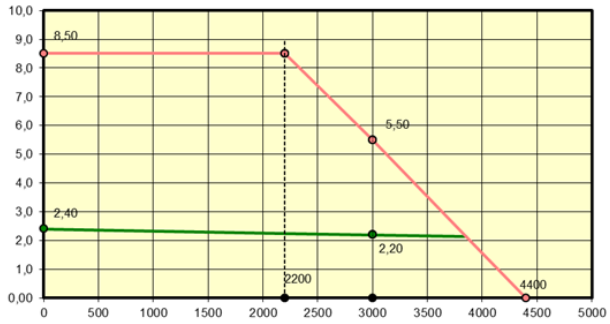

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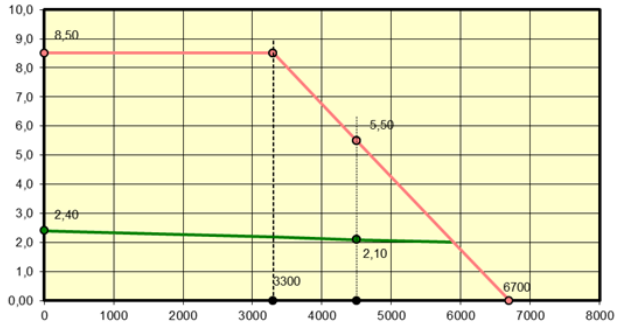

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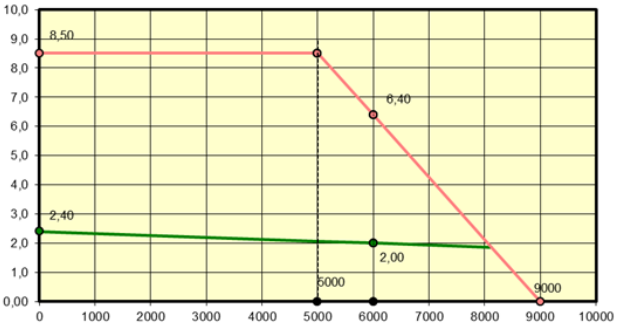

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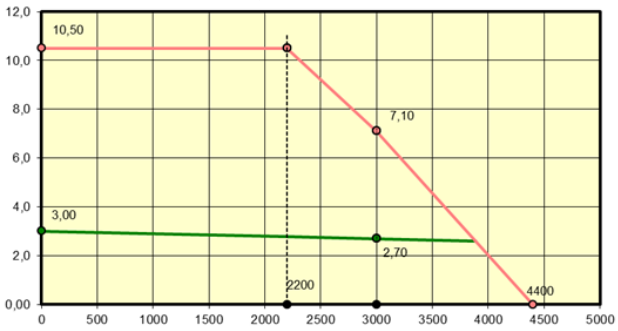

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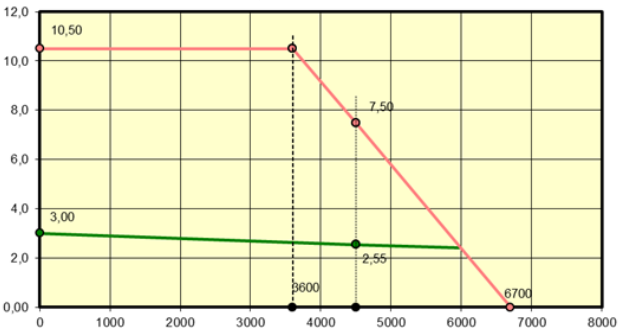

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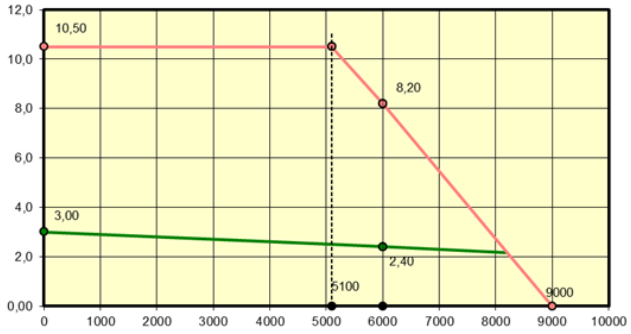
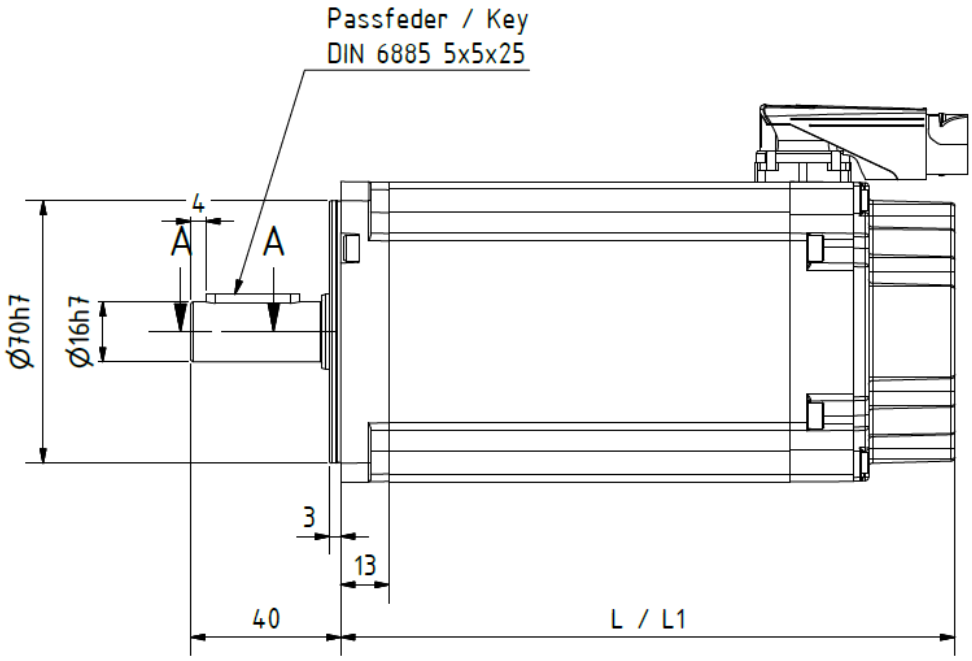
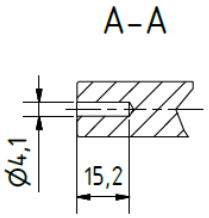
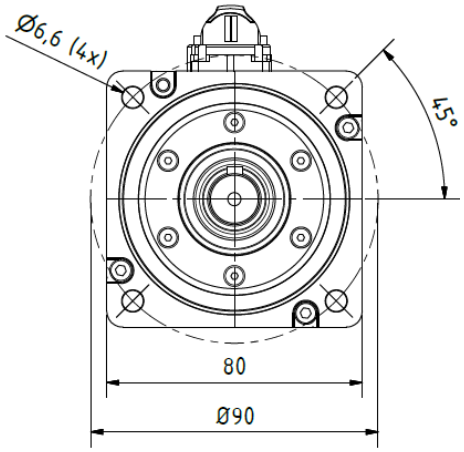


6.5 Flange size - JHQ24



with EEx37 encoder





P = Power connector size L = Length without brake L1 = Length with brake	**P**	**L**	**L1**	**L**	**L1**
Type		**Resolver/SEx37**		**EEx37**	
JHQ24-0070	Y/I	86	116	95	125
JHQ24-0140	Y/I	97.5	127.5	106.5	136.5
JHQ24-0270	Y/I	120	150	129	159

6.5.1 Technical data of the brake

The technical data of the brake for motor type JHQ24 are listed below:

Technical specifications	Values		
Holding torque	M_{BR}	Nm	0.4
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	8
Rotor inertia	J_{BR}	kg*cm^2	0.013
Weight	m_{BR}	kg	0.08

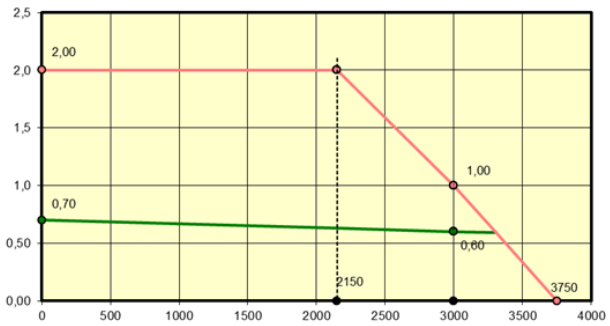
6.5.2 Specific technical data (DC link voltage DC 320 V)

Motor type			JHQ24-0070-057	JHQ24-0070-028	JHQ24-0140-057	JHQ24-0140-028
Rated speed	N_n	RPM	3000	6000	3000	6000
Rated torque	M_n	Nm	0.60	0.40	1.20	0.90
Rated current	I_n	A	0.64	0.85	1.30	1.90
Holding torque	M_o	Nm	0.70	0.70	1.40	1.40
Continuous stall current	I_o	A	0.75	1.49	1.50	3.0
Max. torque	M_{max}	Nm	2.0	2.0	4.2	4.2
Max. current	I_{max}	A	2.5	5.0	5.1	10.1
Max. speed	N_{max}	RPM	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	56.6	28.3	56.6	28.3
Torque constant	K_T	Nm/A	0.94	0.47	0.94	0.47
Winding resistance	R_{2ph}	Ω	33.5	8.4	9.7	2.4
Winding inductance	L_{2ph}	mH	28.3	7.1	13.2	3.3
Number of motor poles	P_{mot}		10	10	10	10
Idling speed	N_o	RPM	3750	6800	6800	6601
Max. torque at sea level	M_x	Nm	1.0	1.5	4.2	4.2
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	35
Electrical time constant	T_{el}	ms	0.84	0.85	1.4	1.4
Mechanical time constant	T_{mech}	ms	5.5	5.5	2.2	2.1
Thermal time constant	T_{th}	min	15.0	15.0	17.0	17.0
Rotor inertia without brake	J	kg*cm^2	0.83	0.83	1.1	1.1
Weight without brake	m	kg	1.7	1.7	2.1	2.1
Axial load	F_A	N	23	23	24	24
Radial load	F_R	N	230	230	240	240

Motor type			**JHQ24-0270-057**	**JHQ24-0270-028**
Rated speed	N_n	RPM	3000	6000
Rated torque	M_n	Nm	2.4	1.90
Rated current	I_n	A	2.6	4.1
Holding torque	M_o	Nm	2.7	2.7
Continuous stall current	I_o	A	2.9	4.3
Max. torque	M_{max}	Nm	8.5	8.5
Max. current	I_{max}	A	10.1	20
Max. speed	N_{max}	RPM	9000	9000
Back EMF constant	K_E	V/kRPM	56.6	28.3
Torque constant	K_T	Nm/A	0.94	0.47
Winding resistance	R_{2ph}	Ω	4.5	0.93
Winding inductance	L_{2ph}	mH	8.4	1.60
Number of motor poles	P_{mot}		10	10
Idling speed	N_o	RPM	6400	6601
Max. torque at sea level	M_x	Nm	8.5	8.5
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35
Electrical time constant	T_{el}	ms	1.9	1.7
Mechanical time constant	T_{mech}	ms	1.5	1.3
Thermal time constant	T_{th}	min	20	20
Rotor inertia without brake	J	$kg*cm^2$	1.7	1.7
Weight without brake	m	kg	2.6	2.6
Axial load	F_A	N	25	25
Radial load	F_R	N	250	250

6.5.3 Torque/speed characteristic (DC link voltage DC 320 V)

JHQ24-0070-057



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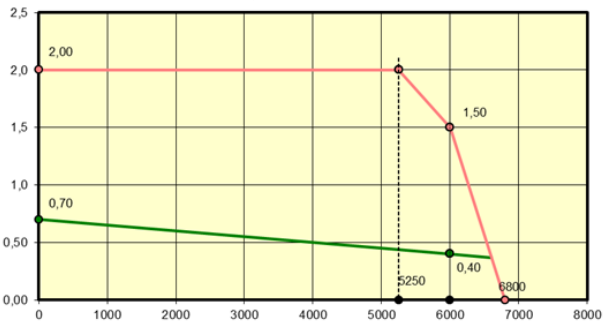

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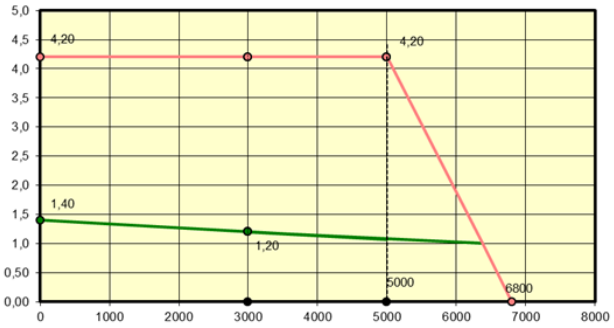

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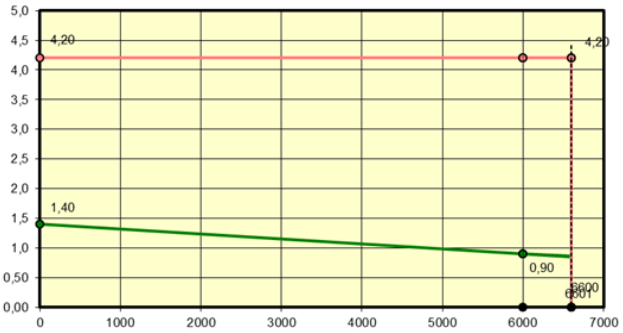

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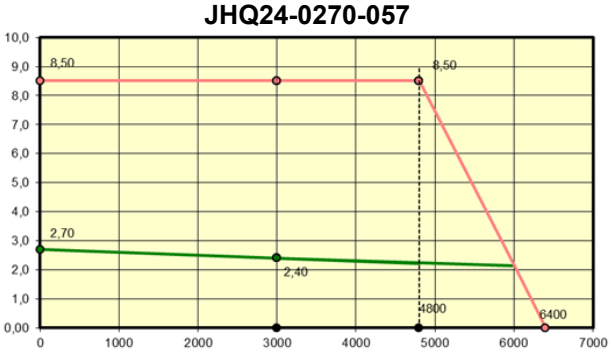

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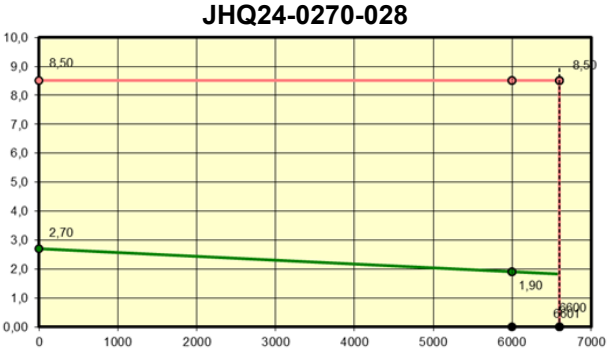


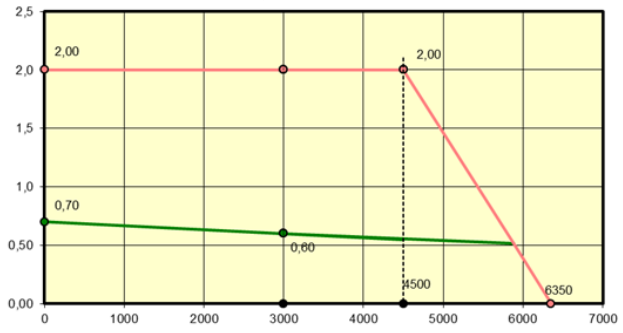
6.5.4 Specific technical data (DC link voltage DC 560 V)

Motor type			**JHQ24-0070-057**	**JHQ24-0070-028**	**JHQ24-0140-057**	**JHQ24-0140-028**
Rated speed	N_n	RPM	3000	6000	3000	6000
Rated torque	M_n	Nm	0.60	0.40	1.20	0.90
Rated current	I_n	A	0.64	0.85	1.30	1.90
Holding torque	M_o	Nm	0.70	0.70	1.40	1.40
Continuous stall current	I_o	A	0.75	1.50	1.50	3.0
Max. torque	M_{max}	Nm	2.0	2.0	4.2	4.2
Max. current	I_{max}	A	2.5	5.0	5.1	10.1
Max. speed	N_{max}	RPM	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	56.6	28.3	56.6	28.3
Torque constant	K_T	Nm/A	0.94	0.47	0.94	0.47
Winding resistance	R_{2ph}	Ω	33.5	8.4	9.7	2.4
Winding inductance	L_{2ph}	mH	28.3	7.1	13.2	3.3
Number of motor poles	P_{mot}		10	10	10	10
Idling speed	N_o	RPM	6350	6601	6800	6601
Max. torque at sea level	M_x	Nm	2.0	2.0	4.2	4.2
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	35
Electrical time constant	T_{el}	ms	0.84	0.85	1.4	1.4
Mechanical time constant	T_{mech}	ms	5.5	5.5	2.2	2.1
Thermal time constant	T_{th}	min	15.0	15.0	17.0	17.0
Rotor inertia without brake	J	$kg*cm^2$	0.83	0.83	1.1	1.1
Weight without brake	m	kg	1.7	1.7	2.1	2.1
Axial load	F_A	N	23	23	24	24
Radial load	F_R	N	230	230	240	240

Motor type			**JHQ24-0270-057**	**JHQ24-0270-028**
Rated speed	N_n	RPM	3000	6000
Rated torque	M_n	Nm	2.4	1.90
Rated current	I_n	A	2.6	4.1
Holding torque	M_o	Nm	2.7	2.7
Continuous stall current	I_o	A	2.9	4.3
Max. torque	M_{max}	Nm	8.5	8.5
Max. current	I_{max}	A	10.1	20
Max. speed	N_{max}	RPM	9000	9000
Back EMF constant	K_E	V/kRPM	56.6	28.3
Torque constant	K_T	Nm/A	0.94	0.47
Winding resistance	R_{2ph}	Ω	4.5	0.93
Winding inductance	L_{2ph}	mH	8.4	1.60
Number of motor poles	P_{mot}		10	10
Idling speed	N_o	RPM	6400	6601
Max. torque at sea level	M_x	Nm	8.5	8.5
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35
Electrical time constant	T_{el}	ms	1.9	1.7
Mechanical time constant	T_{mech}	ms	1.5	1.3
Thermal time constant	T_{th}	min	20	20
Rotor inertia without brake	J	$kg*cm^2$	1.7	1.7
Weight without brake	m	kg	2.6	2.6
Axial load	F_A	N	25	25
Radial load	F_R	N	250	250

6.5.5 Torque/speed characteristic (DC link voltage DC 560 V)

JHQ24-0070-057



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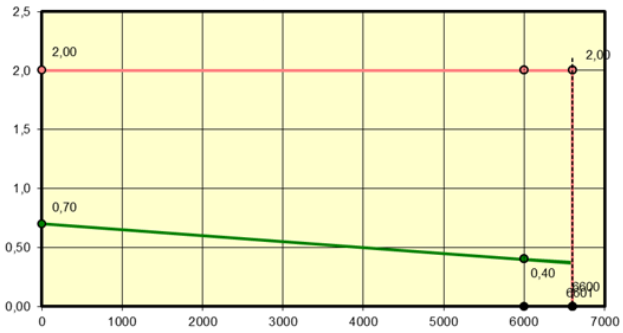
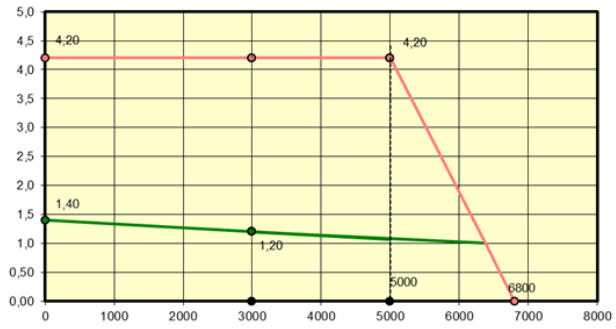


JHQ24-0140-057



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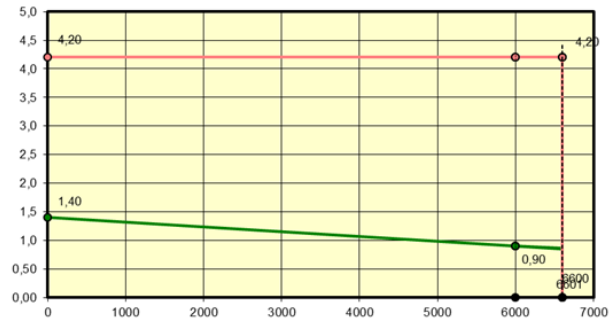

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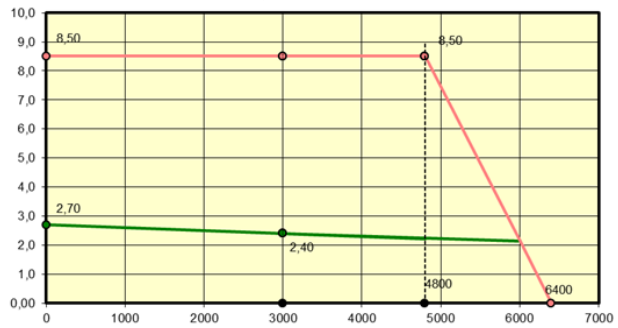

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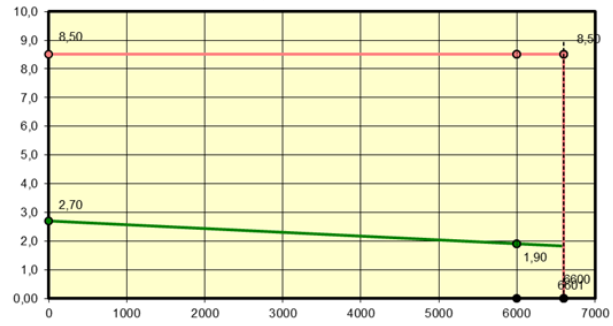
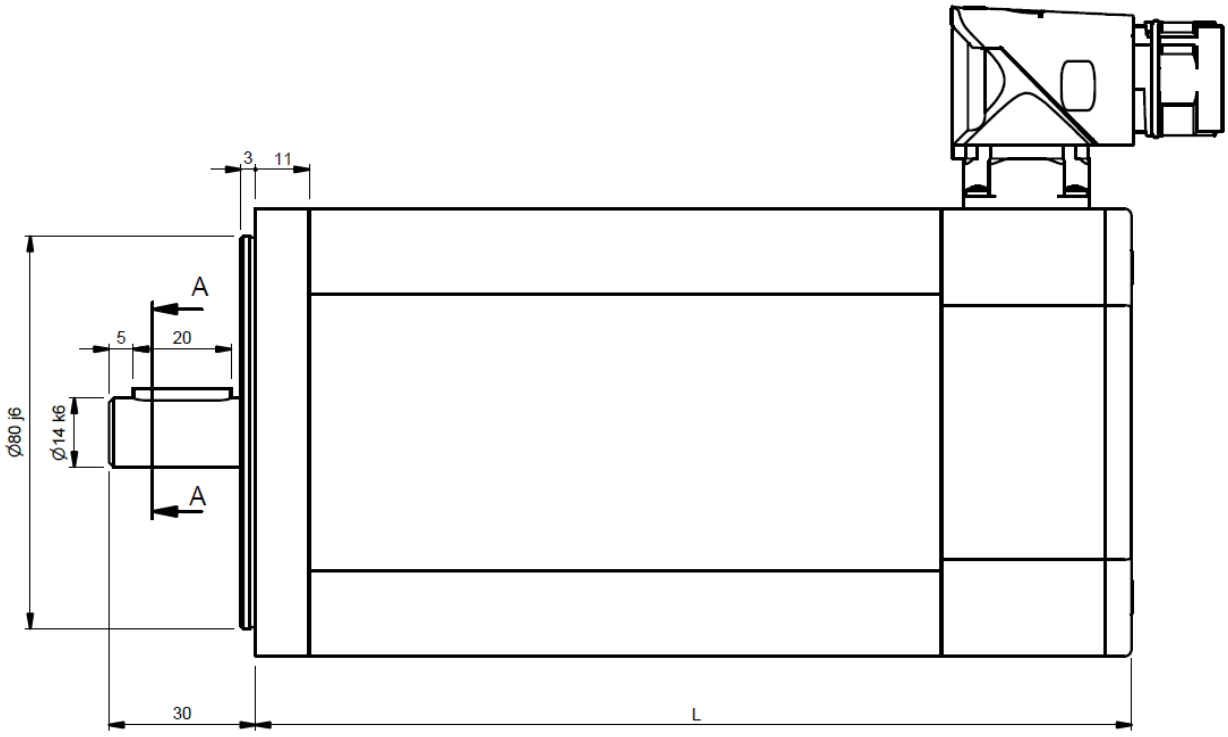
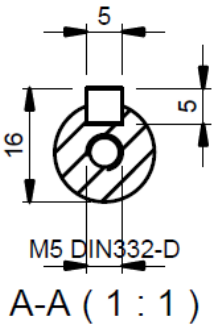
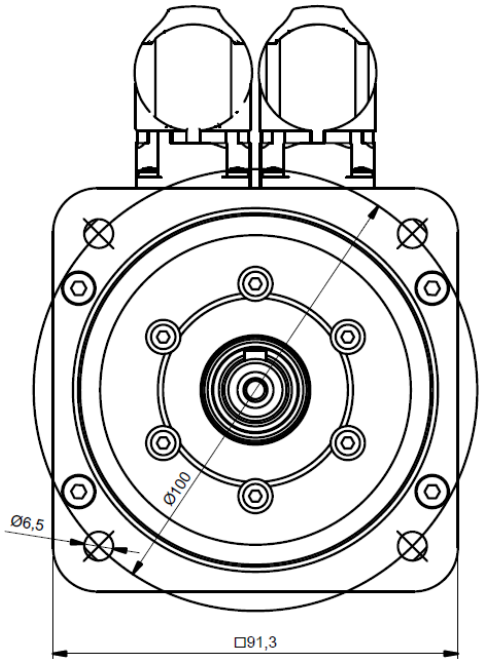


6.6 Flange size - JHQ3







P = Power connector size L = Length without brake L1 = Length with brake	**P**	**L**	**L1**	**L**	**L1**	**L**	**L1**
Type		**Resolver/SEx37**		**SKx36**		**EEx37/EKx36:**	
JHQ3-0135	M23	122	157	131.5	166.5	136.5	171.5
JHQ3-0260	M23	144.5	179.5	154	189	159	194
JHQ3-0350	M23	159.5	194.5	169	204	174	209
JHQ3-0450	M23	179.5	214.5	189	224	194	229

6.6.1 Technical data of the brake

The technical data of the brake for motor type JHQ3 are listed below:

Technical specifications	Values		
Holding torque	M_{BR}	Nm	3.2
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	10.8
Rotor inertia	J_{BR}	kg*cm^2	0.38
Weight	m_{BR}	kg	0.6

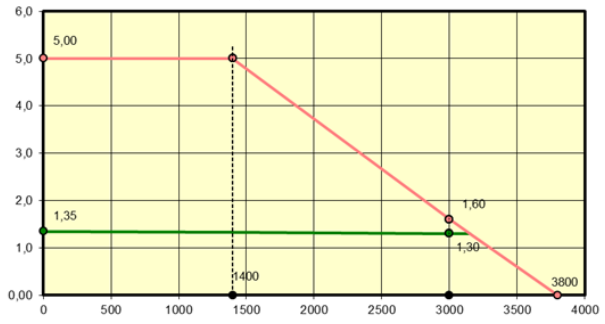
6.6.2 Specific technical data (DC link voltage DC 320 V)

Motor type			**JHQ3-0135-057**	**JHQ3-0135-028**	**JHQ3-0260-057**	**JHQ3-0260-050**	**JHQ3-0260-028**
Rated speed	N_n	RPM	3000	6000	3000	3000	6000
Rated torque	M_n	Nm	1.30	1.00	2.5	2.5	1.70
Rated current	I_n	A	1.40	2.1	2.7	3.0	3.6
Holding torque	M_o	Nm	1.35	1.35	2.6	2.6	2.6
Continuous stall current	I_o	A	1.40	2.9	2.8	3.1	5.5
Max. torque	M_{max}	Nm	5.0	5.0	10.0	10.0	10.0
Max. current	I_{max}	A	6.2	12.3	12.3	14.3	25
Max. speed	N_{max}	RPM	9000	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	56.5	28.3	56.5	50.0	28.3
Torque constant	K_T	Nm/A	0.94	0.47	0.94	0.83	0.47
Winding resistance	R_{2ph}	Ω	12.4	3.1	5.2	3.2	1.10
Winding inductance	L_{2ph}	mH	45.0	11.2	24.2	17.1	6.1
Number of motor poles	P_{mot}		8	8	8	8	8
Idling speed	N_o	RPM	3800	7500	3800	4100	7500
Max. torque at sea level	M_x	Nm	1.6	1.9	3.2	6.0	3.8
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	35	35
Electrical time constant	T_{el}	ms	3.6	3.6	4.7	5.3	5.5
Mechanical time constant	T_{mech}	ms	1.1	1.1	0.90	0.71	0.76
Thermal time constant	T_{th}	min	31	31	34	34	34
Rotor inertia without brake	J	kg*cm^2	0.47	0.47	0.88	0.88	0.88
Weight without brake	m	kg	3.5	3.5	4.4	4.4	4.4
Axial load	F_A	N	22	22	24	24	24
Radial load	F_R	N	220	220	235	235	235

Motor type			**JHQ3-0350-057**	**JHQ3-0350-028**	**JHQ3-0450-057**	**JHQ3-0450-028**
Rated speed	N_n	RPM	3000	6000	3000	6000
Rated torque	M_n	Nm	3.1	2.0	3.9	2.3
Rated current	I_n	A	3.3	4.3	4.2	4.9
Holding torque	M_o	Nm	3.5	3.5	4.5	4.5
Continuous stall current	I_o	A	3.7	7.5	4.8	9.6
Max. torque	M_{max}	Nm	14.0	14.0	18.0	18.0
Max. current	I_{max}	A	17.3	28	22	44
Max. speed	N_{max}	RPM	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	56.5	28.3	56.6	28.3
Torque constant	K_T	Nm/A	0.94	0.47	0.94	0.47
Winding resistance	R_{2ph}	Ω	3.2	0.90	2.4	0.6
Winding inductance	L_{2ph}	mH	18.0	4.5	14.4	3.6
Number of motor poles	P_{mot}		8	8	8	8
Idling speed	N_o	RPM	3800	7500	3800	7500
Max. torque at sea level	M_x	Nm	5.0	5.3	6.0	18.0
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	39
Electrical time constant	T_{el}	ms	5.6	5.0	6.0	6.0
Mechanical time constant	T_{mech}	ms	0.69	0.77	0.66	0.66
Thermal time constant	T_{th}	min	36	36	39	39
Rotor inertia without brake	J	$kg*cm^2$	1.1	1.1	1.4	1.4
Weight without brake	m	kg	5.0	5.0	5.8	5.8
Axial load	F_A	N	25	25	26	26
Radial load	F_R	N	245	245	255	255

6.6.3 Torque/speed characteristic (DC link voltage DC 320 V)

JHQ3-0135-057



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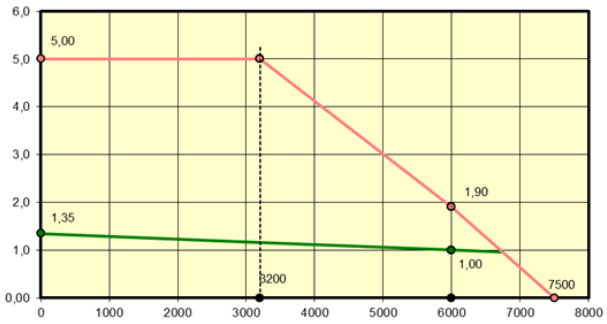

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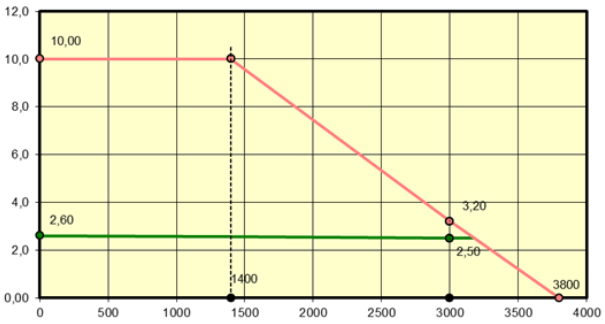

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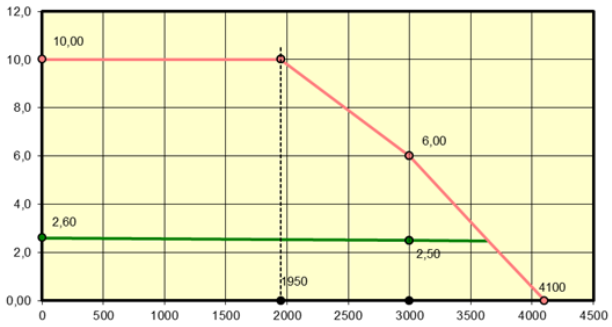

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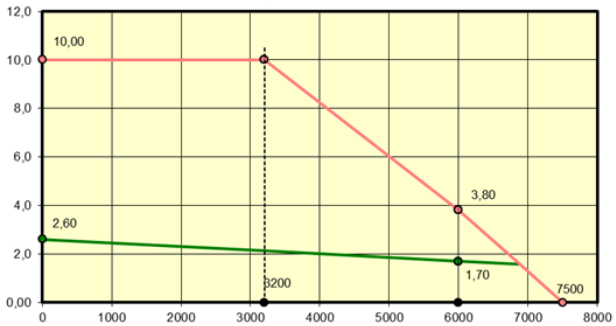

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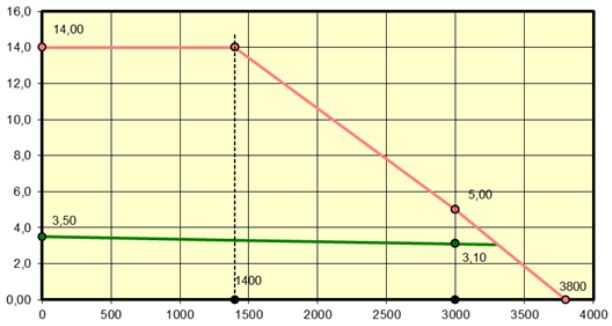

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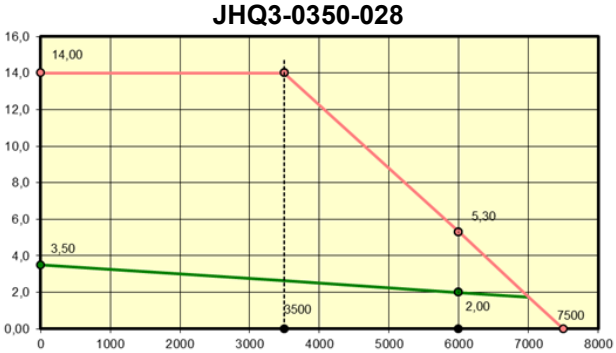

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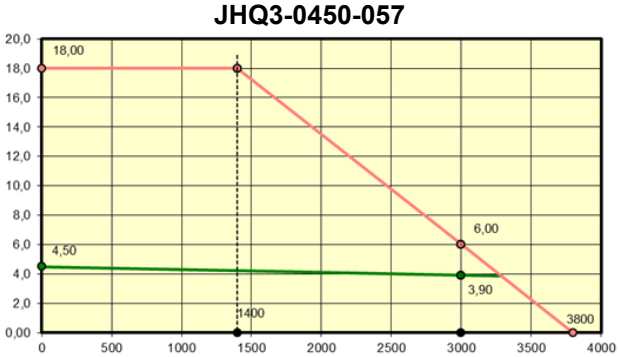
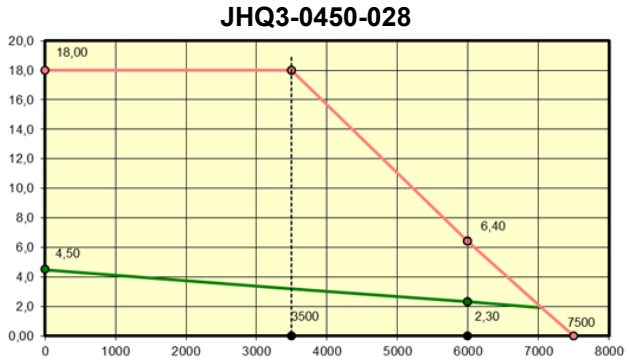




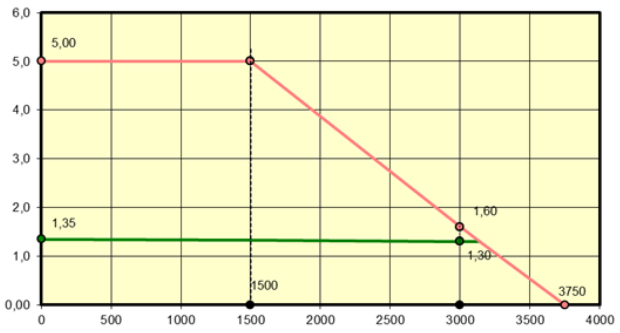
6.6.4 Specific technical data (DC link voltage DC 560 V)

Motor type			**JHQ3-0135-098**	**JHQ3-0135-066**	**JHQ3-0135-049**	**JHQ3-0260-098**	**JHQ3-0260-066**	**JHQ3-0260-049**
Rated speed	N_n	RPM	3000	4500	6000	3000	4500	6000
Rated torque	M_n	Nm	1.30	1.20	1.00	2.5	2.1	1.70
Rated current	I_n	A	0.80	1.10	1.20	1.50	1.90	2.1
Holding torque	M_o	Nm	1.35	1.35	1.35	2.6	2.6	2.6
Continuous stall current	I_o	A	0.80	1.20	1.70	1.60	2.4	3.2
Max. torque	M_{max}	Nm	5.0	5.0	5.0	10.0	10.0	10.0
Max. current	I_{max}	A	3.6	5.4	7.1	7.1	10.7	14.3
Max. speed	N_{max}	RPM	9000	9000	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	98.4	66.0	49.2	98.4	66.0	49.2
Torque constant	K_T	Nm/A	1.63	1.09	0.81	1.63	1.09	0.81
Winding resistance	R_{2ph}	Ω	37.4	16.6	9.4	15.3	6.3	3.4
Winding inductance	L_{2ph}	mH	135	60	33.8	73	30.0	18.2
Number of motor poles	P_{mot}		8	8	8	8	8	8
Idling speed	N_o	RPM	3750	5650	7600	3750	5650	7700
Max. torque at sea level	M_x	Nm	1.6	1.8	1.9	3.2	3.6	3.8
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	35	35	35
Electrical time constant	T_{el}	ms	3.6	3.6	3.6	4.8	4.8	5.4
Mechanical time constant	T_{mech}	ms	1.1	1.1	1.2	0.88	0.81	0.79
Thermal time constant	T_{th}	min	31	31	31	34	34	34
Rotor inertia without brake	J	$kg*cm^2$	0.47	0.47	0.47	0.88	0.88	0.88
Weight without brake	m	kg	3.5	3.5	3.5	4.4	4.4	4.4
Axial load	F_A	N	22	22	22	24	24	24
Radial load	F_R	N	220	220	220	235	235	235

Motor type			**JHQ3-0350-098**	**JHQ3-0350-066**	**JHQ3-0350-049**	**JHQ3-0450-098**	**JHQ3-0450-066**	**JHQ3-0450-049**
Rated speed	N_n	RPM	3000	4500	6000	3000	4500	6000
Rated torque	M_n	Nm	3.1	2.6	2.0	3.9	3.2	2.3
Rated current	I_n	A	1.90	2.4	2.5	2.4	2.9	2.8
Holding torque	M_o	Nm	3.5	3.5	3.5	4.5	4.5	4.5
Continuous stall current	I_o	A	2.1	3.2	4.3	2.8	4.1	5.6
Max. torque	M_{max}	Nm	14.0	14.0	14.0	18.0	18.0	18.0
Max. current	I_{max}	A	10.0	15.0	20	12.7	19.0	25
Max. speed	N_{max}	RPM	9000	9000	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	98.4	66.0	49.2	98.4	66.0	49.2
Torque constant	K_T	Nm/A	1.63	1.09	0.81	1.63	1.09	0.81
Winding resistance	R_{2ph}	Ω	9.5	4.4	2.7	7.0	3.2	1.90
Winding inductance	L_{2ph}	mH	54	23.4	13.5	43.2	17.8	10.8
Number of motor poles	P_{mot}		8	8	8	8	8	8
Idling speed	N_o	RPM	3750	5650	7600	3750	5650	7600
Max. torque at sea level	M_x	Nm	4.4	4.5	4.7	5.8	6.0	6.2
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	35	35	35
Electrical time constant	T_{el}	ms	5.7	5.3	5.0	6.2	5.6	5.7
Mechanical time constant	T_{mech}	ms	0.68	0.70	0.77	0.64	0.65	0.70
Thermal time constant	T_{th}	min	36	36	36	39	39	39
Rotor inertia without brake	J	kg*cm^2	1.1	1.1	1.1	1.4	1.4	1.4
Weight without brake	m	kg	5.0	5.0	5.0	5.8	5.8	5.8
Axial load	F_A	N	25	25	25	26	26	26
Radial load	F_R	N	245	245	245	255	255	255

6.6.5 Torque/speed characteristic (DC link voltage DC 560 V)

JHQ3-0135-098



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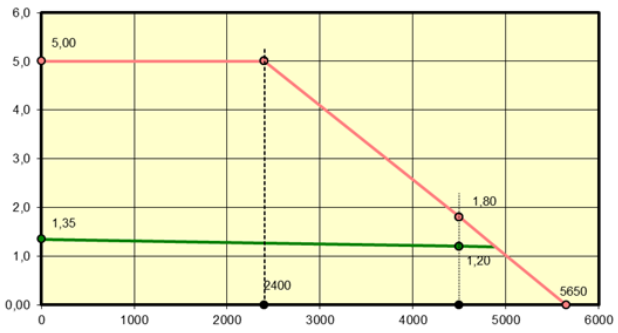

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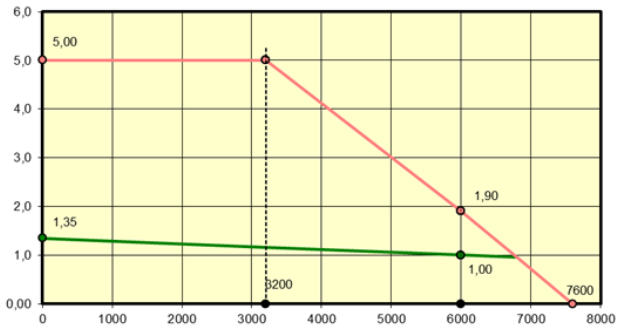

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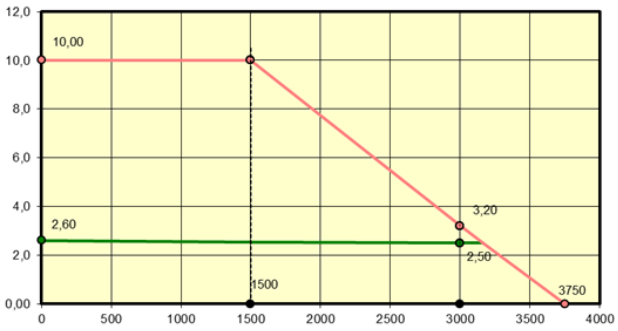

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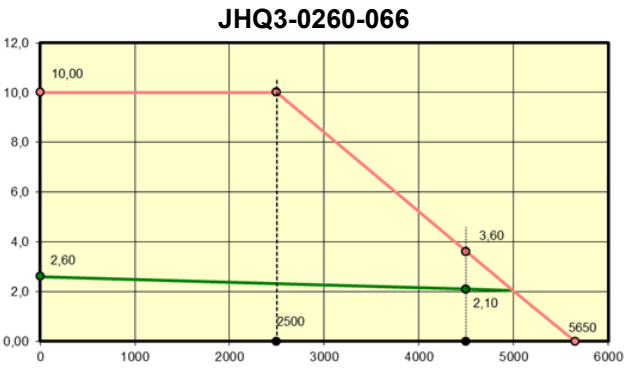

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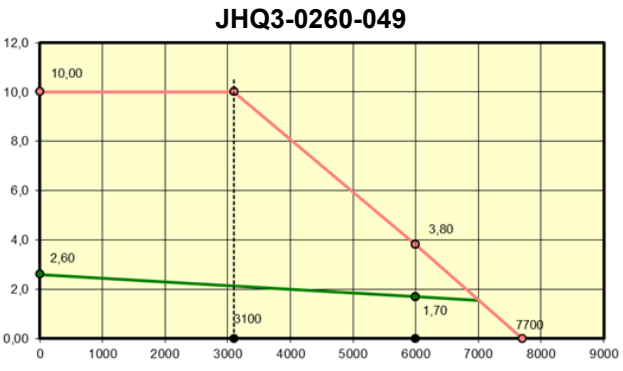

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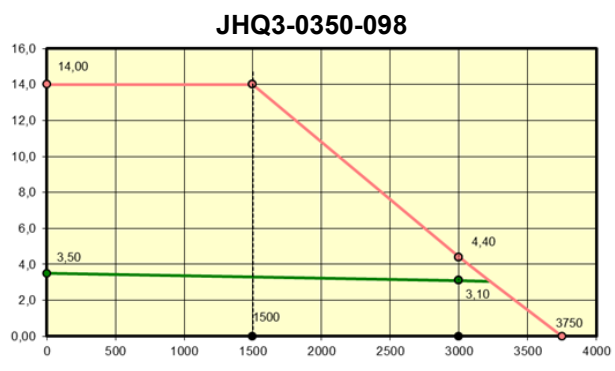

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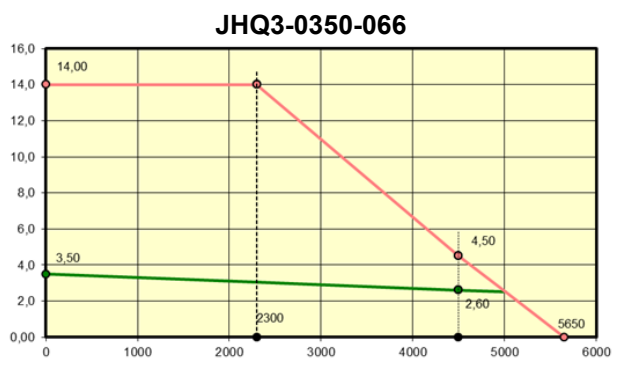

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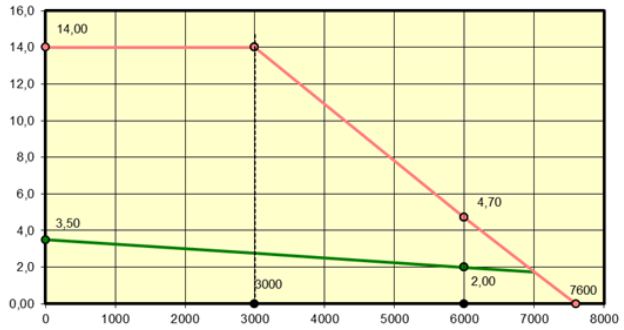

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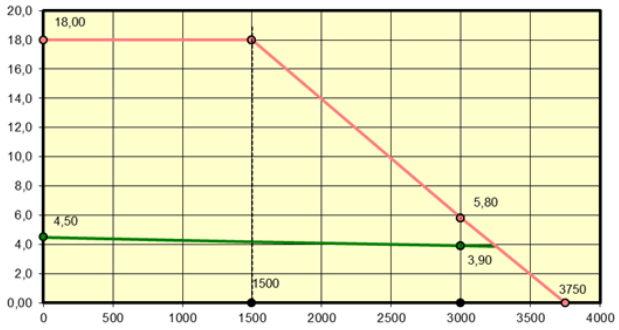

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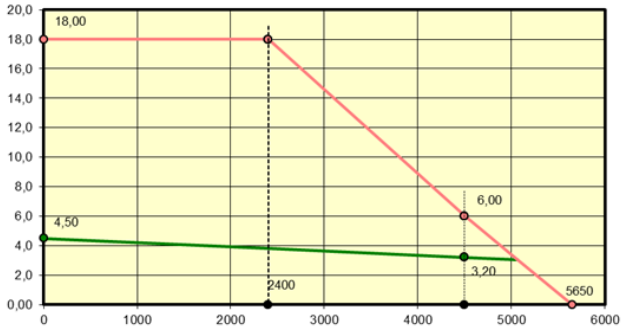

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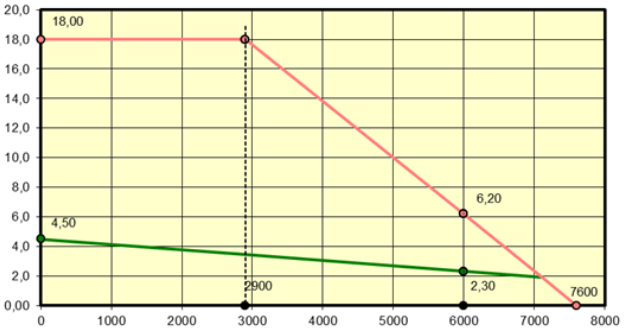
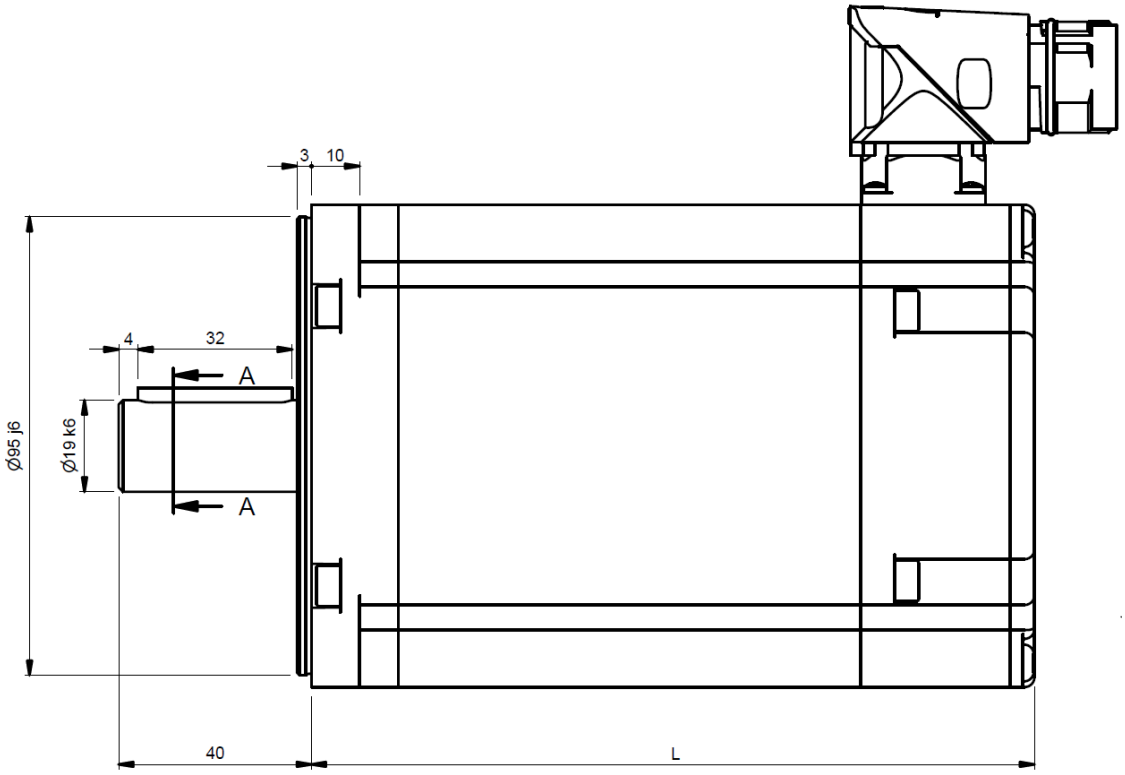
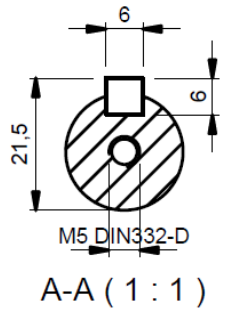


6.7 Flange size - JHQ4





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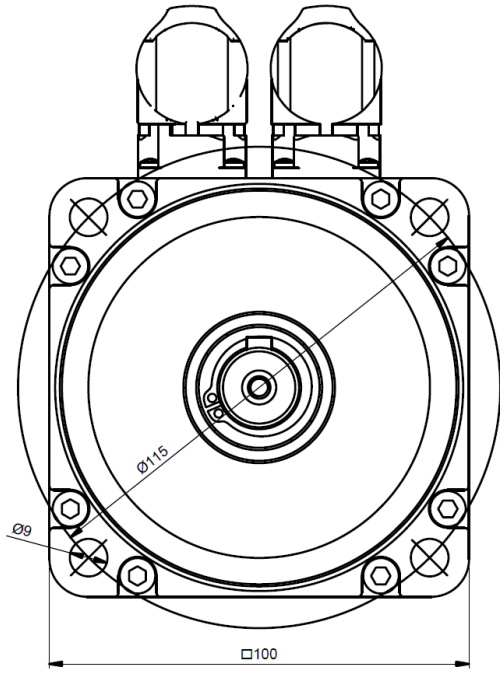


P = Power connector size L = Length without brake L1 = Length with brake	**P**	**L**	**L1**	**L**	**L1**	**L**	**L1**
Type		**Resolver/SEx37**		**SKx36**		**EEx37/EKx36:**	
JHQ4-0400	M23	150	182	161	193	161	193
JHQ4-0600	M23	170	202	181	213	181	213
JHQ4-0800	M23	194	226	205	237	205	237
JHQ4-1000	M23	214	246	225	257	225	257

6.7.1 Technical data of the brake

The technical data of the brake for motor type JHQ4 are listed below:

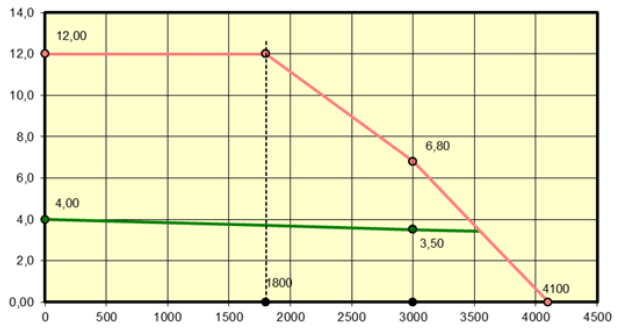
Technical specifications	Values		
Holding torque	M_{BR}	Nm	7.5
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	18
Rotor inertia	J_{BR}	kg*cm^2	0.54
Weight	m_{BR}	kg	0.9

6.7.2 Specific technical data (DC link voltage DC 320 V)

Motor type			JHQ4-0400-057	JHQ4-0600-057	JHQ4-0800-057	JHQ4-1000-057
Rated speed	N_n	RPM	3000	3000	3000	3000
Rated torque	M_n	Nm	3.5	5.3	7.5	8.8
Rated current	I_n	A	3.7	5.6	8.0	9.4
Holding torque	M_o	Nm	4.0	6.0	8.0	10.0
Continuous stall current	I_o	A	4.3	6.4	8.6	10.7
Max. torque	M_{max}	Nm	12.0	18.0	24	30
Max. current	I_{max}	A	20	30	40	50
Max. speed	N_{max}	RPM	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	56.5	56.5	56.5	56.5
Torque constant	K_T	Nm/A	0.94	0.94	0.94	0.94
Winding resistance	R_{2ph}	Ω	1.78	1.16	0.83	0.63
Winding inductance	L_{2ph}	mH	12.2	8.0	7.3	5.8
Number of motor poles	P_{mot}		8	8	8	8
Idling speed	N_o	RPM	4100	4100	4100	4100
Max. torque at sea level	M_x	Nm	6.8	10.0	12.0	15.0
Thermal time constant - Copper winding	T_{ther_CU}	s	35	35	35	35
Electrical time constant	T_{el}	ms	6.9	6.9	8.8	9.2
Mechanical time constant	T_{mech}	ms	0.66	0.61	0.57	0.53
Thermal time constant	T_{th}	min	25	30	30	35
Rotor inertia without brake	J	kg*cm^2	1.9	2.7	3.5	4.3
Weight without brake	m	kg	4.7	5.3	6.2	7.2
Axial load	F_A	N	56	58	60	62
Radial load	F_R	N	560	580	600	620

6.7.3 Torque/speed characteristic (DC link voltage DC 320 V)

JHQ4-0400-057



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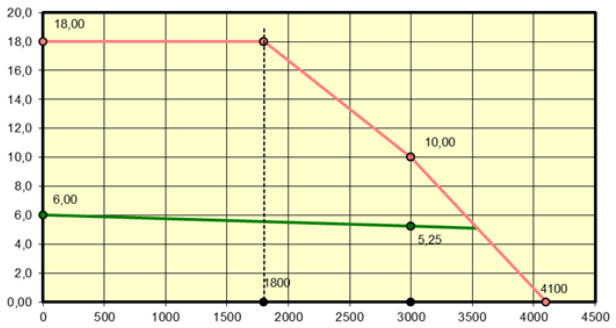

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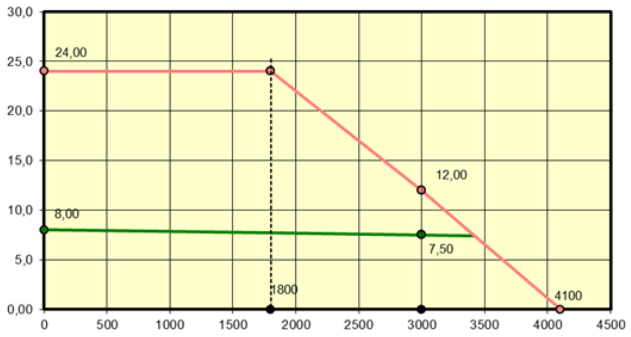

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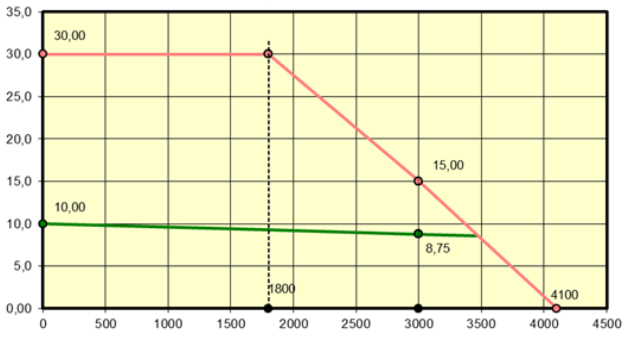


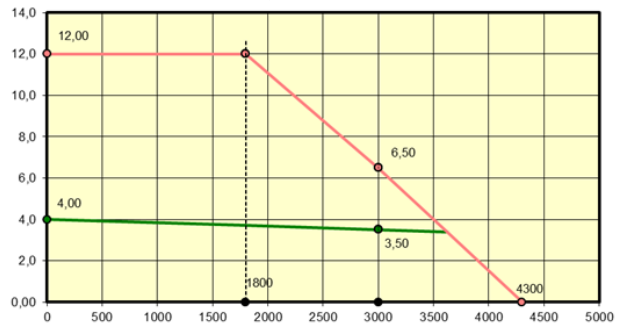
6.7.4 Specific technical data (DC link voltage DC 560 V)

Motor type			**JHQ4-00400-098**	**JHQ4-0400-066**	**JHQ4-0400-049**	**JHQ4-0600-098**	**JHQ4-0600-066**	**JHQ4-0600-049**
Rated speed	N_n	RPM	3000	4500	6000	3000	4500	6000
Rated torque	M_n	Nm	3.5	3.1	2.4	5.3	4.7	3.6
Rated current	I_n	A	2.1	2.9	2.9	3.2	4.3	4.4
Holding torque	M_o	Nm	4.0	4.0	4.0	6.0	6.0	6.0
Continuous stall current	I_o	A	2.5	3.7	4.9	3.7	5.5	7.4
Max. torque	M_{max}	Nm	12.0	12.0	12.0	18.0	18.0	18.0
Max. current	I_{max}	A	11.6	17.3	23	17.4	26	35
Max. speed	N_{max}	RPM	9000	9000	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	98.4	66.0	49.2	98.4	66.0	49.2
Torque constant	K_T	Nm/A	1.63	1.09	0.81	1.63	1.09	0.81
Winding resistance	R_{2ph}	Ω	5.4	2.4	1.35	3.5	1.50	0.88
Winding inductance	L_{2ph}	mH	36.5	16.5	9.1	24.0	10.8	6.0
Number of motor poles	P_{mot}		8	8	8	8	8	8
Idling speed	N_o	RPM	4300	6100	8000	4200	6100	8100
Max. torque at sea level	M_x	Nm	6.5	6.5	7.0	9.0	10.0	11.0
Thermal time constant - Copper winding	T_{ther_CU}	s	59	59	59	59	59	59
Electrical time constant	T_{el}	ms	6.8	6.9	6.8	6.9	7.2	6.8
Mechanical time constant	T_{mech}	ms	0.66	0.65	0.66	0.61	0.58	0.62
Thermal time constant	T_{th}	min	25	25	25	30	30	30
Rotor inertia without brake	J	kg*cm^2	1.9	1.9	1.9	2.7	2.7	2.7
Weight without brake	m	kg	4.7	4.7	4.7	5.3	5.3	5.3
Axial load	F_A	N	56	56	56	58	58	58
Radial load	F_R	N	560	560	560	580	580	580

Motor type			**JHQ4-0800-098**	**JHQ4-0800-066**	**JHQ4-0800-049**	**JHQ4-1000-098**	**JHQ4-1000-066**	**JHQ4-1000-049**
Rated speed	N_n	RPM	3000	4500	6000	3000	4500	6000
Rated torque	M_n	Nm	7.5	6.2	4.8	8.8	7.7	6.0
Rated current	I_n	A	4.6	5.7	5.9	5.4	7.1	7.4
Holding torque	M_o	Nm	8.0	8.0	8.0	10.0	10.0	10.0
Continuous stall current	I_o	A	4.9	7.4	9.8	6.1	9.2	12.3
Max. torque	M_{max}	Nm	24	24	24	30	30	30
Max. current	I_{max}	A	23	35	46	29	43	58
Max. speed	N_{max}	RPM	9000	9000	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	98.4	66.0	49.2	98.4	66.0	49.2
Torque constant	K_T	Nm/A	1.63	1.09	0.81	1.63	1.09	0.81
Winding resistance	R_{2ph}	Ω	2.5	1.10	0.63	1.90	0.90	0.48
Winding inductance	L_{2ph}	mH	21.8	9.7	5.5	17.4	7.8	4.4
Number of motor poles	P_{mot}		8	8	8	8	8	8
Idling speed	N_o	RPM	4200	6100	8100	4200	6100	8100
Max. torque at sea level	M_x	Nm	12.0	12.0	13.0	15.0	14.0	16.0
Thermal time constant - Copper winding	T_{ther_CU}	s	59	59	59	59	59	59
Electrical time constant	T_{el}	ms	8.7	8.8	8.7	9.2	8.7	9.1
Mechanical time constant	T_{mech}	ms	0.57	0.56	0.57	0.53	0.56	0.54
Thermal time constant	T_{th}	min	30	30	30	35	35	35
Rotor inertia without brake	J	kg*cm^2	3.5	3.5	3.5	4.3	4.3	4.3
Weight without brake	m	kg	6.2	6.2	6.2	7.2	7.2	7.2
Axial load	F_A	N	60	60	60	62	62	62
Radial load	F_R	N	600	600	600	620	620	620

6.7.5 Torque/speed characteristic (DC link voltage DC 560 V)

JHQ4-0400-098



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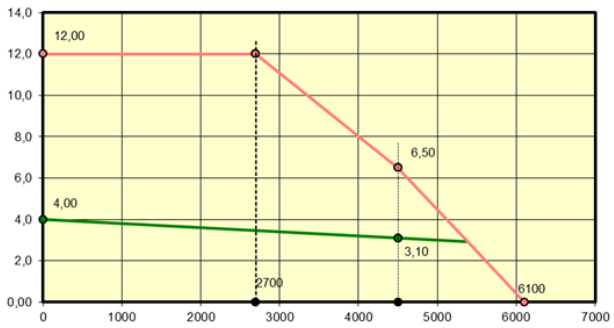

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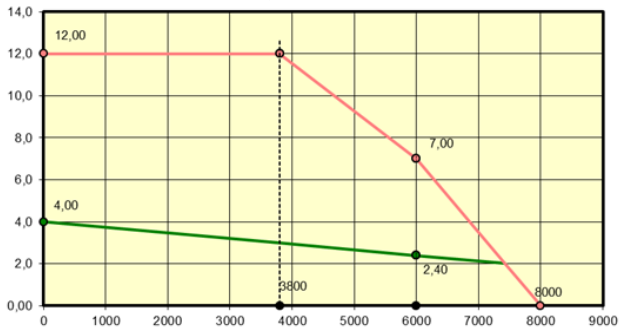

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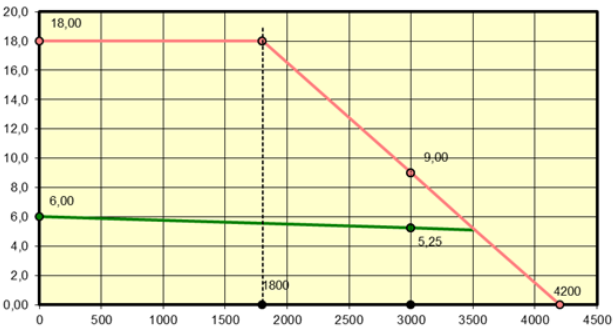

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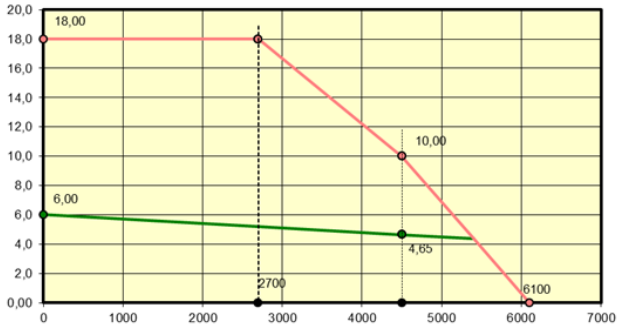

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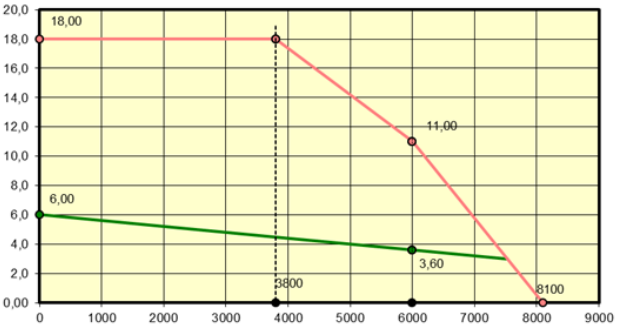

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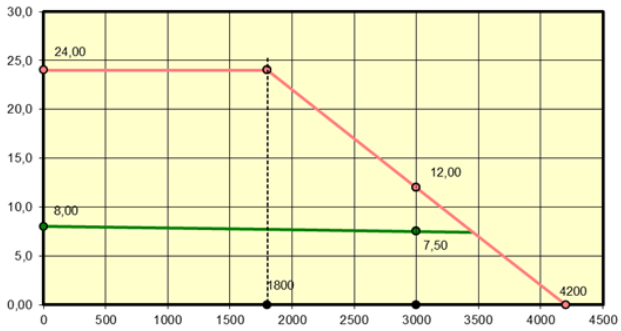

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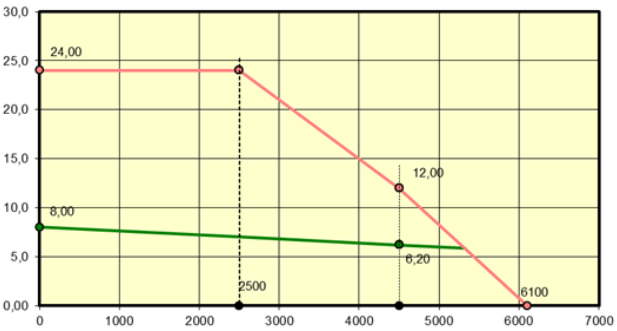

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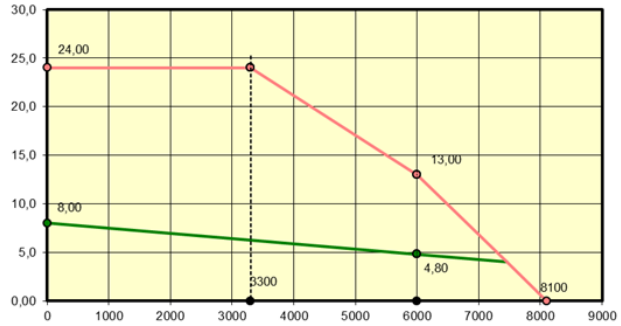

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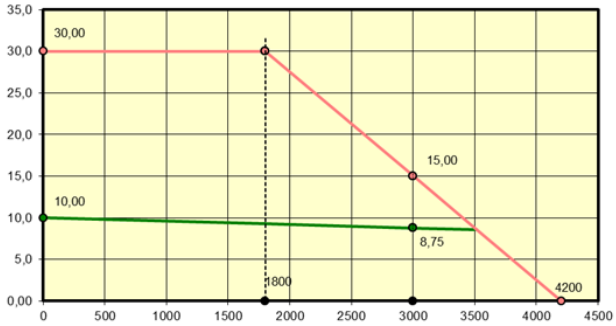

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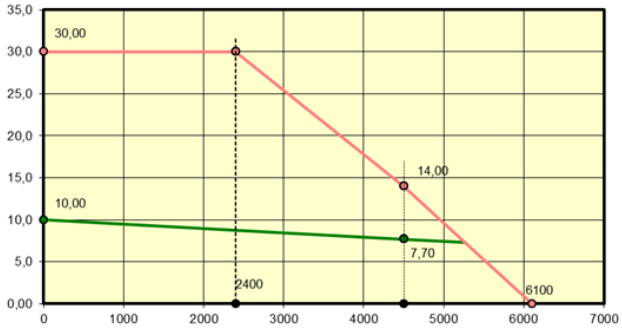

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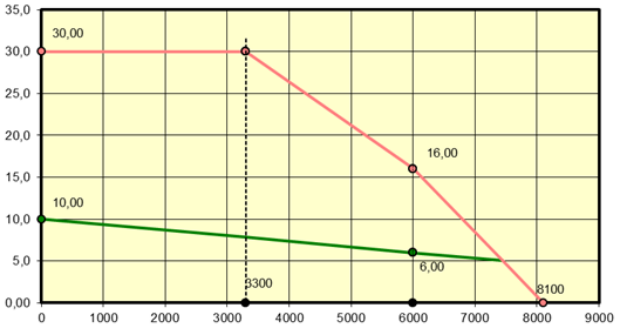
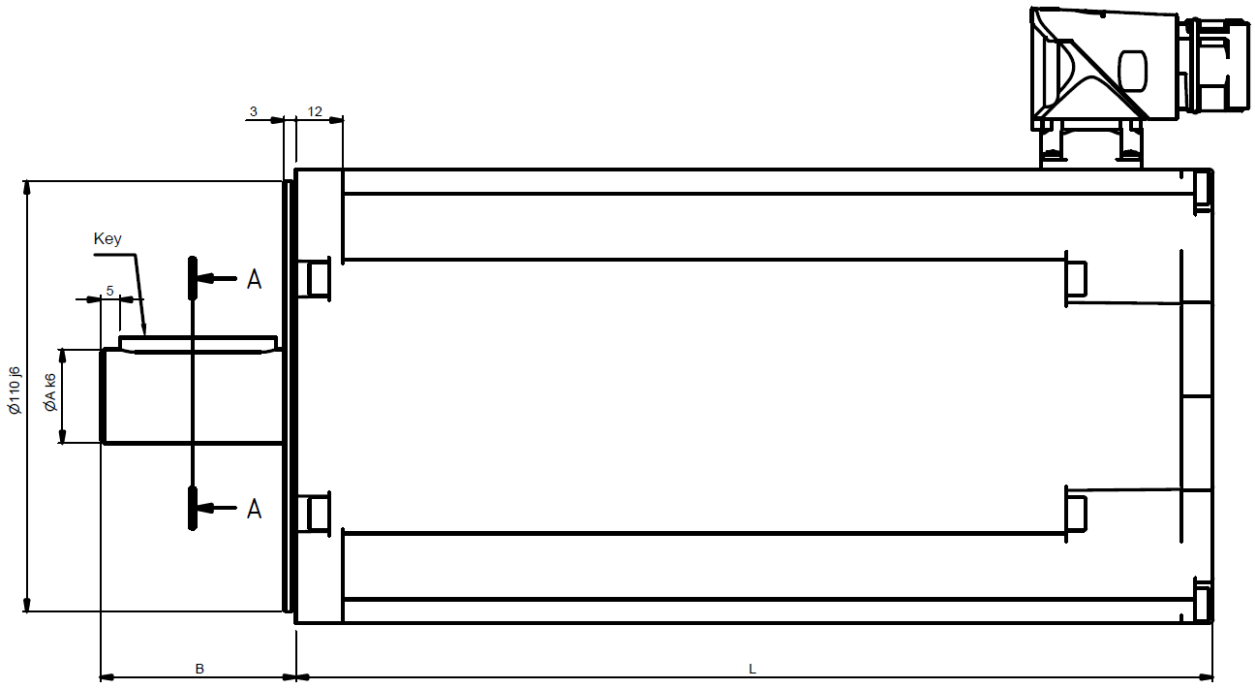
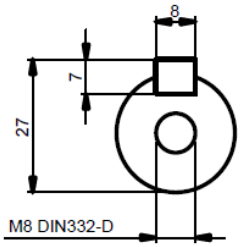


6.8 Flange size - JHQ45





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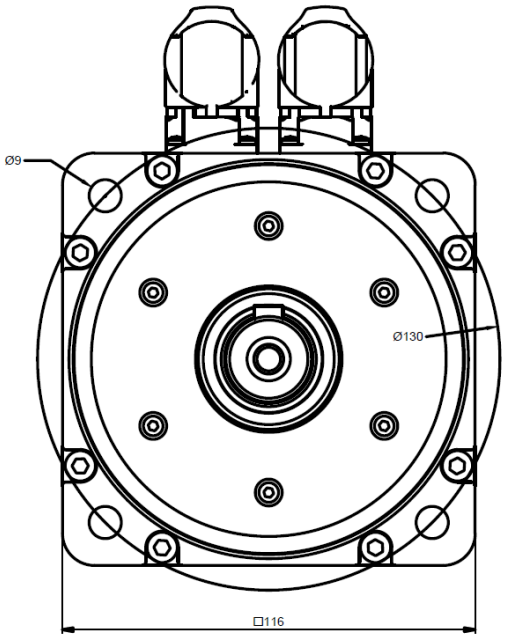


P = Power connector size L = Length without brake L1 = Length with brake	**P**	**L**	**L1**	**L**	**L1**	**L**	**L1**	**Shaft (AxB)/ feather key/ internal thread**
Type		**Resolver/SEx37**		**SKx36**		**EEx37/EKx36:**		**mm**
JHQ45-0600	M23	168	204.5	168	204.5	167	203.5	Ø19x40/ 6x6x32/ M6x16
JHQ45-0800	M23	183	219.5	183	219.5	182	218.5	
JHQ45-1000	M23	198	234.5	198	234.5	197	233.5	Ø24x50/ 8x7x40/ M8x19
JHQ45-1200	M23	213	249.5	213	249.5	212	248.5	
JHQ45-1400	M23	233	269.5	233	269.5	232	268.5	

6.8.1 Technical data of the brake

The technical data of the brake for motor type JHQ45 are listed below:

Technical specifications	Values		
Holding torque	M_{BR}	Nm	12
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	18.7
Rotor inertia	J_{BR}	kg*cm^2	1.8
Weight	m_{BR}	kg	1.5

6.8.2 Specific technical data (DC link voltage DC 560 V)

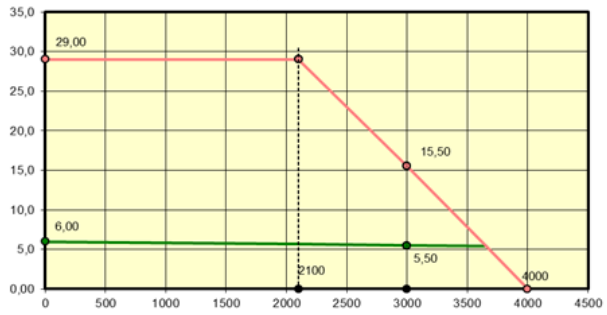
Motor type			JHQ45-0600-098	JHQ45-0600-066	JHQ45-0800-098	JHQ45-0800-066
Rated speed	N_n	RPM	3000	4500	3000	4500
Rated torque	M_n	Nm	5.5	4.7	7.0	6.0
Rated current	I_n	A	3.4	4.3	4.3	5.5
Holding torque	M_o	Nm	6.0	6.0	8.0	8.0
Continuous stall current	I_o	A	3.7	5.5	4.9	7.3
Max. torque	M_{max}	Nm	29	29	38	38
Max. current	I_{max}	A	21	32	28	42
Max. speed	N_{max}	RPM	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	98.4	66.0	98.4	66.0
Torque constant	K_T	Nm/A	1.63	1.09	1.63	1.09
Winding resistance	R_{2ph}	Ω	3.2	1.44	2.3	1.04
Winding inductance	L_{2ph}	mH	12.5	5.6	9.9	4.5
Number of motor poles	P_{mot}		10	10	10	10
Idling speed	N_o	RPM	4000	5400	4000	5400
Max. torque at sea level	M_x	Nm	15.5	15.0	19.0	19.0
Thermal time constant - Copper winding	T_{ther_CU}	s	75	75	75	75
Electrical time constant	T_{el}	ms	3.9	3.9	4.3	4.3
Mechanical time constant	T_{mech}	ms	1.6	1.6	1.6	1.6
Thermal time constant	T_{th}	min	31	31	32	32
Rotor inertia without brake	J	kg*cm^2	7.8	7.8	10.4	10.4
Weight without brake	m	kg	7.1	7.1	8.0	8.0
Axial load	F_A	N	58	58	60	60
Radial load	F_R	N	580	580	600	600

Motor type			**JHQ45-1000-098**	**JHQ45-1000-066**	**JHQ45-1200-098**	**JHQ45-1200-066**
Rated speed	N_n	RPM	3000	4500	3000	4500
Rated torque	M_n	Nm	8.5	7.1	10.1	8.3
Rated current	I_n	A	5.2	6.5	6.2	7.6
Holding torque	M_o	Nm	10.0	10.0	12.0	12.0
Continuous stall current	I_o	A	6.1	9.2	7.4	11.0
Max. torque	M_{max}	Nm	48	48	57	57
Max. current	I_{max}	A	35	53	42	63
Max. speed	N_{max}	RPM	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	98.4	66.0	98.4	66.0
Torque constant	K_T	Nm/A	1.63	1.09	1.63	1.09
Winding resistance	R_{2ph}	Ω	1.74	0.78	1.32	0.59
Winding inductance	L_{2ph}	mH	7.9	3.6	6.5	2.9
Number of motor poles	P_{mot}		10	10	10	10
Idling speed	N_o	RPM	4000	5400	4000	5400
Max. torque at sea level	M_x	Nm	25	24	30	30
Thermal time constant - Copper winding	T_{ther_CU}	s	75	75	75	75
Electrical time constant	T_{el}	ms	4.5	4.6	4.9	4.9
Mechanical time constant	T_{mech}	ms	1.4	1.4	1.3	1.3
Thermal time constant	T_{th}	min	34	34	37	37
Rotor inertia without brake	J	$kg*cm^2$	12.4	12.4	14.9	14.9
Weight without brake	m	kg	8.9	8.9	10.0	10.0
Axial load	F_A	N	68	68	70	70
Radial load	F_R	N	680	680	700	700

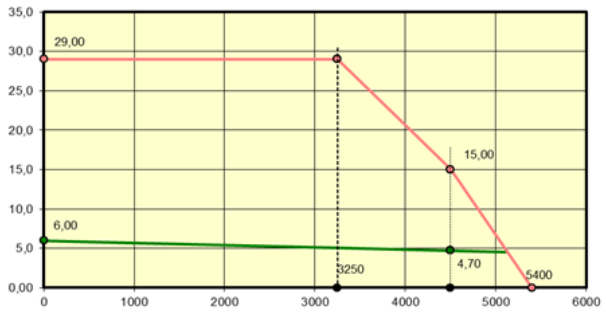
Motor type			**JHQ45-1400-098**	**JHQ45-1400-066**
Rated speed	N_n	RPM	3000	4500
Rated torque	M_n	Nm	11.8	9.7
Rated current	I_n	A	7.2	8.9
Holding torque	M_o	Nm	14.0	14.0
Continuous stall current	I_o	A	8.6	12.8
Max. torque	M_{max}	Nm	70	70
Max. current	I_{max}	A	51	77
Max. speed	N_{max}	RPM	9000	9000
Back EMF constant	K_E	V/kRPM	98.4	66.0
Torque constant	K_T	Nm/A	1.63	1.09
Winding resistance	R_{2ph}	Ω	1.15	0.52
Winding inductance	L_{2ph}	mH	5.7	2.6
Number of motor poles	P_{mot}		10	10
Idling speed	N_o	RPM	4000	5400
Max. torque at sea level	M_x	Nm	35	35
Thermal time constant - Copper winding	T_{ther_CU}	s	75	75
Electrical time constant	T_{el}	ms	5.0	5.0
Mechanical time constant	T_{mech}	ms	1.4	1.4
Thermal time constant	T_{th}	min	41	41
Rotor inertia without brake	J	$kg*cm^2$	18.2	18.2
Weight without brake	m	kg	11.3	11.3
Axial load	F_A	N	72	72
Radial load	F_R	N	720	720

6.8.3 Torque/speed characteristic (DC link voltage DC 560 V)

JHQ45-0600-098



JHQ45-0600-066



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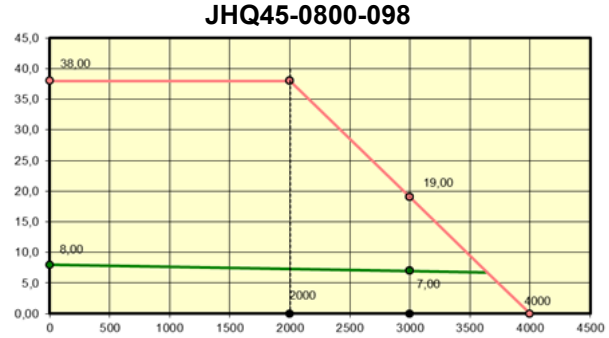

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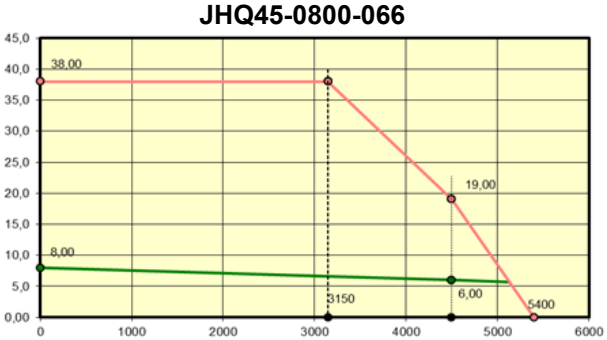

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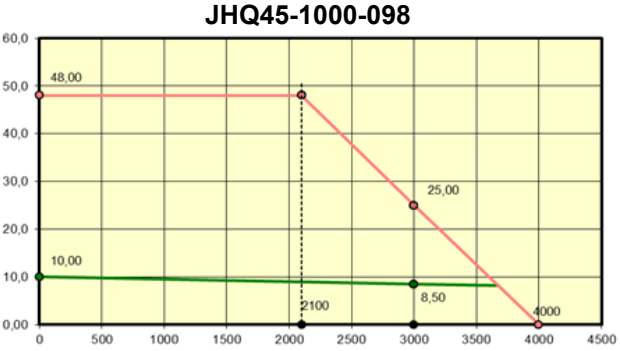

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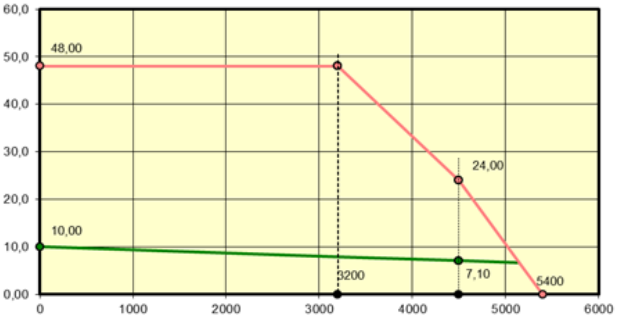

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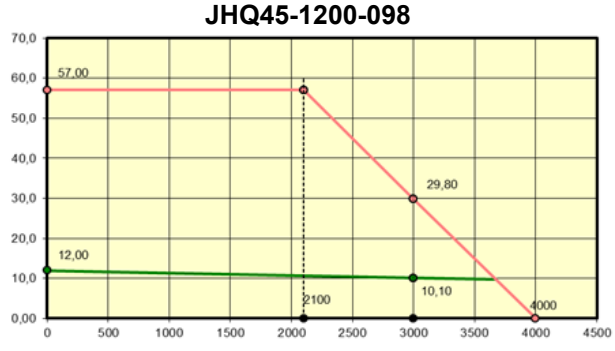

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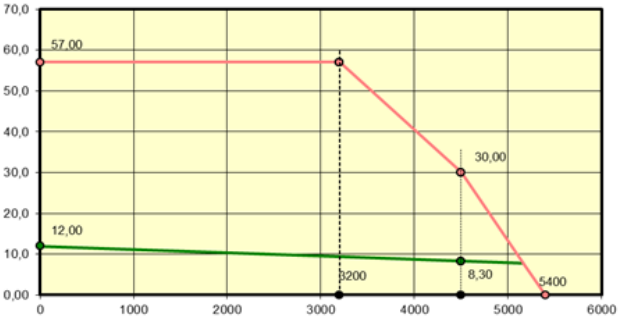

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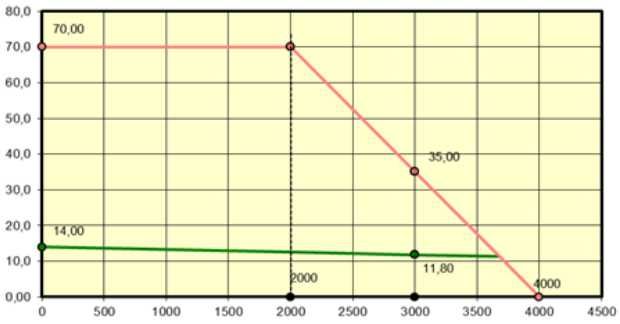

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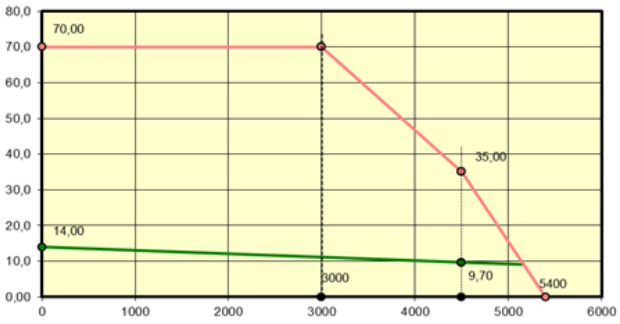
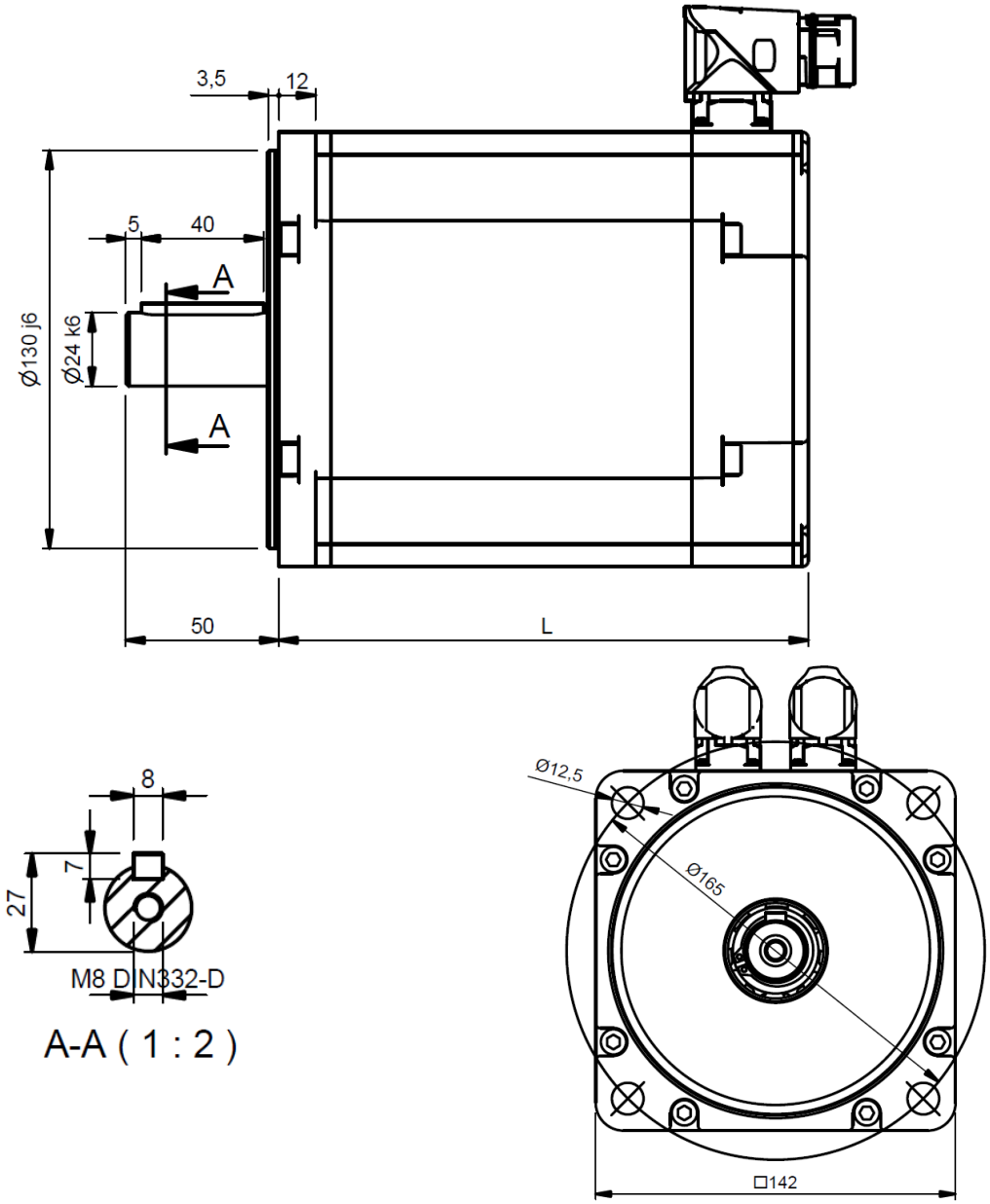


6.9 Flange size - JHQ5



P = Power connector size L = Length without brake L1 = Length with brake	**P**	**L**	**L1**	**L**	**L1**	**L**	**L1**
Type		**Resolver/SEx37**		**SKx36**		**EEx37/EKx36:**	
JHQ5-0450	M23	148	183	159	194	159	194
JHQ5-0900	M23	173	208	184	219	184	219
JHQ5-1250	M23	198	228	209	239	209	239
JHQ5-1600	M23	223	253	234	264	234	264
JHQ5-2000	M23	248	273	259	284	259	284
JHQ5-2600	M23	298	318	309	329	309	329
JHQ5-2900[x1)]	M23	337.5	372.5	337.5	372.5	337.5	372.5

x1): Motor with a diameter of 24 mm at the shaft end:

- A maximum pulse torque M_I = 96.6 Nm is permitted.
- A maximum radial load F_R = 740 N is permitted.
- A maximum axial load FA = 10 % of the radial load is permitted.

6.9.1 Technical data of the brake

The technical data of the brake for motor type JHQ5 are listed below:

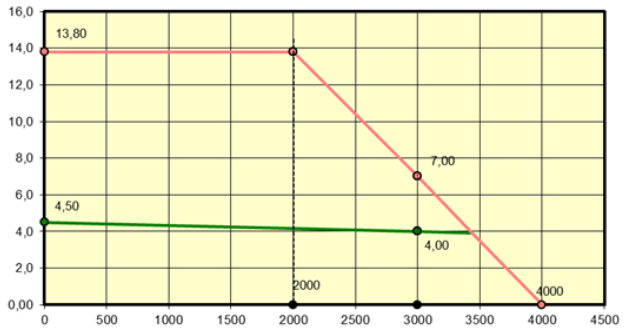
Technical specifications	Values		
Holding torque	M_{BR}	Nm	15
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	24
Rotor inertia	J_{BR}	kg*cm^2	1.66
Weight	m_{BR}	kg	2

6.9.2 Specific technical data (DC link voltage DC 320 V)

Motor type			JHQ5-0450-057	JHQ5-0900-057	JHQ5-1250-057
Rated speed	N_n	RPM	3000	3000	3000
Rated torque	M_n	Nm	4.0	7.7	11.6
Rated current	I_n	A	4.3	8.2	12.4
Holding torque	M_o	Nm	4.5	9.0	12.5
Continuous stall current	I_o	A	4.8	9.6	13.4
Max. torque	M_{max}	Nm	13.8	28	41
Max. current	I_{max}	A	18.1	36	55
Max. speed	N_{max}	RPM	9000	9000	9000
Back EMF constant	K_E	V/kRPM	56.5	56.5	56.5
Torque constant	K_T	Nm/A	0.94	0.94	0.94
Winding resistance	R_{2ph}	Ω	1.91	0.68	0.35
Winding inductance	L_{2ph}	mH	11.6	6.1	3.8
Number of motor poles	P_{mot}		8	8	8
Idling speed	N_o	RPM	4000	4000	4000
Max. torque at sea level	M_x	Nm	7.0	14.0	24
Thermal time constant - Copper winding	T_{ther_CU}	s	97	97	97
Electrical time constant	T_{el}	ms	6.1	9.0	10.9
Mechanical time constant	T_{mech}	ms	1.4	0.80	0.57
Thermal time constant	T_{th}	min	33	37	40
Rotor inertia without brake	J	kg*cm^2	3.6	6.0	8.2
Weight without brake	m	kg	7.5	9.5	11.5
Axial load	F_A	N	61	65	68
Radial load	F_R	N	610	650	680

6.9.3 Torque/speed characteristic (DC link voltage DC 320 V)

JHQ5-0450-057



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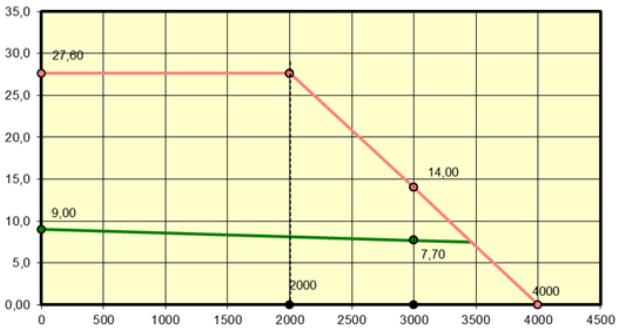

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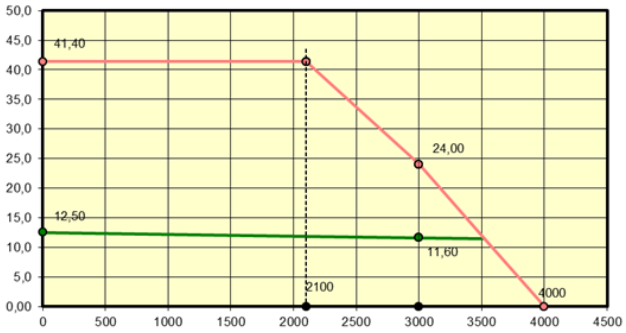

6.9.4 Specific technical data (DC link voltage DC 560 V)

Motor type			**JHQ5-0450-098**	**JHQ5-0450-066**	**JHQ5-0900-098**	**JHQ5-0900-066**	**JHQ5-1250-098**	**JHQ5-1250-066**
Rated speed	N_n	RPM	3000	4500	3000	4500	3000	4500
Rated torque	M_n	Nm	4.0	3.9	7.7	7.3	11.6	9.5
Rated current	I_n	A	2.5	3.6	4.7	6.7	7.1	8.7
Holding torque	M_o	Nm	4.5	4.5	9.0	9.0	12.5	12.5
Continuous stall current	I_o	A	2.8	4.1	5.5	8.3	7.7	11.5
Max. torque	M_{max}	Nm	13.8	13.8	28	28	41	41
Max. current	I_{max}	A	9.8	14.7	19.7	29	30	44
Max. speed	N_{max}	RPM	9000	9000	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	98.4	66.0	98.4	66.0	98.4	66.0
Torque constant	K_T	Nm/A	1.63	1.09	1.63	1.09	1.63	1.09
Winding resistance	R_{2ph}	Ω	5.1	2.2	2.2	0.79	1.13	0.51
Winding inductance	L_{2ph}	mH	40.3	19.3	21.5	8.7	12.5	5.0
Number of motor poles	P_{mot}		8	8	8	8	8	8
Idling speed	N_o	RPM	3900	5900	3900	6000	3900	6000
Max. torque at sea level	M_x	Nm	6.5	6.0	12.5	14.0	22	24
Thermal time constant - Copper winding	T_{ther_CU}	s	97	97	97	97	97	97
Electrical time constant	T_{el}	ms	7.9	8.7	10.0	11.0	11.1	9.8
Mechanical time constant	T_{mech}	ms	1.2	1.2	0.85	0.69	0.60	0.61
Thermal time constant	T_{th}	min	33	33	37	37	40	40
Rotor inertia without brake	J	kg*cm^2	3.6	3.6	6.0	6.0	8.2	8.2
Weight without brake	m	kg	7.5	7.5	9.5	9.5	11.5	11.5
Axial load	F_A	N	61	61	65	65	68	68
Radial load	F_R	N	610	610	650	650	680	680

Motor type			**JHQ5-1600-148**	**JHQ5-1600-098**	**JHQ5-1600-066**	**JHQ5-2000-148**	**JHQ5-2000-098**	**JHQ5-2000-066**
Rated speed	N_n	RPM	2000	3000	4500	2000	3000	4500
Rated torque	M_n	Nm	15.1	13.9	12.7	18.5	17.5	14.6
Rated current	I_n	A	6.2	8.5	11.7	7.6	10.7	13.4
Holding torque	M_o	Nm	16.0	16.0	16.0	20.0	20.0	20.0
Continuous stall current	I_o	A	6.5	9.8	14.7	8.2	12.3	18.4
Max. torque	M_{max}	Nm	55	55	55	69	69	69
Max. current	I_{max}	A	26	39	59	33	49	73
Max. speed	N_{max}	RPM	9000	9000	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	147.7	98.4	66.0	147.7	98.4	66.0
Torque constant	K_T	Nm/A	2.4	1.63	1.09	2.4	1.63	1.09
Winding resistance	R_{2ph}	Ω	1.73	0.75	0.34	1.18	0.56	0.26
Winding inductance	L_{2ph}	mH	20.9	8.2	4.1	14.2	6.3	3.2
Number of motor poles	P_{mot}		8	8	8	8	8	8
Idling speed	N_o	RPM	2600	3900	6000	2600	3900	6000
Max. torque at sea level	M_x	Nm	27	32	30	33	36	38
Thermal time constant - Copper winding	T_{ther_CU}	s	97	97	97	97	97	97
Electrical time constant	T_{el}	ms	12.1	10.9	12.1	12.0	11.3	12.3
Mechanical time constant	T_{mech}	ms	0.54	0.52	0.53	0.45	0.48	0.50
Thermal time constant	T_{th}	min	43	43	43	46	46	46
Rotor inertia without brake	J	kg*cm^2	10.7	10.7	10.7	13.1	13.1	13.1
Weight without brake	m	kg	13.5	13.5	13.5	15.5	15.5	15.5
Axial load	F_A	N	70	70	70	72	72	72
Radial load	F_R	N	700	700	700	720	720	720

Motor type			**JHQ5-2600-148**	**JHQ5-2600-098**	**JHQ5-2600-066**	**JHQ5-2900-098**	**JHQ5-2900-066**
Rated speed	N_n	RPM	2000	3000	4500	3000	4500
Rated torque	M_n	Nm	22.4	18.9	14.7	20.3	15.3
Rated current	I_n	A	9.2	11.6	13.5	12.5	14.1
Holding torque	M_o	Nm	26.0	26.0	26.0	29.0	29.0
Continuous stall current	I_o	A	10.6	16.0	23.9	17.8	26.7
Max. torque	M_{max}	Nm	97	97	97	97	97
Max. current	I_{max}	A	46	69	103	68	102
Max. speed	N_{max}	RPM	9000	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	147.7	98.4	66.0	98.4	66.0
Torque constant	K_T	Nm/A	2.5	1.63	1.09	1.63	1.09
Winding resistance	R_{2ph}	Ω	0.91	0.41	0.19	0.34	0.16
Winding inductance	L_{2ph}	mH	11.2	5.0	2.4	4.3	2.0
Number of motor poles	P_{mot}		8	8	8	8	8
Idling speed	N_o	RPM	2600	3900	6000	3900	6000
Max. torque at sea level	M_x	Nm	50	53	50	60	60
Thermal time constant - Copper winding	T_{ther_CU}	s	97	97	97	97	97
Electrical time constant	T_{el}	ms	12.3	12.2	12.6	12.6	12.5
Mechanical time constant	T_{mech}	ms	0.48	0.49	0.51	0.46	0.48
Thermal time constant	T_{th}	min	49	49	49	51	51
Rotor inertia without brake	J	kg*cm^2	18.4	18.4	18.4	21	21
Weight without brake	m	kg	19.5	19.5	19.5	23	23
Axial load	F_A	N	74	74	74	74	74
Radial load	F_R	N	740	740	740	740	740

6.9.5 Torque/speed characteristic (DC link voltage DC 560 V)

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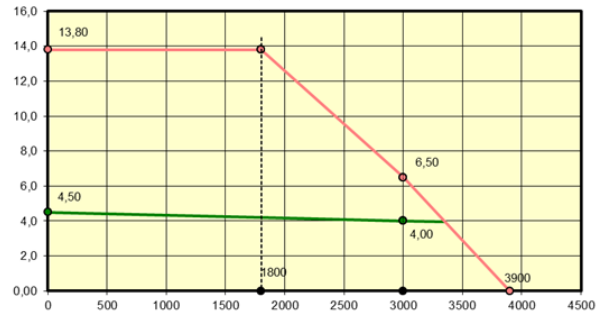

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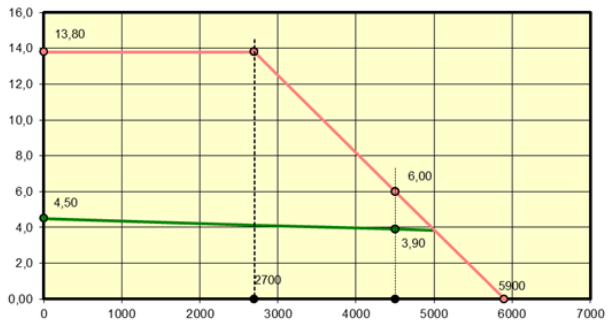

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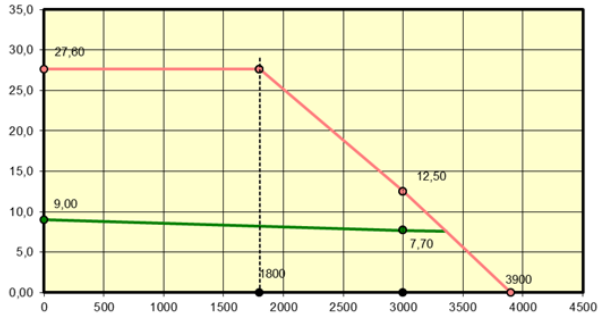

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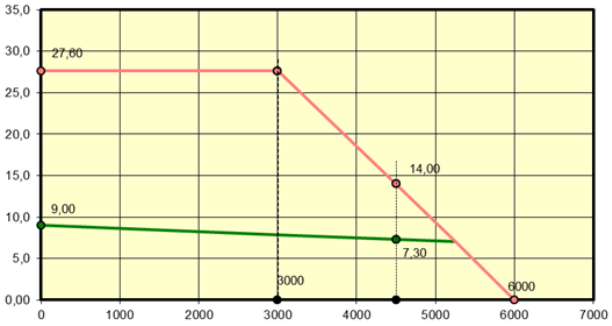

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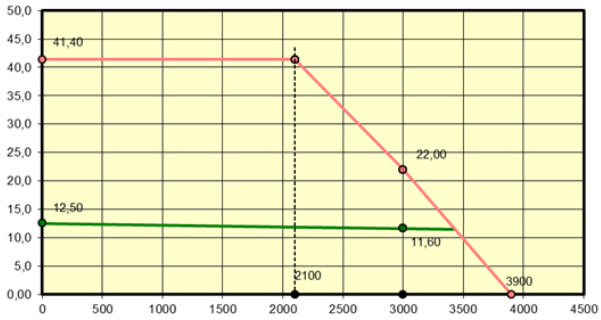

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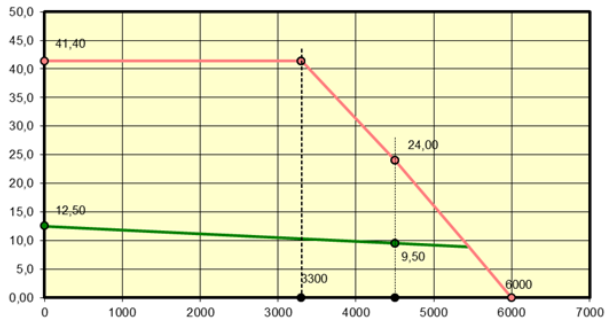

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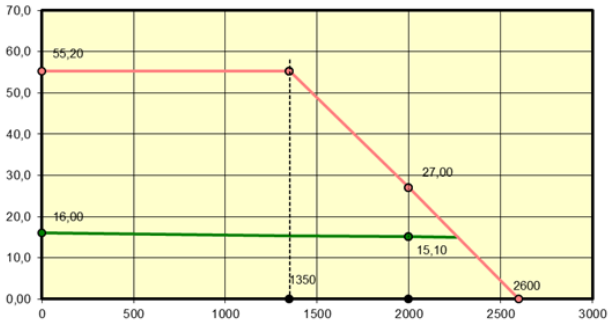

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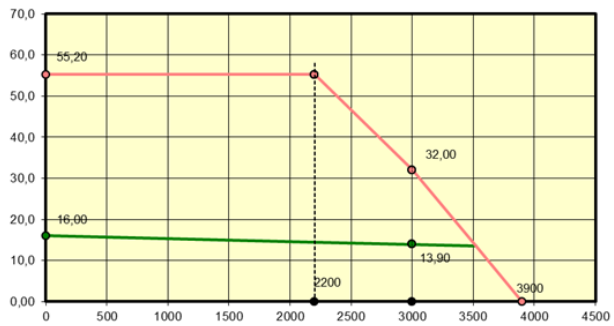

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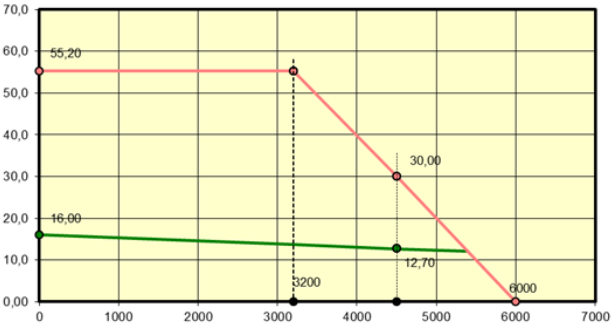

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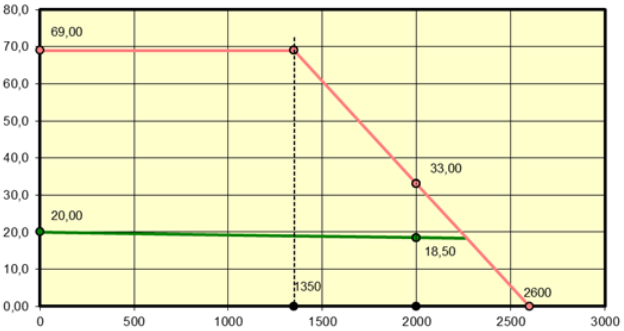

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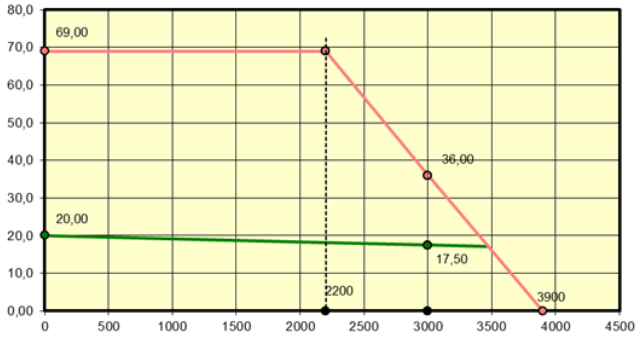

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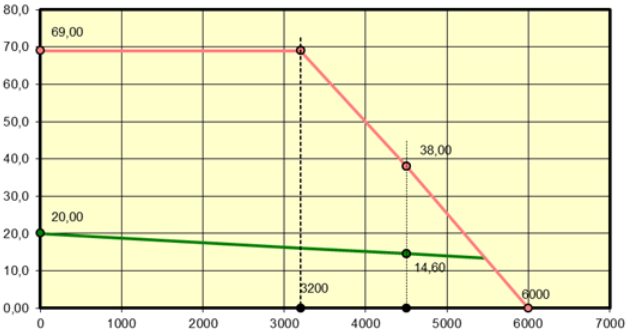

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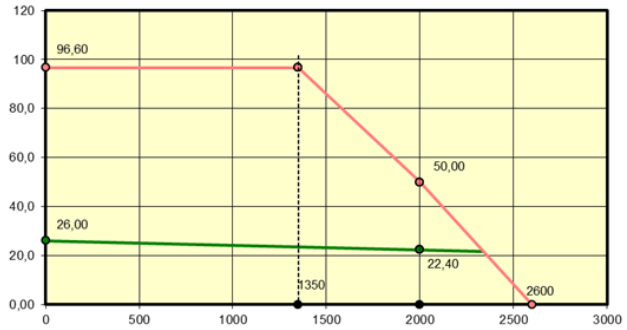

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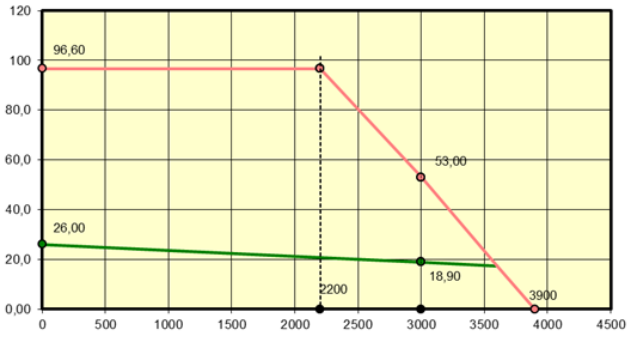

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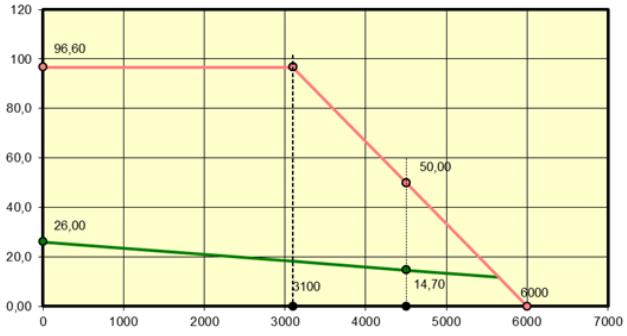

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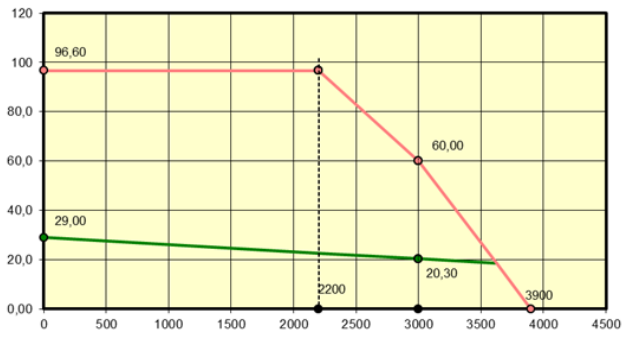

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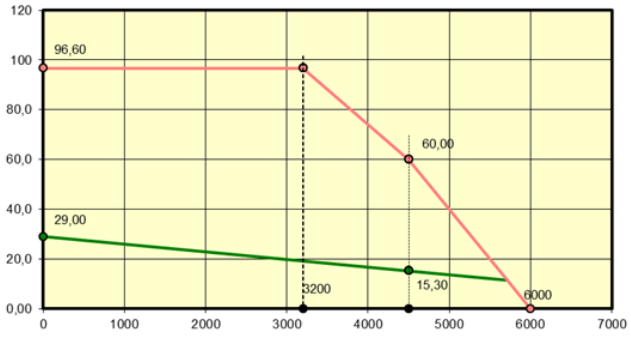
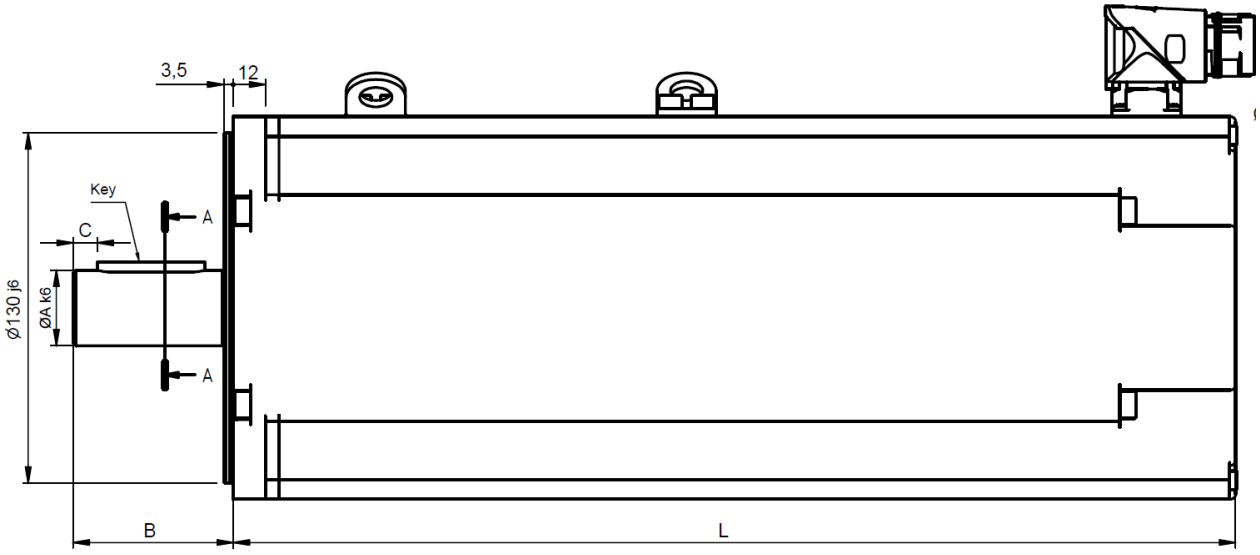
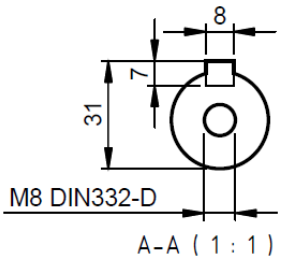
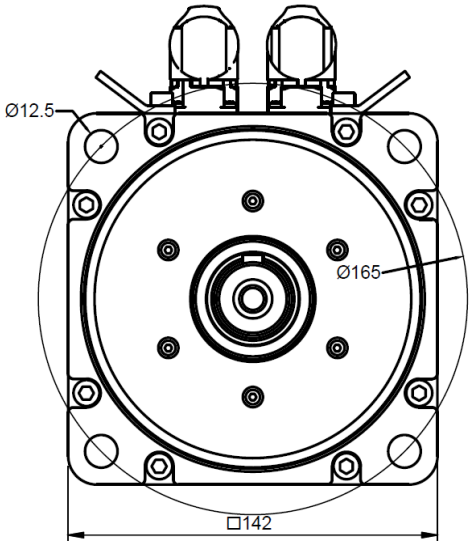


6.10 Flange size - JHQ51







P = Power connector size L = Length without brake L1 = Length with brake	**P**	**L**	**L1**	**L**	**L1**	**L**	**L1**	**M_{max}**	**Shaft (AxB)/ feather key/ D internal thread**
Type		**Resolver/SEx37**		**SKx36**		**EEx37/EKx36:**		**Nm**	**mm**
JHQ51-2900	M23	337.5	372.5	337.5	372.5	337.5	372.5	110	Ø28x58/ 8x7x40/ 9/ M8 DIN 332-D
JHQ51-3800[x1)]	M23	405	440	405	440	405	440	151	

x1): Connector size M40

Only for motors with a standstill torque M_o = 38 Nm and the rated speed n_n = 4500 RPM.

6.10.1 Technical data of the brake

The technical data of the brake of motor type JHQ51 with sizes 5.51 (Mo = 29 Nm) and 51 (Mo = 38 Nm) are as follows:

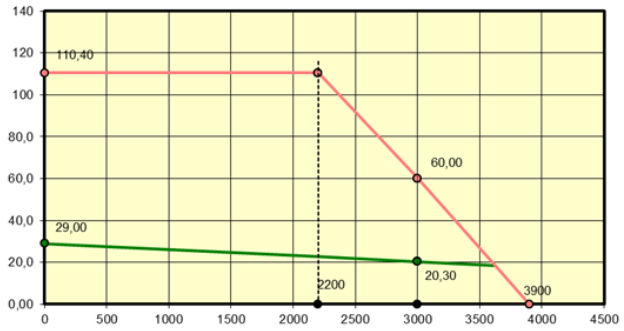
Technical specifications	Values		
Holding torque	M_{BR}	Nm	24
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	24
Rotor inertia	J_{BR}	kg*cm^2	1.66
Weight	m_{BR}	kg	2

6.10.2 Specific technical data (DC link voltage DC 560 V)

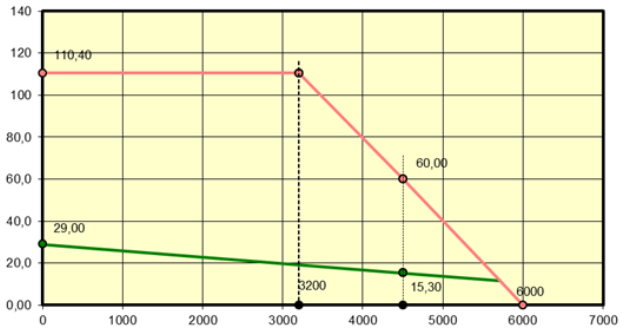
Motor type			JHQ51-2900-098	JHQ51-2900-066	JHQ51-3800-098	JHQ51-3800-066
Rated speed	N_n	RPM	3000	4500	3000	4500
Rated torque	M_n	Nm	20.3	15.3	24.1	16.8
Rated current	I_n	A	12.5	14.1	14.8	15.5
Holding torque	M_o	Nm	29.0	29.0	38.0	38.0
Continuous stall current	I_o	A	17.8	26.7	23.3	35.0
Max. torque	M_{max}	Nm	110	110	151	151
Max. current	I_{max}	A	79	117	108	161
Max. speed	N_{max}	RPM	9000	9000	9000	9000
Back EMF constant	K_E	V/kRPM	98.4	66.0	98.4	66.0
Torque constant	K_T	Nm/A	1.63	1.09	1.63	1.09
Winding resistance	R_{2ph}	Ω	0.34	0.16	0.26	0.11
Winding inductance	L_{2ph}	mH	4.3	2.0	3.2	1.40
Number of motor poles	P_{mot}		8	8	8	8
Idling speed	N_o	RPM	3900	6000	3900	6000
Max. torque at sea level	M_x	Nm	60	60	84	84
Thermal time constant - Copper winding	T_{ther_CU}	s	97	97	97	97
Electrical time constant	T_{el}	ms	12.6	12.5	12.3	12.7
Mechanical time constant	T_{mech}	ms	0.46	0.48	0.48	0.45
Thermal time constant	T_{th}	min	51	51	55	55
Rotor inertia without brake	J	kg*cm^2	21	21	28	28
Weight without brake	m	kg	23	23	29	29
Axial load	F_A	N	76	76	80	80
Radial load	F_R	N	760	760	800	800

6.10.3 Torque/speed characteristic (DC link voltage DC 560 V)

JHQ51-2900-098



JHQ51-2900-066



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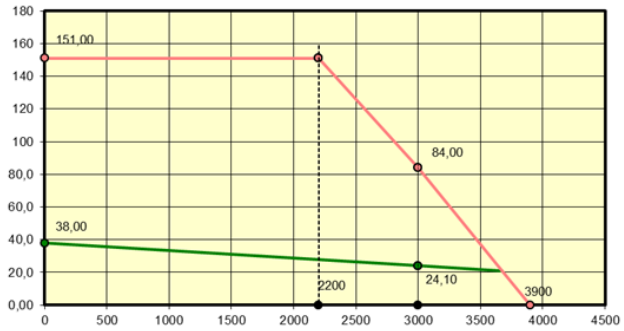

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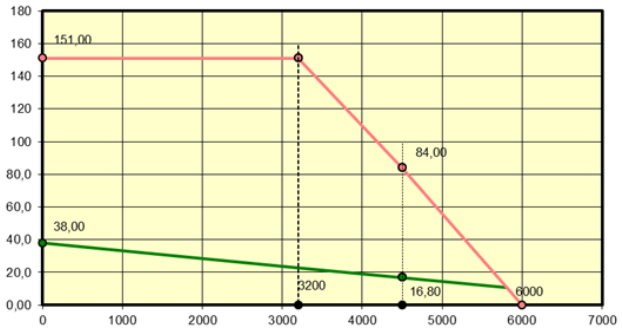
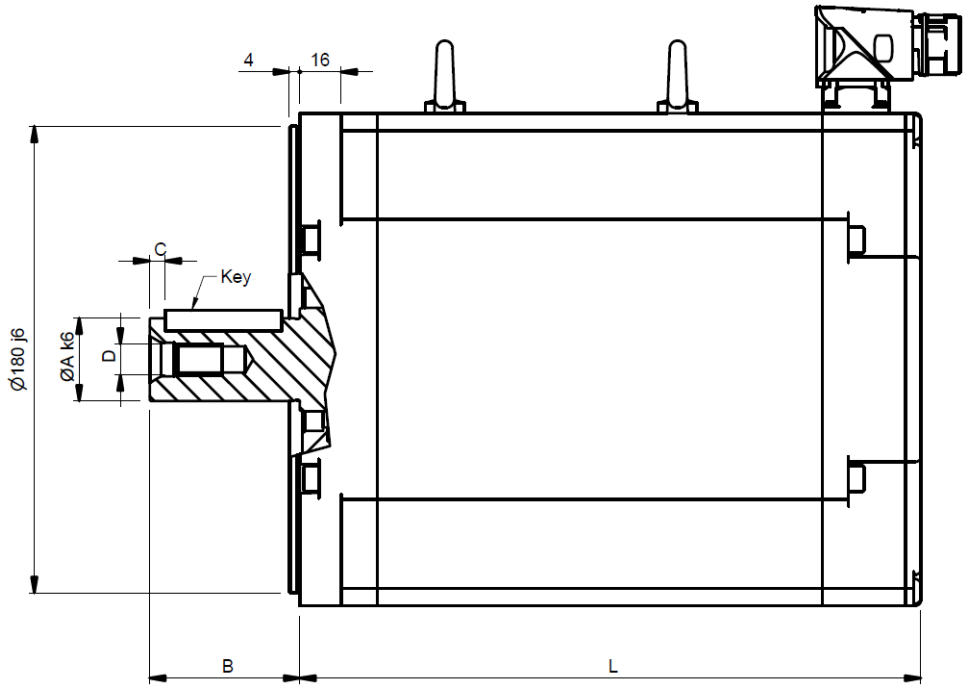
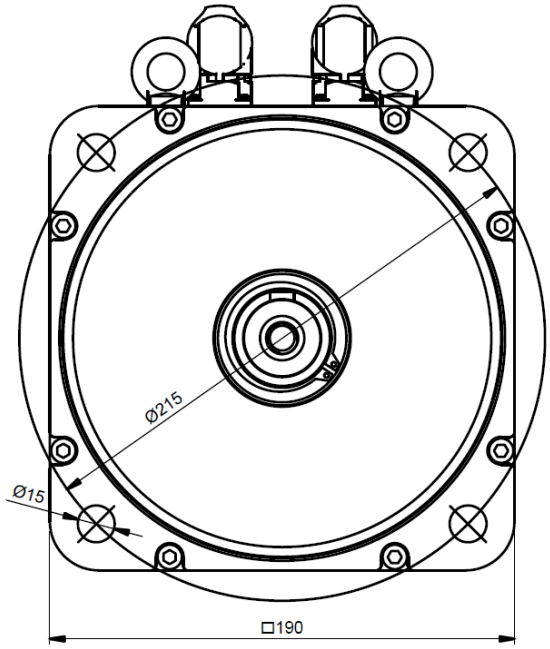


6.11 Flange size JHQ6/JHQ7





P = Power connector size L = Length w/o brake L1 = Length with brake	**P**	**L**	**L1**	**L**	**L1**	**L**	**L1**	**Shaft (AxB)/D/ feather key/ C**
Type		**Resolver/SEx37/SKx36**		**SRx50**		**EEx37/EKx36:**		**mm**
JHQ6-2000	M23	195	225	223	253	195	225	Ø24x50/ M8 DIN 332-D/ 8x7x40/ 5
JHQ6-2800	M23	217.5	247.5	245.5	275.5	217.5	247.5	
JHQ7-3600	M23	240	270	268	298	240	270	Ø28x58/ M10 DIN 332-D/ 8x7x40/ 9
JHQ7-4200	M23	262.5	292.5	290.5	320.5	262.5	292.5	

6.11.1 Technical data of the brake

The technical data of the brake of motor types JHQ6 and JHQ7 are as follows:

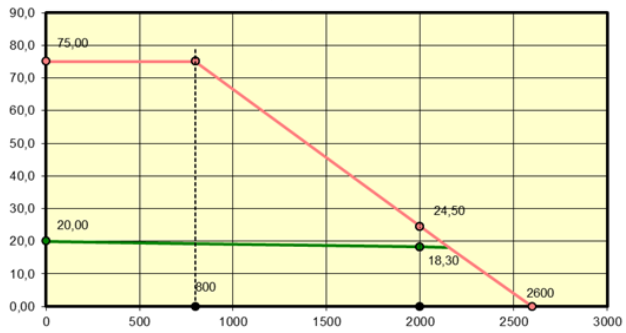
Technical specifications	Values		
Holding torque	M_{BR}	Nm	48
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	20.4
Rotor inertia	J_{BR}	kg*cm^2	32
Weight	m_{BR}	kg	5

6.11.2 JHQ6 - Specific technical data (DC link voltage DC 560 V)

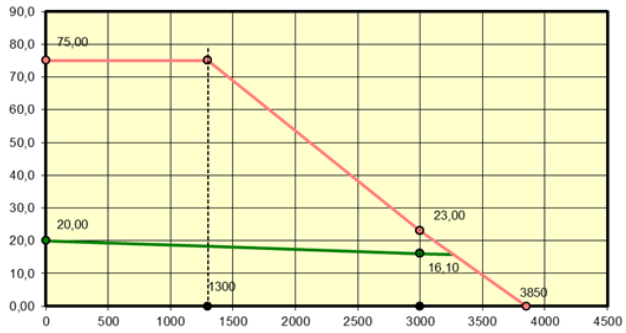
Motor type			JHQ6-2000-148	JHQ6-2000-098	JHQ6-2000-066	JHQ6-2800-148	JHQ6-2800-098	JHQ6-2800-066
Rated speed	N_n	RPM	2000	3000	4500	2000	3000	4500
Rated torque	M_n	Nm	18.3	16.1	11.1	24.7	22.0	16.0
Rated current	I_n	A	7.5	9.9	10.2	10.1	13.5	14.7
Holding torque	M_o	Nm	20.0	20.0	20.0	28.0	28.0	28.0
Continuous stall current	I_o	A	8.2	12.3	18.3	11.4	17.2	25.7
Max. torque	M_{max}	Nm	75	75	75	97	97	97
Max. current	I_{max}	A	44	66	97	56	85	118
Max. speed	N_{max}	RPM	4000	4000	5000	4000	4000	5000
Back EMF constant	K_E	V/kRPM	147.7	98.4	66.0	147.7	98.4	66.0
Torque constant	K_T	Nm/A	2.5	1.63	1.09	2.5	1.63	1.09
Winding resistance	R_{2ph}	Ω	1.78	0.79	0.31	0.90	0.40	0.17
Winding inductance	L_{2ph}	mH	18.7	8.3	3.1	14.2	6.3	2.3
Number of motor poles	P_{mot}		10	10	10	10	10	10
Idling speed	N_o	RPM	2600	3850	5700	2600	3850	5700
Max. torque at sea level	M_x	Nm	25	23	28	32	33	43
Thermal time constant - Copper winding	T_{ther_CU}	s	203	203	203	203	203	203
Electrical time constant	T_{el}	ms	10.5	10.5	10.0	15.8	15.8	13.5
Mechanical time constant	T_{mech}	ms	1.7	1.7	1.5	1.2	1.2	1.1
Thermal time constant	T_{th}	min	32	32	32	37	37	37
Rotor inertia without brake	J	kg*cm^2	33	33	33	46	46	46
Weight without brake	m	kg	17.0	17.0	17.0	21	21	21
Axial load	F_A	N	86	86	86	93	93	93
Radial load	F_R	N	860	860	860	930	930	930

6.11.3 JHQ6 - Torque/speed characteristic (DC link voltage DC 560 V)

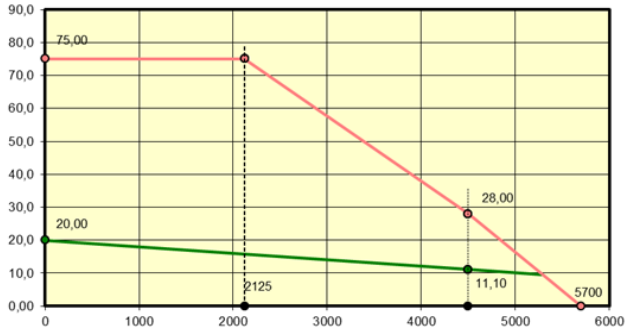
JHQ6-2000-148



JHQ6-2000-098



JHQ6-2000-066



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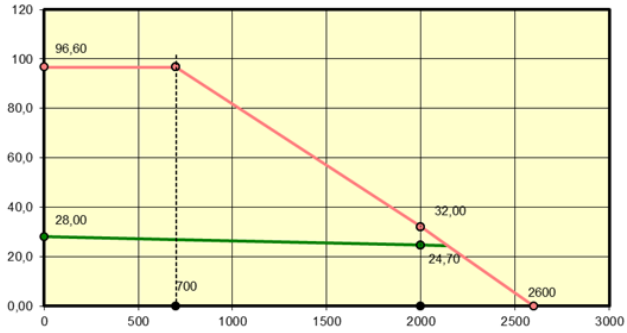

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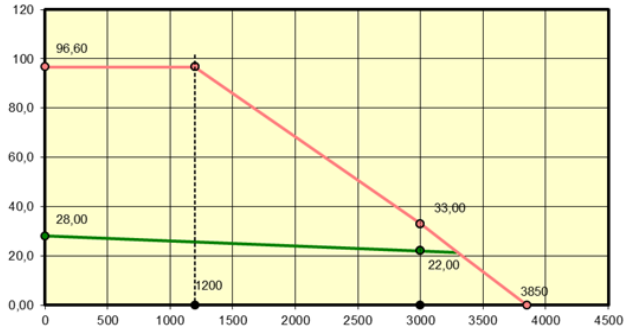

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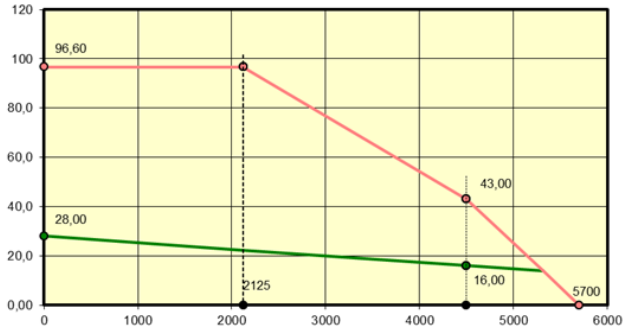
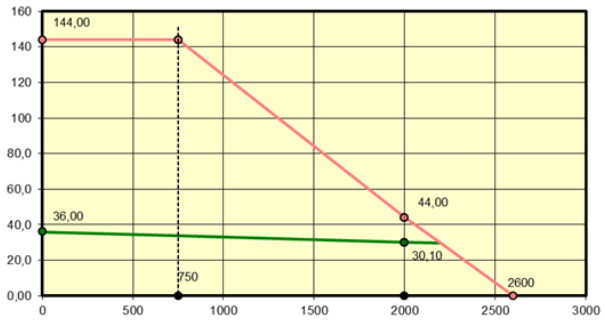


6.11.4 JHQ7 - Specific technical data (DC link voltage DC 560 V)

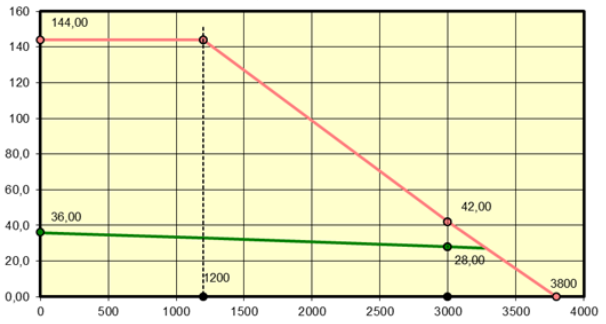
Motor type			**JHQ7-3600-148**	**JHQ7-3600-098**	**JHQ7-4200-148**	**JHQ7-4200-098**
Rated speed	N_n	RPM	2000	3000	2000	3000
Rated torque	M_n	Nm	30.1	28.0	36.1	32.5
Rated current	I_n	A	12.3	17.2	14.8	19.9
Holding torque	M_o	Nm	36.0	36.0	42.0	42.0
Continuous stall current	I_o	A	14.7	22.1	17.2	25.8
Max. torque	M_{max}	Nm	144	144	151	151
Max. current	I_{max}	A	84	126	88	133
Max. speed	N_{max}	RPM	4000	4000	4000	4000
Back EMF constant	K_E	V/kRPM	147.7	98.4	147.7	98.4
Torque constant	K_T	Nm/A	2.5	1.63	2.5	1.63
Winding resistance	R_{2ph}	Ω	0.63	0.28	0.50	0.22
Winding inductance	L_{2ph}	mH	11.0	4.9	8.8	3.9
Number of motor poles	P_{mot}		10	10	10	10
Idling speed	N_o	RPM	2600	3800	2600	3800
Max. torque at sea level	M_x	Nm	44	42	59	56
Thermal time constant - Copper winding	T_{ther_CU}	s	215	215	215	215
Electrical time constant	T_{el}	ms	17.5	17.5	17.6	17.7
Mechanical time constant	T_{mech}	ms	1.1	1.1	1.1	1.1
Thermal time constant	T_{th}	min	41	41	46	46
Rotor inertia without brake	J	$kg*cm^2$	60	60	74	74
Weight without brake	m	kg	25	25	30	30
Axial load	F_A	N	100	100	107	107
Radial load	F_R	N	1000	1000	1070	1070

6.11.5 JHQ7 - Torque/speed characteristic (DC link voltage DC 560 V)

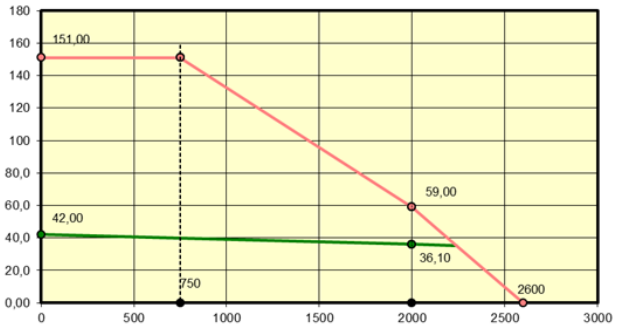
JHQ7-3600-148



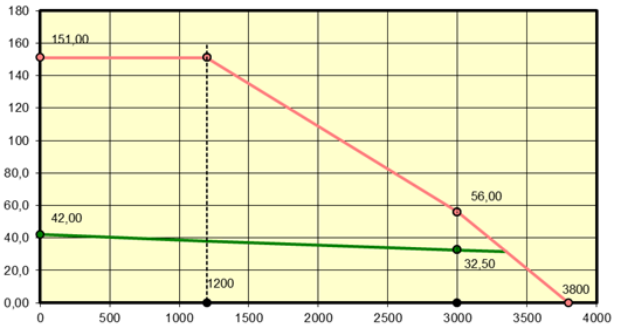
JHQ7-3600-098



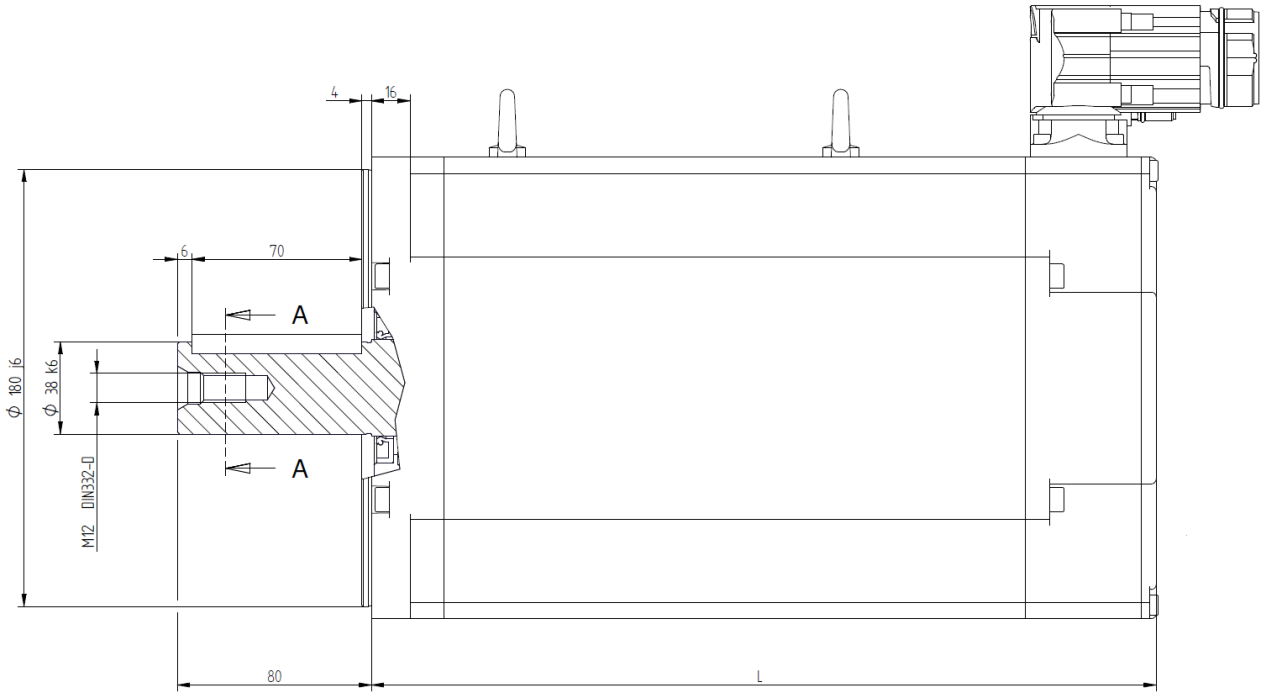
JHQ7-4200-148

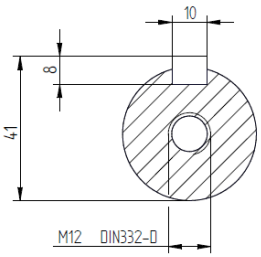


JHQ7-4200-098



6.12 Flange size - JHQ71





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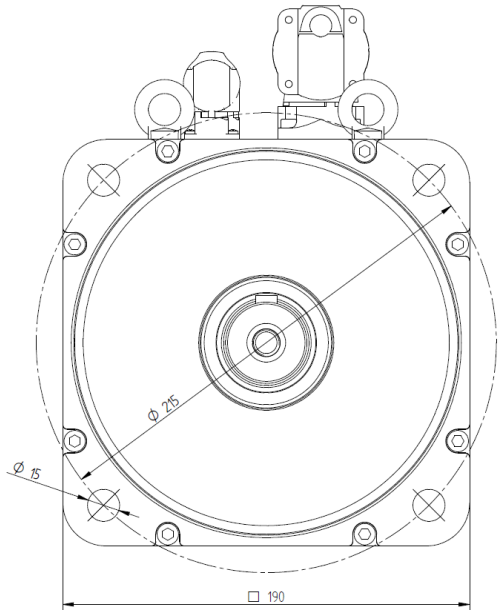


P = Power conn. size L = Length w/o brake L1 = Length with brake	**P**	**L**	**L1**	**L**	**L1**	**L**	**L1**	**Shaft/ feather key**
Type		**Resolver/SEx37/SKx36**		**SRx50**		**EEx37/EKx36:**		**mm**
JHQ71-5600	M23[x1)]/ M40	307.5[x2)]	337.5[x2)]	307.5[x 3)]	337.5[x2)]	307.5[x2)]	337.5[x2)]	Ø38x80/ 10x8x70
JHQ71-6800	M40	368.5	398.5	368.5	398.5	368.5	398.5	
JHQ71-8000	M40	413.5	443.5	413.5	443.5	413.5	443.5	

x1): **Connector size M23** only for motors with continuous stall torque M_o = 56 Nm and rated speed n_n = 2000 RPM, M_{max} = 230 Nm.
x2): With **connector size M40**, the motor has an additional length of +16 mm.
x3): With **connector size M40**, the motor has an additional length of +12 mm.

6.12.1 Technical data of the brake

The technical data of the brake for motor type JHQ71 are listed below:

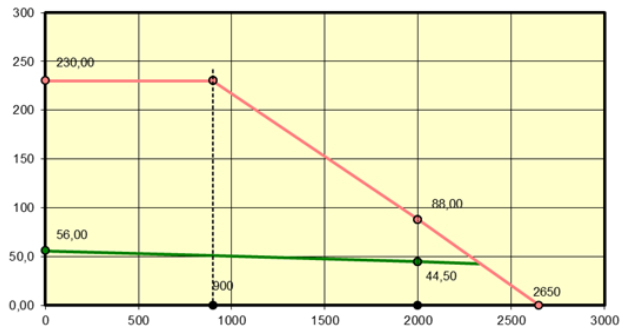
Technical specifications	Values		
Holding torque	M_{BR}	Nm	48
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	20.4
Rotor inertia	J_{BR}	kg*cm^2	32
Weight	m_{BR}	kg	5

6.12.2 Specific technical data (DC link voltage DC 560 V)

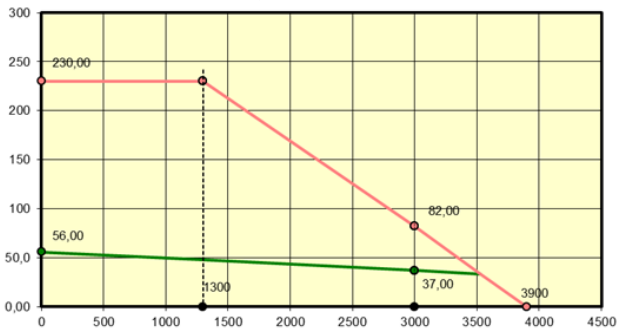
Motor type			JHQ71-5600-148	JHQ71-5600-098	JHQ71-6800-148	JHQ71-6800-098	JHQ71-8000-148	JHQ71-8000-098
Rated speed	N_n	RPM	2000	3000	2000	3000	2000	3000
Rated torque	M_n	Nm	44.5	37.0	51	40.9	58	44.0
Rated current	I_n	A	18.2	22.7	20.8	25.1	23.6	27.0
Holding torque	M_o	Nm	56	56	68	68	80	80
Continuous stall current	I_o	A	22.9	34.4	27.8	41.7	32.7	49.1
Max. torque	M_{max}	Nm	230	230	322	322	396	396
Max. current	I_{max}	A	134	201	188	282	231	347
Max. speed	N_{max}	RPM	4000	4000	4000	4000	4000	4000
Back EMF constant	K_E	V/kRPM	147.7	98.4	147.7	98.4	147.7	98.4
Torque constant	K_T	Nm/A	2.5	1.63	2.5	1.63	2.5	1.63
Winding resistance	R_{2ph}	Ω	0.31	0.15	0.23	0.10	0.18	0.08
Winding inductance	L_{2ph}	mH	5.6	2.7	4.7	2.1	4.1	1.80
Number of motor poles	P_{mot}		10	10	10	10	10	10
Idling speed	N_o	RPM	2650	3900	2650	3900	2550	3900
Max. torque at sea level	M_x	Nm	88	82	114	110	122	127
Thermal time constant - Copper winding	T_{ther_CU}	s	215	215	215	215	215	215
Electrical time constant	T_{el}	ms	18.1	18.0	20	21	23	23
Mechanical time constant	T_{mech}	ms	0.92	1.00	0.87	0.85	0.82	0.82
Thermal time constant	T_{th}	min	56	56	65	65	74	74
Rotor inertia without brake	J	kg*cm^2	102	102	130	130	158	158
Weight without brake	m	kg	38	38	47	47	55	55
Axial load	F_A	N	114	114	121	121	128	128
Radial load	F_R	N	1140	1140	1210	1210	1280	1280

6.12.3 Torque/speed characteristic (DC link voltage DC 560 V)

JHQ71-5600-148



JHQ71-5600-098



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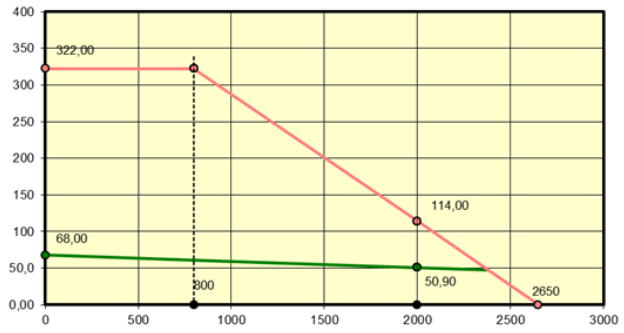

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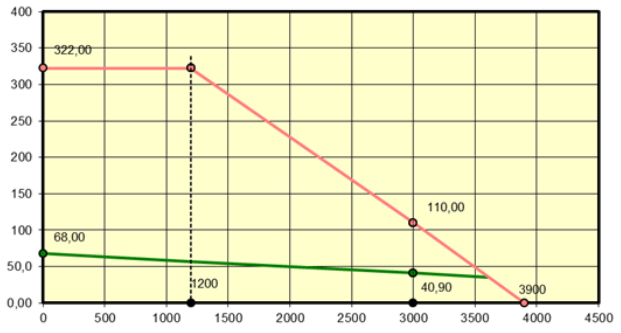

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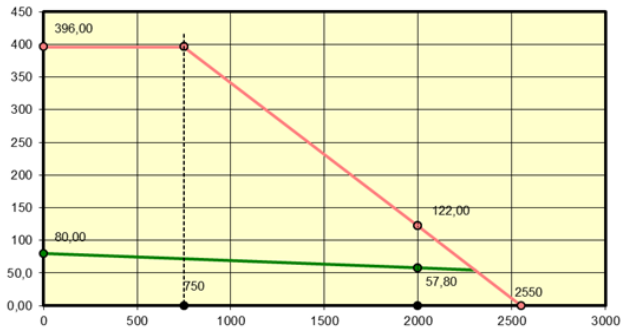
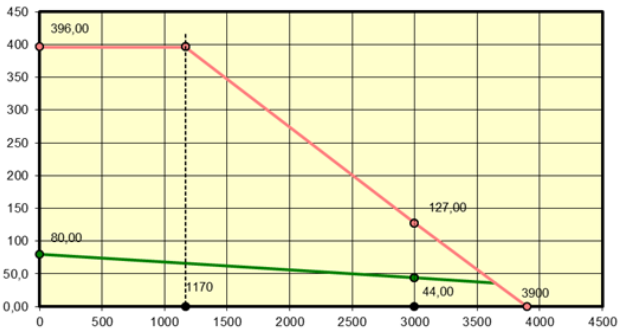
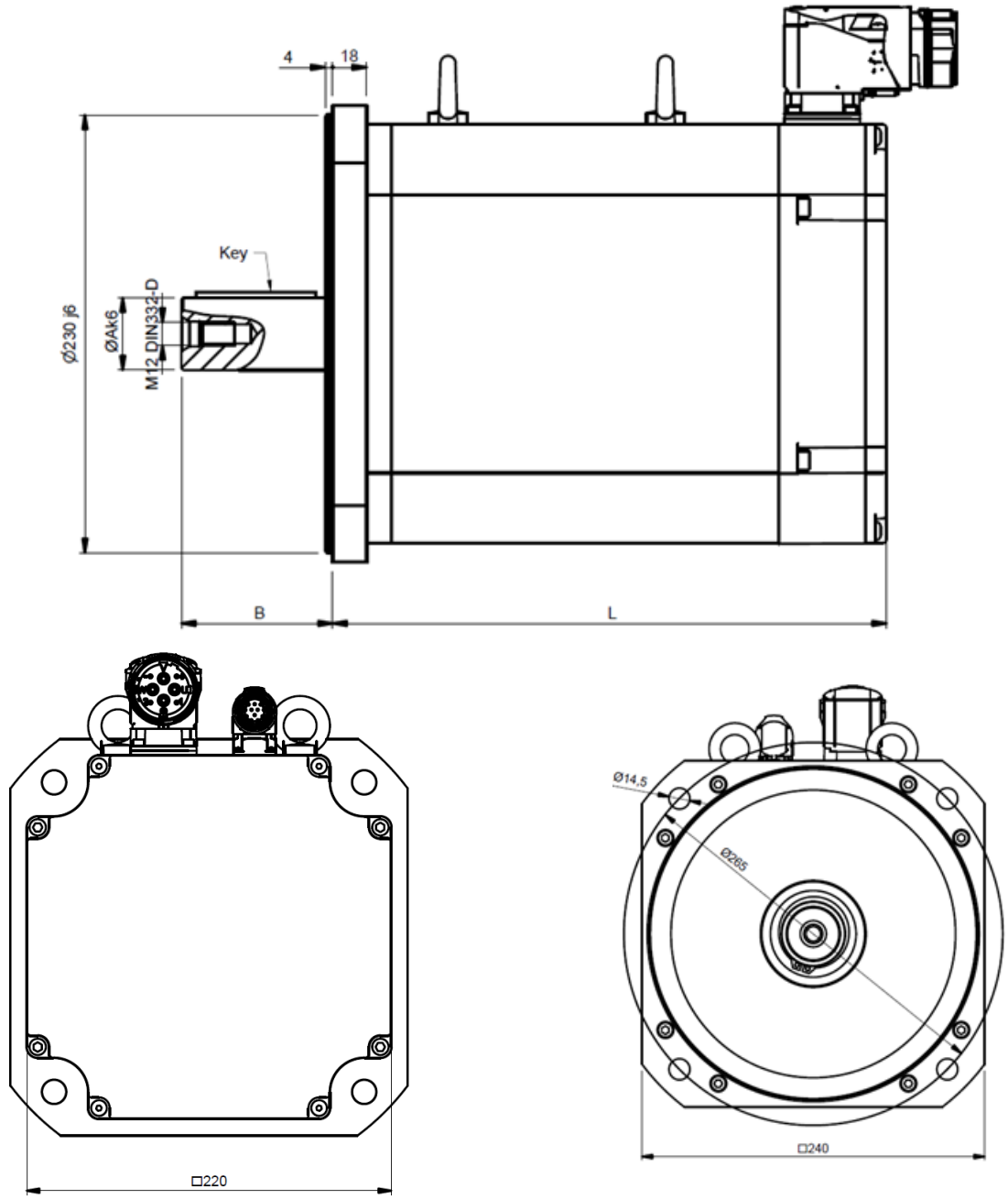


JHQ71-8000-098



6.13 Flange size - JHQ8



P = Power conn. size L = Length w/o brake L1 = Length with brake	P	L	L1	L	L1	L	L1	Shaft (AxB)/ feather key/ internal thread
Type		**Resolver/SEx37**		**SKx36/SRx50:**		**EEx37/EKx36:**		**mm**
JHQ8-4200	M40	293	343	321	371	321	371	Ø38x80/ 10x8x63/ M12 DIN 332-D
JHQ8-5800	M40	333	383	361	411	361	411	
JHQ8-7300	M40	373	423	401	451	401	451	
JHQ8-8100	M40	393	443	421	471	421	471	Ø42x110/ 12x8x63 M12 DIN 332-D
JHQ8-9800	M40	433	483	461	511	461	511	
JHQ8-12000	M40	493	543	521	571	521	571	

6.13.1 Technical data of the brake

The technical data of the brake for motor type JHQ8 are listed below:

Technical specifications	Values		
Holding torque	M_{BR}	Nm	145
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +10 %)
Rated power	P_{BR}	W	50
Rotor inertia	J_{BR}	kg*cm^2	53
Weight	m_{BR}	kg	7

6.13.2 Specific technical data (DC link voltage DC 560 V)

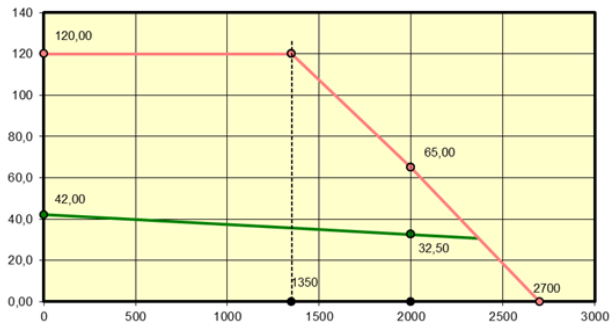
Motor type			JHQ8-4200-148	JHQ8-4200-098	JHQ8-5800-148	JHQ8-5800-098
Rated speed	N_n	RPM	2000	3000	2000	3000
Rated torque	M_n	Nm	32.5	27.5	43.0	38.2
Rated current	I_n	A	13.3	16.9	17.6	23.4
Holding torque	M_o	Nm	42.0	42.0	58	58
Continuous stall current	I_o	A	17.2	25.8	23.7	35.6
Max. torque	M_{max}	Nm	120	120	162	162
Max. current	I_{max}	A	60	90	84	127
Max. speed	N_{max}	RPM	3600	3600	3600	3600
Back EMF constant	K_E	V/kRPM	147.7	98.4	147.7	98.4
Torque constant	K_T	Nm/A	2.4	1.63	2.4	1.63
Winding resistance	R_{2ph}	Ω	0.53	0.23	0.36	0.13
Winding inductance	L_{2ph}	mH	12.7	5.4	8.6	3.2
Number of motor poles	P_{mot}		6	6	6	6
Idling speed	N_o	RPM	2700	3600	2750	3600
Max. torque at sea level	M_x	Nm	65	69	92	110
Thermal time constant - Copper winding	T_{ther_CU}	s	483	483	483	483
Electrical time constant	T_{el}	ms	24	23	24	25
Mechanical time constant	T_{mech}	ms	1.0	0.98	0.94	0.76
Thermal time constant	T_{th}	min	65	65	90	90
Rotor inertia without brake	J	kg*cm^2	65	65	90	90
Weight without brake	m	kg	48	48	55	55
Axial load	F_A	N	315	315	323	323
Radial load	F_R	N	3150	3150	3230	3230

Motor type			**JHQ8-7300-148**	**JHQ8-7300-098**	**JHQ8-8100-148**	**JHQ8-8100-098**
Rated speed	N_n	RPM	2000	3000	2000	3000
Rated torque	M_n	Nm	54	48.9	60	54
Rated current	I_n	A	21.9	30.0	24.6	32.8
Holding torque	M_o	Nm	73	73	81	81
Continuous stall current	I_o	A	29.9	44.8	33.1	49.7
Max. torque	M_{max}	Nm	204	204	231	231
Max. current	I_{max}	A	109	163	121	181
Max. speed	N_{max}	RPM	3600	3600	3600	3600
Back EMF constant	K_E	V/kRPM	147.7	98.4	147.7	98.4
Torque constant	K_T	Nm/A	2.4	1.63	2.4	1.63
Winding resistance	R_{2ph}	Ω	0.24	0.10	0.22	0.10
Winding inductance	L_{2ph}	mH	7.3	2.6	6.5	2.9
Number of motor poles	P_{mot}		6	6	6	6
Idling speed	N_o	RPM	2750	3600	2750	3600
Max. torque at sea level	M_x	Nm	110	135	125	125
Thermal time constant - Copper winding	T_{ther_CU}	s	483	483	483	483
Electrical time constant	T_{el}	ms	30	26	30	29
Mechanical time constant	T_{mech}	ms	0.80	0.74	0.81	0.82
Thermal time constant	T_{th}	min	114	114	70	70
Rotor inertia without brake	J	$kg*cm^2$	114	114	126	126
Weight without brake	m	kg	62	62	67	67
Axial load	F_A	N	332	332	332	332
Radial load	F_R	N	3320	3320	3320	3320

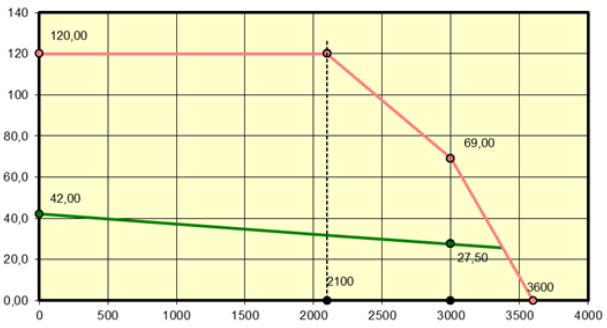
Motor type			**JHQ8-9800-148**	**JHQ8-9800-098**	**JHQ8-12000-148**	**JHQ8-12000-098**
Rated speed	N_n	RPM	2000	3000	2000	3000
Rated torque	M_n	Nm	73	61	86	67
Rated current	I_n	A	29.7	37.1	35.0	41.1
Holding torque	M_o	Nm	98	98	120	120
Continuous stall current	I_o	A	40.1	60	49.1	74
Max. torque	M_{max}	Nm	280	280	345	345
Max. current	I_{max}	A	145	217	181	271
Max. speed	N_{max}	RPM	3600	3600	3600	3600
Back EMF constant	K_E	V/kRPM	147.7	98.4	147.7	98.4
Torque constant	K_T	Nm/A	2.4	1.63	2.4	1.63
Winding resistance	R_{2ph}	Ω	0.17	0.08	0.12	0.05
Winding inductance	L_{2ph}	mH	4.9	2.2	3.9	1.70
Number of motor poles	P_{mot}		6	6	6	6
Idling speed	N_o	RPM	2750	3600	2750	3600
Max. torque at sea level	M_x	Nm	165	165	210	210
Thermal time constant - Copper winding	T_{ther_CU}	s	483	483	483	483
Electrical time constant	T_{el}	ms	29	28	33	34
Mechanical time constant	T_{mech}	ms	0.74	0.78	0.67	0.63
Thermal time constant	T_{th}	min	80	80	90	90
Rotor inertia without brake	J	kg*cm^2	150	150	192	192
Weight without brake	m	kg	76	76	92	92
Axial load	F_A	N	334	334	340	340
Radial load	F_R	N	3340	3340	3400	3400

6.13.3 Torque/speed characteristic (DC link voltage DC 560 V)

JHQ8-4200-148



JHQ8-4200-098



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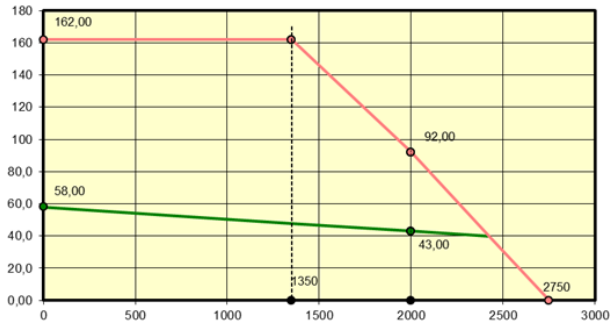

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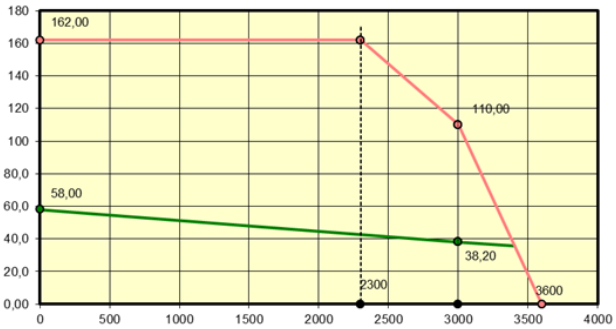

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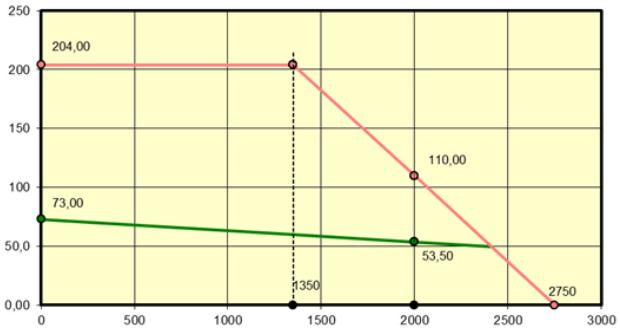

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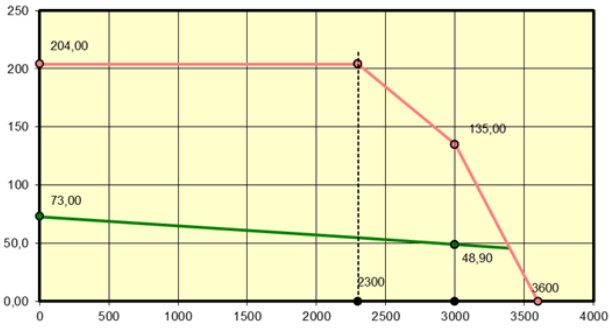

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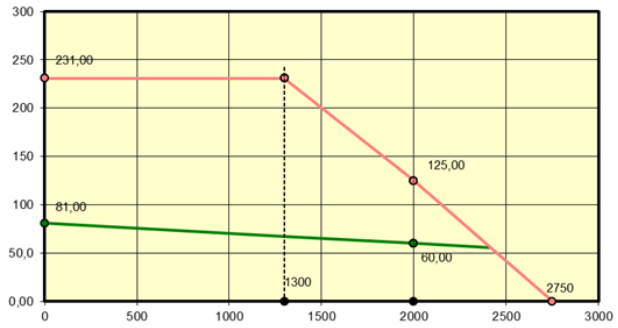

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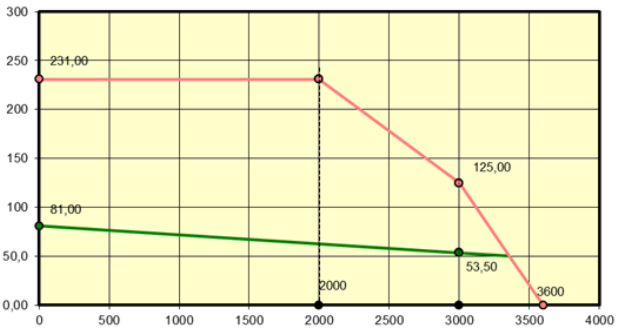

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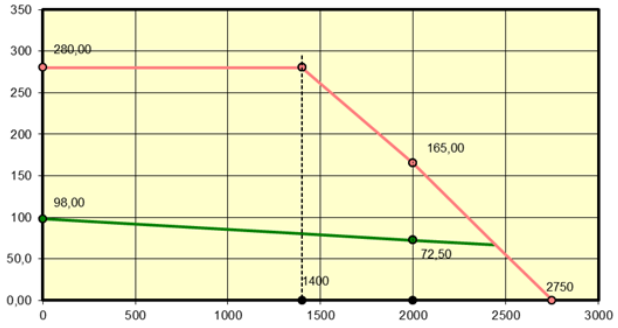

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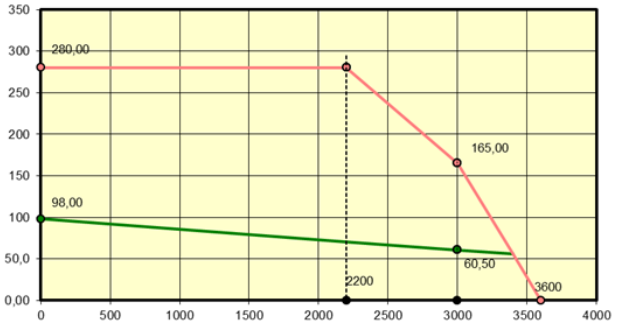

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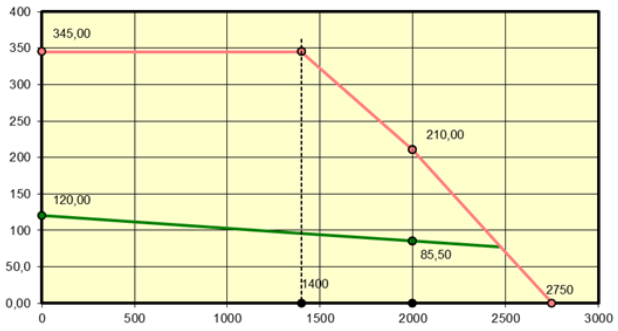

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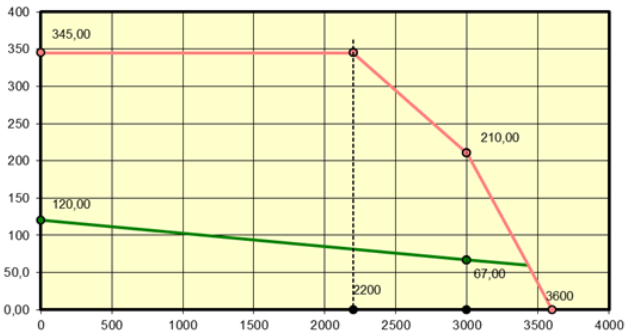


7 Servo motors of the JL series

The table below lists the tolerance of the shaft length according to DIN ISO 2768-1, Table 1, for longitudinal dimensions of the JL series:

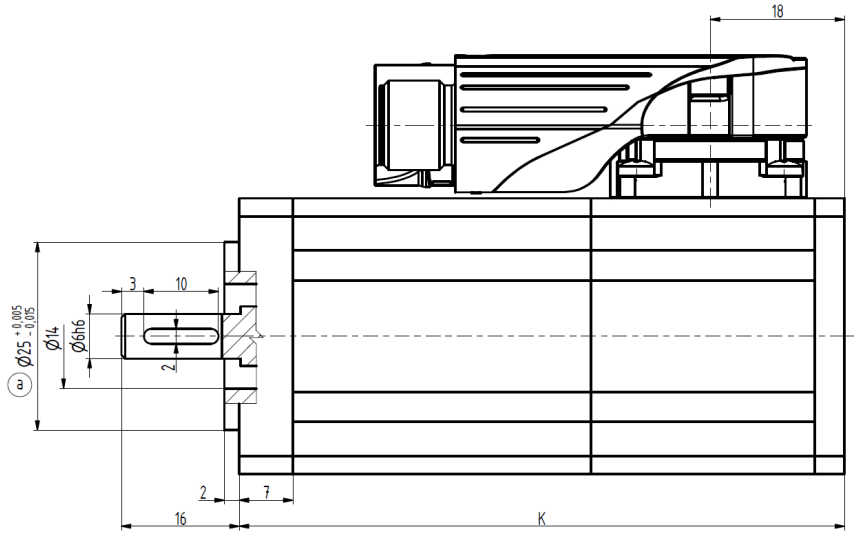
Tolerance class	Limit deviations in mm for nominal dimension range in mm									
	up to 0.5	0.5 through 3	over 3 to 6	over 6 to 30	over 30 to 120	over 120 to 400	over 400 to 1000	over 1000 to 2000	over 2000 to 4000	over 4000 to 8000
v (very coarse)	See below[1)]	-	± 0.5	± 1	± 1.5	± 2.5	± 4	± 6	± 8	± 8

[1)] For nominal dimensions below 0.5 mm, the limit deviations must be indicated directly on the nominal dimension.

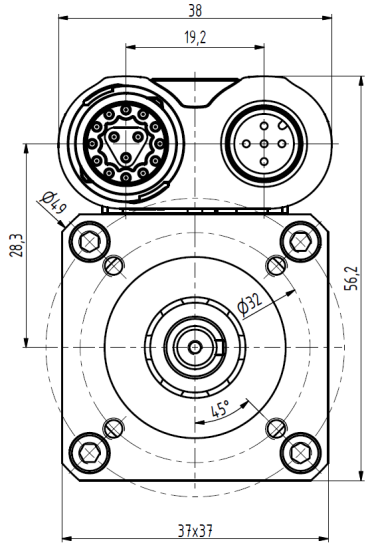
The following illustrations of flange sizes show the dimensions in millimeters of motors equipped with a resolver.

7.1 Flange size - JL1

JL1 with Y-Tec connector (option SA-X):

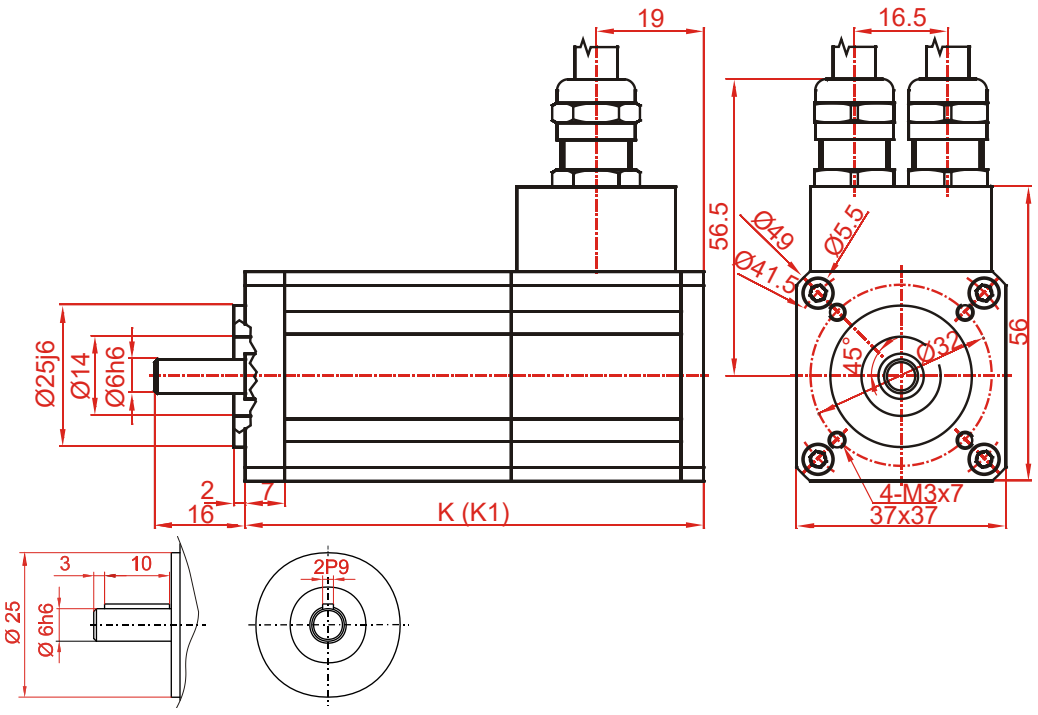


Option with feather key 5x5x22



P = Power connector size K = Dimension without brake K1 = Dimension with brake	**P** SA-X	S3-xx.x = Without cable connector	**P** S4-xx.x = With cable and cable connector	**K**	**K1**
Type				**Resolver**	
JL1-0010	Y	-	M23	81	111
JL1-0020	Y	-	M23	96	126
JL1-0030	Y	-	M23	111	141

JL1 with option S3-xx.x or S4-xx.x:



Option with feather key 2x2x10

7.1.1 Technical data of the brake

The technical data of the brake for motor type JL1 are listed below:

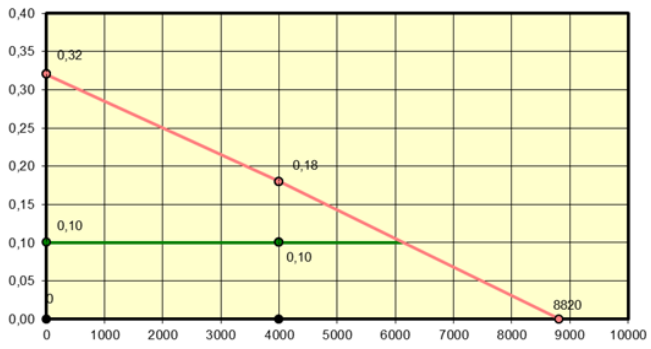
Technical specifications	**Values**		
Holding torque	M_{BR}	Nm	0.4
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	8
Rotor inertia	J_{BR}	kg*cm^2	0.013
Weight	m_{BR}	kg	0.08

7.1.2 Specific technical data (DC link voltage DC 24 V)

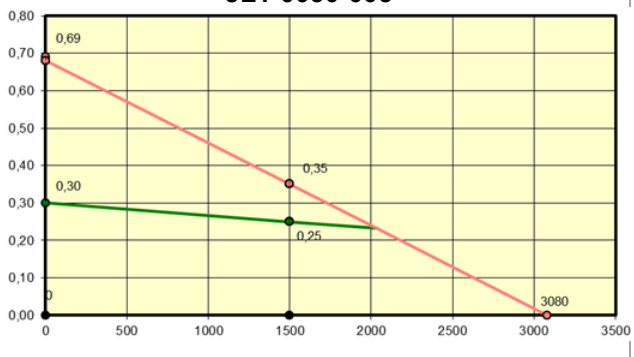
Motor type			**JL1-0010-002**	**JL1-0030-005**
Rated speed	N_n	RPM	4000	1500
Rated torque	M_n	Nm	0.10	0.25
Rated current	I_n	A	3.8	3.3
Holding torque	M_o	Nm	0.10	0.30
Continuous stall current	I_o	A	3.6	3.8
Max. torque	M_{max}	Nm	0.32	0.69
Max. current	I_{max}	A	12.0	8.7
Max. speed	N_{max}	RPM	12000	12000
Back EMF constant	K_E	V/kRPM	1.7	4.8
Torque constant	K_T	Nm/A	0.03	0.08
Winding resistance	R_{2ph}	Ω	1.04	1.43
Winding inductance	L_{2ph}	mH	0.30	0.40
Number of motor poles	P_{mot}		6	6
Idling speed	N_o	RPM	8820	3080
Max. torque at sea level	M_x	Nm	0.18	0.35
Thermal time constant - Copper winding	T_{ther_CU}	s	5	5
Electrical time constant	T_{el}	ms	0.29	0.28
Mechanical time constant	T_{mech}	ms	13.7	3.9
Thermal time constant	T_{th}	min	18.0	22
Rotor inertia without brake	J	$kg*cm^2$	0.06	0.10
Weight without brake	m	kg	0.37	0.53
Axial load	F_A	N	31	35
Radial load	F_R	N	161	182

7.1.3 Torque/speed characteristic (DC link voltage DC 24 V)

JL1-0010-002



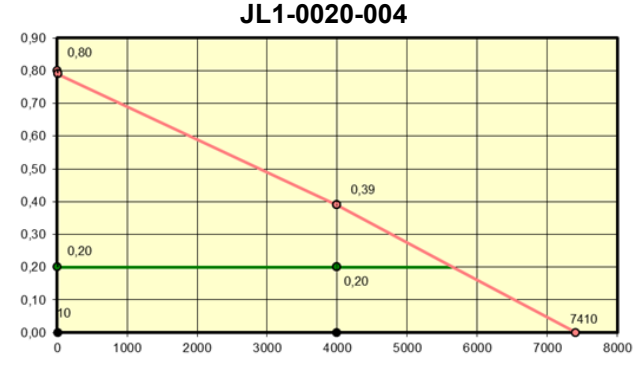
JL1-0030-005



7.1.4 Specific technical data (DC link voltage DC 48 V)

Motor type			**JL1-0020-004**
Rated speed	N_n	RPM	4000
Rated torque	M_n	Nm	0.20
Rated current	I_n	A	3.2
Holding torque	M_o	Nm	0.20
Continuous stall current	I_o	A	3.0
Max. torque	M_{max}	Nm	0.80
Max. current	I_{max}	A	12.9
Max. speed	N_{max}	RPM	12000
Back EMF constant	K_E	V/kRPM	4.0
Torque constant	K_T	Nm/A	0.07
Winding resistance	R_{2ph}	Ω	1.92
Winding inductance	L_{2ph}	mH	0.50
Number of motor poles	P_{mot}		6
Idling speed	N_o	RPM	7410
Max. torque at sea level	M_x	Nm	0.39
Thermal time constant - Copper winding	T_{ther_CU}	s	5
Electrical time constant	T_{el}	ms	0.26
Mechanical time constant	T_{mech}	ms	6.1
Thermal time constant	T_{th}	min	20
Rotor inertia without brake	J	$kg*cm^2$	0.08
Weight without brake	m	kg	0.45
Axial load	F_A	N	33
Radial load	F_R	N	174

7.1.5 Torque/speed characteristic (DC link voltage DC 48 V)

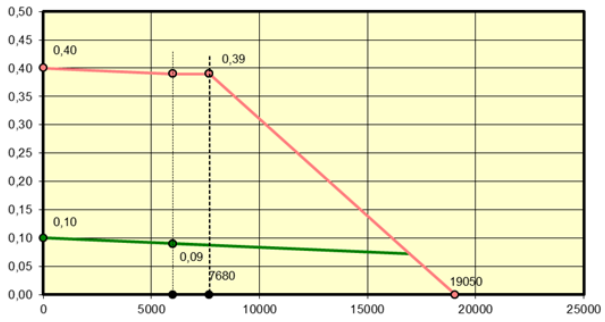


7.1.6 Specific technical data (DC link voltage DC 320 V)

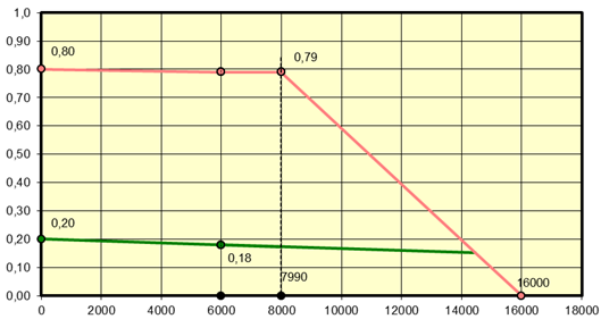
Motor type			**JL1-0010-010**	**JL1-0020-012**	**JL1-0030-019**
Rated speed	N_n	RPM	6000	6000	6000
Rated torque	M_n	Nm	0.09	0.18	0.27
Rated current	I_n	A	0.56	0.92	0.89
Holding torque	M_o	Nm	0.10	0.20	0.30
Continuous stall current	I_o	A	0.58	0.97	0.95
Max. torque	M_{max}	Nm	0.40	0.80	1.2
Max. current	I_{max}	A	2.5	4.2	4.1
Max. speed	N_{max}	RPM	12000	12000	12000
Back EMF constant	K_E	V/kRPM	10.5	12.5	19.5
Torque constant	K_T	Nm/A	0.17	0.21	0.31
Winding resistance	R_{2ph}	Ω	38.9	18.9	22.9
Winding inductance	L_{2ph}	mH	9.2	4.5	6.5
Number of motor poles	P_{mot}		6	6	6
Idling speed	N_o	RPM	19050	16000	10460
Max. torque at sea level	M_x	Nm	0.39	0.79	0.91
Thermal time constant - Copper winding	T_{ther_CU}	s	5	5	5
Electrical time constant	T_{el}	ms	0.24	0.24	0.28
Mechanical time constant	T_{mech}	ms	13.4	6.1	3.8
Thermal time constant	T_{th}	min	18.0	20	22
Rotor inertia without brake	J	kg*cm^2	0.06	0.08	0.10
Weight without brake	m	kg	0.37	0.45	0.53
Axial load	F_A	N	31	33	35
Radial load	F_R	N	161	174	182

7.1.7 Torque/speed characteristic (DC link voltage DC 320 V)

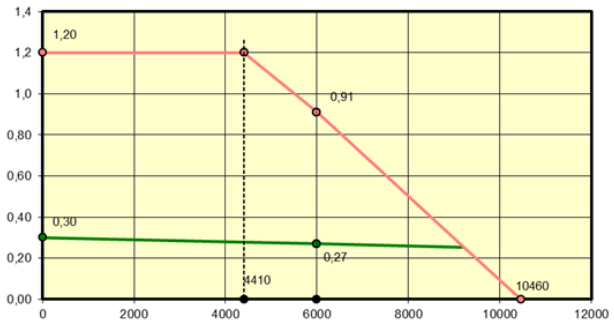
JL1-0010-010



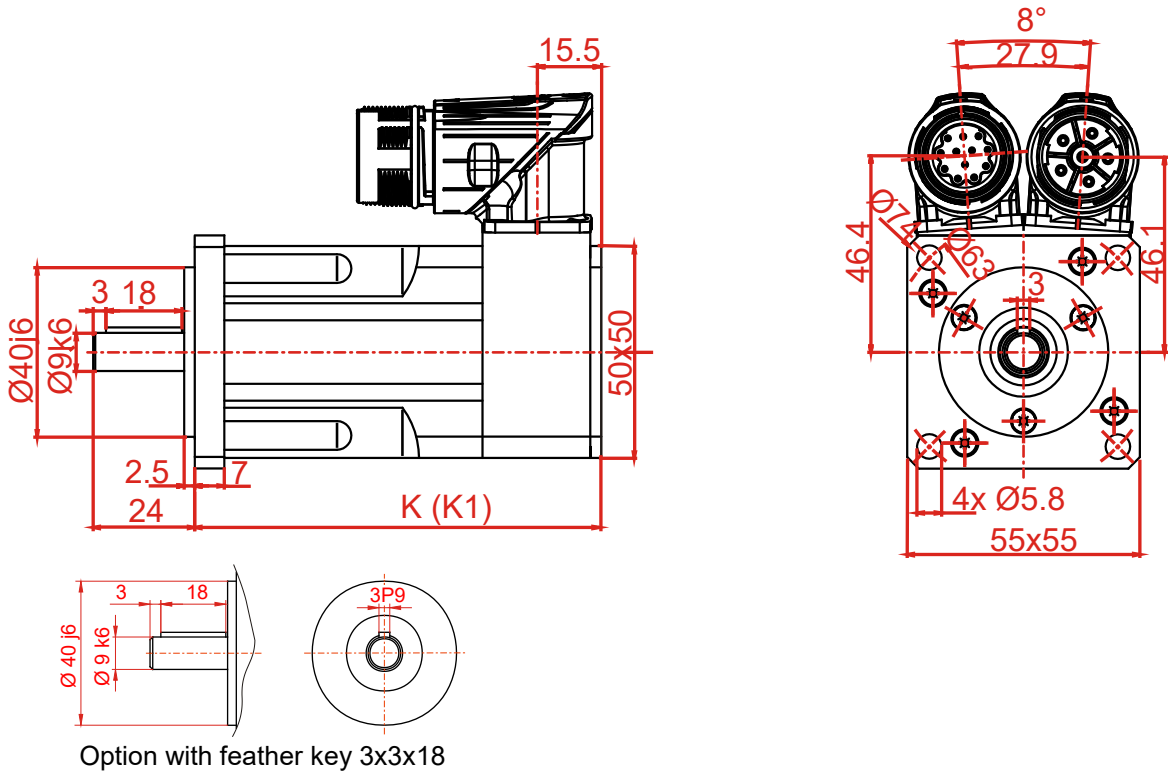
JL1-0020-012



JL1-0030-019



7.2 Flange size - JL2



Option with feather key 3x3x18

P = Power connector size K = Dimension w/o brake K1 = Dimension with brake	**P**	**K**	**K1**	**K**	**K1**
Type		**Resolver**		**SKx36**	
JL2-0020	M23	98	131	109	142
JL2-0040	M23	113	146	124	157
JL2-0060	M23	128	161	139	172
JL2-0080	M23	143	176	154	187

7.2.1 Technical data of the brake

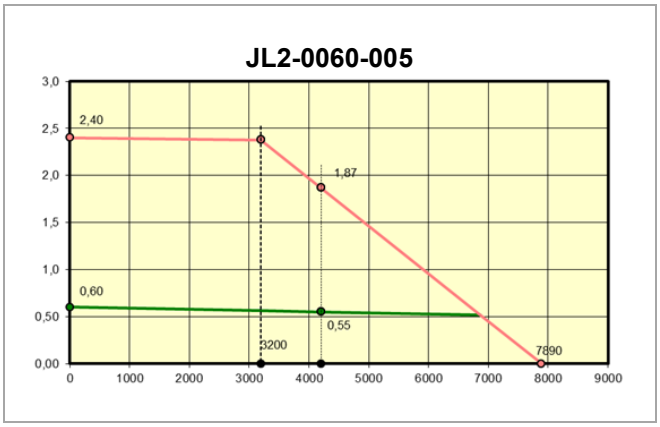
The technical data of the brake for motor type JL2 are listed below:

Technical specifications	**Values**		
Holding torque	M_{BR}	Nm	2
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	11
Rotor inertia	J_{BR}	kg*cm^2	0.068
Weight	m_{BR}	kg	0.15

7.2.2 Specific technical data (DC link voltage DC 70 V)

Motor type			**JL2-0060-005**
Rated speed	N_n	RPM	4200
Rated torque	M_n	Nm	0.55
Rated current	I_n	A	6.3
Holding torque	M_o	Nm	0.60
Continuous stall current	I_o	A	6.5
Max. torque	M_{max}	Nm	2.4
Max. current	I_{max}	A	28
Max. speed	N_{max}	RPM	12000
Back EMF constant	K_E	V/kRPM	5.5
Torque constant	K_T	Nm/A	0.09
Winding resistance	R_{2ph}	Ω	0.67
Winding inductance	L_{2ph}	mH	0.60
Number of motor poles	P_{mot}		6
Idling speed	N_o	RPM	7890
Max. torque at sea level	M_x	Nm	1.9
Thermal time constant - Copper winding	T_{ther_CU}	s	18
Electrical time constant	T_{el}	ms	0.90
Mechanical time constant	T_{mech}	ms	1.5
Thermal time constant	T_{th}	min	20
Rotor inertia without brake	J	$kg*cm^2$	0.11
Weight without brake	m	kg	1.2
Axial load	F_A	N	47
Radial load	F_R	N	245

7.2.3 Torque/speed characteristic (DC link voltage DC 70 V)



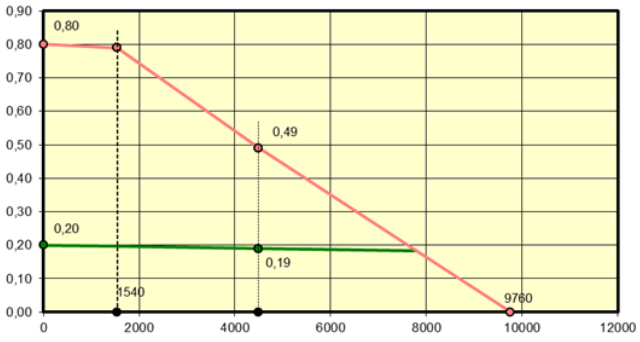
7.2.4 Specific technical data (DC link voltage DC 320 V)

Motor type			**JL2-0020-020**	**JL2-0020-008**	**JL2-0040-026**	**JL2-0040-008**	**JL2-0060-031**	**JL2-0060-008**
Rated speed	N_n	RPM	4500	6000	4500	6000	4500	6000
Rated torque	M_n	Nm	0.19	0.18	0.36	0.35	0.55	0.53
Rated current	I_n	A	0.60	1.45	0.88	2.6	1.18	4.1
Holding torque	M_o	Nm	0.20	0.20	0.40	0.40	0.60	0.60
Continuous stall current	I_o	A	0.59	1.47	0.93	2.8	1.23	4.4
Max. torque	M_{max}	Nm	0.80	0.80	1.6	1.6	2.4	2.4
Max. current	I_{max}	A	2.5	6.3	4.0	12.1	5.3	18.7
Max. speed	N_{max}	RPM	12000	12000	12000	12000	12000	12000
Back EMF constant	K_E	V/kRPM	20.5	8.2	26.0	8.6	30.0	8.3
Torque constant	K_T	Nm/A	0.34	0.14	0.43	0.14	0.49	0.14
Winding resistance	R_{2ph}	Ω	54	8.7	26.3	2.6	19.9	1.41
Winding inductance	L_{2ph}	mH	32.0	5.1	21.4	2.2	17.2	1.30
Number of motor poles	P_{mot}		6	6	6	6	6	6
Idling speed	N_o	RPM	9760	24040	7690	23150	6780	23960
Max. torque at sea level	M_x	Nm	0.49	0.78	0.95	1.6	1.2	2.4
Thermal time constant - Copper winding	T_{ther_CU}	s	18	18	18	18	18	18
Electrical time constant	T_{el}	ms	0.59	0.59	0.82	0.85	0.87	0.92
Mechanical time constant	T_{mech}	ms	4.9	4.9	2.0	1.8	1.5	1.4
Thermal time constant	T_{th}	min	10.0	10.0	15.0	15.0	20	20
Rotor inertia without brake	J	kg*cm^2	0.06	0.06	0.08	0.08	0.11	0.11
Weight without brake	m	kg	0.90	0.90	1.1	1.1	1.2	1.2
Axial load	F_A	N	43	43	45	45	47	47
Radial load	F_R	N	225	225	237	237	245	245

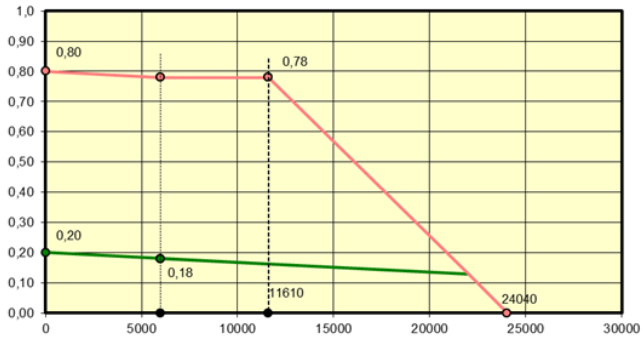
Motor type			**JL2-0080-025**
Rated speed	N_n	RPM	4500
Rated torque	M_n	Nm	0.72
Rated current	I_n	A	1.76
Holding torque	M_o	Nm	0.80
Continuous stall current	I_o	A	1.86
Max. torque	M_{max}	Nm	3.2
Max. current	I_{max}	A	8.0
Max. speed	N_{max}	RPM	12000
Back EMF constant	K_E	V/kRPM	26.0
Torque constant	K_T	Nm/A	0.43
Winding resistance	R_{2ph}	Ω	9.3
Winding inductance	L_{2ph}	mH	9.0
Number of motor poles	P_{mot}		6
Idling speed	N_o	RPM	7650
Max. torque at sea level	M_x	Nm	2.5
Thermal time constant - Copper winding	T_{ther_CU}	s	18
Electrical time constant	T_{el}	ms	0.97
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	22
Rotor inertia without brake	J	$kg*cm^2$	0.13
Weight without brake	m	kg	1.4
Axial load	F_A	N	48
Radial load	F_R	N	252

7.2.5 Torque/speed characteristic (DC link voltage DC 320 V)

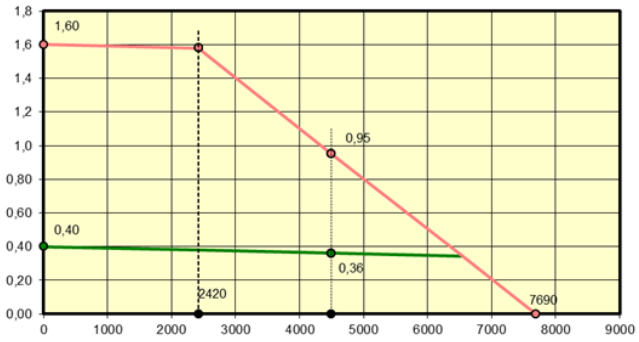
JL2-0020-020



JL2-0020-008



JL2-0040-026



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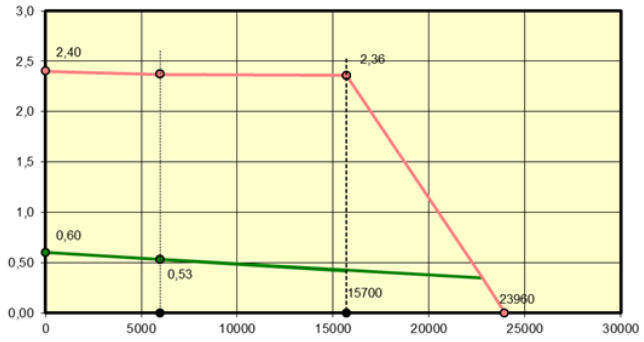

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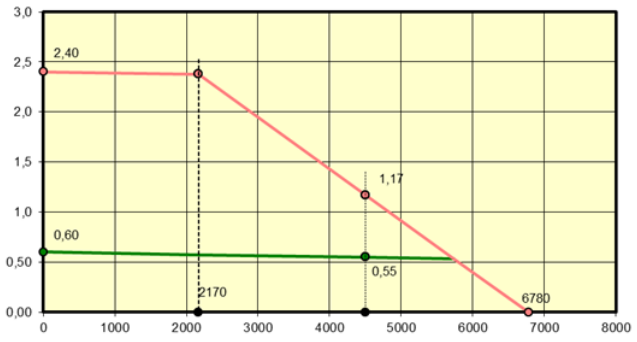

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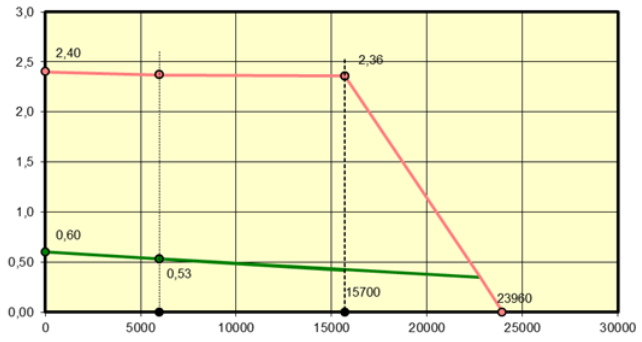
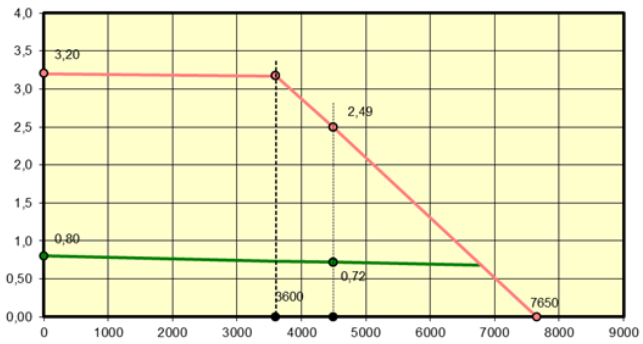


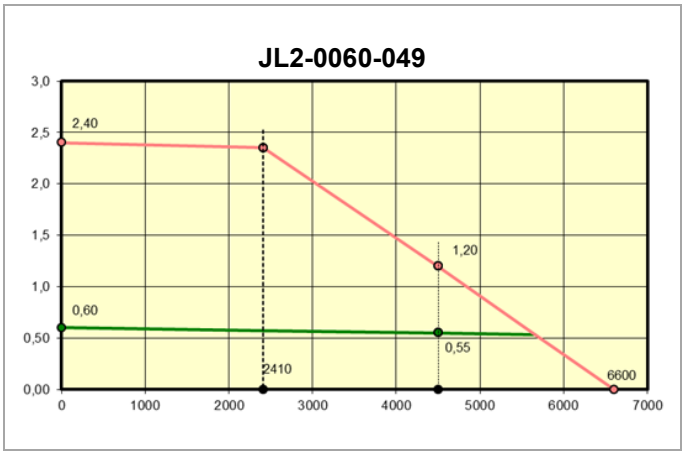
JL2-0080-025



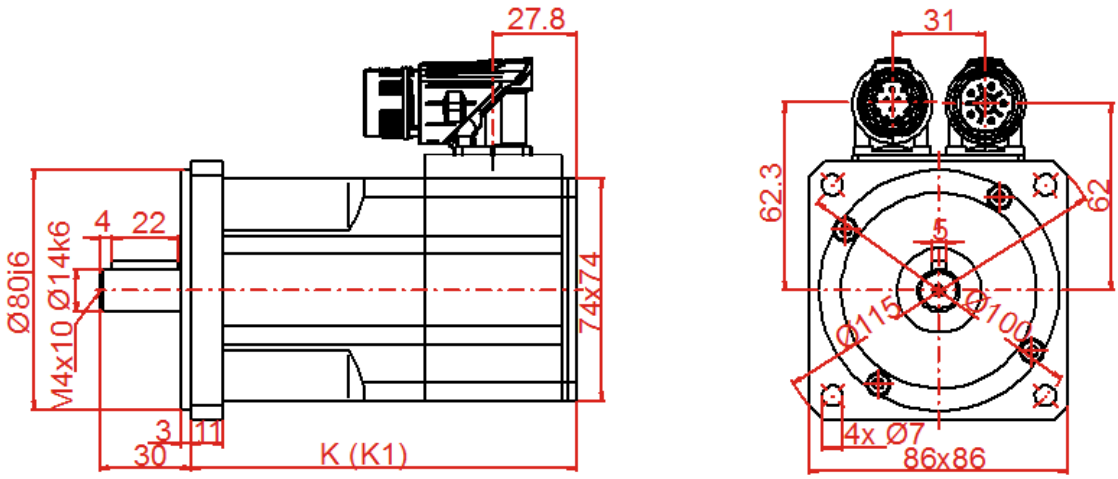
7.2.6 Specific technical data (DC link voltage DC 560 V)

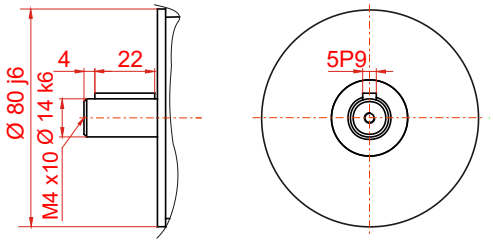
Motor type			**JL2-0060-049**
Rated speed	N_n	RPM	4500
Rated torque	M_n	Nm	0.55
Rated current	I_n	A	0.70
Holding torque	M_o	Nm	0.60
Continuous stall current	I_o	A	0.73
Max. torque	M_{max}	Nm	2.4
Max. current	I_{max}	A	3.1
Max. speed	N_{max}	RPM	12000
Back EMF constant	K_E	V/kRPM	50.0
Torque constant	K_T	Nm/A	0.83
Winding resistance	R_{2ph}	Ω	51
Winding inductance	L_{2ph}	mH	45.5
Number of motor poles	P_{mot}		6
Idling speed	N_o	RPM	6600
Max. torque at sea level	M_x	Nm	1.2
Thermal time constant - Copper winding	T_{ther_CU}	s	18
Electr. time constant	T_{el}	ms	0.90
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	20
Rotor inertia without brake	J	$kg*cm^2$	0.11
Weight without brake	m	kg	1.2
Axial load	F_A	N	47
Radial load	F_R	N	245

7.2.7 Torque/speed characteristic (DC link voltage DC 560 V)



7.3 Flange size - JL3





Option with feather key 5x5x22

P = Power connector size K = Dimension without brake K1 = Dimension with brake	P	K	K1	K	K1
Type		Resolver		SRx50	
JL3-0065	M23	109	142	128.5	161.5
JL3-0130	M23	127	160	146.5	179.5
JL3-0250	M23	163	196	182.5	215.5
JL3-0300	M23	181	214	200.5	233.5

7.3.1 Technical data of the brake

The technical data of the brake for motor type JL3 are listed below:

Technical specifications	Values		
Holding torque	M_{BR}	Nm	4.5
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	12
Rotor inertia	J_{BR}	kg*cm^2	0.18
Weight	m_{BR}	kg	0.47

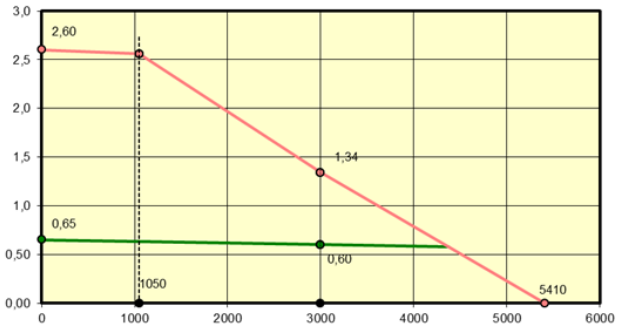
7.3.2 Specific technical data (DC link voltage DC 320 V)

Motor type			**JL3-0065-036**	**JL3-0130-026**	**JL3-0250-050**	**JL3-0250-025**	**JL3-0250-015**
Rated speed	N_n	RPM	3000	4500	3000	4500	4500
Rated torque	M_n	Nm	0.60	1.05	2.2	2.0	2.0
Rated current	I_n	A	1.04	2.5	2.7	4.9	8.5
Holding torque	M_o	Nm	0.65	1.30	2.5	2.5	2.5
Continuous stall current	I_o	A	1.06	2.9	3.0	5.8	10.1
Max. torque	M_{max}	Nm	2.6	5.2	10.0	10.0	10.0
Max. current	I_{max}	A	4.6	12.5	13.0	25	43
Max. speed	N_{max}	RPM	12000	12000	12000	12000	12000
Back EMF constant	K_E	V/kRPM	37.0	27.0	50.0	26.0	15.0
Torque constant	K_T	Nm/A	0.61	0.45	0.83	0.43	0.25
Winding resistance	R_{2ph}	Ω	28.2	4.2	5.4	1.38	0.46
Winding inductance	L_{2ph}	mH	33.3	7.2	11.7	3.1	1.00
Number of motor poles	P_{mot}		6	6	6	6	6
Idling speed	N_o	RPM	5410	7370	4000	7680	13310
Max. torque at sea level	M_x	Nm	1.3	4.2	4.9	9.9	9.9
Thermal time constant - Copper winding	T_{ther_CU}	s	24	24	24	24	24
Electrical time constant	T_{el}	ms	1.2	1.7	2.2	2.2	2.2
Mechanical time constant	T_{mech}	ms	6.5	2.4	1.9	1.8	1.8
Thermal time constant	T_{th}	min	25	30	32	32	32
Rotor inertia without brake	J	$kg*cm^2$	0.50	0.65	1.4	1.4	1.4
Weight without brake	m	kg	1.8	2.3	3.2	3.2	3.2
Axial load	F_A	N	70	75	80	80	80
Radial load	F_R	N	370	393	422	422	422

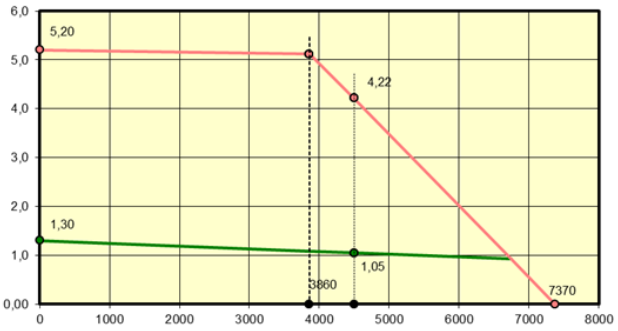
Motor type			**JL3-0300-046**	**JL3-0300-026**
Rated speed	N_n	RPM	3000	4500
Rated torque	M_n	Nm	2.5	2.1
Rated current	I_n	A	3.2	5.2
Holding torque	M_o	Nm	3.0	3.0
Continuous stall current	I_o	A	3.7	7.0
Max. torque	M_{max}	Nm	12.0	12.0
Max. current	I_{max}	A	15.8	30
Max. speed	N_{max}	RPM	12000	12000
Back EMF constant	K_E	V/kRPM	49.5	26.0
Torque constant	K_T	Nm/A	0.82	0.43
Winding resistance	R_{2ph}	Ω	3.7	1.01
Winding inductance	L_{2ph}	mH	8.6	2.4
Number of motor poles	P_{mot}		6	6
Idling speed	N_o	RPM	4030	7680
Max. torque at sea level	M_x	Nm	7.1	11.9
Thermal time constant - Copper winding	T_{ther_CU}	s	24	24
Electrical time constant	T_{el}	ms	2.3	2.4
Mechanical time constant	T_{mech}	ms	1.4	1.4
Thermal time constant	T_{th}	min	33	33
Rotor inertia without brake	J	$kg*cm^2$	1.5	1.5
Weight without brake	m	kg	3.7	3.7
Axial load	F_A	N	82	82
Radial load	F_R	N	431	431

7.3.3 Torque/speed characteristic (DC link voltage DC 320 V)

JL3-0065-036



JL3-0130-026



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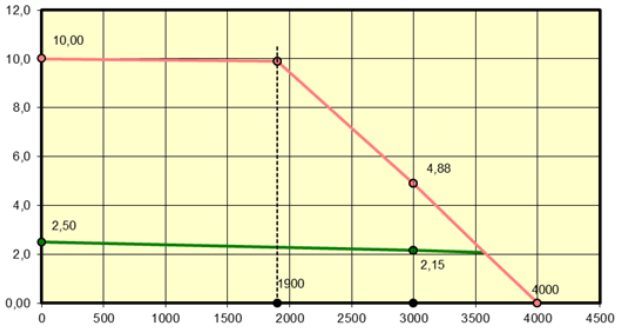

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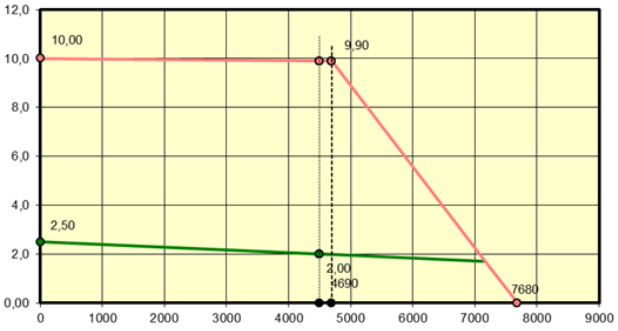
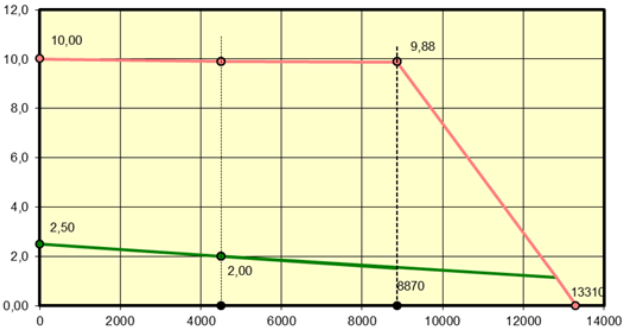


JL3-0250-015



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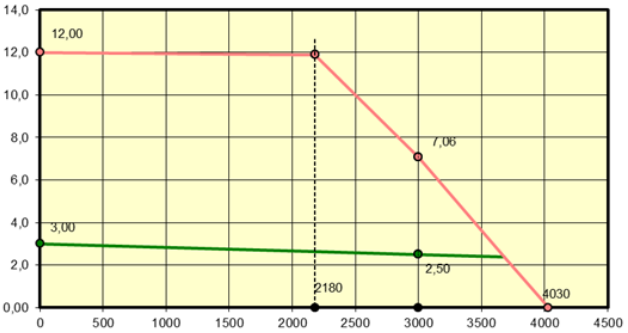

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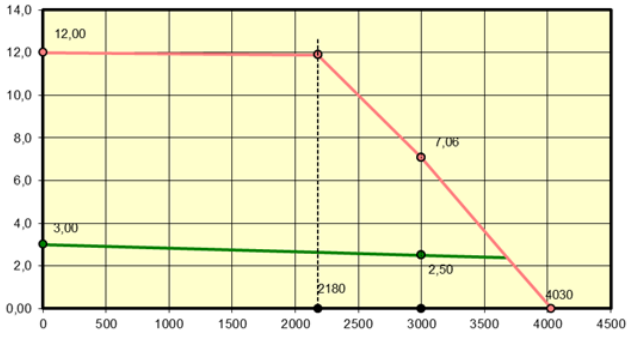
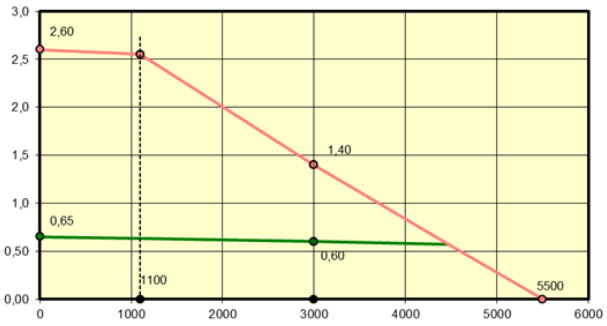


7.3.4 Specific technical data (DC link voltage DC 560 V)

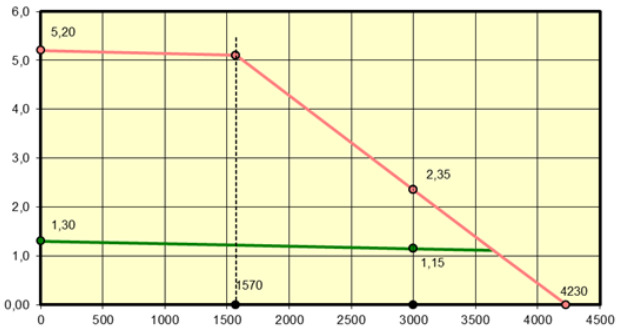
Motor type			**JL3-0065-059**	**JL3-0130-077**	**JL3-0130-047**	**JL3-0250-083**	**JL3-0300-068**
Rated speed	N_n	RPM	3000	3000	6000	3000	4000
Rated torque	M_n	Nm	0.60	1.15	1.00	2.2	2.3
Rated current	I_n	A	0.64	0.95	1.40	1.62	2.0
Holding torque	M_o	Nm	0.65	1.30	1.30	2.5	3.0
Continuous stall current	I_o	A	0.65	1.01	1.67	1.80	2.6
Max. torque	M_{max}	Nm	2.6	5.2	5.2	10.0	12.0
Max. current	I_{max}	A	2.8	4.3	7.2	7.7	11.0
Max. speed	N_{max}	RPM	12000	12000	12000	12000	12000
Back EMF constant	K_E	V/kRPM	60.0	78.0	47.0	84.0	71.0
Torque constant	K_T	Nm/A	0.99	1.29	0.78	1.39	1.17
Winding resistance	R_{2ph}	Ω	75	34.5	12.7	15.0	7.5
Winding inductance	L_{2ph}	mH	88	62	21.5	33.2	17.6
Number of motor poles	P_{mot}		6	6	6	6	6
Idling speed	N_o	RPM	5500	4230	7020	3930	4630
Max. torque at sea level	M_x	Nm	1.4	2.4	1.7	4.6	4.4
Thermal time constant - Copper winding	T_{ther_CU}	s	24	24	24	24	24
Electrical time constant	T_{el}	ms	1.2	1.8	1.7	2.2	2.3
Mechanical time constant	T_{mech}	ms	6.6	2.3	2.4	1.9	1.4
Thermal time constant	T_{th}	min	25	30	30	32	33
Rotor inertia without brake	J	$kg*cm^2$	0.50	0.65	0.65	1.4	1.5
Weight without brake	m	kg	1.8	2.3	2.3	3.2	3.7
Axial load	F_A	N	70	75	75	80	82
Radial load	F_R	N	370	393	393	422	431

7.3.5 Torque/speed characteristic (DC link voltage DC 560 V)

JL3-0065-059



JL3-0130-077



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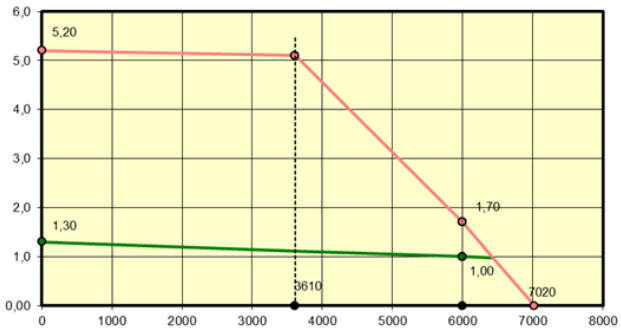

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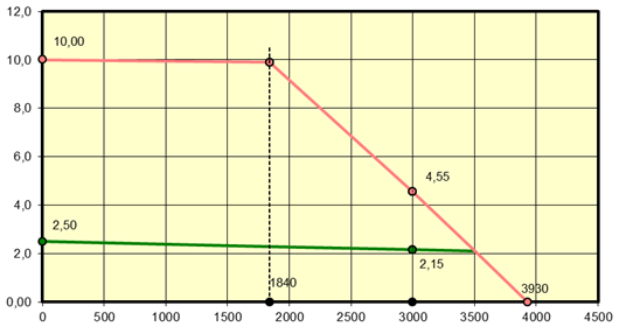

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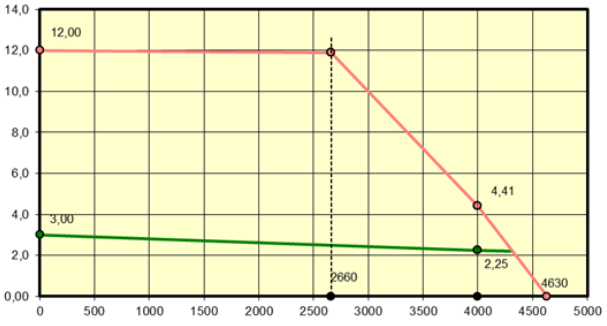
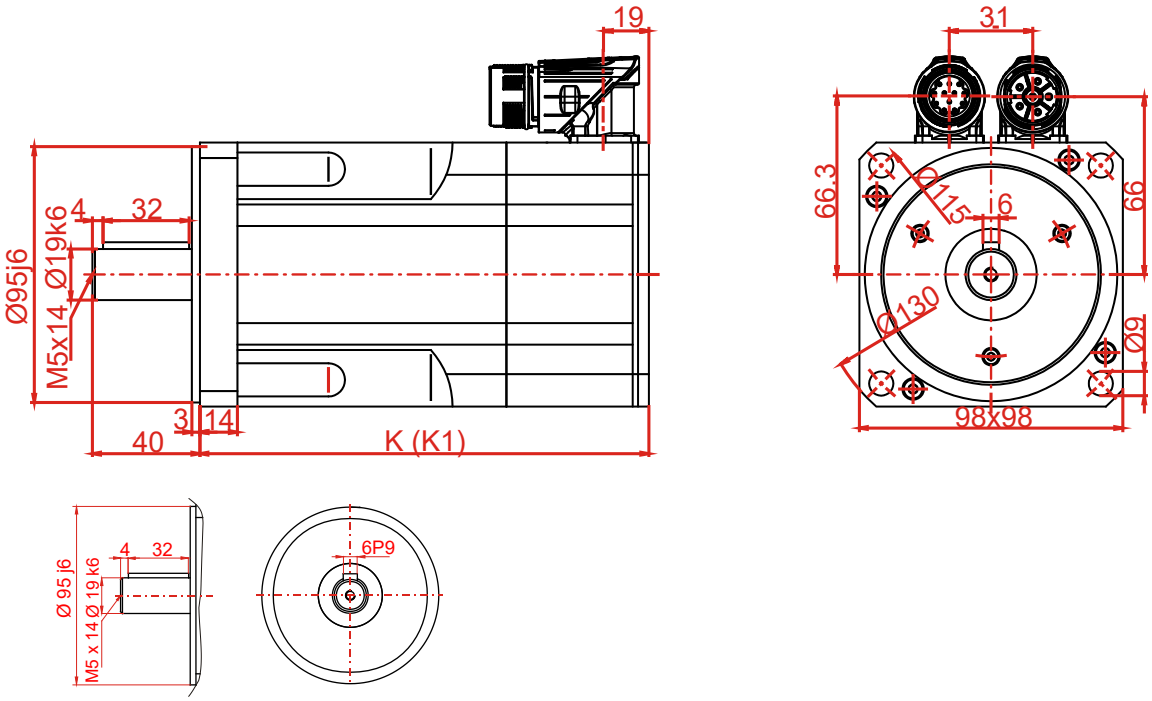


7.4 Flange size - JL4



Option with feather key 6x6x32

P = Power connector size K = Dimension without brake K1 = Dimension with brake	**P**	**K**	**K1**	**K**	**K1**
Type		**Resolver**		**SRx50**	
JL4-0530	M23	176	208	197	229
JL4-0750	M23	221	253	242	274

7.4.1 Technical data of the brake

The technical data of the brake for motor type JL4 are listed below:

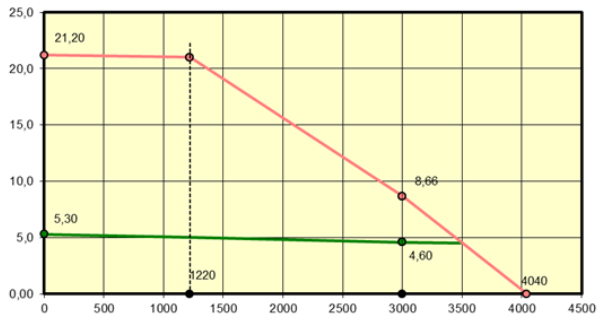
Technical specifications	**Values**		
Holding torque	M_{BR}	Nm	9
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	18
Rotor inertia	J_{BR}	kg*cm^2	0.54
Weight	m_{BR}	kg	0.82

7.4.2 Specific technical data (DC link voltage DC 320 V)

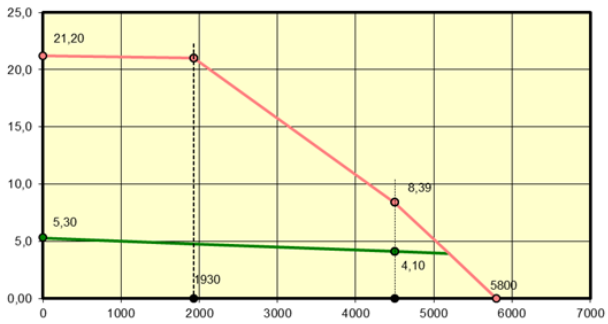
Motor type			**JL4-0530-048**	**JL4-0530-032**	**JL4-0750-053**	**JL4-0750-044**
Rated speed	N_n	RPM	3000	4500	3000	3000
Rated torque	M_n	Nm	4.6	4.1	6.4	6.4
Rated current	I_n	A	5.9	7.7	8.1	9.4
Holding torque	M_o	Nm	5.3	5.3	7.5	7.5
Continuous stall current	I_o	A	6.5	9.3	9.1	10.5
Max. torque	M_{max}	Nm	21	21	30	30
Max. current	I_{max}	A	39	56	54	63
Max. speed	N_{max}	RPM	12000	12000	12000	12000
Back EMF constant	K_E	V/kRPM	49.5	34.5	50.0	43.0
Torque constant	K_T	Nm/A	0.82	0.57	0.83	0.71
Winding resistance	R_{2ph}	Ω	1.66	0.81	0.87	0.64
Winding inductance	L_{2ph}	mH	9.8	4.7	5.6	4.1
Number of motor poles	P_{mot}		6	6	6	6
Idling speed	N_o	RPM	4040	5800	4000	4640
Max. torque at sea level	M_x	Nm	8.7	8.4	14.6	19.0
Thermal time constant - Copper winding	T_{ther_CU}	s	58	58	58	58
Electrical time constant	T_{el}	ms	5.9	5.8	6.4	6.4
Mechanical time constant	T_{mech}	ms	1.1	1.1	0.91	0.91
Thermal time constant	T_{th}	min	64	64	66	66
Rotor inertia without brake	J	$kg*cm^2$	2.7	2.7	4.2	4.2
Weight without brake	m	kg	5.6	5.6	7.7	7.7
Axial load	F_A	N	128	128	135	135
Radial load	F_R	N	676	676	711	711

7.4.3 Torque/speed characteristic (DC link voltage DC 320 V)

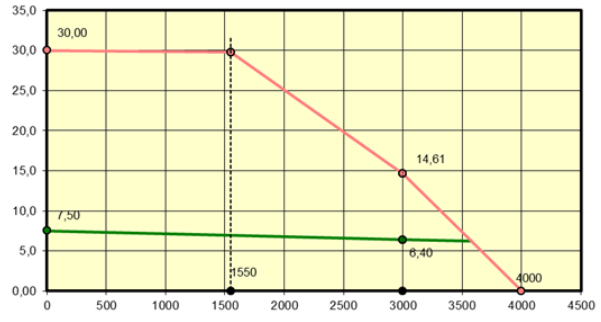
JL4-0530-048



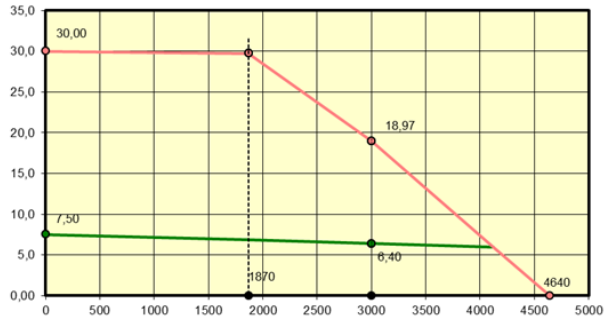
JL4-0530-032



JL4-0750-053



JL4-0750-044

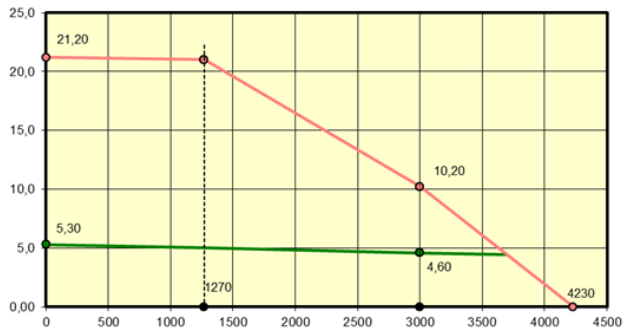


7.4.4 Specific technical data (DC link voltage DC 560 V)

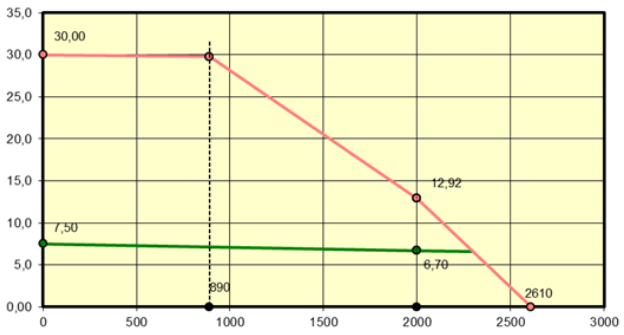
Motor type			**JL4-0530-080**	**JL4-0750-127**	**JL4-0750-096**
Rated speed	N_n	RPM	3000	2000	3000
Rated torque	M_n	Nm	4.6	6.7	6.4
Rated current	I_n	A	3.8	3.3	4.4
Holding torque	M_o	Nm	5.3	7.5	7.5
Continuous stall current	I_o	A	4.1	3.6	4.8
Max. torque	M_{max}	Nm	21	30	30
Max. current	I_{max}	A	25	22	29
Max. speed	N_{max}	RPM	12000	12000	12000
Back EMF constant	K_E	V/kRPM	82.0	126.0	94.0
Torque constant	K_T	Nm/A	1.29	2.1	1.55
Winding resistance	R_{2ph}	Ω	4.2	5.5	3.0
Winding inductance	L_{2ph}	mH	24.0	34.9	19.2
Number of motor poles	P_{mot}		6	6	6
Idling speed	N_o	RPM	4230	2610	3510
Max. torque at sea level	M_x	Nm	10.2	12.9	10.1
Thermal time constant - Copper winding	T_{ther_CU}	s	58	58	58
Electrical time constant	T_{el}	ms	5.7	6.3	6.4
Mechanical time constant	T_{mech}	ms	1.0	0.91	0.89
Thermal time constant	T_{th}	min	64	66	66
Rotor inertia without brake	J	$kg*cm^2$	2.7	4.2	4.2
Weight without brake	m	kg	5.6	7.7	7.7
Axial load	F_A	N	128	135	135
Radial load	F_R	N	676	711	711

7.4.5 Torque/speed characteristic (DC link voltage DC 560 V)

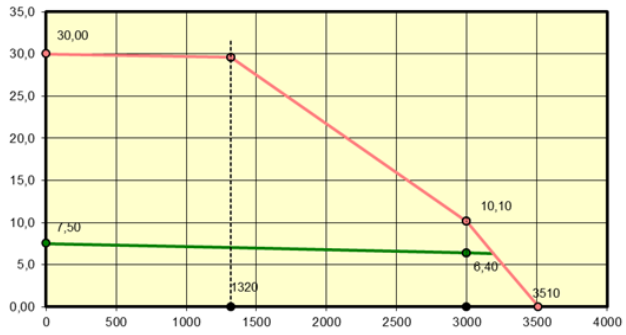
JL4-0530-080



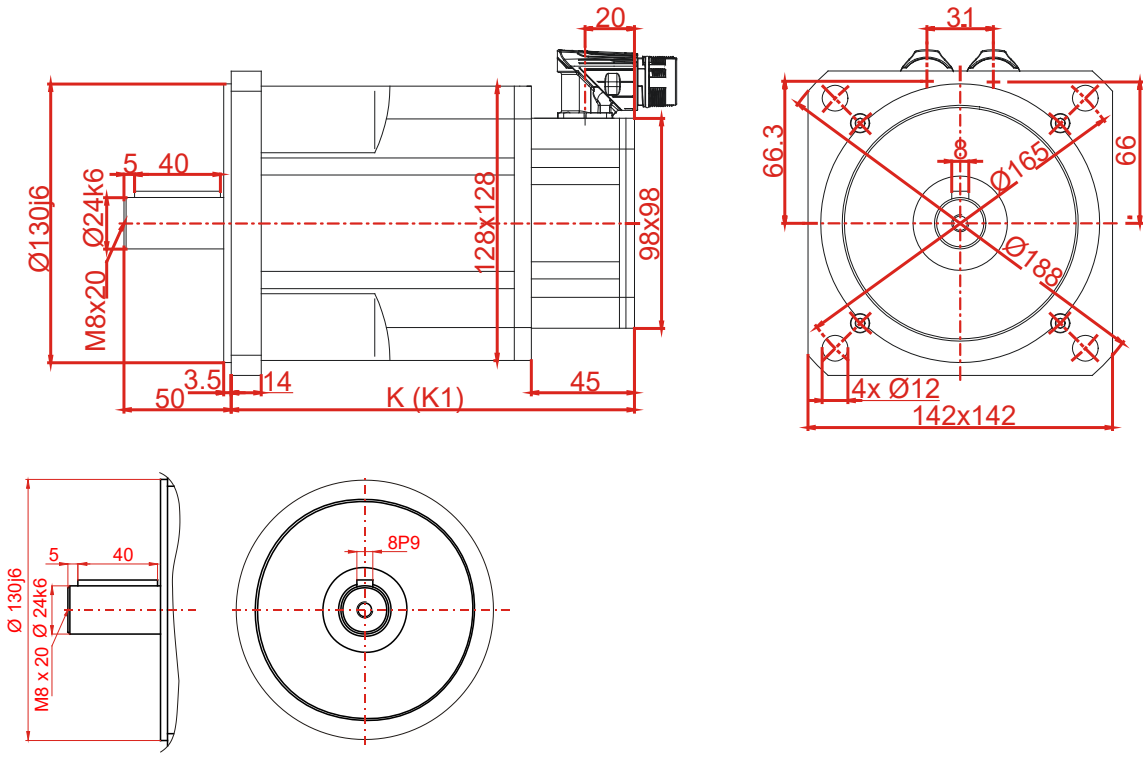
JL4-0750-127



JL4-0750-096



7.5 Flange size - JL5



Option with feather key 8x7x40

P = Power connector size K = Dimension without brake K1 = Dimension with brake	**P with option C1**	**P without option C1**	**K**	**K1**	**K**	**K1**	**K**	**K1**	**K**	**K1**
Type			**Resolver (C1)**		**SRx50 (C1)**		**Resolver**		**SRx50**	
JL5-1050	M23	M40	219	262	222	265	226	269	229	272
JL5-1350	M23	M40	236	279	239	282	243	286	246	289
JL5-1700	M23	M40	270	313	273	316	277	320	280	323
JL5-2200	M23	M40	304	347	307	350	311	354	314	357

7.5.1 Technical data of the brake

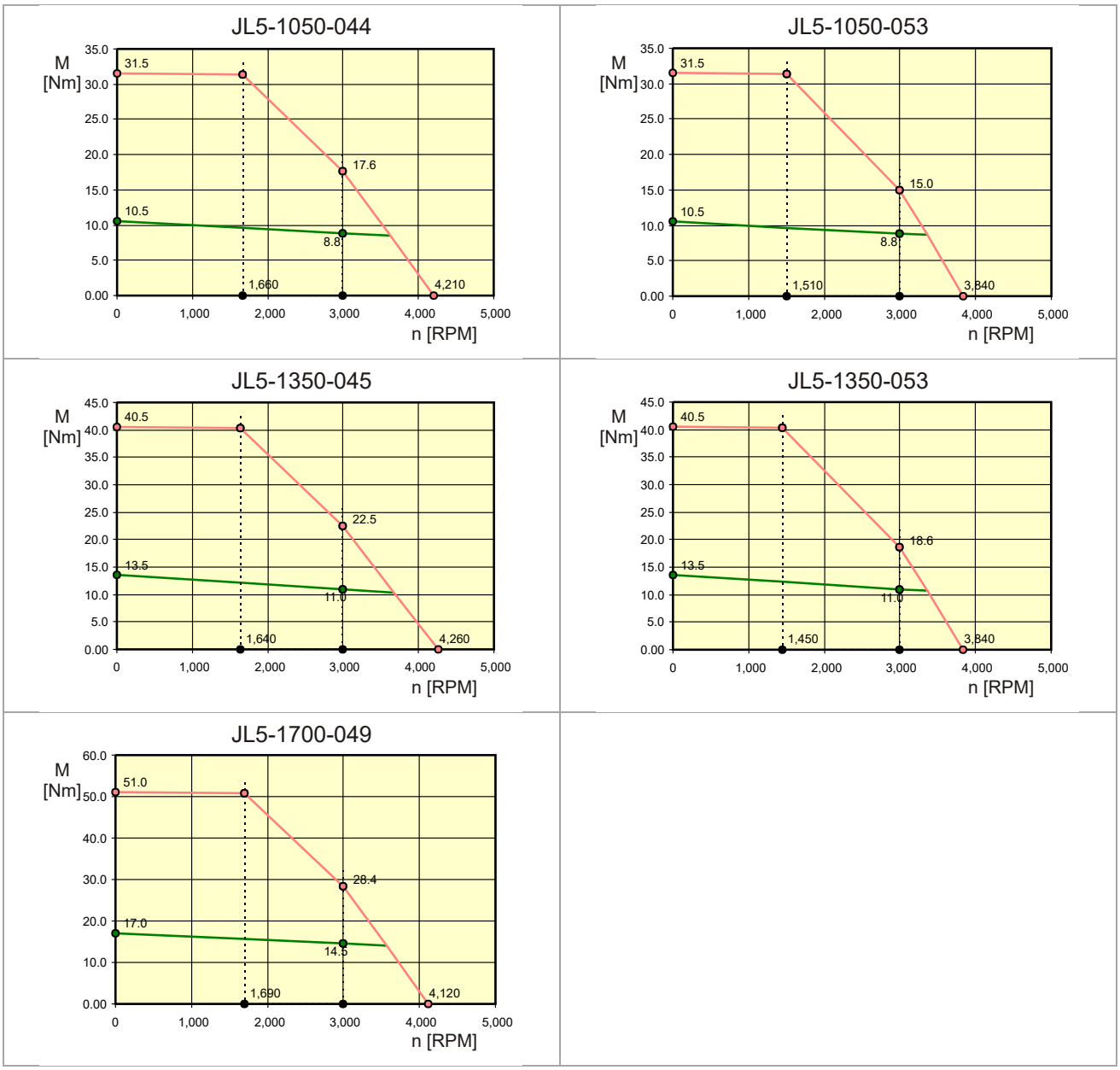
The technical data of the brake for motor type JL5 are listed below:

Technical specifications	**Values**		
Holding torque	M_{BR}	Nm	18
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	24
Rotor inertia	J_{BR}	kg*cm^2	1.66
Weight	m_{BR}	kg	1.8

7.5.2 Specific technical data (DC link voltage DC 320 V)

Motor type			JL5-1050-044	JL5-1050-053	JL5-1350-045	JL5-1350-053	JL5-1700-049
Motor data							
Holding torque	M_o	Nm	10.5	10.5	13.5	13.5	17.0
Continuous stall current	I_o	A	13.4	12.2	17.4	15.7	21.2
Back EMF constant	K_E	V/kmin^{-1}	47.5	52.0	47.0	52.0	48.5
Torque constant	K_T	Nm/A	0.79	0.86	0.78	0.86	0.80
Winding resistance - Phase to phase	R_{Ph}	Ω	0.51	0.61	0.38	0.48	0.28
Winding inductance - Phase to phase	L_{Ph}	mH	4.6	5.5	3.6	4.5	2.9
Electr. time constant	T_{el}	ms	9.0	9.0	9.5	9.4	10.4
Mech. time constant	T_{mech}	ms	0.89	0.89	0.79	0.81	0.72
Thermal time constant - Entire motor	T_{ther}	min	50	50	55	55	60
Thermal time constant - Copper winding	T_{ther_CU}	s	87	87	87	87	87
Number of motor poles	p_{mot}	-	6	6	6	6	6
Rated data							
Rated torque	M_n	Nm	8.8	8.8	11.0	11.0	14.5
Rated speed	N_n	rpm	3,000	3,000	3,000	3,000	3,000
Rated current	I_n	A	11.5	10.5	14.5	13.1	18.5
Maximum values							
Max. torque	M_{max}	Nm	32	32	41	41	51
Max. current	I_{max}	A	67	61	87	78	106
Max. speed	N_{max}	rpm	9,000	9,000	9,000	9,000	9,000
Mechanical parameters							
Rotor inertia	J	kg*cm^2	6.2	6.2	7.3	7.3	9.5
Weight without brake	m	kg	10.0	10.0	11.2	11.2	13.7
Axial load	F_A	N	139	139	142	142	147
Radial load	F_R	N	733	733	748	748	772

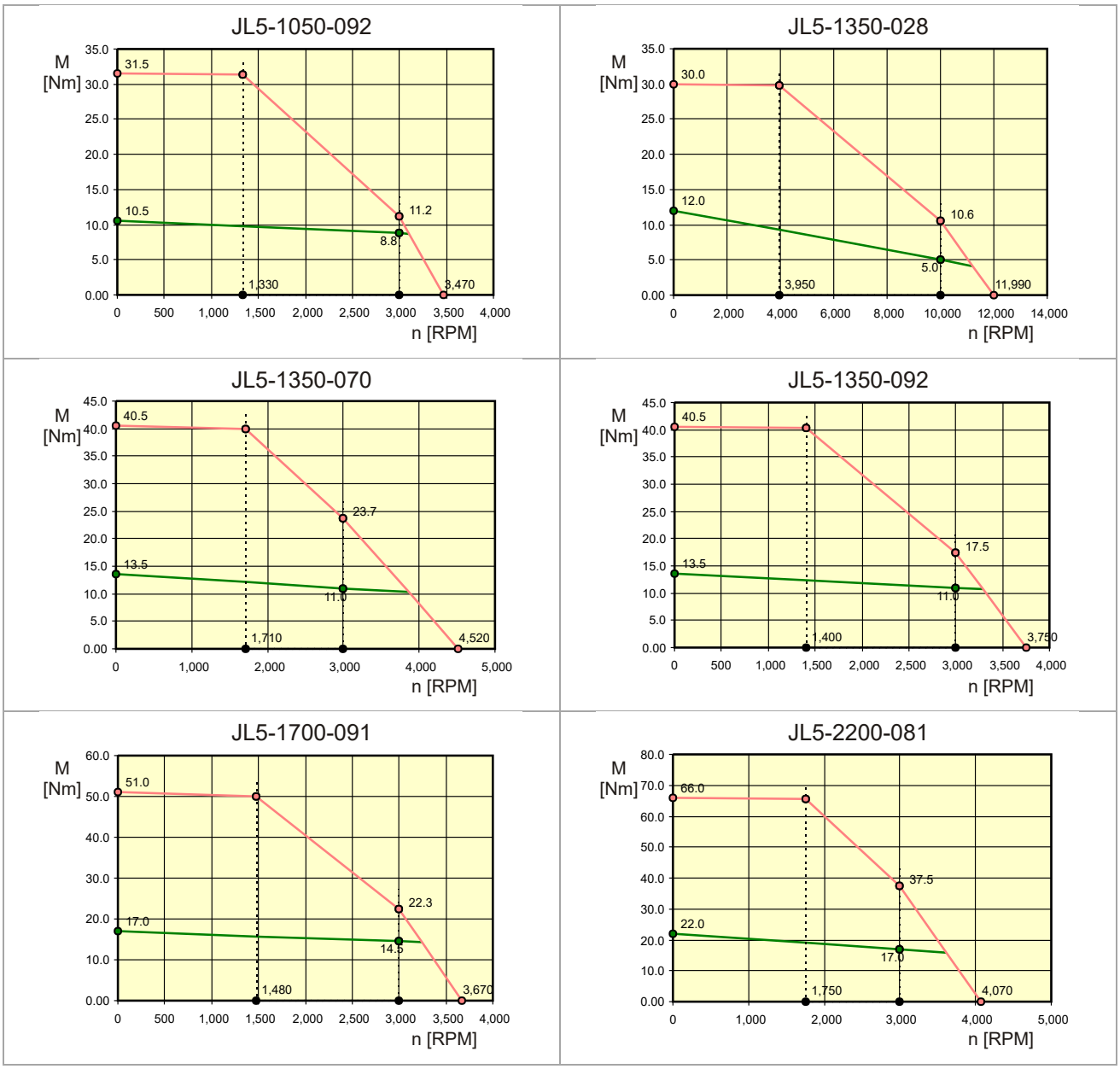
7.5.3 Torque/speed characteristic (DC link voltage DC 320 V)



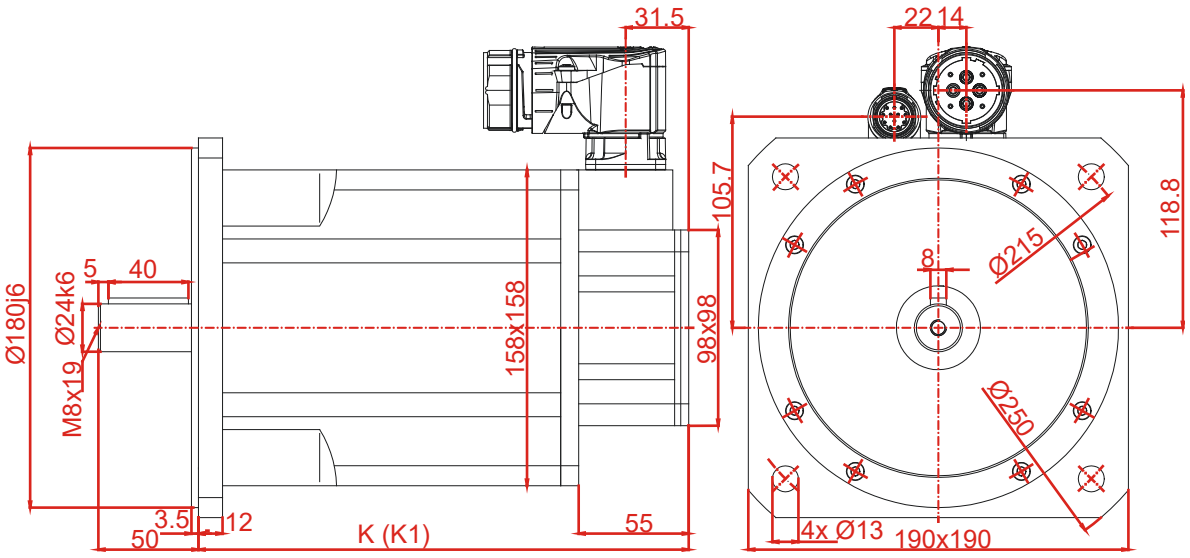
7.5.4 Specific technical data (DC link voltage DC 560 V)

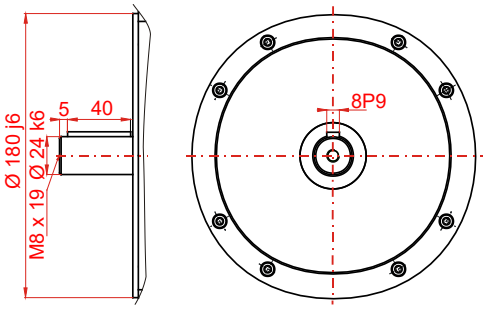
Motor type			JL5-1050-092	JL5-1350-028	JL5-1350-070	JL5-1350-092	JL5-1700-091	JL5-2200-081
Motor data								
Holding torque	M_o	Nm	10.5	12.0	13.5	13.5	17.0	22.0
Continuous stall current	I_o	A	6.7	26.4	11.2	9.3	11.4	16.4
Back EMF constant	K_E	V/kmin^{-1}	95.0	27.5	73.0	88.0	90.0	81.0
Torque constant	K_T	Nm/A	1.57	0.45	1.21	1.46	1.49	1.34
Winding resistance - Phase to phase	R_{Ph}	Ω	2.1	0.23	0.95	1.36	0.95	0.54
Winding inductance - Phase to phase	L_{Ph}	mH	18.4	2.2	9.0	13.0	10.0	5.9
Electr. time constant	T_{el}	ms	9.0	9.6	9.5	9.6	10.5	10.9
Mech. time constant	T_{mech}	ms	0.89	1.4	0.82	0.81	0.71	0.61
Thermal time constant - Entire motor	T_{ther}	min	50	55	55	55	60	75
Thermal time constant - Copper winding	T_{ther_CU}	s	87	87	87	87	87	87
Number of motor poles	p_{mot}	-	6	6	6	6	6	6
Rated data								
Rated torque	M_n	Nm	8.8	5.0	11.0	11.0	14.5	17.0
Rated speed	N_n	rpm	3,000	10,000	3,000	3,000	3,000	3,000
Rated current	I_n	A	5.8	11.6	9.5	7.7	10.0	13.0
Maximum values								
Max. torque	M_{max}	Nm	32	30	41	41	51	66
Max. current	I_{max}	A	33	109	56	46	57	82
Max. speed	N_{max}	rpm	9,000	12,000	9,000	9,000	9,000	9,000
Mechanical parameters								
Rotor inertia	J	kg*cm^2	6.2	7.3	7.3	7.3	9.5	11.7
Weight without brake	m	kg	10.0	11.2	11.2	11.2	13.7	16.2
Axial load	F_A	N	139	142	142	142	147	150
Radial load	F_R	N	733	748	748	748	772	790

7.5.5 Torque/speed characteristic (DC link voltage DC 560 V)



7.6 Flange size - JL6





Option with feather key 8x7x40

P = Power connector size K = Dimension without brake K1 = Dimension with brake	**P**	**K**	**K1**	**K**	**K1**
Type		**Resolver**		**SRx50**	
JL6-1900	M40	242	295	245	298
JL6-2200	M40	259	312	262	315
JL6-2900	M40	317	370	320	366

7.6.1 Technical data of the brake

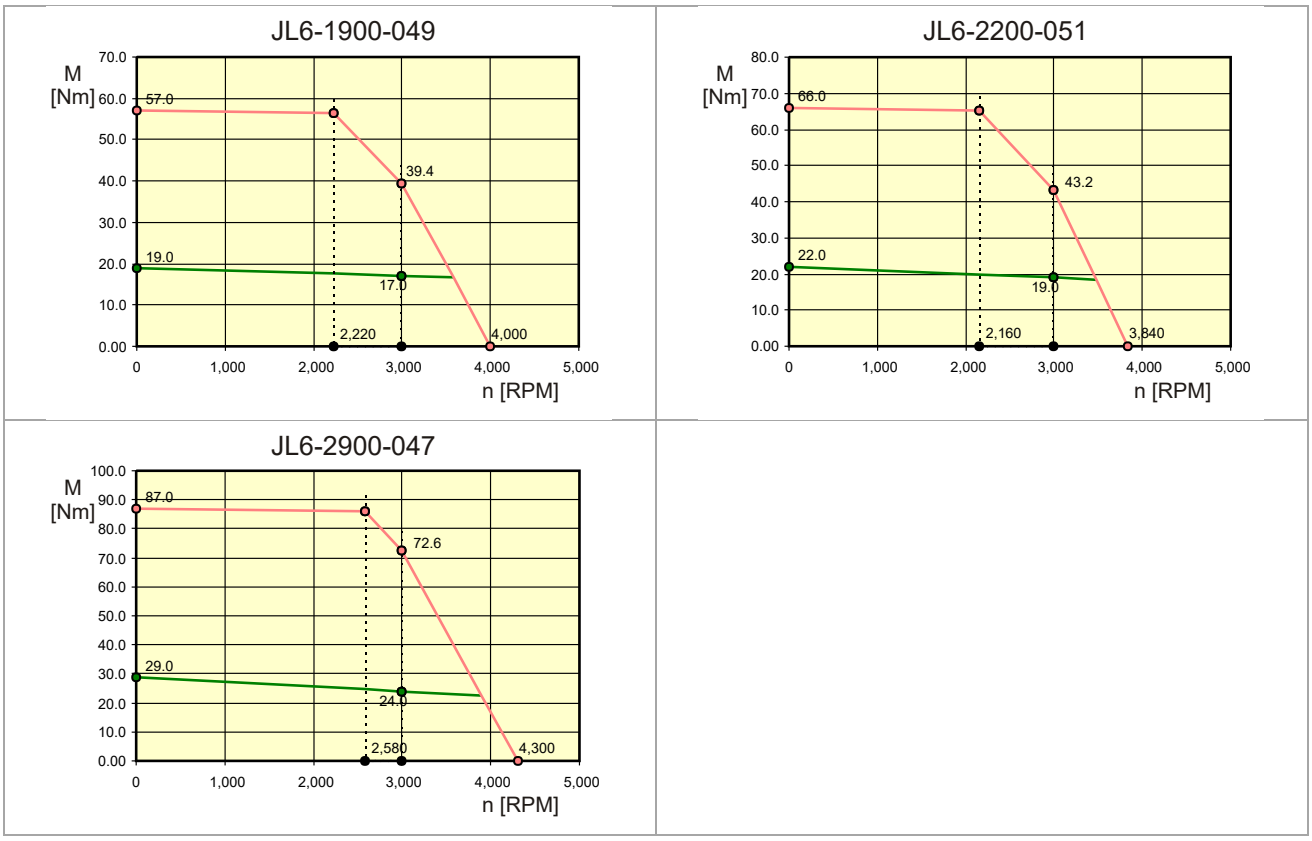
The technical data of the brake for motor type JL6 are listed below:

Technical specifications	**Values**		
Holding torque	M_{BR}	Nm	36
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	26
Rotor inertia	J_{BR}	kg*cm^2	5.56
Weight	m_{BR}	kg	2.86

7.6.2 Specific technical data (DC link voltage DC 320 V)

Motor type			JL6-1900-049	JL6-2200-051	JL6-2900-047
Motor data					
Holding torque	M_o	Nm	19.0	22.0	29.0
Continuous stall current	I_o	A	23.0	25.6	37.7
Back EMF constant	K_E	V/kmin^{-1}	50.0	52.0	46.5
Torque constant	K_T	Nm/A	0.83	0.86	0.77
Winding resistance - Phase to phase	R_{Ph}	Ω	0.15	0.13	0.07
Winding inductance - Phase to phase	L_{Ph}	mH	2.3	2.1	1.20
Electr. time constant	T_{el}	ms	15.3	16.2	17.1
Mech. time constant	T_{mech}	ms	0.71	0.65	0.67
Thermal time constant - Entire motor	T_{ther}	min	53	60	70
Thermal time constant - Copper winding	T_{ther_CU}	s	203	203	203
Number of motor poles	p_{mot}	-	6	6	6
Rated data					
Rated torque	M_n	Nm	17.0	19.0	24.0
Rated speed	n_n	rpm	3,000	3,000	3,000
Rated current	I_n	A	21.3	22.9	32.2
Maximum values					
Max. torque	M_{max}	Nm	57	66	87
Max. current	I_{max}	A	97	108	159
Max. speed	N_{max}	rpm	6,000	6,000	6,000
Mechanical parameters					
Rotor inertia	J	kg*cm^2	18.7	22	33
Weight without brake	m	kg	18.2	20.3	26.7
Axial load	F_A	N	141	142	147
Radial load	F_R	N	741	748	771

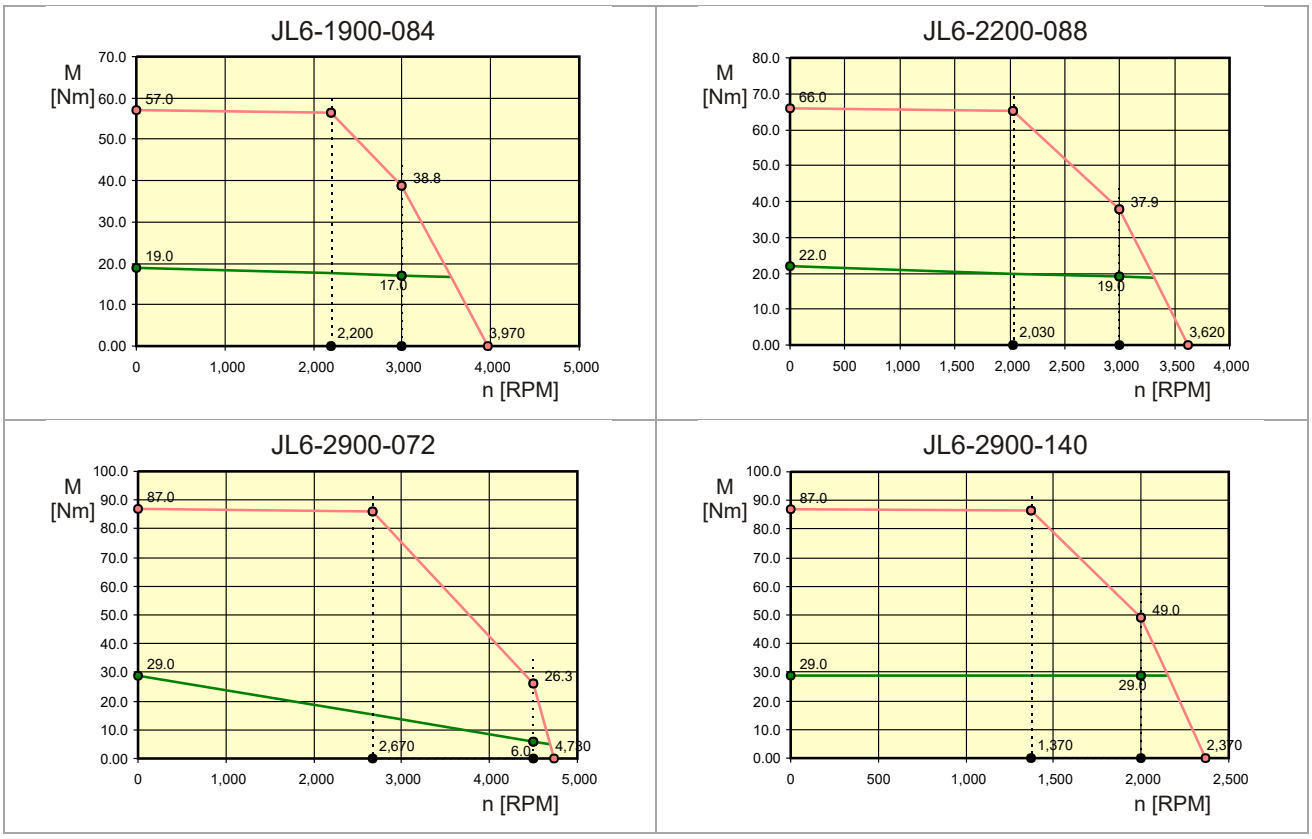
7.6.3 Torque/speed characteristic (DC link voltage DC 320 V)



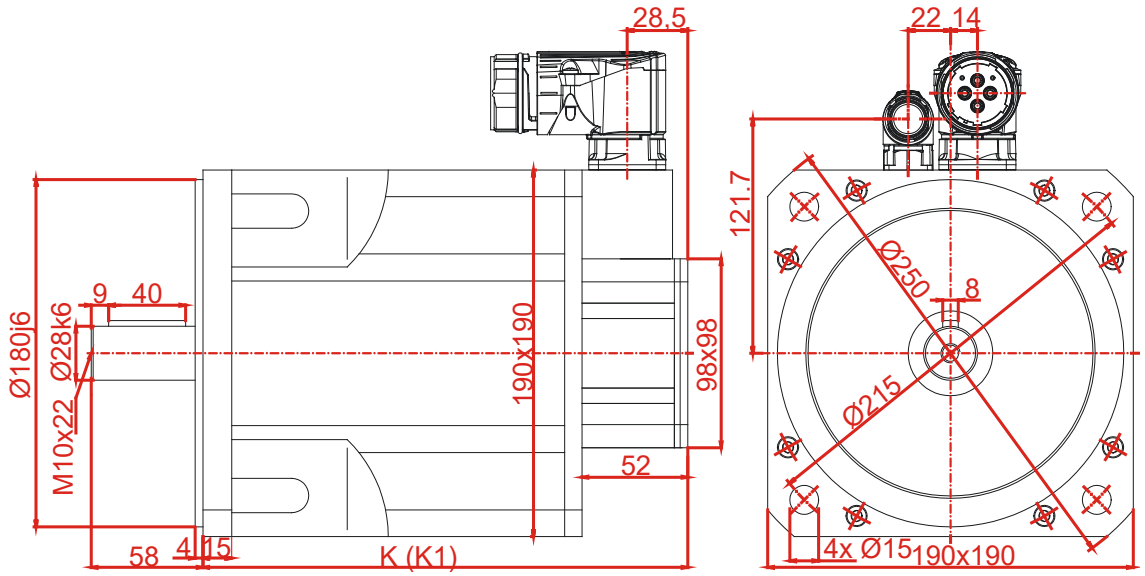
7.6.4 Specific technical data (DC link voltage DC 560 V)

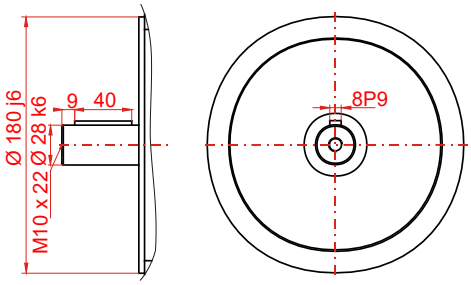
Motor type			JL6-1900-084	JL6-2200-088	JL6-2900-072	JL6-2900-140
Motor data						
Holding torque	M_o	Nm	19.0	22.0	29.0	29.0
Continuous stall current	I_o	A	13.8	14.6	23.7	12.6
Back EMF constant	K_E	V/kmin^{-1}	83.0	91.0	74.0	139.0
Torque constant	K_T	Nm/A	1.37	1.51	1.22	2.3
Winding resistance - Phase to phase	R_{Ph}	Ω	0.42	0.41	0.16	0.58
Winding inductance - Phase to phase	L_{Ph}	mH	6.3	6.4	3.0	10.4
Electr. time constant	T_{el}	ms	15.0	15.6	18.8	17.9
Mech. time constant	T_{mech}	ms	0.72	0.67	0.61	0.62
Thermal time constant - Entire motor	T_{ther}	min	53	60	70	70
Thermal time constant - Copper winding	T_{ther_CU}	s	203	203	203	203
Number of motor poles	p_{mot}	-	6	6	6	6
Rated data						
Rated torque	M_n	Nm	17.0	19.0	6.0	29.0
Rated speed	N_n	rpm	3,000	3,000	4,500	2,000
Rated current	I_n	A	12.8	13.1	5.7	12.9
Maximum values						
Max. torque	M_{max}	Nm	57	66	87	87
Max. current	I_{max}	A	59	62	100	53
Max. speed	n_{max}	rpm	6,000	6,000	6,000	6,000
Mechanical parameters						
Rotor inertia	J	kg*cm^2	18.7	22	33	33
Weight without brake	m	kg	18.2	20.3	26.7	26.7
Axial load	F_A	N	141	142	147	147
Radial load	F_R	N	741	748	771	771

7.6.5 Torque/speed characteristic (DC link voltage DC 560 V)



7.7 Flange size - JL7





Option with feather key 8x7x40

P = Power connector size K = Dimension without brake K1 = Dimension with brake	**P**	**K**	**K1**	**K**	**K1**
Type		**Resolver**		**SRx50**	
JL7-3200	M40	264	318	267	321
JL7-4000	M40	294	348	297	351

7.7.1 Technical data of the brake

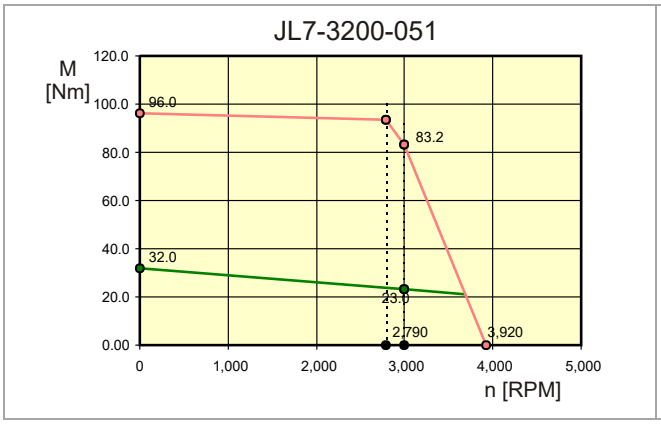
The technical data of the brake for motor type JL7 are listed below:

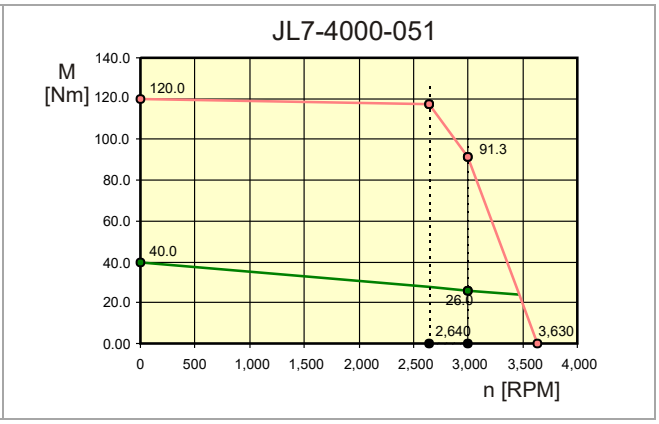
Technical specifications	**Values**		
Holding torque	M_{BR}	Nm	36
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	26
Rotor inertia	J_{BR}	kg*cm^2	5.56
Weight	m_{BR}	kg	3.25

7.7.2 Specific technical data (DC link voltage DC 320 V)

Motor type			JL7-3200-051	JL7-4000-051
Motor data				
Holding torque	M_o	Nm	32.0	40.0
Continuous stall current	I_o	A	37.9	44.0
Back EMF constant	K_E	V/kmin^{-1}	51.0	55.0
Torque constant	K_T	Nm/A	0.84	0.91
Winding resistance - Phase to phase	R_{Ph}	Ω	0.09	0.07
Winding inductance - Phase to phase	L_{Ph}	mH	0.90	0.80
Electr. time constant	T_{el}	ms	10.0	11.4
Mech. time constant	T_{mech}	ms	0.86	0.67
Thermal time constant - Entire motor	T_{ther}	min	67	72
Thermal time constant - Copper winding	T_{ther_CU}	s	215	215
Number of motor poles	p_{mot}	-	6	6
Rated data				
Rated torque	M_n	Nm	23.0	26.0
Rated speed	N_n	rpm	3,000	3,000
Rated current	I_n	A	29.9	31.8
Maximum values				
Max. torque	M_{max}	Nm	96	120
Max. current	I_{max}	A	148	172
Max. speed	n_{max}	rpm	6,000	6,000
Mechanical parameters				
Rotor inertia	J	kg*cm^2	39	46
Weight without brake	m	kg	26.00	31.50
Axial load	F_A	N	260	267
Radial load	F_R	N	1370	1406

7.7.3 Torque/speed characteristic (DC link voltage DC 320 V)

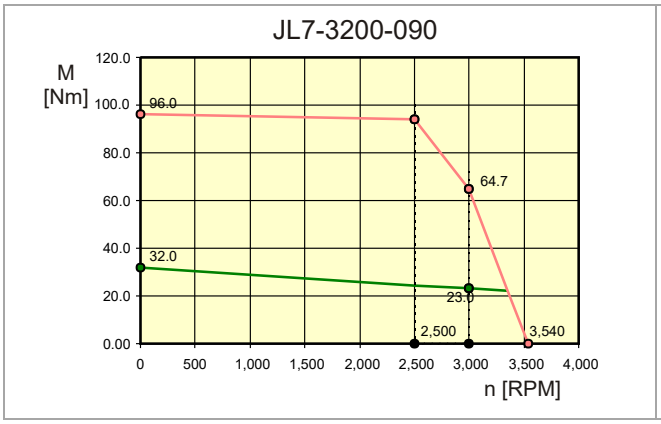


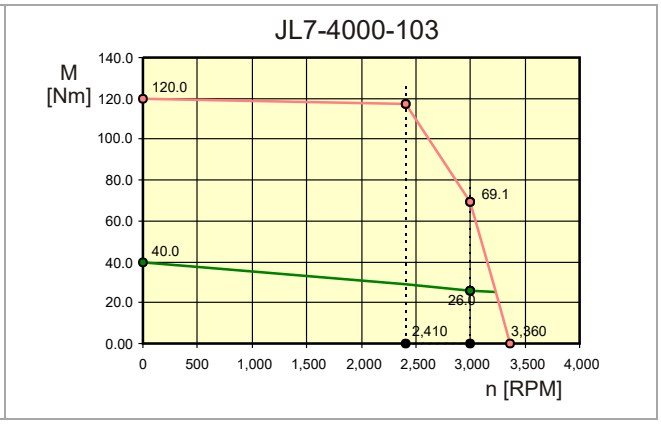


7.7.4 Specific technical data (DC link voltage DC 560 V)

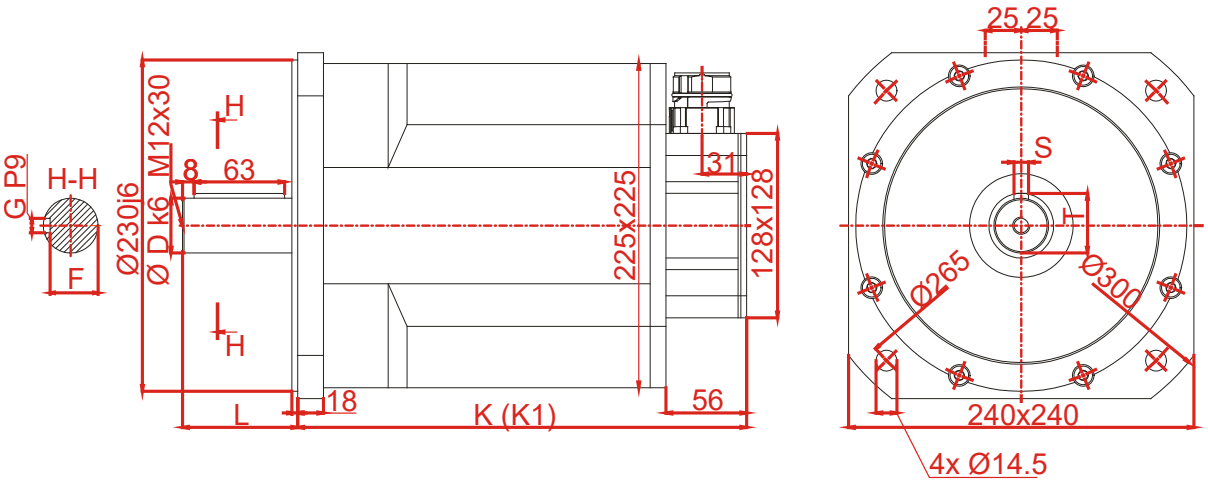
Motor type			JL7-3200-090	JL7-4000-103
Motor data				
Holding torque	M_o	Nm	32.0	40.0
Continuous stall current	I_o	A	20.8	24.7
Back EMF constant	K_E	V/kmin^{-1}	93.0	98.0
Torque constant	K_T	Nm/A	1.54	1.62
Winding resistance - Phase to phase	R_{Ph}	Ω	0.29	0.23
Winding inductance - Phase to phase	L_{Ph}	mH	3.2	2.7
Electr. time constant	T_{el}	ms	11.0	11.7
Mech. time constant	T_{mech}	ms	0.83	0.69
Thermal time constant - Entire motor	T_{ther}	min	67	72
Thermal time constant - Copper winding	T_{ther_CU}	s	215	215
Number of motor poles	p_{mot}	-	6	6
Rated data				
Rated torque	M_n	Nm	23.0	26.0
Rated speed	N_n	rpm	3,000	3,000
Rated current	I_n	A	16.4	17.9
Maximum values				
Max. torque	M_{max}	Nm	96	120
Max. current	I_{max}	A	81	96
Max. speed	n_{max}	rpm	6,000	6,000
Mechanical parameters				
Rotor inertia	J	kg*cm^2	39	46
Weight without brake	m	kg	26.00	31.50
Axial load	F_A	N	260	267
Radial load	F_R	N	1370	1406

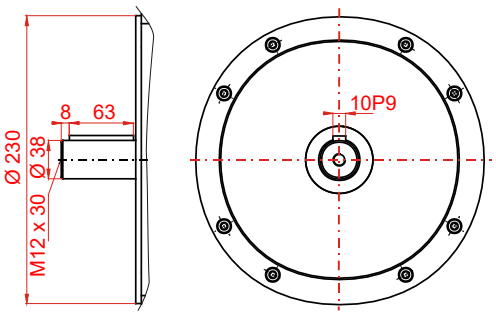
7.7.5 Torque/speed characteristic (DC link voltage DC 560 V)



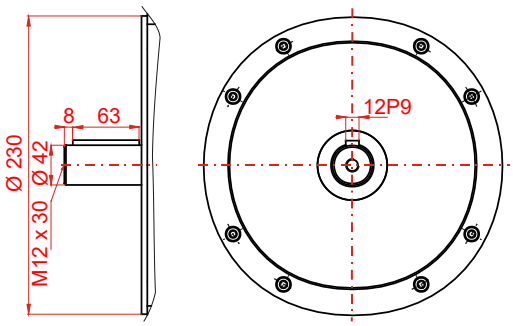


7.8 Flange size - JL8





Option with feather key 10x8x63
with JL8-4000 … JL8-6800



Option with feather key 12x8x63
with JL8-9300 … JL8-11500

P = Power connector size L = Length without brake L1 = Length with brake	**P**	**K**	**K1**	**K**	**K1**	**M_{max}**	**Shaft (DxL)/ feather key/ S/T / G/F**
Type		**Resolver**		**SRx50**		**Nm**	**mm**
JL8-0400	M40	310	378	312	380	40	Ø38x80 10x8x63 10/41.3 / 10/33.3
JL8-0680	M40	378	446	380	448	68	
JL8-0930	M40	446	514	448	516	93	Ø42x110 12x8x63 12/45.1 / 12/37.1
JL8-1150	M40	514	582	516	584	115	

7.8.1 Technical data of the brake

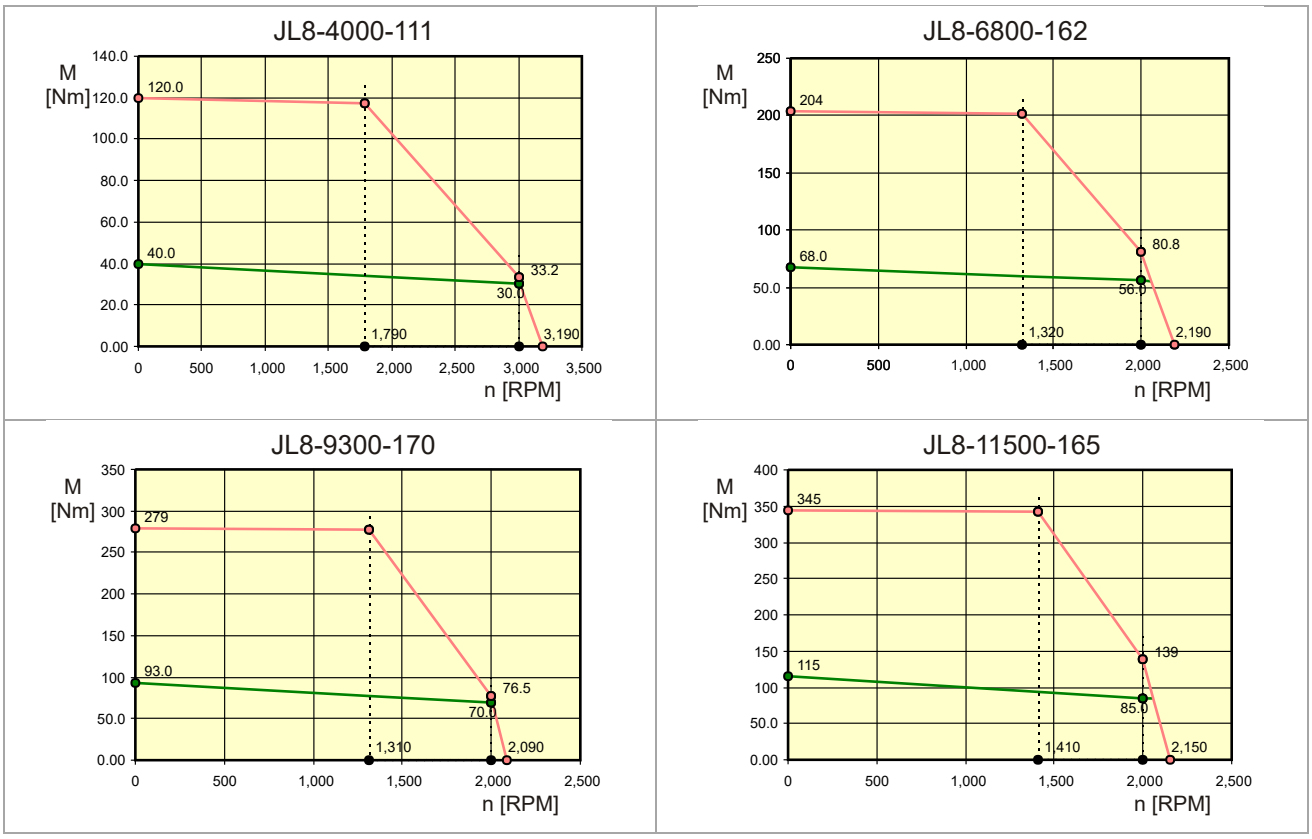
The technical data of the brake for motor type JL8 are listed below:

Technical specifications	**Values**		
Holding torque	M_{BR}	Nm	145
Supply voltage	U_{BR}	V	DC 24 V (-10 % … +6 %)
Rated power	P_{BR}	W	50
Rotor inertia	J_{BR}	kg*cm^2	53.0
Weight	m_{BR}	kg	9.5

7.8.2 Specific technical data (DC link voltage DC 560 V)

Motor type			JL8-4000-111	JL8-6800-162	JL8-9300-170	JL8-11500-165
Motor data						
Holding torque	M_o	Nm	40.0	68	93	115
Continuous stall current	I_o	A	21.8	25.4	33.1	42.1
Back EMF constant	K_E	V/kmin^{-1}	111.0	162.0	170.0	165.0
Torque constant	K_T	Nm/A	1.84	2.7	2.8	2.7
Winding resistance - Phase to phase	R_{Ph}	Ω	0.25	0.24	0.15	0.11
Winding inductance - Phase to phase	L_{Ph}	mH	5.7	6.3	4.8	3.4
Electr. time constant	T_{el}	ms	23	26	32	31
Mech. time constant	T_{mech}	ms	0.98	0.66	0.50	0.49
Thermal time constant - Entire motor	T_{ther}	min	47	65	79	90
Thermal time constant - Copper winding	T_{ther_CU}	s	483	483	483	483
Number of motor poles	p_{mot}	-	6	6	6	6
Rated data						
Rated torque	M_n	Nm	30.0	56	70	85
Rated speed	N_n	rpm	3,000	2,000	2,000	2,000
Rated current	I_n	A	17.8	22.0	25.3	32.4
Maximum values						
Max. torque	M_{max}	Nm	120	204	279	345
Max. current	I_{max}	A	85	99	129	164
Max. speed	n_{max}	rpm	3,600	3,600	3,600	3,600
Mechanical parameters						
Rotor inertia	J	kg*cm^2	76	114	153	190
Weight without brake	m	kg	41.00	56.00	73.00	89.00
Axial load	F_A	N	323	337	337	346
Radial load	F_R	N	1702	1775	1775	1823

7.8.3 Torque/speed characteristic (DC link voltage DC 560 V)



8 Installation and commissioning

NOTICE

Standards DIN EN 50110-1 and DIN IEC 60364 must be met!

Have installation and commissioning carried out by qualified personnel only.

- Observe the standards DIN EN 50110-1 and DIN IEC 60364 in your work.

8.1 Place of installation, ambient conditions

8.1.1 Check the servo motor before installation

NOTICE

Handle servo motors with care!

Follow the instructions below to avoid losing your warranty:

- Do not dismantle or open the gearbox, motor or electronics.
- Do not fit parts to the drive shaft in a way that causes excessive forces on the bearings of the shaft.
- Do not make any modifications to the shaft, flange, connector or encoder housing.

NOTICE

Check servomotor before installation!

The servo motor may be damaged.

- Check the motor for external damage and faulty connections.
- Do not install damaged servo motors.

8.1.2 Unsuitable places of installation – Shortening of service life

Unsuitable installation sites	Reason
Outdoor installation site	The motor must not be exposed to rain or water jets. Therefore, do not use a steam jet or other such devices to clean the device.
Corrosive or contaminated surrounding area	The motor can be damaged in corrosive or contaminated atmosphere.

8.1.3 Motor as ignition source in potentially explosive atmosphere

DANGER

Danger in potentially explosive atmospheres!

The motor can become a source of ignition in potentially explosive atmospheres.

- When using a motor in an area with potentially explosive atmosphere, it must have an ATEX approval corresponding to the respective protection zone.
  Jetter servo amplifiers do not have ATEX approval and must therefore not be installed in hazardous areas.

8.1.4 Caution when assuming the wrong degree of protection

The servo motors comply with the degree of protection IP65.

CAUTION

Observe the degree of protection at installing the motor!

If an incorrect degree of protection is assumed, personal injury and damage to property may occur.

- Install the motor with the degree of protection required for the application.
- Protect the motor from harmful environmental influences.

8.1.5 Suitable places of installation

- The motor must be easily accessible.
- Operating temperature: -15 … +40 °C
- Operating altitude: Max. 1000 m above sea level
- Relative humidity: 15 ... 85%, non-condensing

Operation at higher temperatures and altitudes will necessarily require a derating. For detailed information, see Chapter 0, Chapter 4.6.2 and Chapter 4.7.2.

8.2 Mechanical installation

8.2.1 Installation location

The installation location must be free from conductive and corrosive substances.
For encapsulated installation, please consult the application department of Jetter AG.

8.2.2 Mechanical equipment, tools

NOTICE

Avoid damage to the servomotor!

If not handled properly, the servo motor can be damaged.

- Do **by all means** refrain from applying hard blows or shocks to the motor flange or shaft.
- For fitting backlash-free power output shafts with friction locking, only use the specifically designed tightening thread in the motor shaft.
  If possible, heat the output elements.
  Fitting the power output elements may only be carried out by means of suitable tools. Please follow the instructions given by the power output element manufacturers.

A special hint: Use double-conical collets.

8.2.3 Clutch, timing belts, timing belt pulleys, radial and axial load

DANGER

Danger in potentially explosive atmospheres!
Avoid electrostatic charging!
When using pulleys/toothed belt pulleys, unsuitable belts cause electrostatic charge which can cause an explosion.

- Only use belts that do not cause electrostatic charging.

NOTICE

Avoiding damage to the servo motor and maintaining its service life!

Improper installation may damage the motor or considerably shorten its service life.

- Make sure the clutch is aligned correctly. Please follow the instructions given by the manufacturer of the clutch.
  An offset will produce intolerable vibrations and will damage ball bearings and clutch.
- When using timing belts, observe the permissible radial forces F_R.
  Radial loads exceeding the limits will significantly reduce the service life of motors.
  If a belt drive is used, the minimum permitted diameter of the pinion, for example, is calculated as follows:
  $d_{min} \geq M_o/F_R \times 2$.
- Avoid axial load of the motor shaft.
  Axial load will significantly shorten the service life of the motor.

8.2.4 Cooling plate

All torque data have been determined for motors equipped with cooling plates.
For calculating the dimensions of a cooling plate with a thickness of 3.5 mm, the following formula has been applied:

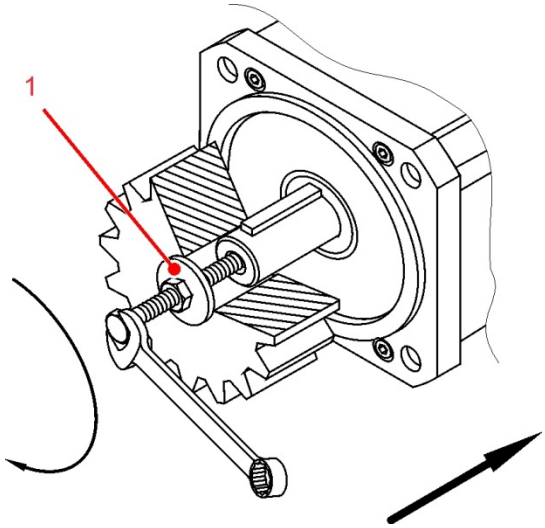
Length of cooling plate in mm = 2.5 x flange size in mm

Example for a JL2-0040-… motor
The motor's flange size of 55 mm results in a cooling plate length of 2.5 x 55 mm = 137.5 mm.
Thus, the dimensions of the cooling plate are: 137.5 mm x 137.5 mm x 3.5 mm

8.2.5 Carrying out the mechanical installation

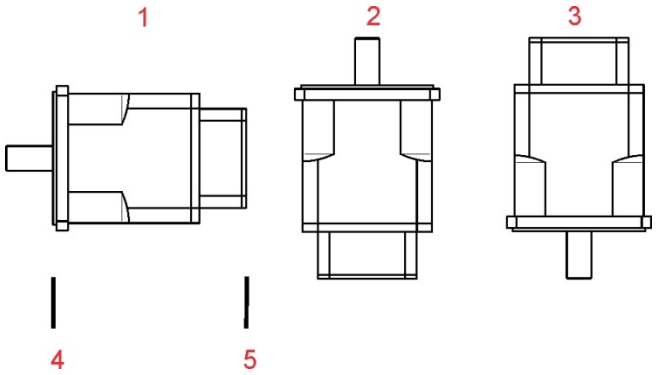
1. Prior to installing the motor, check it for possible damages in transit or storage.
   Please do notify Jetter AG without delay of possibly damaged mechanical equipment, as well as of corrosion damages to shaft or flange.
   If there is a brake, release it first. Try to turn the rotor by hand; it must react easily. Watch out for unusual scraping noises.
2. At manufacturing, the rotor of the motor is balanced electronically. Before fitting the power output elements to the end of the shaft, remove the corrosion protection that it might still be covered with.

3. For fitting couplings, gear wheels or pulleys use the motor shaft thread intended for this purpose. Warm up the power output elements, if possible.



1 Spacer washer

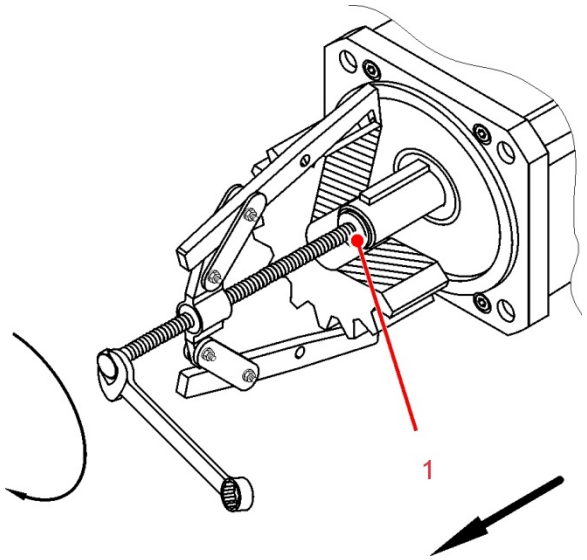
4. Check power output elements (coupling, gearbox, pulley) for tight fit and correct set-up.
5. Under all circumstances avoid a hyperstatic arrangement of the motor shaft bearings, for example, by using a rigid coupling and an external additional bearing (e.g. in the gearbox).
6. Protect the motors against liquids soaking into the bearing by applying design V1 with the shaft end pointing upwards.



1 IM B 5 (B5)
2 IM V 1 (V1)
3 IM V 3 (V3)
4 D end
5 ND end

7. Ensure unobstructed ventilation of the motor. Observe the allowed ambient and flange temperature. The rated data of the motor are reached as long as the flange temperature does not exceed 65 °C during operation.

8. In order to remove gears, pulleys etc. please use a pulling device.



1 Spacer screw

8.3 Electrical Installation - Hazards

8.3.1 Heat build-up of the motor during operation - Temperature monitoring

NOTICE

Protect the servomotor from overheating!

Without monitoring the temperature in the motor by means of suitable sensors, the motor can become too hot.

- **Integrate the thermistor of the motor into the monitoring system of the servo amplifiers.**
- Never operate the motor without integrating and evaluating the built-in temperature sensor KTY83-110 (PTC). To do this, route the temperature sensor signal in the encoder connector of the motor to the respective input of the servo amplifier. For older motors, appropriate thermal sensors must be used.
- **If the temperature monitor detects that the resistance of the temperature sensor is greater than 2150 Ohm, the servo amplifier must switch the motor off and issue the message "Motor temperature error".**
  The JM-2xx, JM-35xx and JM-1yxx servo amplifiers support motor temperature monitoring and switching off in the event of overheating.
- Our motors comply with insulation class F. Thus, the insulating materials of the motor are designed for a maximum temperature of 155 °C.
  According to the ATEX directive, the temperature must therefore not exceed 155 °C.

8.3.2 Heat build-up of the motor during operation - Heat dissipation

WARNING

Warning of hot surfaces!

The motor heats up during operation.
The surface temperature can exceed 130 °C.

- Take protective measures to prevent inadvertent contact with the motor, e.g. install guards.
- Make sure that no temperature-sensitive parts, e.g. connection cables, are attached or fastened to the motor.
- Provide sufficient heat dissipation. For the following locations of the motor, the respective maximum temperatures apply:
  Connector: ≤ 130 °C
  Cable: ≤ 90 °C
  Flange: ≤ 65 °C

Higher temperatures require a derating. Derating tables for operating the motors at higher temperatures can be found in the chapter 0

Derating at ambient temperatures higher than 40 °C.

- Allow the motor to cool down for some time before you start working on it, e.g. to carry out maintenance jobs.
- If necessary, take additional measures for specific applications and operating conditions.

8.3.3 Danger due to high operating voltage

DANGER

Hazard caused by high operating voltage!
Risk of electric shock due to wrong grounding of the frame

Wrong grounding can cause a high voltage to be present on the frame.
This may lead to muscle cramps, burns, unconsciousness, respiratory standstill, or death.

- Please mind proper grounding of servo amplifier and servo motor.
- Please ensure correct, low-resistance grounding of the frame via PE reference potential in the control cabinet.
- The frame must have a conductive, low-resistance connection with the machine into which the motor has been integrated.

8.3.4 Danger from electrical leakage and stray currents

DANGER

Danger in potentially explosive atmospheres!
Sparking caused by electrical leakage currents in conductive parts of the motor!

The motor can become an ignition source in potentially explosive atmospheres if leakage currents flow in conductive parts of the motor.
This can lead to overheating of surfaces or dangerous corrosion.

- Ensure balanced voltage potentials so that no stray or leakage currents can occur.
- According to DIN EN 60079-14 and DIN EN 61241-0, there must be a connection to an equipotential bonding system. The grounding conductor must be fixed with a suitable PE bolt of size 4 mm^2 or more or equal to the supply line.

8.4 Connections – New terminology, important notes on motor connections and wiring

Power connector:
This is the new name for the former *motor connector* in contrast to the encoder connector.

Motor connector:
Now, motor connector stands for a combination of power and encoder connector. For this, please note the explanations on 1-cable technology below.

1-cable technology:
With 1-cable technology, the motor power is transmitted together with the encoder signal in a hybrid cable.

2-cable technology:
In 2-cable technology, the servomotor has two connectors, one encoder connector and one power connector. The encoder is connected to the encoder connector. The load current of the motor is fed through the power connector.

HIPERFACE DSL®:
With HIPERFACE DSL®, the encoder signal (DSL) is modulated onto the power supply line, so only 2 conductors are needed.. These 2 conductors are routed in one cable - in addition to the brake signal and the motor power. The HIPERFACE DSL® interface can therefore be recognized by the fact that the motor only has one connector.

Important note on the encoder connector

NOTICE

Malfunction!

Malfunctions of the encoder caused by missing contacts of the pins will result in malfunctioning of the motor.

- Ensure vertical position of the encoder connector. The encoder connector must not cant.
- Please mind correct pin assignment and coding of the encoder connector.
- If there are several codings on the connector, make sure you use the correct one.

Cable size:
The cable diameter must be designed according to the continuous rated current of the motor. Please do also observe the ambient conditions, the mode of installation and the local regulations.

Note on the cables:
You can either order prefabricated cables from Jetter AG or opt for self-made cables.

Note on the JL1 motor and some JHN2 motors:
In the order reference, the length of the cables is specified in meters, e.g. S3-1.00 or S4-1.00 for a cable length of 1.00 m.

Power and encoder mating connectors:
You can order the appropriate power and encoder mating connector from Jetter AG.

8.5 Electrical installation - Wiring description for 2-cable technology

8.5.1 JL1 motor, variant 1 (electrical connection S3-x.xx)

Jetter AG prefers the use of variants 2 or 3 to variant 1.
A few motors of the JHN2 series also have the electrical connection S3-x.xx.

The motor has two cable glands with cables for the power and encoder cables. The cable length must be specified in the order according to the type designation S3-x.xx in meters. The cable ends are without connectors. See following figure:

The following table shows the assignment of the cable cores of the power connection:

Power cable signal	Core number/core color
Phase U	1
Phase V	2
Phase W	3
PE conductor	Green/yellow
Brake+	4
Brake-	5

The following table shows the assignment of the cable cores of the encoder connection:

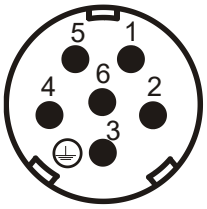
Resolver cable signal	Core color with option S3-x.xx	Pin assignment for option S4-x.xx
S1 (cosine+)	Brown	1
S3 (cosine-)	White	2
S4 (sine-)	Green	3
S2 (sine+)	Yellow	4
R1 (exciter winding+)	Pink	5
R2 (exciter winding-)	Gray	6
Thermoswitch+	Blue	7
Thermoswitch-	Red	8
Not assigned		9 - 12

8.5.2 JL1 motor, variant 2 (electrical connection S4-x.xx)

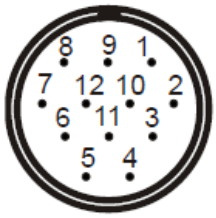
A few motors of the JHN2 series also have the electrical connection S4-x.xx.

The motor has two cable glands with cables for the power and encoder cables. The cable length must be specified in the order according to the type designation S4-x.xx in meters. The ends of the cables are fitted with connectors as shown in the figure below:

The following table shows the pinout of the power connector, size 1 (M23 x 1):

Front view	Pin	Signal
 6-pole, pins	1	Phase 1
	5	Phase 2
	2	Phase 3
	⏚	PE conductor
	6	Brake+
	4	Brake-
Plug connector M23 (with thread)	Housing	The outer shield is connected to the connector housing.

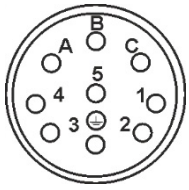
The following table shows the pinout of the encoder connector, size 1 (M23 x 1):

Front view	Pin	Resolver signal
 12-pole, pins	1	S1 (cosine+)
	2	S3 (cosine-)
	3	S4 (sine-)
	4	S2 (sine+)
	5	R1R (exciter winding+)
	6	R2L (exciter winding-)
	7	Th1 (PTC)
	8	Th2 (PTC)
Connector M23 (with thread)	9	-
	10	-
	11	-
	12	-
	Housing	The outer shield is connected to the connector housing.

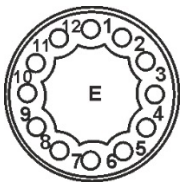
Suitable cables for these connectors can also be found in the Industrial Automation Catalog, Products and Services.

8.5.3 JL1 motor, variant 3 (electrical connection SA-X)

The following table shows the pinout of the Y-Tec power connector with M17 quick release:

Front view	Pin	Signal
 Orange, 9-pole, pins Connector Y-Tec	A	Phase 1
	B	Phase 2
	C	Phase 3
		PE conductor
	1	Brake+
	2	Brake-
	Housing	The outer shield is connected to the connector housing.

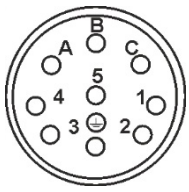
The following table shows the pinout of the Y-Tec encoder connector with M17 quick release:

Front view	Pin	Resolver signal
 Green, 12-pole, pins Connector Y-Tec	1	S1 (cosine+)
	2	S3 (cosine-)
	3	S4 (sine-)
	4	S2 (sine+)
	5	R1R (exciter winding+)
	6	R2L (exciter winding-)
	7	Th1 (PTC)
	8	Th2 (PTC)
	9	-
	10	-
	11	-
	12	-
	Housing	The outer shield is connected to the connector housing

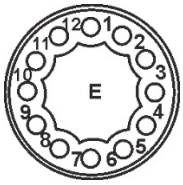
Suitable cables for these connectors can also be found in the Industrial Automation Catalog, Products and Services.

8.5.4 Motors JHQ12, JHQ22 or JHQ24 (electrical connection SA-X or SB-X)

The following table shows the pinout of the Y-Tec power connector with M17 quick release:

Front view	Pin	Signal
 Orange, 9-pole, pins Connector Y-Tec	A	Phase 1
	B	Phase 2
	C	Phase 3
		PE conductor
	1	Brake+
	2	Brake-
	Housing	The outer shield is connected to the connector housing.

The following table shows the pinout of the Y-Tec encoder connector with M17 quick release:

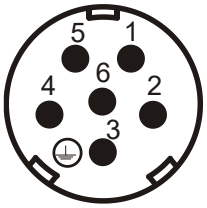
Front view	Pin	Resolver signal	HIPERFACE® signal
 Green, 12-pole, pins Connector Y-Tec	1	S1 (cosine+)	-
	2	S3 (cosine-)	-
	3	S4 (sine-)	Sine+
	4	S2 (sine+)	Sine-
	5	R1R (exciter winding+)	Cosine+
	6	R2L (exciter winding-)	Cosine-
	7	Th1 (PTC)	Data- (RS-485)
	8	Th2 (PTC)	Data+ (RS-485)
	9	-	0 V
	10	-	Power supply (7 … 12 V)
	11	-	Thermal sensor+
	12	-	Thermal sensor-
	Housing	The outer shield is connected to the connector housing.	The outer shield is connected to the connector housing.

Comment on the HIPERFACE® encoder:
On the JM-2xx, pins 12 and 9 in the encoder connector must be jumpered. A 9-pin Sub-D connector must be fitted at the other end of the cable.

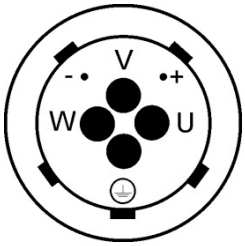
Suitable cables for these connectors can also be found in the Industrial Automation Catalog, Products and Services.

8.5.5 All other motors

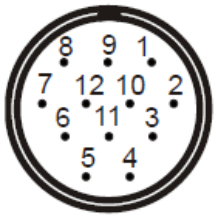
The following table shows the pinout of the power connector, size 1 (M23 x 1):

Front view	Pin	Signal
 6-pole, pins Plug connector M23 (with thread)	1	Phase 1
	5	Phase 2
	2	Phase 3
	⏚	PE conductor
	6	Brake+
	4	Brake-
	Housing	The outer shield is connected to the connector housing.

The following table shows the pinout of the power connector, size 1.5 (M40 x 1.5):

Front view	Pin	Signal
 6-pole, pins Plug connector M40 (with thread)	U	Phase 1
	V	Phase 2
	W	Phase 3
	⏚	PE conductor
	+	Brake+
	-	Brake-
	Housing	The outer shield is connected to the connector housing.

The following table shows the pinout of the encoder connector, size 1 (M23 x 1):

Front view	Pin	Resolver signal	HIPERFACE® signal
 12-pole, pins	1	S1 (cosine+)	-
	2	S3 (cosine-)	-
	3	S4 (sine-)	Sine+
	4	S2 (sine+)	Sine-
	5	R1R (exciter winding+)	Cosine+
	6	R2L (exciter winding-)	Cosine-
	7	Th1 (PTC)	Data- (RS-485)
	8	Th2 (PTC)	Data+ (RS-485)
	9	-	0 V
	10	-	Power supply (7 … 12 V)
	11	-	Thermal sensor+
	12	-	Thermal sensor-
Connector M23 (with thread)	Housing	The outer shield is connected to the connector housing.	The outer shield is connected to the connector housing.

Comment on the HIPERFACE® encoder:
On the JM-2xx, pins 12 and 9 in the encoder connector must be jumpered. A 9-pin Sub-D connector must be fitted at the other end of the cable.

Suitable cables for these connectors can also be found in the Industrial Automation Catalog, Products and Services.

8.6 Electrical installation - Wiring description for 1-cable technology

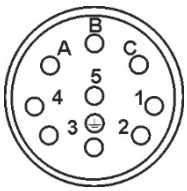
NOTICE

Evaluation of HIPERFACE DSL® encoders required!

Use the 1-cable technology ONLY with servo amplifiers that can evaluate HIPERFACE DSL® encoders - HDSL encoders for short.
These are, for example, JM-1000 or JM-3000 with the option TD.
If 1-cable technology is applied, the motor temperature sensor has already been wired to the HDSL encoder by the motor manufacturer. In the case of a hybrid cable, the encoder signal is transmitted via the motor cables.
A motor connector is the term used to describe the entirety of a power and encoder connector.

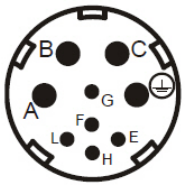
8.6.1 JHQ12, JHQ22 and JHQ24 motors

These motors use the HIPERFACE DSL® as encoder. The following table shows the pinout of the motor connector with M17 quick release:

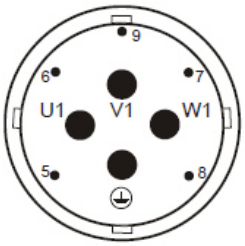
Front view	Pin	Signal
 Orange, 9-pole, pins Connector I-Tec	A	Phase 1
	B	Phase 2
	C	Phase 3
	⏚	PE conductor
	1	Brake+
	2	Brake-
	3	DSL+
	4	DSL-
	5	DSL shield Avoid contact between the DSL shield and the all-over shield. Attach the DSL shielding to the motor (pin 5) and to the respective pin of the servo amplifier.
	Housing	Place the all-over shielding and the brake shielding on the connector housing.

8.6.2 All other motors

These motors use the HIPERFACE DSL® as encoder. The following table shows the pinout of the motor connector with M23 quick release:

Front view	Pin	Signal
 9-pole, pins Connector M23	A	Phase 1
	B	Phase 2
	C	Phase 3
	⏚	PE conductor
	G	Brake+
	F	Brake-
	E	DSL+
	H	DSL-
	L	DSL shield Avoid contact between the DSL shield and the all-over shield. Attach the DSL shielding to the motor (pin L) and to the respective pin of the servo amplifier.
	Housing	Place the all-over shielding and the brake shielding on the connector housing.

These motors use the HIPERFACE DSL® as encoder. The following table shows the pinout of the motor connector with M40 quick release:

Front view	Pin	Signal
 9-pole, pins Connector M40	U1	Phase 1
	V1	Phase 2
	W1	Phase 3
	⏚	PE conductor
	6	Brake+
	5	Brake-
	7	DSL+
	8	DSL-
	9	DSL shield Avoid contact between the DSL shield and the all-over shield. Attach the DSL shielding to the motor (pin 9) and to the respective pin of the servo amplifier.
	Housing	Place the all-over shielding and the brake shielding on the connector housing.

8.7 Commissioning

8.7.1 Before starting work

Before starting any work, but especially before opening covers, the drive must be properly disconnected. In addition to the main circuits, attention must also be paid to any auxiliary circuits present.

DANGER

Hazard caused by high operating voltage!
Risk of electric shock due to residual voltage in the capacitors of the servo amplifier!
The high operating voltage may cause muscle cramps, burns, unconsciousness, respiratory arrest, or death.
Capacitors of the servo amplifier can store dangerous voltages for at least 7 minutes after the power has been switched off.
Observe the five safety rules before starting work:

- Disconnect completely.
- Secure against reconnection.
- Verify that the installation is dead.
- Carry out grounding and short-circuiting.
- Provide protection against adjacent live parts.

The above measures may only be revoked once the work has been completed and the drive has been completely installed.

8.7.2 Prerequisites for successful commissioning

NOTICE

Check the drive before switching it on for the first time!

Otherwise unsafe and oscillating behavior of the drive is possible.
Faulty settings can result in overheating and can destroy the drive.
Check the items below and follow the instructions:

- Commissioning of the motor is prohibited until the motor has been installed in the system.
- Referring to the nameplates and wiring diagrams of motor and servo amplifier, compare the continuous rated current and the AC rated voltage of the devices.
- Is the protective earth conductor (PE) connected and are motor and servo amplifier grounded? Grounding is also required for short functional tests!
- Are all cables and connectors on the drive system safely installed and mounted according to the wiring diagrams?
- Have the control loop parameters been set? Otherwise the drive may begin to oscillate.
- Has it been checked before switching on the drive whether the safety devices function properly?
- Have all necessary protection measures against accidental contact with live or moving parts been taken.

When configuring the digital servo amplifier, make sure that the correct number of motor poles and of resolver poles is set.

- Further important parameters can be set by selecting the motor from the JetSym motor database.

If third-party motors are used:

- Calculate and set the number of pole pairs.
  Calculate and set the maximum motor currents in the servo amplifier
- Calculate valid control parameters.

8.7.3 During Commissioning

DANGER

Hazard caused by high operating voltage!
Extremely hazardous voltages of up to DC 900 V may occur!
The high operating voltage may cause muscle cramps, burns, unconsciousness, respiratory standstill, or death.

- Do not open the device.
- While the motor is in operation, do not touch the following terminals: Power supply, motor voltage and DC link voltage.

WARNING

Warning of unguarded moving machine parts!

The drive shaft of the motor moves mechanical parts, some of which have sharp edges.
You could get caught in the rotating drive shaft and incur crushes and cuts.

- Never touch a rotating drive shaft.
- Do not wear lose-fitting clothing.
- Do not wear gloves.
- Make sure that there will be no danger to persons or damage to property even if the drive starts moving unintentionally.

Follow the steps below to continue the commissioning procedure:

1. A possibly existing holding brake must be checked for proper functioning (apply DC 24 V, the brake must be released then).
2. Check to see whether the rotor of the motor can be turned easily (a possibly existing brake must be released beforehand). Watch out for unusual scraping noises.
3. Carry out any other checks specific to or required for your system.
4. Put the drive into operation according to the user manual of the servo amplifier and servo motor.
5. When using multi-axis systems, put each drive unit - servo amplifier/motor - into operation separately.

8.7.4 At the end of commissioning

WARNING

Warning of electric shock!
Capacitors can still have dangerous voltages present up to five minutes after switching off the operating voltage!

The residual voltage of the capacitors can cause muscle cramps, burns, unconsciousness, respiratory arrest or death.

- For safety reasons, measure the voltage in the DC link and wait until the voltage drops below DC 40 V.
- **Always** wait at least 7 minutes after switching off before you disconnect the device from the mains or unplug connectors.
- **Always** wait at least 10 minutes after switching off before you disconnect the terminals and touch the contacts.

After commissioning, reinstall the protective cover provided and check that all live connections are protected against contact.

8.7.5 Malfunctions and troubleshooting

Type of error	Error cause	Error handling
The motor is humming		 • Immediately deactivate the ENABLE signal to prevent the motor winding from overheating! • Wait until the motor has cooled off. • Check motor and control parameters.
Neither controller nor motor are functioning any more	• The servo amplifier has not been enabled.	• Apply ENABLE signal.

	• There is insufficient protection against interference.	• To prevent disturbances caused by the motor, encoder or brake lines from being transmitted to the voltage supply of the controller or to other sensitive sensors proceed as follows:
		  • Use servo cables from Jetter AG.
		  • Use a separate power supply unit for the brake supply voltage.

Motor does not rotate	• Motor phases are mixed up	• Connect motor phases correctly
	• Brake is not released	• Check brake control
	• Drive mechanism is jammed	• Check drive mechanism
Motor does not follow the setpoint	• Setpoint line is interrupted.	• Check setpoint line
Motor overspeed	• Motor phases are mixed up	• Connect motor phases correctly
Motor chatters	• Resolver line shielding has been interrupted	• Replace resolver line
	• Gain factor too high	• Use motor default values
Brake does not grip	• Brake defective	• Replace motor
	• Axial motor shaft overload	• Check and reduce axial load • If the bearings are damaged, replace the motor
	• Required holding torque is too high	• Check dimensioning
Error message: Brake	• Short-circuit in the supply line of the motor holding brake	• Eliminate short circuit
	• Motor holding brake is defective	• Replace motor
Error message: Output stage	• Short-circuit or ground fault on motor line	• Replace cable
	• Short-circuit or ground fault in motor	• Replace motor

Type of error	Error cause	Error handling
Error message: Resolver	• Resolver connector has not been plugged on properly	• Check plug connection
	• Resolver line interrupted, crushed and the like	• Check the lines
Error message: Motor temperature • Motor overtemperature protection tripped.		 • Immediately deactivate the ENABLE signal to prevent the motor winding from overheating! • Check whether the frame temperature is higher than 80 °C.
• The frame temperature is higher than 100 °C	• Motor is overheated during continuous operation	• Use the oscilloscope function to record measurements of the motor function in a JetSym motion profile and send them to Jetter AG. • Allow the motor to cool down.
• The encoder line is loose or interrupted.	**With Jetter motors, the thermal sensor values are transmitted to the servo amplifier via encoder line.**	• Check the connector • Possibly replace the encoder line • If the error has been fixed, apply ENABLE signal again.
Unusual noise coming from the ball bearing		• Send the motor to Jetter AG - the ball bearings will be replaced
Unusual noise coming from the motor		• Put the motor out of operation • Remove the motor • By hand, ensure the motor shaft is moving smoothly • If there is still unusual noise to be heard, send the motor to Jetter AG

9 Maintenance and repairs

9.1 Maintenance

DANGER

Danger in potentially explosive atmospheres!

The motor may become a source of ignition in potentially explosive atmospheres if it is not regularly serviced and cleaned. Dust deposits must not ignite on hot surfaces.

- The surface temperature of the motor must be significantly lower than the glow temperature of deposited dust.
- Carry out regular maintenance and observe the service intervals.
- Clean the motor and prevent dust deposits of > 5 mm.
- Clean existing air ducts regularly depending on ambient conditions.

If you want to clean the motor housing:

- Use **only** isopropanol for cleaning.
- Never use cleaning agents containing solvents.
- Never immerse the engine in diluent.
- Never spray the engine with diluent.
- Never clean the engine with a steam jet.

Part of the maintenance of the motor is the replacement of the ball bearings.

- Check the motor every 2,500 operating hours or at least once a year for unusual ball bearing noises.

Under normal operating conditions, the service life of rotor ball bearings is at least 20,000 service hours.

The following factors can reduce the service life of the ball bearings:

- The axial or radial load is too high. This can be cause, for example, by the cogged belts
- Non-centered installation; smooth running is impeded this way
- If the bearings are worn, the grease is prone to dry out and to be contaminated which results in a loss of lubricity up to running dry

If these factors apply, have the bearings replaced after at the latest 20,000 operating hours.

- For this, please send the motor to Jetter AG.

Replacing the bearings before the motor shaft is worn helps to prolong the lifetime of the motor. Replacing a completely damaged rotor exceeds the original price of the motor by about 50 %, which means it is not profitable any more.

If there are unusual noises coming from the ball bearing:

- Put the motor out of operation and remove it.
- Do not disassemble the motor under any circumstances, as for reassembling specific instructions and settings must be observed.
- Send the motor to Jetter AG.

If you notice unusual noise from the motor (not the bearings):

- Put the motor out of operation and remove it.
- Check the motor by turning the motor shaft by hand for ease of movement or noise inside the motor.

9.2 Repairs

Defective components could cause dangerous malfunctions and could compromise safety. Repairs to the engine must not be carried out by the operator, but only by the manufacturer. Do not open the motor.

The motor does not contain any parts that could be repaired by the operator.

- Send the motor to Jetter AG.

9.3 Storage and shipment

Store the motor under the specified ambient conditions for temperature and humidity. The permissible ambient temperature range is between -10 °C and 40 °C. The humidity must be < 50 %. Protect the motor from dirt and dust.

For protection against impacts and shocks, transport must take place in the original packaging. In case of damaged packaging inspect the device for any visible damage, and immediately inform your freight forwarder and Jetter AG of the damage caused during shipment.
In case of damage or after a fall, do not commission the motor.

9.4 Disposal of obsolete equipment

The engines are made of a variety of materials that must be recycled or disposed of separately.

Disassemble the motor only for disposal. A disassembled motor cannot be made functional again without special tools.

Separate the materials according to the following table of disposal labels for electric motors.

Waste code of the motor which is disposed of in its entirety	EWC (European Waste Code)	EWC description
When disposing of the complete motor	**2/16/2014**	**Waste equipment**
When disposing of the disassembled motor:		
Aluminum parts: Flange, cover, terminal box and frame made of aluminum	1/12/2003	Chips from non-ferrous metals
Steel parts: Rotor with shaft (both in die casting and with magnets), stator package with wire windings, gray cast iron flange and gray cast iron cover, terminal box, brake with magnet, friction disk, springs, screws, etc.	1/12/2001	Ferrous metal chips
Plastic parts: Fan, fan cover, terminal box, brake cover, shaft protection	1/12/2005	Plastic shavings
Electrical components: Switches, capacitors, starters, terminal board, etc.	2/16/2016	Components that have been removed from end-of-life devices

The printed circuit board and electronic components of the HIPERFACE® encoder must be disposed of separately in accordance with the applicable environmental regulations. Dispose of these parts in the special waste recycling system.
When disposing of neodymium and magnets from NdFeB, it must be ensured that they constitute hazardous waste according to the European Waste Catalog Ordinance (AVV). For reuse, these metal salt residues are stored in collection containers for regenerable metal salt.

10 Service

10.1 Customer service

Should you have any questions, suggestions, or problems, please don’t hesitate to contact our service representatives. To contact them, please call our technical hotline or use the contact form on our homepage:

Technical hotline | Jetter - We automate your success.

You are also welcome to send an e-mail to our technical hotline:

hotline@jetter.de

11 Spare parts and accessories

11.1 Jetter servo cables

We recommend using ready-made and tested servo cables from Jetter AG. All available versions can also be found in the Industrial Automation Catalog - Products and Services.

Depending on the design of the motors with different encoder systems in 1- or 2-cable technology, these are available in different lengths for the respective JetMoves.
For KAY_1013_**xxxx**, xxxx is the length in centimeters.

Example:
You want to order a KAY_1013 cable of 1 m in length.
So when you order, specify KAY_1013_**0100**.

All servo cables are shielded, with PUR sheathing in DESINA color code and suitable for drag chains.
They also have UL and CSA approval, are flame-retardant, halogen-free and largely oil-resistant.

11.2 Connector

Cable connectors can also be supplied as spare parts.

11.3 Servo motors with mounted gearboxes

Jetter AG can offer the motor together with the mounted servo planetary gear.

See the link to planetary gear units on the Jetter AG homepage:

Gears | Jetter - We automate your success.

Jetter automation

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