

Motor Catalog

JL, JK, JH, JHN and JHQ - Servo Motors

60881713

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Item # 60881713

Revision 3.02

November 2016 / Printed in Germany

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1 Servo motors of the JL, JK, JH, JHN and JHQ series

Introduction

This chapter gives an overview of the synchronous servo motors made by Jetter AG.
It also describes features and provides type designations of the servo motors.

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Jetter AG in a nutshell

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. Your programming is simplified and you can get your systems up and running more quickly. A clear advantage with regard to time-to-market! In the 1990s, Jetter AG was the first company in the industry to systematically focus on networking with standard Ethernet TCP/IP and the use of web technologies (known as JetWeb technology). For the very first time, it became possible to bridge the divide that existed between corporate IT networks and production. This enabled the simplification of processes and the implementation of trendsetting features, such as remote maintenance. Since the introduction of JetWeb technology, thousands of Jetter control solutions have been implemented in a wide range of applications in mechanical and plant engineering - an expertise which is now of benefit to you, our customer, in the form of matured products and first-class service. Driven on by a string of successes, Jetter AG continues to research and develop new solutions and technologies with the aim of further simplifying the work you do as a user. 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.

Jetter motors - Multi-size power

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 series JL, JK, JH, JHN, and JHQ.

- JL motors cover the range from 0.1 Nm (JL1) to 115 Nm (JL8). They feature classic winding technology.
- JK motors excel by their extremely short design which makes them very space-saving.
- A specific feature of JHN motors is automated segmented winding technology and further optimized motor design, which result in high power density at very low space requirements.

Frame sizes 2 to 7 of 0.28 Nm to 60 Nm are available. plug connection, degree of protection or encoder design complete the supply leaving nothing to be desired when searching for a suitable servo motor. Along with this comprehensive range of motors, Jetter AG supplies pre-fabricated, tested servo cables and installs suitable transmissions. This saves you time and guarantees you a safe system! And on top of all that, we process your order fast and deliver promptly.

We automate your success.

Motor series - Comparison

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).

The following illustration shows a JL5 motor:



Servo motors of the JK series (End of Life)

The JK motor series comprises synchronous servo motors featuring classic winding technology. The specific feature of this series is its extremely short design which is very handy if there is only little space.

The following illustration shows a JK4 motor:



Servo motors of the JH series (End of Life)

The JH motor series comprises synchronous servo motors which excel by their compact design thanks to segmented winding technology. This technology results in a power density increase of more than 40 % compared with traditional technologies, which leads to a higher dynamic performance and significantly reduced space requirements.

The following illustration shows a JH3 motor:



Servo motors of the JK and JH series - (End of Life)

The JK and JH series have been discontinued and have therefore got the status **End of Life**. For this reason, use these motors for spare parts only and not for new plants!

Servo motors of the JHN series

JHN motors by Jetter AG excel by their very compact design coming with a high torque. This way the machines can be kept small.

The following illustration shows a JHN2 motor:

**Servo motors of the JHQ series**

The JHQ motors by Jetter AG comprise frame sizes 2-5 (JH) and 2-8 (JL). Further they have got two intermediate sizes, 23 and 45. 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.

Depending on the flange size, the JHQ motors have got a pole pair number of 4, 5, or 3.

The parameters of the JHQ characteristic curves have also been provided together with JetSym version 5.3 in the Motion Setup database by Jetter AG for commissioning tasks in JetSym.

Both with JHQ and JHN motors, 1-cable technology is to be applied.

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



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



Configurations

Resolver

A 2-pole hollow shaft resolver is used in the motor as a standard for encoder feedback. 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.

HIPERFACE®

The SinCos motor feedback system with the standardised **High Performance Interface**, HIPERFACE® for short, is often used in digital drive systems due to its high resolution and absolute positioning capability. In this case, search for reference is not required. The features of this system are as follows:

- 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.

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 the acronym of **D**igital-**S**ervo-**L**ink-.

Temperature monitoring

Thermal sensors monitor the temperature limit of the stator windings located in the winding overhangs. By default, there is a KTY-83-110 in the thermal sensor. As an alternative, the motors can also be supplied with PTC, NTC, or thermostwitch.

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 .




Gearings





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

1 Servo motors of the JL, JK, JH, JHN and JHQ series

Motor types - Overview

JL series			
Type	Flange size	Torque	
JL1	37 x 37 [mm ²]		0.1 - 0.2 [Nm] Page 26
JL2	55 x 55 [mm ²]		0.2 - 0.8 [Nm] Page 34
JL3	86 x 86 [mm ²]		0.65 - 3.0 [Nm] Page 42
JL4	98 x 98 [mm ²]		5.3 - 7.5 [Nm] Page 50
JL5	142 x 142 [mm ²]		10.5 - 22.0 [Nm] Page 57
JL6	190 x 190 [mm ²]		19.0 - 29.0 [Nm] Page 64
JL7	190 x 190 [mm ²]		32.0 - 40.0 [Nm] Page 71
JL8	240 x 240 [mm ²]		40.0 - 115.0 [Nm] Page 77

JK series			
Type	Flange size	Torque	
JK4	98 x 98 [mm ²]		1.0 [Nm] Page 84
JK5	142 x 142 [mm ²]		2.1 - 4.3 [Nm] Page 90
JK6	190 x 190 [mm ²]		3.5 - 8.6 [Nm] Page 95

JH series			
Type	Flange size	Torque	
JH2	55 x 55 [mm ²]		0.26 - 0.95 [Nm] Page 104
JH3	86 x 86 [mm ²]		0.95 - 4.2 [Nm] Page 112
JH4	98 x 98 [mm ²]		4.1 - 8.6 [Nm] Page 117
JH5	142 x 142 [mm ²]		11.6 - 30 [Nm] Page 123

JHN series			
Type	Flange size	Torque	
JHN2	55 x 55 [mm ²]	0.28 - 0.95 [Nm]	Page 130
JHN3	86 x 86 [mm ²]	1.15 - 4.8 [Nm]	Page 138
JHN4	98 x 98 [mm ²]	5.1 - 11.3 [Nm]	Page 147
JHN5	142 x 142 [mm ²]	12.0 - 24 [Nm]	Page 154
JHN6	190 x 190 [mm ²]	18.0 - 44.0 [Nm]	Page 160
JHN7	190 x 190 [mm ²]	30.0 - 60.0 [Nm]	Page 165

Servo motors of the JL, JK, JH, JHN and JHQ series:

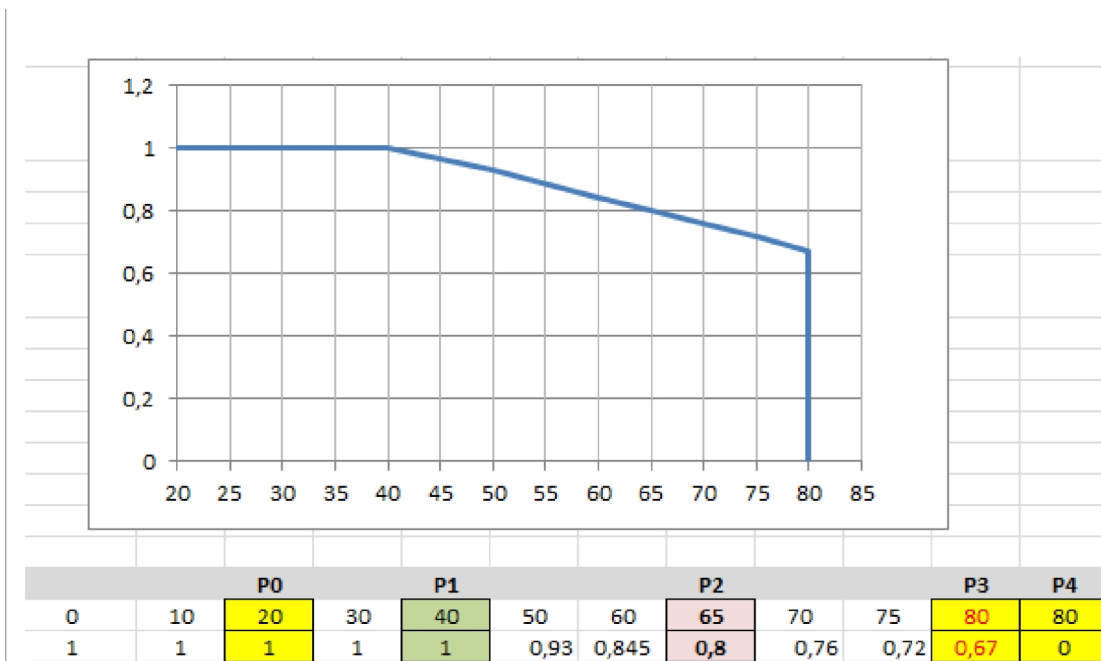
Derating at an ambient temperature is greater than 40 °C

The derating parameters of Jetter motors have been stored for each motor type in the ServoSoft database.

When the ambient temperature exceeds 40 °C, the respective parameter is automatically considered 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]



1 Servo motors of the JL, JK, JH, JHN and JHQ series

Servo motors of the JHQ series			
Type	Flange size	Torque	
JHQ2	58 x 58 [mm ²]	0.25 - 1.25 [Nm]	Page 172
JHQ23	70 x 70 [mm ²]	0.6 - 3.0 [Nm]	Page 172
JHQ3	91.3 x 91.3 [mm]	1.35 - 4.5 [Nm]	Page 172
JHQ4	100 x 100 [mm ²]	4 - 10 [Nm]	Page 172
JHQ45	116 x 116 [mm ²]	6 - 14 [Nm]	Page 172
JHQ5	142 x 142 [mm ²]	4.5 - 26 [Nm]	Page 172
JHQ6	190 x 190 [mm ²]	20 - 28 [Nm]	Page 172
JHQ7	190 x 190 [mm ²]	36 - 42 [Nm]	Page 172
JHQ8	240 x 240 [mm ²]	42.0 - 120.0 [Nm]	Page 172

The following table shows the Jetter motor series JL, JH, JHN, and JHQ, sorted by flange and shaft measurements.

Note

Flange, shaft and centering of the JK motors differ from those of the JL, JH, JHN, and JHQ series.

When changing from JK motors to other Jetter motors, the respective machine must be customized!

JL (6-pin)	JL1	JL2		JL3	JL4		JL5	JL6	JL7	JL8	JL8
JHN (6-/10-pin)		JHN2		JHN3	JHN4		JHN5	JHN6	JHN7		
JHQ (8-/10-/6-pin)		JHQ2	JHQ23	JHQ3	JHQ4	JHQ45	JHQ5	JHQ6	JHQ7	JHQ8	JHQ8
Flange size	1	2	23	4	5	45	5	6	7	8	8
Flange - JL, JH, JHN (B x H [mm ²])	37	55		86	98		142	190	190	240	240
Flange - JHQ (B x H [mm ²])		58	70	91.3	100	116	142	190	190	240	240
Hole circle/ centering [mm diameter]	41.5/25	63/40	75/60	100/80	115/95	130/110	165/130	215/180	215/180	230/265	230/265

Shaft [mm diameter x length]	6x16	JL: 9 x 24 JH, JHN, JHQ: 9 x 20	11 x 23 (0,6 - 1,8 Nm) 14 x 30 (2,4 - 3 Nm)	14 x 30	19 x 40	19 x 40 (6 - 8 Nm) 24 x 50 (10 - 14 Nm)	24 x 50	24 x 50	28 x 58	38 x 80	42 x 110
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Note

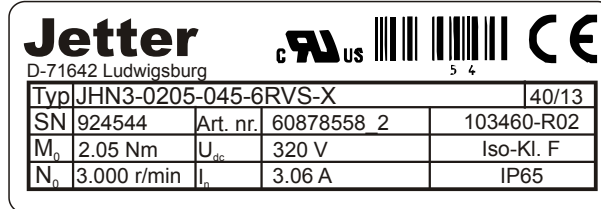
For further details of all Jetter AG servo motors, please turn to the catalog
Industrial automation, products and services,
 Item # 60876905

1 Servo motors of the JL, JK, JH, JHN and JHQ series

Type designation

Example of type designation

The nameplate has been placed on the ND end of the motor. As you can see on the illustration, the type designation has been printed on the nameplate. Example: Type designation on a JHN3 motor:



Decoding a type designation

The part of the designation that is highlighted by bold letters is the standard option of the motor.

The example below shows how to decode the type designation on the nameplate of the motor:

Type designation															
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

Series	
JHN 3 - 0250-045-6 R V B P S-X C F E L K X	
Series	JL
	JK (End of Life)
	JH (End of Life)
	JHN
	JHQ

2: Frame size

Frame size	
JHN 3 - 0250-045-6 R V B P S-X C F E L K X	
Frame size	1
	2
	3
	4
	5
	6
	7
	8

3: Continuous stall torque

Continuous stall torque	
JHN 3 - 0250 -045-6 R V B P S-X C F E L K X	
Continuous stall torque	Value in Ncm Example: 0250 means 2.5 Nm

4: Back EMF constant

Back EMF constant	
JHN 3 - 0250- 045 -6 R V B P S-X C F E L K X	
Back EMF constant	Value in V/k min ⁻¹ Example: 45 V/1000 min ⁻¹

5: Thermal circuit-breaker

Thermal circuit-breaker	
JHN 3 - 0250-045- 6 R V B P S-X C F E L K X	
3	Thermal circuit-breaker 145 °C
4	Thermal circuit-breaker PTC
5	Thermal circuit-breaker NTC
6	KTY83-110
8	PT-1000 only for JM-1000, JM-3000, e.g. motors featuring 1-cable technology

6: Shaft tolerance

Shaft tolerance	
JHN 3 - 0250-045-6 R V B P S-X C F E L K X	
R	Runout tolerance of shaft ends to DIN 42955R

7: Degree of protection

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

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

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

1 Servo motors of the JL, JK, JH, JHN and JHQ series

10: Electrical connection

Electrical connection	
JHN 3 - 0250-045-6 R V B P S-X C F E L K X	
S	Electrical connection
–	Vertical position of the connector
S-A	Plug connection, D end
S-B	Plug connection, ND end
S-X	Plug connection, rotatable
S4-xxx.x	Cable gland with cable, cable length in m, with connectors
S-41-xxx.x	Cable gland with cable, cable length in m, with connectors for central installation

11: Connector type

Connector type	
JHN 3 - 0250-045-6 R V B P S-X C F E L K X	
C	Connector type
–	<ul style="list-style-type: none"> ▪ Encoder and power connector, size 1 for <ul style="list-style-type: none"> ▪ JL2 ... JL4, JK4 ... JK6, JH2 ... JH5, JHN2 ... JHN7, JHQ2 ... JHQ7 ▪ Power connector size (2-cable technology) and motor connector size (1-cable technology) 1.5 for <ul style="list-style-type: none"> ▪ JL5 ... JL8, JK7, JHQ8
C1	Encoder and power connector, size 1 (for JL5 only)

12: Encoder type

Encoder type	
JHN 3 - 0250-045-6 R V B P S-X C F E L K X	
–	Resolver, two-pin
F2	HIPERFACE single-turn as of frame size 2, SKS36 for frame size 2, or SRS50 (JL, JH, JK motors as of frame size 3)
F3	HIPERFACE multi-turn as of frame size 2, SKM36 for frame size 2, or SRM50 (JL, JH, JK motors as of frame size 3)
F11	HIPERFACE single-turn SEK34 or SEK37 or SEK52 for JHN and JHQ motors
F12	HIPERFACE multi-turn SEL34 or SEL37 or SEL52 for JHN and JHQ motors
F13	HIPERFACE single-turn SKS36 (JHN and JHQ motors as of frame size 2)
F14	HIPERFACE multi-turn SKM36 (JHN and JHQ motors as of frame size 2)
F15	HIPERFACE single-turn SRS50 (JHN and JHQ motors as of frame size 3)
F16	HIPERFACE multi-turn SRM50 (JHN and JHQ motors as of frame size 3)
F17	HIPERFACE DSL single-turn EES37 (for JHN and JHQ motors; HIPERFACE DSL EES34 in preparation)
F18	HIPERFACE DSL multi-turn EEM37 (for JHN and JHQ motors; HIPERFACE DSL EEM34 in preparation)
F19	HIPERFACE DSL single-turn EKS36 (JHN and JHQ motors as of frame size 2)
F20	HIPERFACE DSL multi-turn EKM36 (JHN and JHQ motors as of frame size 2)

13: Potentially explosive areas

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

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

Cooling	
JHN 3 - 0250-045-6 R V B P S-X C F E L K X	
–	Natural air cooling (standard)
K1	Forced ventilation on ND end

1 Servo motors of the JL, JK, JH, JHN and JHQ series

16: Further options

Further options	
JHN 3 - 0250-045-6 R V B P S-X C F E L K X	
X	Further configurations

Note - Applying motors at safety controllers

When applying motors and connected resolvers to safety controllers (e.g. Jetter Safety Control JSC), there is an option **Y - Safe encoder installation to EN 61800-5-2, table D.16.**

The MTTFd value is 140,000 hours at an ambient temperature of the motor of 60 °C.

If a HIPERFACE encoder with safety configuration is applied, the type designation is extended by an extra "S" at Fxx. Taking the HDSL encoder EKM 36 S as an example, this would be the order code F20S.

2 Servo motors of the JL series

General technical data

General technical information on JL motors is listed below:

Parameter	Description
Design	B5, V1, V3
Coating	Matt black to RAL 9005 (no stability to solvents, such as Trilene, thinners, etc.)
Ball bearing service life	≥ 20,000 operating hours
Flange	Flange size to IEC standard, fit j6, accuracy to DIN 2955 Tolerance class: R
Degree of protection	IP65 (without shaft seal) Exception: JL1 motors IP64
Insulation class	F acc. to VDE 0350
Cooling	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: thermal circuit-breaker 145 °C or PTC
Derating at altitudes higher than 1000 m above sea level when the motor has come to a standstill at 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 derated by the following formula: $M_{red} = M_0 * \sqrt{1 - (H - 1000) / 10000}$	

Rated data - Resolver

The rated resolver data for JL motors are listed below:

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

2 Servo motors of the JL series

Standard configuration

The standard motor configuration includes the following features:

- KTY83-110; for JL1 only PTC can be applied
 - No brake
 - Plain shaft
 - Two straight flange sockets for power and signal
 - Resolver
 - Runout tolerance = R
 - Degree of protection IP65
-

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2.1 Motor type JL1 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JL1
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

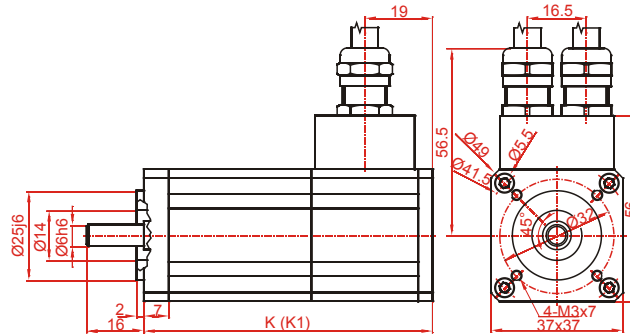
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Frame size JL1

Physical dimensions of the motor with resolver

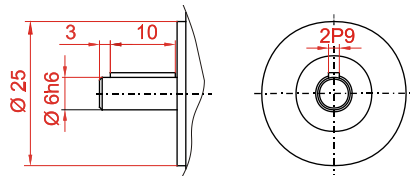
The following illustration shows the dimensions of a JL1 motor equipped with a resolver.



Motor type	JL1-0010	JL1-0020	JL1-0030
K (without brake)	81	96	111
K1 (with brake)	111	126	141

Keyway/feather key

As an option, JL1 motors can be supplied with keyway/feather key 2x2x10 to DIN 6885-A.



JL1 - General technical data

Options HIPERFACE and thermal circuit-breaker 145 °C (option 3) are not available for motor type JL1.

Type of connections Motor type JL1 is equipped with two cable glands including cables for connecting power and feedback cables. In the type designation, the cable length is specified in meters. The cable ends are not equipped with connectors.

Pin assignment - Motor The pin assignment on the motor side is as follows:

Signal	Core number/core color
Phase U	1
Phase V	2
Phase W	3
PE conductor	Yellow-green
Brake +	4
Brake -	5

Pin assignment - Resolver for option -S3 The pin assignment on the resolver side for option S3 is as follows:

Signal	Core color
S1 (cosine +)	Brown
S3 (cosine -)	White
S4 (sine -)	Green
S2 (sine +)	Yellow
R1 (exciter winding +)	Pink
R2 (exciter winding -)	Gray
Thermoswitch +	Blue
Thermoswitch -	Red

2 Servo motors of the JL series

Pin assignment - Resolver for option -S4

The pin assignment on the resolver side for option S4 is as follows:

Signal	Pin
S1 (cosine +)	1
S3 (cosine -)	2
S4 (sine -)	3
S2 (sine +)	4
R1 (exciter winding +)	5
R2 (exciter winding -)	6
Thermoswitch +	7
Thermoswitch -	8
Not assigned	9 - 12

Brake (option)

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

Technical specifications	Value		
Holding torque	M_{BR}	<i>Nm</i>	0.4
Supply voltage	U_{BR}	<i>V</i>	DC 24 V (-10 % to +6 %)
Rated power	P_{BR}	<i>W</i>	8
Rotor inertia	J_{BR}	<i>kg*cm²</i>	0.013
Weight	m_{BR}	<i>kg</i>	0.08

JL1 - Specific technical data (DC link voltage DC 24 V)

Motor type			JL1-0010-002	JL1-0030-005
Motor data				
Holding torque	M_o	<i>Nm</i>	0.10	0.30
Continuous stall current	I_o	<i>A</i>	3.6	3.8
Back EMF constant	K_E	<i>V/kRPM</i>	1.7	4.8
Torque constant	K_T	<i>Nm/A</i>	0.03	0.08
Winding resistance - Phase to phase	R_{Ph}	Ω	1.04	1.43
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	0.30	0.40
Electr. time constant	T_{el}	<i>ms</i>	0.29	0.28
Mech. time constant	T_{mech}	<i>ms</i>	13.7	3.9
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	18	22
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	5	5
Number of motor poles	p_{mot}	-	6	6
Rated data				
Rated torque	M_n	<i>Nm</i>	0.10	0.25
Rated speed	n_n	<i>rpm</i>	4,000	1,500
Continuous rated current	I_n	<i>A</i>	3.8	3.3
Maximum values				
Max. torque	M_{max}	<i>Nm</i>	0.32	0.69
Max. current	I_{max}	<i>A</i>	12.0	8.7
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000
Mechanical parameters				
Rotor inertia	J	<i>kg*cm²</i>	0.06	0.10
Weight without brake	m	<i>kg</i>	0.37	0.53
Axial load	F_A	<i>N</i>	31	35
Radial load	F_R	<i>N</i>	161	182

JL1 - Specific technical data (DC link voltage DC 48 V)

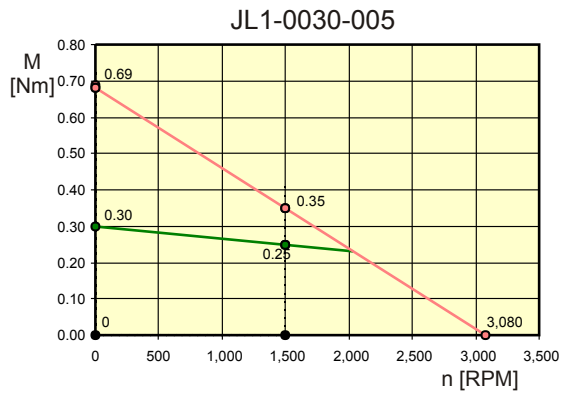
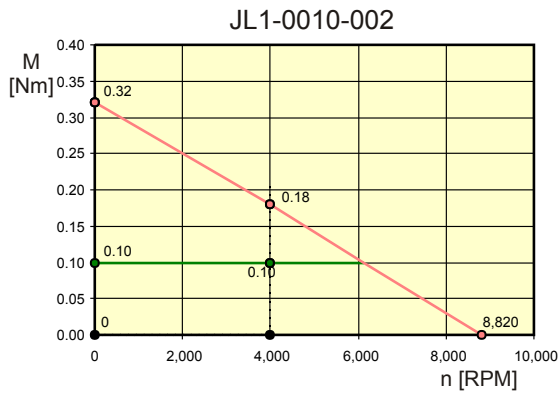
Motor type	JL1-0020-004		
Motor data			
Holding torque	M_o	<i>Nm</i>	0.20
Continuous stall current	I_o	<i>A</i>	3.0
Back EMF constant	K_E	<i>V/kRPM</i>	4.0
Torque constant	K_T	<i>Nm/A</i>	0.07
Winding resistance - Phase to phase	R_{Ph}	Ω	1.92
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	0.50
Electr. time constant	T_{el}	<i>ms</i>	0.26
Mech. time constant	T_{mech}	<i>ms</i>	6.1
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	20
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	5
Number of motor poles	p_{mot}	-	6
Rated data			
Rated torque	M_n	<i>Nm</i>	0.20
Rated speed	n_n	<i>rpm</i>	4,000
Continuous rated current	I_n	<i>A</i>	3.2
Maximum values			
Max. torque	M_{max}	<i>Nm</i>	0.80
Max. current	I_{max}	<i>A</i>	12.9
Max. speed	n_{max}	<i>rpm</i>	12,000
Mechanical parameters			
Rotor inertia	J	<i>kg*cm²</i>	0.08
Weight without brake	m	<i>kg</i>	0.45
Axial load	F_A	<i>N</i>	33
Radial load	F_R	<i>N</i>	174

JL1 - Specific technical data (DC link voltage DC 320 V)

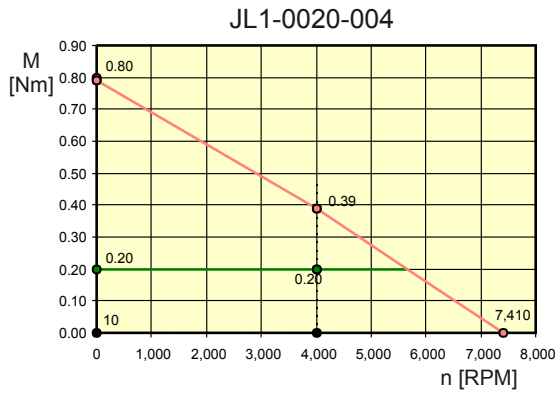
Motor type			JL1-0010-010	JL1-0020-012
Motor data				
Holding torque	M_o	<i>Nm</i>	0.10	0.20
Continuous stall current	I_o	<i>A</i>	0.58	0.97
Back EMF constant	K_E	<i>V/kRPM</i>	10.5	12.5
Torque constant	K_T	<i>Nm/A</i>	0.17	0.21
Winding resistance - Phase to phase	R_{Ph}	Ω	38.9	18.9
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	9.2	4.5
Electr. time constant	T_{el}	<i>ms</i>	0.24	0.24
Mech. time constant	T_{mech}	<i>ms</i>	13.4	6.1
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	18	20
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	5	5
Number of motor poles	p_{mot}	-	6	6
Rated data				
Rated torque	M_n	<i>Nm</i>	0.09	0.18
Rated speed	n_n	<i>rpm</i>	6,000	6,000
Continuous rated current	I_n	<i>A</i>	0.56	0.92
Maximum values				
Max. torque	M_{max}	<i>Nm</i>	0.40	0.80
Max. current	I_{max}	<i>A</i>	2.5	4.2
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000
Mechanical parameters				
Rotor inertia	J	<i>kg*cm²</i>	0.06	0.08
Weight without brake	m	<i>kg</i>	0.37	0.45
Axial load	F_A	<i>N</i>	31	33
Radial load	F_R	<i>N</i>	161	174

Torque-speed characteristic - JL1 motors

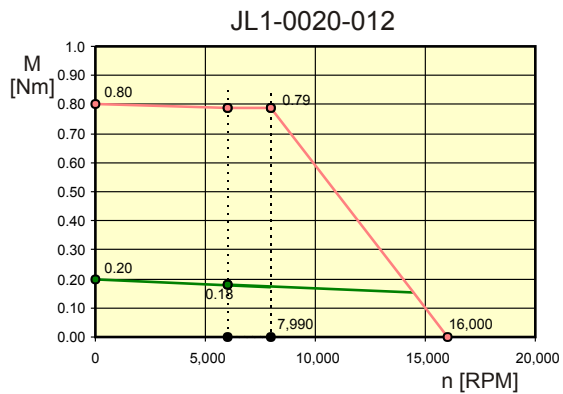
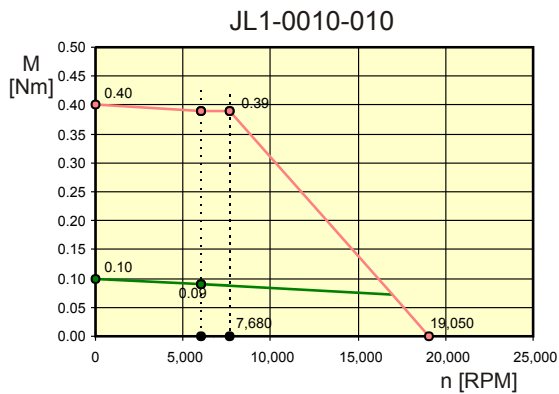
DC link voltage DC 24 V



DC link voltage DC 48 V



DC link voltage DC 320 V



2.2 Motor type JL2 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JL2
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

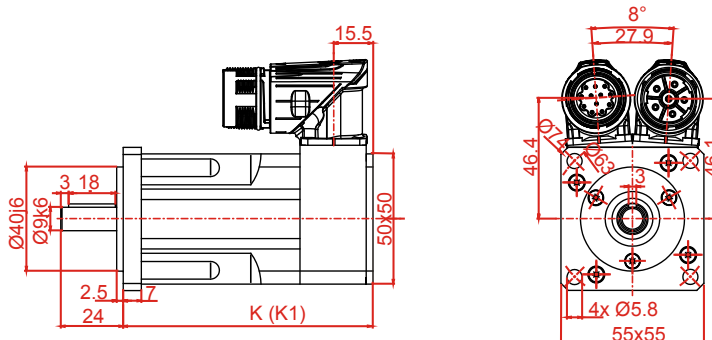
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JL2 - Specific technical data (DC link voltage DC 560 V).....	38
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Frame size JL2

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JL2 motor equipped with a resolver.



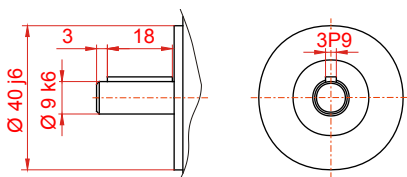
Motor type	JL2-0020	JL2-0040	JL2-0060	JL2-0080
K (without brake)	98	113	128	143
K1 (with brake)	131	146	161	176

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JL2 motors can be supplied with keyway/feather key 3x3x18 to DIN 6885-A.



JL2 - General technical data

Options

HIPERFACE is not available for motor type JL2.

Type of connections

Motor type JL2 is connected to power by the power connector, see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JL2 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

Technical data	Value		
Holding torque	M_{BR}	Nm	2
Supply voltage	U_{BR}	V	DC 24 V (-10 % to +6 %)
Rated power	P_{BR}	W	11
Rotor inertia	J_{BR}	$kg \cdot cm^2$	0.068
Weight	m_{BR}	kg	0.15

JL2 - Specific technical data (DC link voltage DC 70 V)

Motor type	JL2-0060-005		
Motor data			
Holding torque	M_o	<i>Nm</i>	0.60
Continuous stall current	I_o	<i>A</i>	6.5
Back EMF constant	K_E	<i>V/kRPM</i>	5.5
Torque constant	K_T	<i>Nm/A</i>	0.09
Winding resistance - Phase to phase	R_{Ph}	Ω	0.67
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	0.60
Electr. time constant	T_{el}	<i>ms</i>	0.9
Mech. time constant	T_{mech}	<i>ms</i>	1.5
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	20
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	18
Number of motor poles	p_{mot}	-	6
Rated data			
Rated torque	M_n	<i>Nm</i>	0.55
Rated speed	n_n	<i>rpm</i>	4,200
Continuous rated current	I_n	<i>A</i>	6.3
Maximum values			
Max. torque	M_{max}	<i>Nm</i>	2.4
Max. current	I_{max}	<i>A</i>	28
Max. speed	n_{max}	<i>rpm</i>	12,000
Mechanical parameters			
Rotor inertia	J	<i>kg*cm²</i>	0.11
Weight without brake	m	<i>kg</i>	1.21
Axial load	F_A	<i>N</i>	47
Radial load	F_R	<i>N</i>	245

JL2 - Specific technical data (DC link voltage DC 320 V)

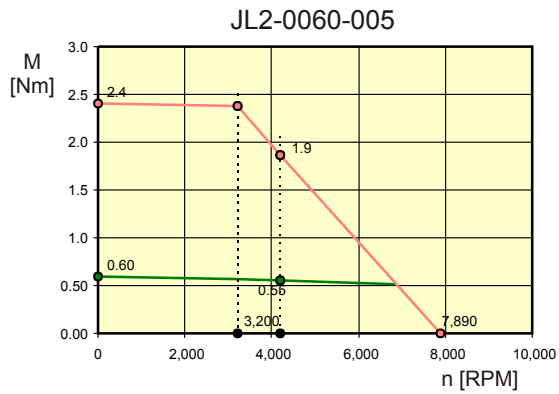
Motor type			JL2-0020-008	JL2-0020-020	JL2-0040-008	JL2-0040-026	JL2-0060-008	JL2-0060-031	JL2-0080-025
Motor data									
Holding torque	M_o	<i>Nm</i>	0.20	0.20	0.40	0.40	0.60	0.60	0.80
Continuous stall current	I_o	<i>A</i>	1.47	0.59	2.8	0.93	4.4	1.23	1.86
Back EMF constant	K_E	<i>V/kRPM</i>	8.2	20.5	8.6	26.0	8.3	30.0	26.0
Torque constant	K_T	<i>Nm/A</i>	0.14	0.34	0.14	0.43	0.14	0.49	0.43
Winding resistance - Phase to phase	R_{Ph}	Ω	8.7	54	2.6	26.3	1.41	19.9	9.3
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	5.1	32.0	2.2	21.4	1.30	17.2	9.0
Electr. time constant	T_{el}	<i>ms</i>	0.59	0.59	0.85	0.82	0.92	0.87	0.97
Mech. time constant	T_{mech}	<i>ms</i>	4.9	4.9	1.8	2.0	1.4	1.5	1.1
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	10	10	15	15	20	20	22
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	18	18	18	18	18	18	24
Number of motor poles	p_{mot}	-	6	6	6	6	6	6	6
Rated data									
Rated torque	M_n	<i>Nm</i>	0.18	0.19	0.35	0.36	0.53	0.55	0.72
Rated speed	n_n	<i>rpm</i>	6,000	4,500	6,000	4,500	6,000	4,500	4,500
Continuous rated current	I_n	<i>A</i>	1.45	0.60	2.6	0.88	4.1	1.18	1.76
Maximum values									
Max. torque	M_{max}	<i>Nm</i>	0.80	0.80	1.6	1.6	2.4	2.4	3.2
Max. current	I_{max}	<i>A</i>	6.3	2.5	12.1	4.0	18.7	5.3	8.0
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Mechanical parameters									
Rotor inertia	J	<i>kg*cm²</i>	0.06	0.06	0.08	0.08	0.11	0.11	0.13
Weight without brake	m	<i>kg</i>	0.90	0.90	1.06	1.06	1.21	1.21	1.36
Axial load	F_A	<i>N</i>	43	43	45	45	47	47	48
Radial load	F_R	<i>N</i>	225	225	237	237	245	245	252

JL2 - Specific technical data (DC link voltage DC 560 V)

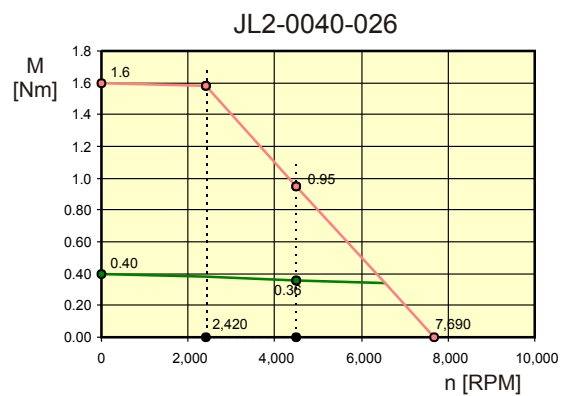
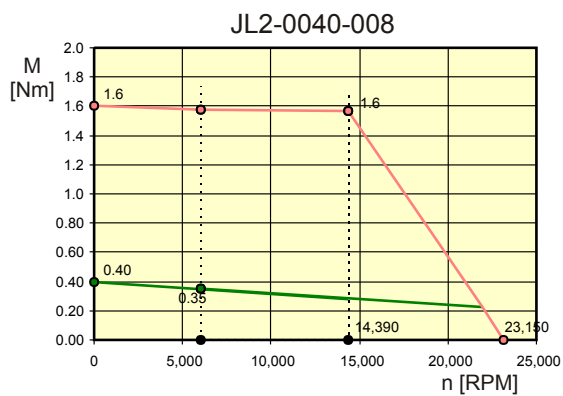
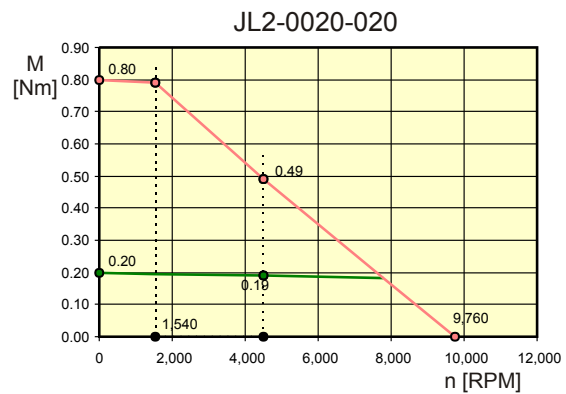
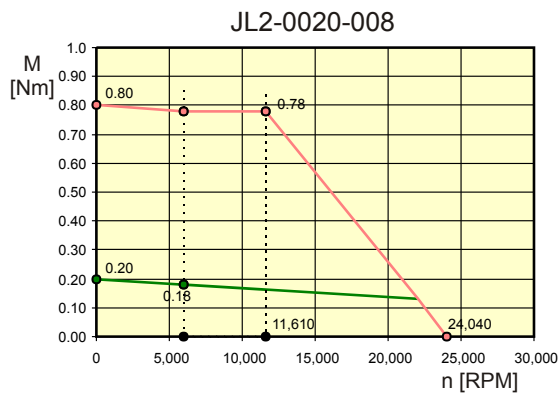
Motor type	JL2-0060-049		
Motor data			
Holding torque	M_o	<i>Nm</i>	0.60
Continuous stall current	I_o	<i>A</i>	0.73
Back EMF constant	K_E	<i>V/kRPM</i>	50.0
Torque constant	K_T	<i>Nm/A</i>	0.83
Winding resistance - Phase to phase	R_{Ph}	Ω	51
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	45.5
Electr. time constant	T_{el}	<i>ms</i>	0.90
Mech. time constant	T_{mech}	<i>ms</i>	1.4
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	20
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	18
Number of motor poles	p_{mot}	-	6
Rated data			
Rated torque	M_n	<i>Nm</i>	0.55
Rated speed	n_n	<i>rpm</i>	4,500
Continuous rated current	I_n	<i>A</i>	0.70
Maximum values			
Max. torque	M_{max}	<i>Nm</i>	2.4
Max. current	I_{max}	<i>A</i>	3.1
Max. speed	n_{max}	<i>rpm</i>	12,000
Mechanical parameters			
Rotor inertia	J	<i>kg*cm²</i>	0.11
Weight without brake	m	<i>kg</i>	1.21
Axial load	F_A	<i>N</i>	47
Radial load	F_R	<i>N</i>	245

Torque-speed characteristic - JL2 motors

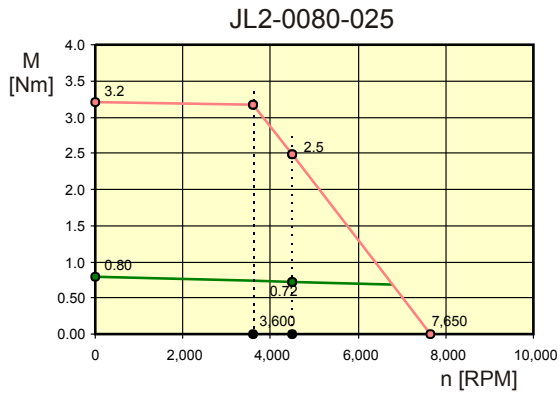
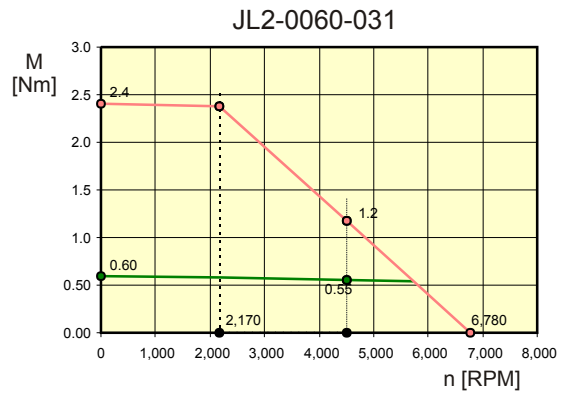
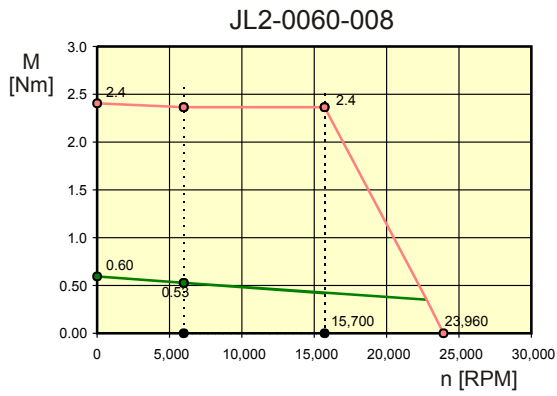
DC link voltage DC 70 V



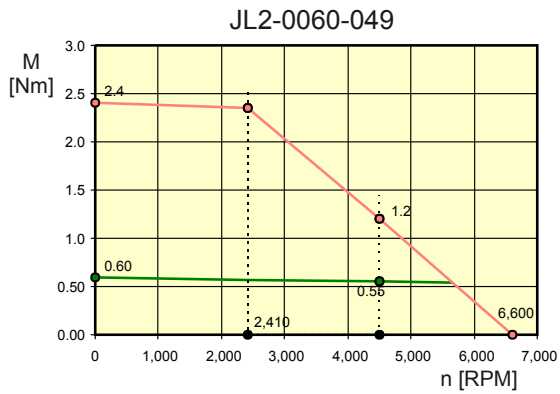
DC link voltage DC 320 V



2 Servo motors of the JL series



DC link voltage DC 560 V



2.3 Motor type JL3 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JL3
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

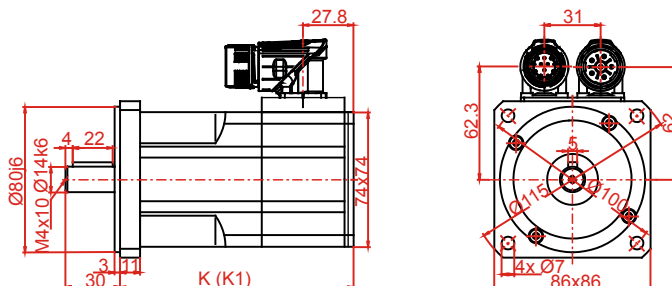
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Frame size JL3

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JL3 motor equipped with a resolver.



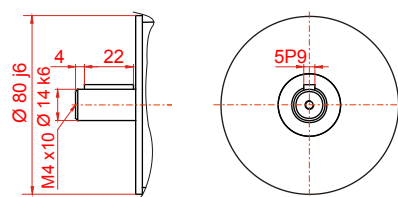
Motor type	JL3-0065	JL3-0130	JL3-0250	JL3-0300
K (without brake)	109	127	163	181
K1 (with brake)	142	160	196	214

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JL3 motors can be supplied with keyway/feather key 5x5x22 to DIN 6885-A.



JL3 - General technical data

Type of connections

Motor type JL3 is connected to power by the power connector, see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JL3 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JL3 - Specific technical data (DC link voltage DC 320 V)

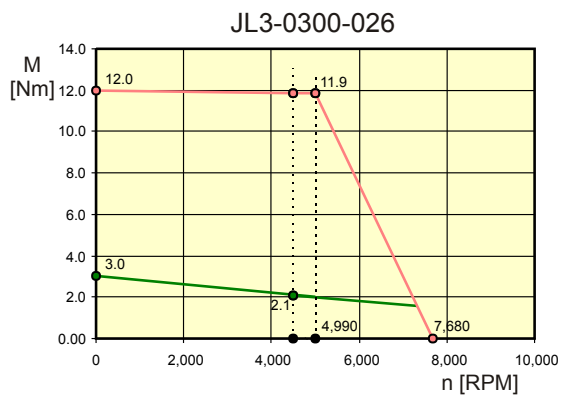
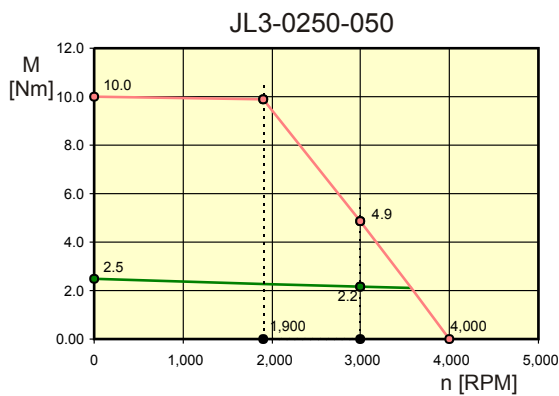
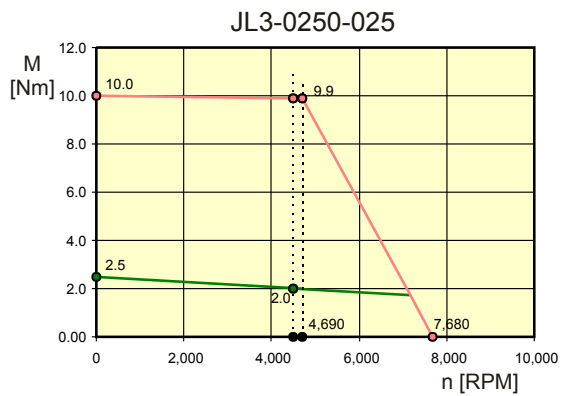
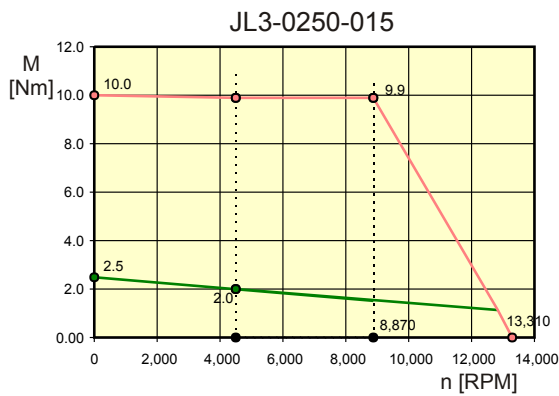
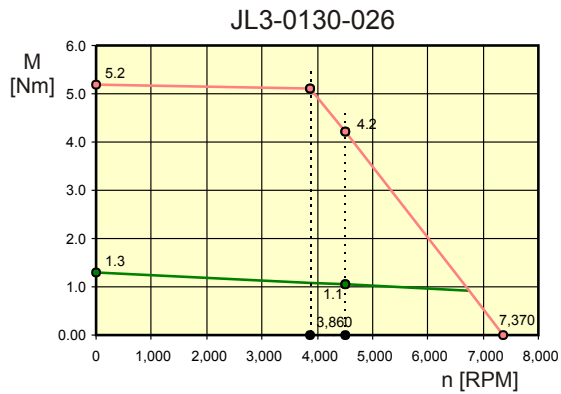
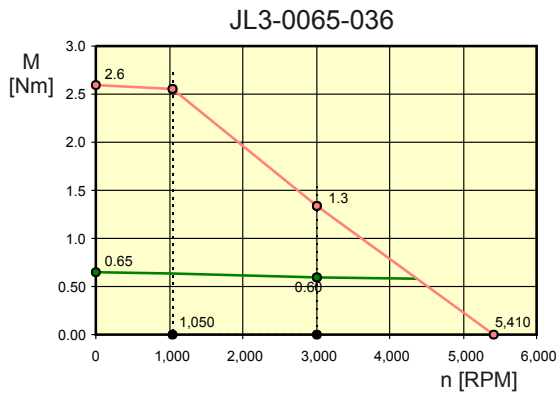
Motor type			JL3-0065-036	JL3-0130-026	JL3-0250-015	JL3-0250-025	JL3-0250-050	JL3-0300-026	JL3-0300-046
Motor data									
Holding torque	M_o	<i>Nm</i>	0.65	1.3	2.5	2.5	2.5	3.0	3.0
Continuous stall current	I_o	<i>A</i>	1.06	2.9	10.1	5.8	3.0	7.0	3.7
Back EMF constant	K_E	<i>V/kRPM</i>	37.0	27.0	15.0	26.0	50.0	26.0	49.5
Torque constant	K_T	<i>Nm/A</i>	0.61	0.45	0.25	0.43	0.83	0.43	0.82
Winding resistance - Phase to phase	R_{Ph}	Ω	28.2	4.2	0.46	1.38	5.4	1.01	3.7
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	33.3	7.2	1.0	3.1	11.7	2.4	8.6
Electr. time constant	T_{el}	<i>ms</i>	1.2	1.7	2.2	2.2	2.2	2.4	2.3
Mech. time constant	T_{mech}	<i>ms</i>	6.5	2.4	1.8	1.8	1.9	1.4	1.4
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	25	30	32	32	32	33	33
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	24	24	24	24	24	24	24
Number of motor poles	p_{mot}	-	6	6	6	6	6	6	6
Rated data									
Rated torque	M_n	<i>Nm</i>	0.60	1.05	2.0	2.0	2.2	2.1	2.5
Rated speed	n_n	<i>rpm</i>	3,000	4,500	4,500	4,500	3,000	4,500	3,000
Continuous rated current	I_n	<i>A</i>	1.04	2.5	8.5	4.9	2.7	5.2	3.2
Maximum values									
Max. torque	M_{max}	<i>Nm</i>	2.6	5.2	10.0	10.0	10.0	12.0	12.0
Max. current	I_{max}	<i>A</i>	4.6	12.5	43.0	25.0	13.0	30.0	15.8
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Mechanical parameters									
Rotor inertia	J	<i>kg*cm²</i>	0.5	0.65	1.4	1.4	1.4	1.5	1.5
Weight without brake	m	<i>kg</i>	1.75	2.25	3.2	3.2	3.2	3.65	3.65
Axial load	F_A	<i>N</i>	70	75	80	80	80	82	82
Radial load	F_R	<i>N</i>	370	393	422	422	422	431	431

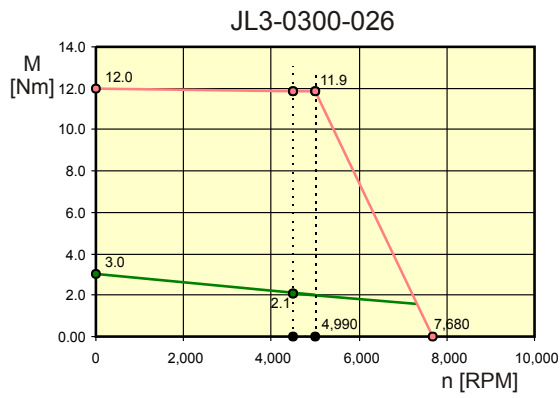
JL3 - Specific technical data (DC link voltage DC 560 V)

Motor type			JL3-0065-059	JL3-0130-047	JL3-0130-077	JL3-0250-083	JL3-0300-068
Motor data							
Holding torque	M_o	<i>Nm</i>	0.65	1.3	1.3	2.5	3.0
Continuous stall current	I_o	<i>A</i>	0.65	1.67	1.01	1.8	2.6
Back EMF constant	K_E	<i>V/kRPM</i>	60.0	47.0	78.0	84.0	71.0
Torque constant	K_T	<i>Nm/A</i>	0.99	0.78	1.29	1.39	1.17
Winding resistance - Phase to phase	R_{Ph}	Ω	75	12.7	34.5	15.0	7.5
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	88	21.5	62	33.2	17.6
Electr. time constant	T_{el}	<i>ms</i>	1.2	1.7	1.8	2.2	2.3
Mech. time constant	T_{mech}	<i>ms</i>	6.6	2.4	2.3	1.9	1.4
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	25	30	30	32	33
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	24	24	24	24	24
Number of motor poles	p_{mot}	-	6	6	6	6	6
Rated data							
Rated torque	M_n	<i>Nm</i>	0.6	1.0	1.15	2.2	2.3
Rated speed	n_n	<i>rpm</i>	3,000	6,000	3,000	3,000	4,000
Continuous rated current	I_n	<i>A</i>	0.64	1.4	0.95	1.62	2.0
Maximum values							
Max. torque	M_{max}	<i>Nm</i>	2.6	5.2	5.2	10.0	12.0
Max. current	I_{max}	<i>A</i>	2.8	7.2	4.3	7.7	11.0
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000	12,000	12,000
Mechanical parameters							
Rotor inertia	J	<i>kg*cm²</i>	0.5	0.65	0.65	1.4	1.5
Weight without brake	m	<i>kg</i>	1.75	2.25	2.25	3.2	3.65
Axial load	F_A	<i>N</i>	70	75	75	80	82
Radial load	F_R	<i>N</i>	370	393	393	422	431

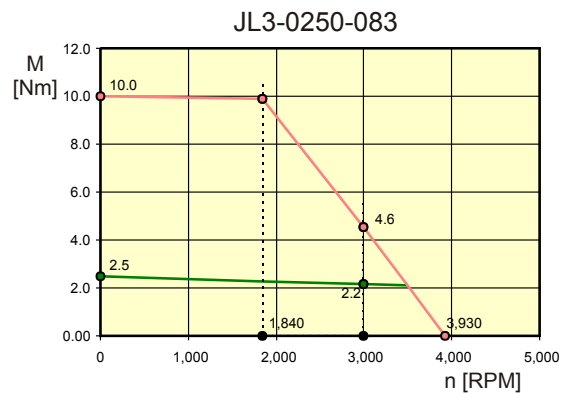
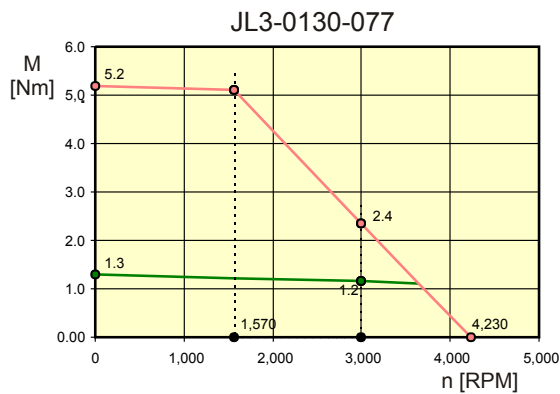
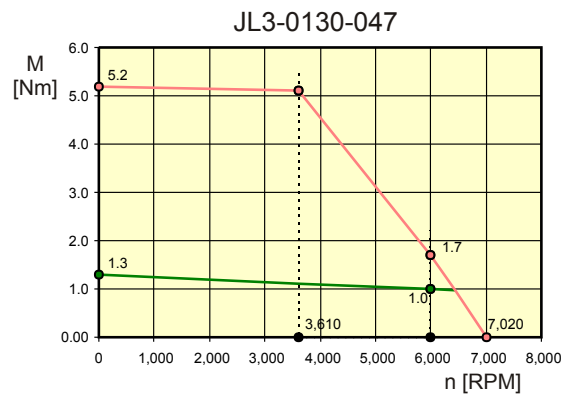
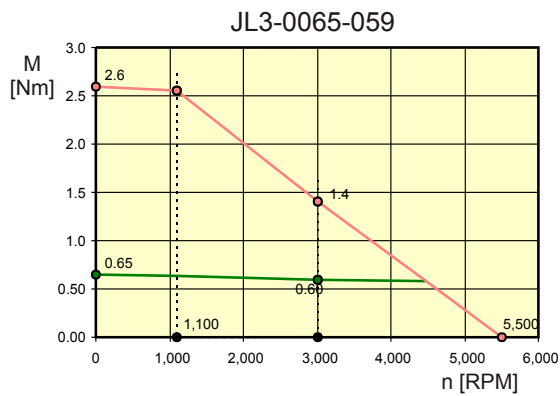
Torque-speed characteristic - JL3 motors

DC link voltage DC 320 V

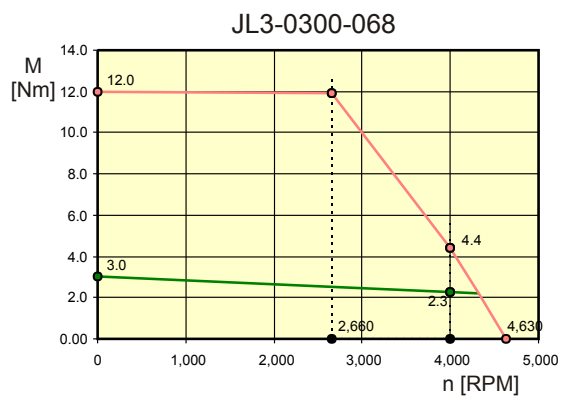




DC link voltage DC 560 V



2 Servo motors of the JL series



2.4 Motor type JL4 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JL4
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

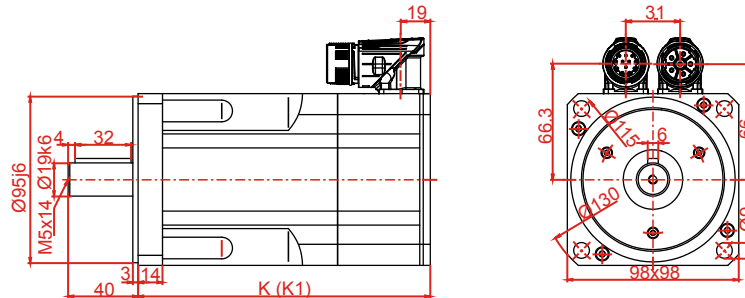
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JL4 - Specific technical data (DC link voltage DC 560 V).....	53
Torque-speed characteristic - JL4 motors	54

Frame size JL4

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JL4 motor equipped with a resolver.



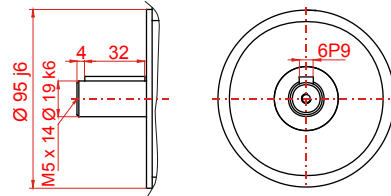
Motor type	JL4-0530	JL4-0750
K (without brake)	176	221
K1 (with brake)	208	253

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JL4 motors can be supplied with keyway/feather key 6x6x32 to DIN 6885-A.



JL4 - General technical data

Type of connections

Motor type JL4 is connected to power by the power connector, see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JL4 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JL4 - Specific technical data (DC link voltage DC 320 V)

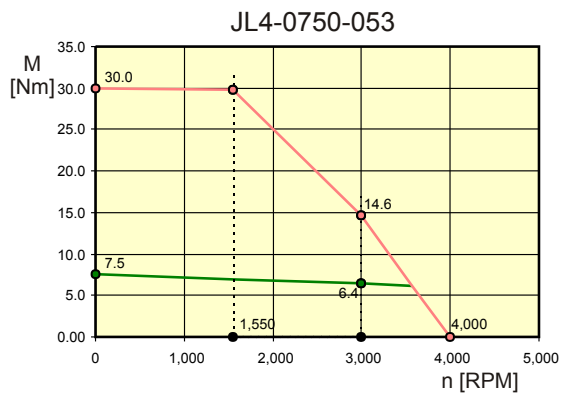
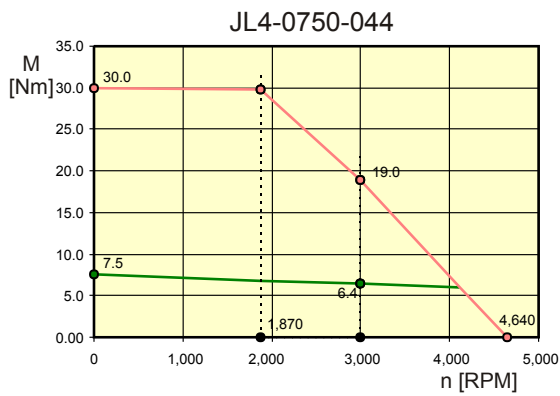
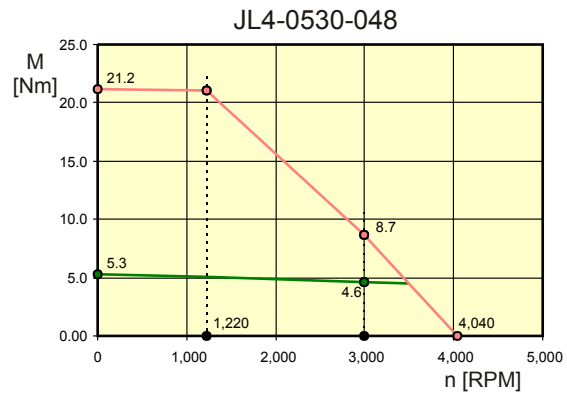
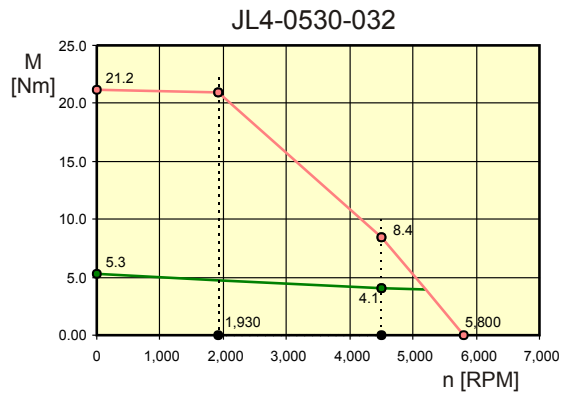
Motor type			JL4-0530-032	JL4-0530-048	JL4-0750-044	JL4-0750-053
Motor data						
Holding torque	M_o	<i>Nm</i>	5.3	5.3	7.5	7.5
Continuous stall current	I_o	<i>A</i>	9.3	6.5	10.5	9.1
Back EMF constant	K_E	<i>V/kRPM</i>	34.5	49.5	43.0	50.0
Torque constant	K_T	<i>Nm/A</i>	0.57	0.82	0.71	0.83
Winding resistance - Phase to phase	R_{Ph}	Ω	0.81	1.66	0.64	0.87
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	4.7	9.8	4.1	5.6
Electr. time constant	T_{el}	<i>ms</i>	5.8	5.9	6.4	6.4
Mech. time constant	T_{mech}	<i>ms</i>	1.1	1.1	0.91	0.91
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	64	64	66	66
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	58	58	58	58
Number of motor poles	p_{mot}	-	6	6	6	6
Rated data						
Rated torque	M_n	<i>Nm</i>	4.1	4.6	6.4	6.4
Rated speed	n_n	<i>rpm</i>	4,500	3,000	3,000	3,000
Continuous rated current	I_n	<i>A</i>	7.7	5.9	9.4	8.1
Maximum values						
Max. torque	M_{max}	<i>Nm</i>	21	21	30	30
Max. current	I_{max}	<i>A</i>	56	39	63	54
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000	12,000
Mechanical parameters						
Rotor inertia	J	<i>kg*cm²</i>	2.7	2.7	4.2	4.2
Weight without brake	m	<i>kg</i>	5.6	5.6	7.7	7.7
Axial load	F_A	<i>N</i>	128	128	135	135
Radial load	F_R	<i>N</i>	676	676	711	711

JL4 - Specific technical data (DC link voltage DC 560 V)

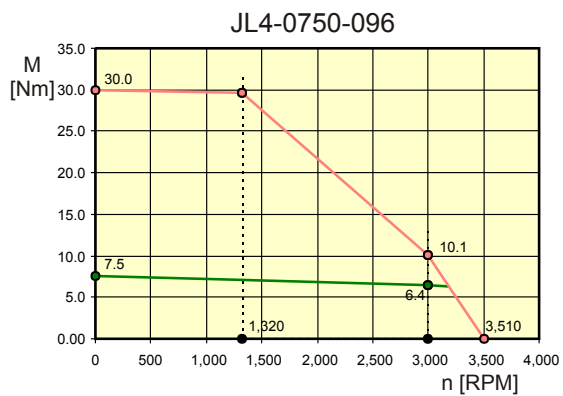
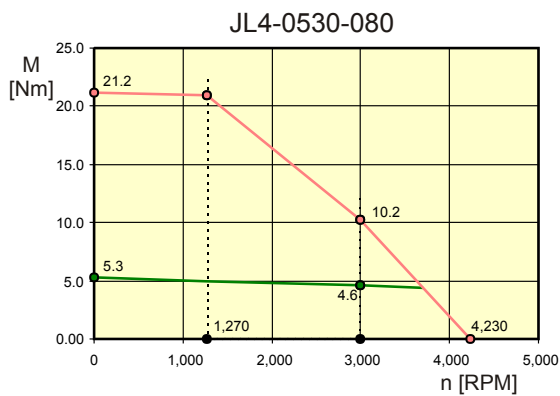
Motor type			JL4-0530-080	JL4-0750-096	JL4-0750-127
Motor data					
Holding torque	M_o	<i>Nm</i>	5.3	7.5	7.5
Continuous stall current	I_o	<i>A</i>	4.1	4.8	3.6
Back EMF constant	K_E	<i>V/kRPM</i>	78.0	94.0	126.0
Torque constant	K_T	<i>Nm/A</i>	1.29	1.55	2.1
Winding resistance - Phase to phase	R_{Ph}	Ω	4.2	3.0	5.5
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	24.0	19.2	34.9
Electr. time constant	T_{el}	<i>ms</i>	5.7	6.4	6.3
Mech. time constant	T_{mech}	<i>ms</i>	1.2	0.89	0.91
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	64	66	66
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	58	58	58
Number of motor poles	p_{mot}	-	6	6	6
Rated data					
Rated torque	M_n	<i>Nm</i>	4.6	6.4	6.7
Rated speed	n_n	<i>rpm</i>	3,000	3,000	2,000
Continuous rated current	I_n	<i>A</i>	3.8	4.4	3.3
Maximum values					
Max. torque	M_{max}	<i>Nm</i>	21	30	30
Max. current	I_{max}	<i>A</i>	25	29	22
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000
Mechanical parameters					
Rotor inertia	J	<i>kg*cm²</i>	2.7	4.2	4.2
Weight without brake	m	<i>kg</i>	5.6	7.7	7.7
Axial load	F_A	<i>N</i>	128	135	135
Radial load	F_R	<i>N</i>	676	711	711

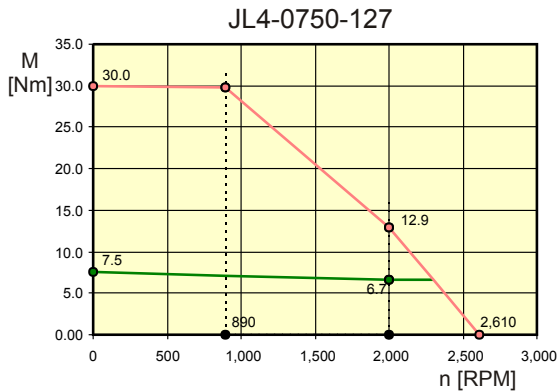
Torque-speed characteristic - JL4 motors

DC link voltage DC 320 V



DC link voltage DC 560 V





2.5 Motor type JL5 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JL5
 - Connector types
 - Technical data of the brake
-

Options

We supply further options of the motor type on request.

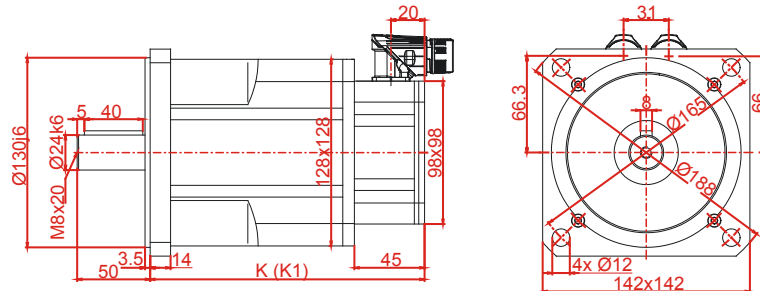
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Torque-speed characteristic - JL5 motors.....	61

Frame size JL5

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JL5 motor equipped with a resolver.



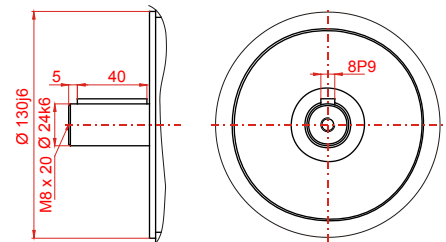
Motor type	JL5-1050	JL5-1350	JL5-1700	JL5-2200
K (without brake)	219	236	270	304
K1 (with brake)	262	279	313	347

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JL5 motors can be supplied with keyway/feather key 7x8x40 to DIN 6885-A.



JL5 - General technical data

Type of connections

Motor type JL5 is connected to power by the power connector, see **Power connector, size 1.5, in 2-cable technology - Pin assignment** (see page 187).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JL5 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JL5 - Specific technical data (DC link voltage DC 320 V)

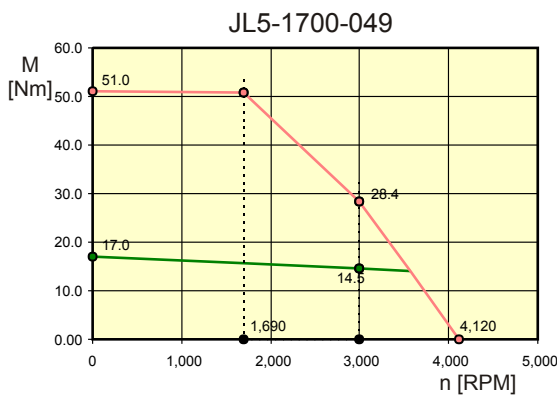
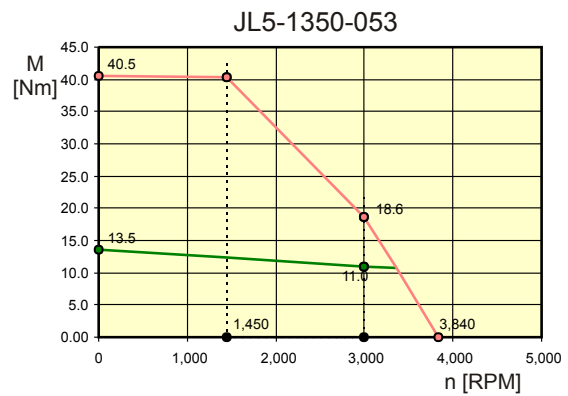
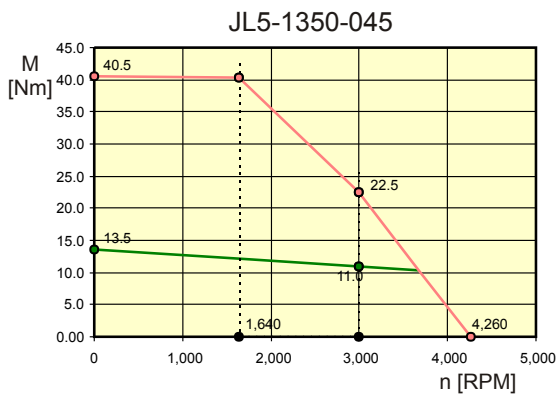
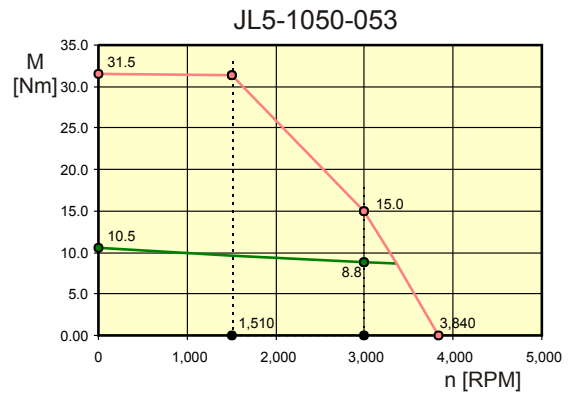
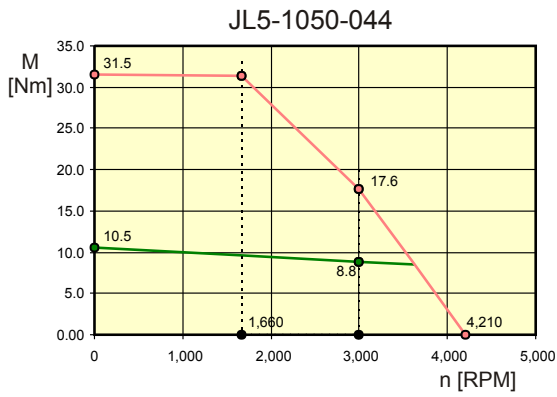
Motor type			JL5- 1050- 044	JL5- 1050- 053	JL5- 1350- 045	JL5- 1350- 053	JL5- 1700- 049
Motor data							
Holding torque	M_o	<i>Nm</i>	10.5	10.5	13.5	13.5	17.0
Continuous stall current	I_o	<i>A</i>	13.4	12.2	17.4	15.7	21.2
Back EMF constant	K_E	<i>V/kRPM</i>	47.5	52.0	47.0	52.0	48.5
Torque constant	K_T	<i>Nm/A</i>	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}	<i>mH</i>	4.6	5.5	3.6	4.5	2.9
Electr. time constant	T_{el}	<i>ms</i>	9.0	9.0	9.5	9.4	10.4
Mech. time constant	T_{mech}	<i>ms</i>	0.89	0.89	0.79	0.81	0.72
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	50	50	55	55	60
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	87	87	87	87	87
Number of motor poles	p_{mot}	-	6	6	6	6	6
Rated data							
Rated torque	M_n	<i>Nm</i>	8.8	8.8	11.0	11.0	14.5
Rated speed	n_n	<i>rpm</i>	3,000	3,000	3,000	3,000	3,000
Continuous rated current	I_n	<i>A</i>	11.5	10.5	14.5	13.1	18.5
Maximum values							
Max. torque	M_{max}	<i>Nm</i>	32	32	41	41	51
Max. current	I_{max}	<i>A</i>	67	61	87	78	106
Max. speed	n_{max}	<i>rpm</i>	9,000	9,000	9,000	9,000	9,000
Mechanical parameters							
Rotor inertia	J	<i>kg*cm²</i>	6.2	6.2	7.3	7.3	9.5
Weight without brake	m	<i>kg</i>	10.0	10.0	11.2	11.2	13.7
Axial load	F_A	<i>N</i>	139	139	142	142	147
Radial load	F_R	<i>N</i>	733	733	748	748	772

JL5 - 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_0	<i>Nm</i>	10.5	12.0	13.5	13.5	17.0	22.0
Continuous stall current	I_0	<i>A</i>	6.7	26.4	11.2	9.3	11.4	16.4
Back EMF constant	K_E	<i>V/kRPM</i>	95.0	27.5	73.0	88.0	90.0	81.0
Torque constant	K_T	<i>Nm/A</i>	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}	<i>mH</i>	18.4	2.2	9.0	13.0	10.0	5.9
Electr. time constant	T_{el}	<i>ms</i>	9.0	9.6	9.5	9.6	10.5	10.9
Mech. time constant	T_{mech}	<i>ms</i>	0.89	1.4	0.82	0.81	0.71	0.61
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	50	55	55	55	60	75
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	87	87	87	87	87	87
Number of motor poles	p_{mot}	-	6	6	6	6	6	6
Rated data								
Rated torque	M_n	<i>Nm</i>	8.8	5.0	11.0	11.0	14.5	17.0
Rated speed	n_n	<i>rpm</i>	3,000	10,000	3,000	3,000	3,000	3,000
Continuous rated current	I_n	<i>A</i>	5.8	11.6	9.5	7.7	10.0	13.0
Maximum values								
Max. torque	M_{max}	<i>Nm</i>	32	30	41	41	51	66
Max. current	I_{max}	<i>A</i>	33	109	56	46	57	82
Max. speed	n_{max}	<i>rpm</i>	9,000	12,000	9,000	9,000	9,000	9,000
Mechanical parameters								
Rotor inertia	J	<i>kg*cm²</i>	6.2	7.3	7.3	7.3	9.5	11.7
Weight without brake	m	<i>kg</i>	10.0	11.2	11.2	11.2	13.7	16.2
Axial load	F_A	<i>N</i>	139	142	142	142	147	150
Radial load	F_R	<i>N</i>	733	748	748	748	772	790

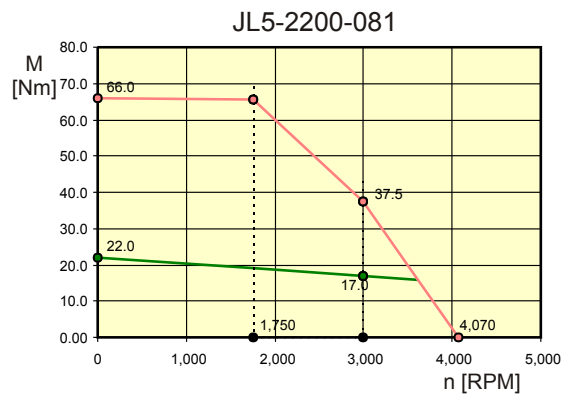
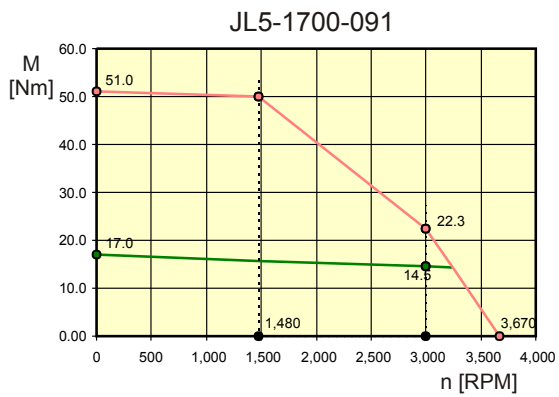
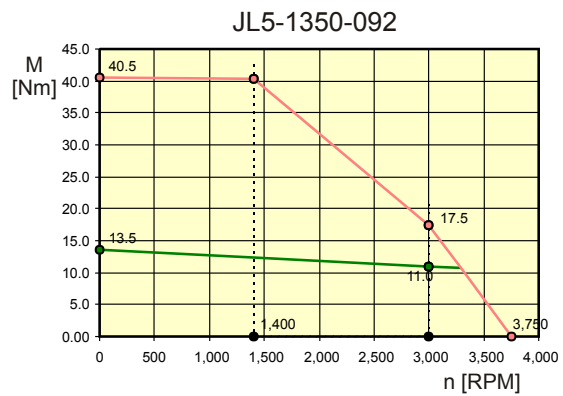
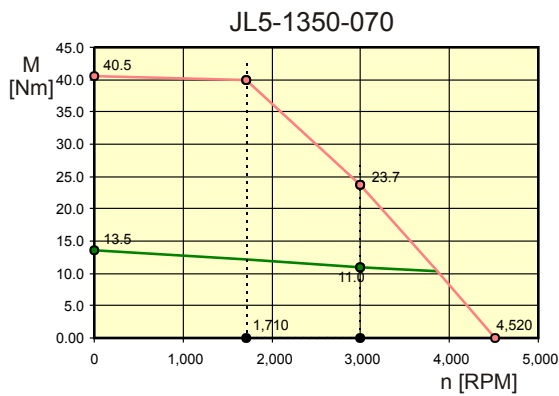
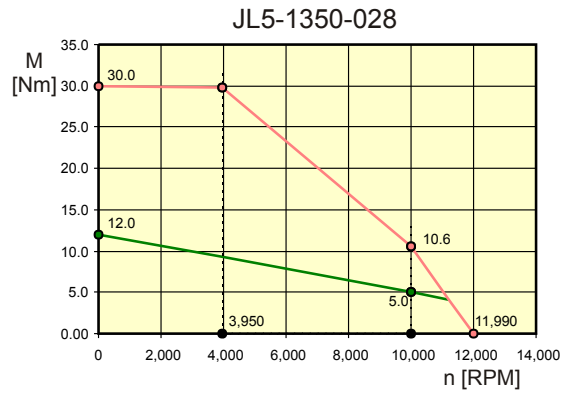
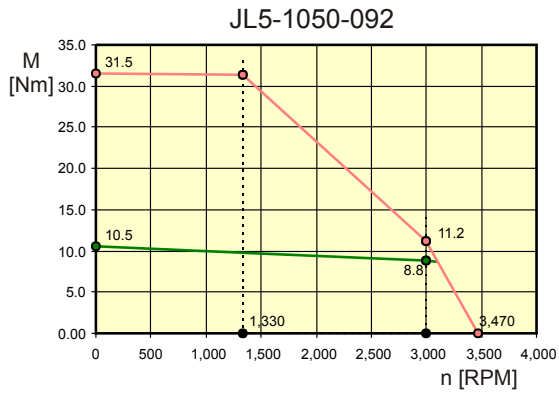
Torque-speed characteristic - JL5 motors

DC link voltage DC 320 V



2 Servo motors of the JL series

DC link voltage DC 560 V



2.6 Motor type JL6 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JL6
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

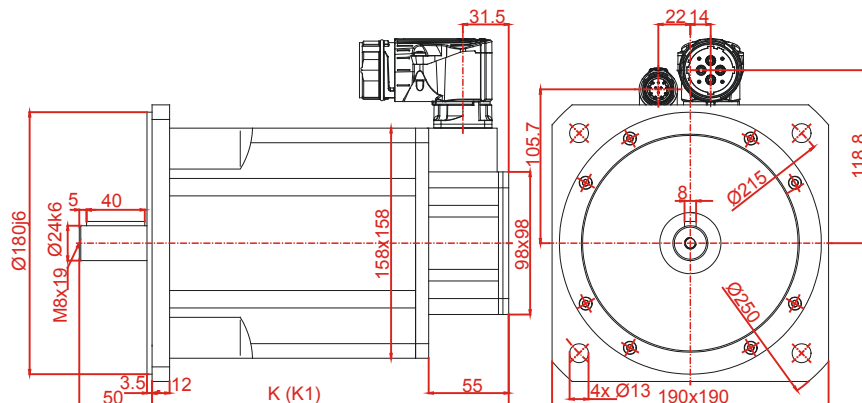
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JL6 - Specific technical data (DC link voltage DC 560 V).....	67
Torque-speed characteristic - JL6 motors	68

Frame size JL6

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JL6 motor equipped with a resolver.



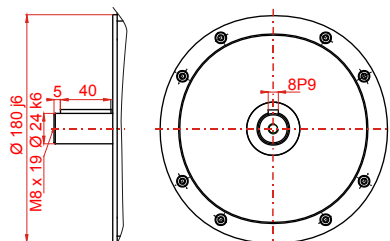
Motor type	JL6-1900	JL6-2200	JL6-2900
K (without brake)	242	259	317
K1 (with brake)	295	312	370

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JL6 motors can be supplied with keyway/feather key 7x8x40 to DIN 6885-A.



JL6 - General technical data

Type of connections

Motor type JL6 is connected to power by the power connector, see **Power connector, size 1.5, in 2-cable technology - Pin assignment** (see page 187).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JL6 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JL6 - Specific technical data (DC link voltage DC 320 V)

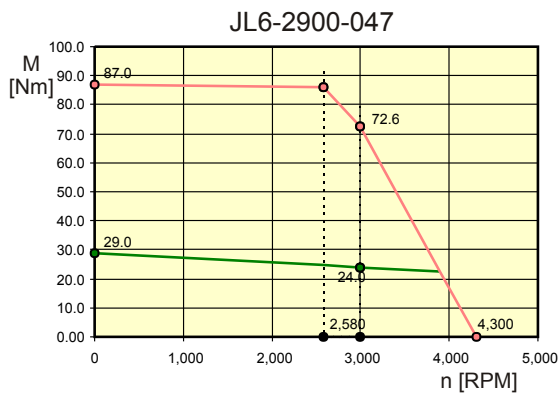
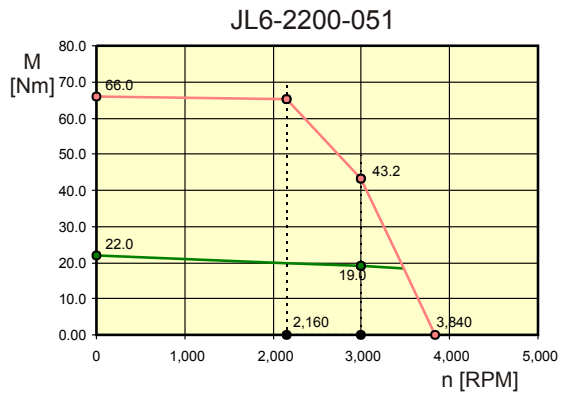
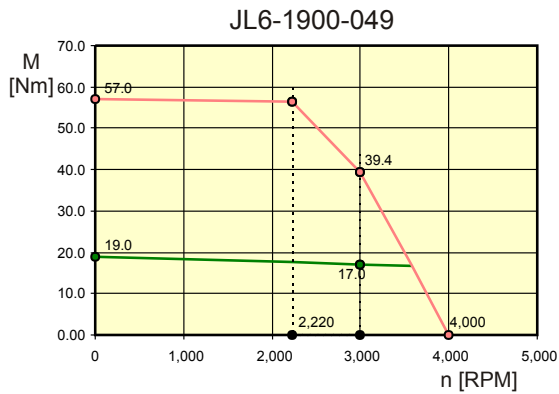
Motor type			JL6-1900-049	JL6-2200-051	JL6-2900-047
Motor data					
Holding torque	M_o	<i>Nm</i>	19.0	22.0	29.0
Continuous stall current	I_o	<i>A</i>	23.0	25.6	37.7
Back EMF constant	K_E	<i>V/kRPM</i>	50.0	52.0	46.5
Torque constant	K_T	<i>Nm/A</i>	0.83	0.86	0.77
Winding resistance - Phase to phase	R_{Ph}	Ω	0.15	0.13	0.07
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	2.3	2.1	1.20
Electr. time constant	T_{el}	<i>ms</i>	15.3	16.2	17.1
Mech. time constant	T_{mech}	<i>ms</i>	0.71	0.65	0.67
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	53	60	70
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	203	203	203
Number of motor poles	p_{mot}	-	6	6	6
Rated data					
Rated torque	M_n	<i>Nm</i>	17.0	19.0	24.0
Rated speed	n_n	<i>rpm</i>	3,000	3,000	3,000
Continuous rated current	I_n	<i>A</i>	21.3	22.9	32.2
Maximum values					
Max. torque	M_{max}	<i>Nm</i>	57	66	87
Max. current	I_{max}	<i>A</i>	97	108	159
Max. speed	n_{max}	<i>rpm</i>	6,000	6,000	6,000
Mechanical parameters					
Rotor inertia	J	<i>kg*cm²</i>	18.7	22	33
Weight without brake	m	<i>kg</i>	18.2	20.3	26.7
Axial load	F_A	<i>N</i>	141	142	147
Radial load	F_R	<i>N</i>	741	748	771

JL6 - Specific technical data (DC link voltage DC 560 V)

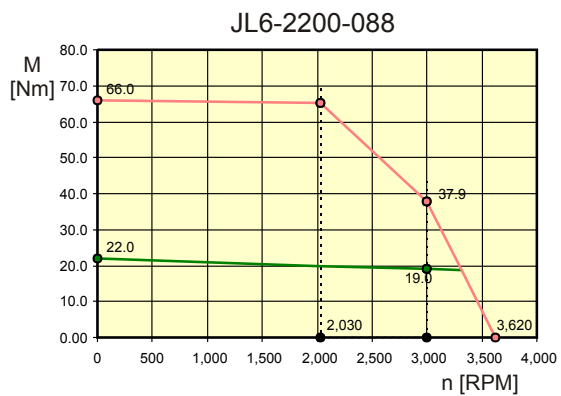
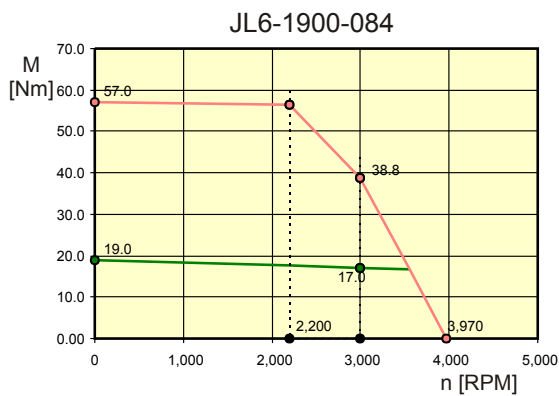
Motor type			JL6- 1900- 084	JL6- 2200- 088	JL6- 2900- 072	JL6- 2900- 140
Motor data						
Holding torque	M_o	<i>Nm</i>	19.0	22.0	29.0	29.0
Continuous stall current	I_o	<i>A</i>	13.8	14.6	23.7	12.6
Back EMF constant	K_E	<i>V/kRPM</i>	83.0	91.0	74.0	139.0
Torque constant	K_T	<i>Nm/A</i>	1.37	1.51	1.22	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}	<i>mH</i>	6.3	6.4	3.0	10.4
Electr. time constant	T_{el}	<i>ms</i>	15.0	15.6	18.8	17.9
Mech. time constant	T_{mech}	<i>ms</i>	0.72	0.67	0.61	0.62
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	53	60	70	70
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	203	203	203	203
Number of motor poles	p_{mot}	-	6	6	6	6
Rated data						
Rated torque	M_n	<i>Nm</i>	17.0	19.0	6.0	29.0
Rated speed	n_n	<i>rpm</i>	3,000	3,000	4,500	2,000
Continuous rated current	I_n	<i>A</i>	12.8	13.1	5.7	12.9
Maximum values						
Max. torque	M_{max}	<i>Nm</i>	57	66	87	87
Max. current	I_{max}	<i>A</i>	59	62	100	53
Max. speed	n_{max}	<i>rpm</i>	6,000	6,000	6,000	6,000
Mechanical parameters						
Rotor inertia	J	<i>kg*cm²</i>	18.7	22	33	33
Weight without brake	m	<i>kg</i>	18.2	20.3	26.7	26.7
Axial load	F_A	<i>N</i>	141	142	147	147
Radial load	F_R	<i>N</i>	741	748	771	771

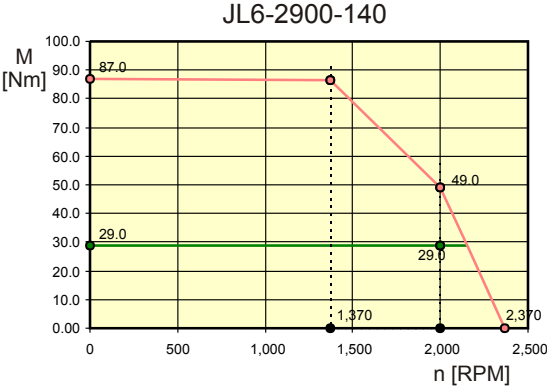
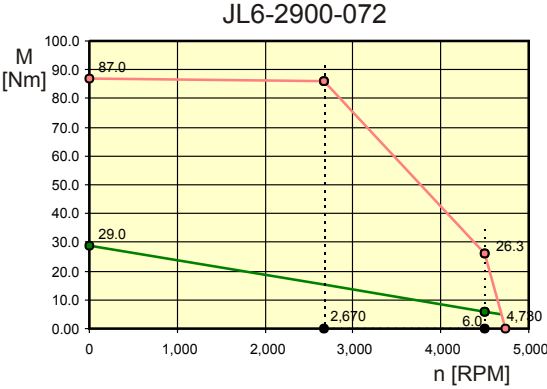
Torque-speed characteristic - JL6 motors

DC link voltage DC 320 V



DC link voltage DC 560 V





2.7 Motor type JL7 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JL7
 - Connector types
 - Technical data of the brake
-

Options

We supply further options of the motor type on request.

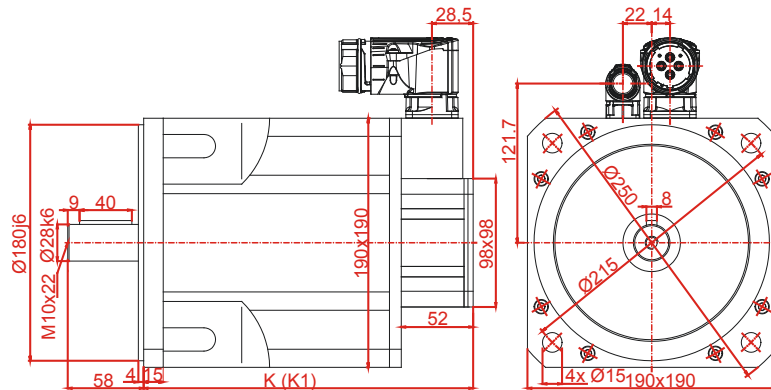
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Frame size JL7

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JL7 motor equipped with a resolver.



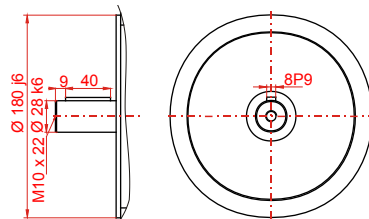
Motor type	JL7-3200	JL7-4000
K (without brake)	264	294
K1 (with brake)	318	348

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JL7 motors can be supplied with keyway/feather key 7x8x40 to DIN 6885-A.



JL7 - General technical data

Type of connections

Motor type JL7 is connected to power by the power connector, see **Power connector, size 1.5, in 2-cable technology - Pin assignment** (see page 187).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JL7 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JL7 - Specific technical data (DC link voltage DC 320 V)

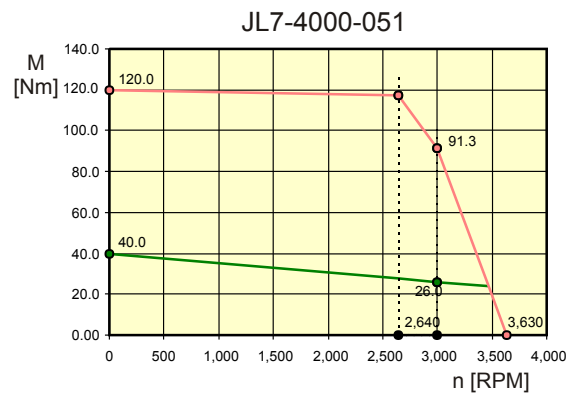
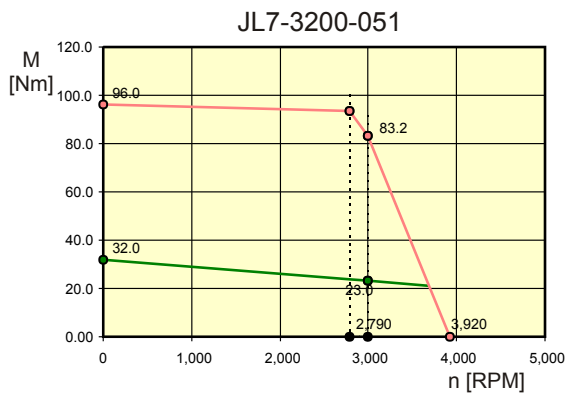
Motor type			JL7- 3200- 051	JL7- 4000- 051
Motor data				
Holding torque	M_o	<i>Nm</i>	32.0	40.0
Continuous stall current	I_o	<i>A</i>	37.9	44.0
Back EMF constant	K_E	<i>V/kRPM</i>	51.0	55.0
Torque constant	K_T	<i>Nm/A</i>	0.84	0.91
Winding resistance - Phase to phase	R_{Ph}	Ω	0.09	0.07
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	0.90	0.80
Electr. time constant	T_{el}	<i>ms</i>	10.0	11.4
Mech. time constant	T_{mech}	<i>ms</i>	0.86	0.67
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	67	72
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	215	215
Number of motor poles	p_{mot}	-	6	6
Rated data				
Rated torque	M_n	<i>Nm</i>	23.0	26.0
Rated speed	n_n	<i>rpm</i>	3,000	3,000
Continuous rated current	I_n	<i>A</i>	29.9	31.8
Maximum values				
Max. torque	M_{max}	<i>Nm</i>	96	120
Max. current	I_{max}	<i>A</i>	148	172
Max. speed	n_{max}	<i>rpm</i>	6,000	6,000
Mechanical parameters				
Rotor inertia	J	<i>kg*cm²</i>	39	46
Weight without brake	m	<i>kg</i>	26.00	31.50
Axial load	F_A	<i>N</i>	260	267
Radial load	F_R	<i>N</i>	1370	1406

JL7 - Specific technical data (DC link voltage DC 560 V)

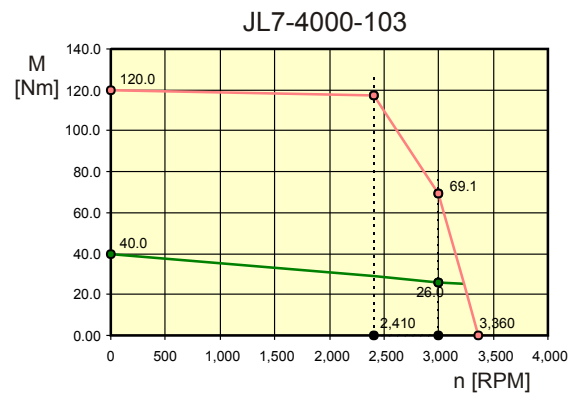
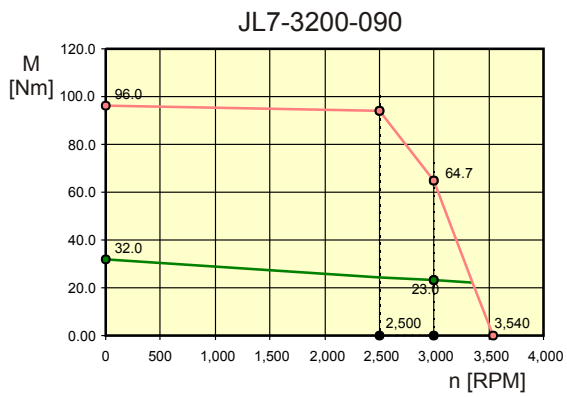
Motor type			JL7-3200-090	JL7-4000-103
Motor data				
Holding torque	M_o	<i>Nm</i>	32.0	40.0
Continuous stall current	I_o	<i>A</i>	20.8	24.7
Back EMF constant	K_E	<i>V/kRPM</i>	93.0	98.0
Torque constant	K_T	<i>Nm/A</i>	1.54	1.62
Winding resistance - Phase to phase	R_{Ph}	Ω	0.29	0.23
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	3.2	2.7
Electr. time constant	T_{el}	<i>ms</i>	11.0	11.7
Mech. time constant	T_{mech}	<i>ms</i>	0.83	0.69
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	67	72
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	215	215
Number of motor poles	p_{mot}	-	6	6
Rated data				
Rated torque	M_n	<i>Nm</i>	23.0	26.0
Rated speed	n_n	<i>rpm</i>	3,000	3,000
Continuous rated current	I_n	<i>A</i>	16.4	17.9
Maximum values				
Max. torque	M_{max}	<i>Nm</i>	96	120
Max. current	I_{max}	<i>A</i>	81	96
Max. speed	n_{max}	<i>rpm</i>	6,000	6,000
Mechanical parameters				
Rotor inertia	J	<i>kg*cm²</i>	39	46
Weight without brake	m	<i>kg</i>	26.00	31.50
Axial load	F_A	<i>N</i>	260	267
Radial load	F_R	<i>N</i>	1370	1406

Torque-speed characteristic - JL7 motors

DC link voltage DC 320 V



DC link voltage DC 560 V



2.8 Motor type JL8 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JL8
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

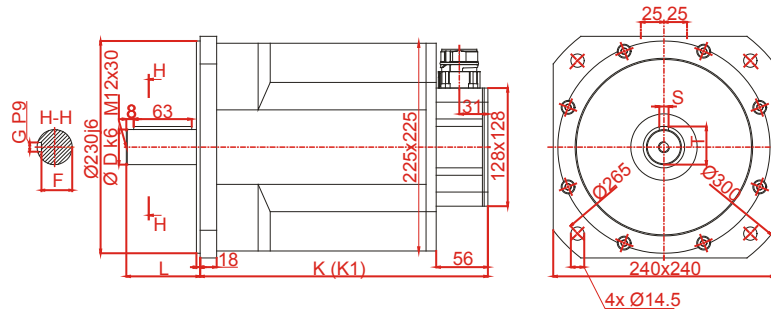
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JL8 - Specific technical data (DC link voltage DC 560 V)	79
Torque-speed characteristic - JL8 motors.....	80

Frame size JL8

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JL8 motor equipped with a resolver.



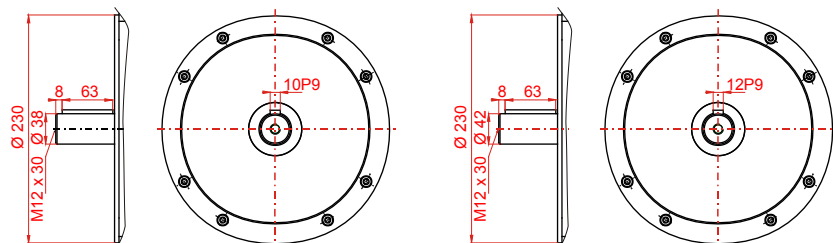
Motor type	JL8-4000	JL8-6800	JL8-9300	JL8-11500
K (without brake)	310	378	446	514
K1 (with brake)	379	447	515	583
D	38	38	42	42
L	80	80	110	110
S	10	10	12	12
T	41.3	41.3	45.1	45.1
G	10	10	12	12
F	33.3	33.3	37.1	37.1

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, the motors JL8-4000-111 and JL8-6800-162 are equipped with keyway/feather key 10x8x63 to DIN 6885-A, and the motors JL8-9300-170 and JL8-11500-165 with keyway/feather key 12x8x63 to DIN 6885-A.



JL8 - General technical data

Type of connections

Motor type JL8 is connected to power by the power connector, see **Power connector, size 1.5, in 2-cable technology - Pin assignment** (see page 187).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JL8 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

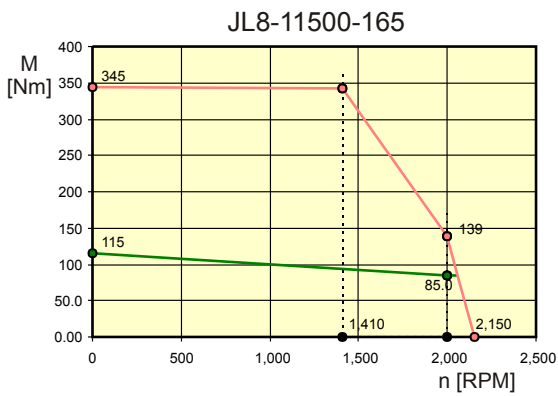
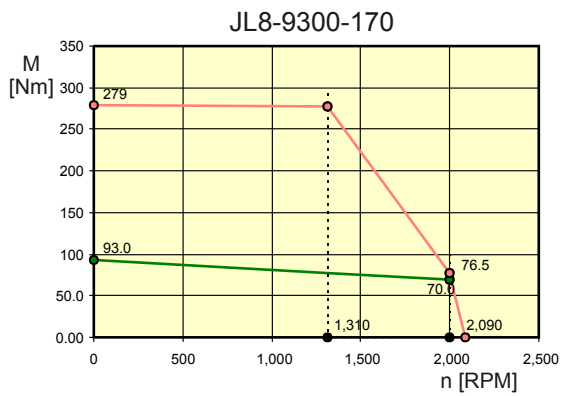
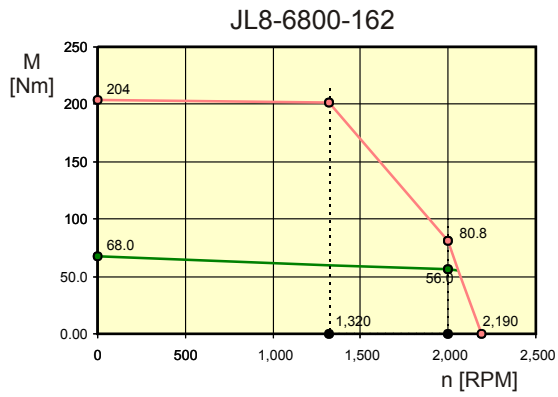
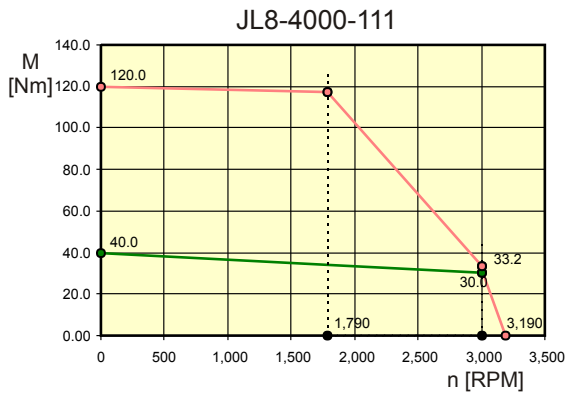
Technical specifications	Value		
Holding torque	M_{BR}	Nm	145
Supply voltage	U_{BR}	V	DC 24 V (-10 % to +6 %)
Rated power	P_{BR}	W	50
Rotor inertia	J_{BR}	$kg \cdot cm^2$	53.0
Weight	m_{BR}	kg	9.5

JL8 - 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	<i>Nm</i>	40.0	68	93	115
Continuous stall current	I_o	<i>A</i>	21.8	25.4	33.1	42.1
Back EMF constant	K_E	<i>V/kRPM</i>	111.0	162.0	170.0	165.0
Torque constant	K_T	<i>Nm/A</i>	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}	<i>mH</i>	5.7	6.3	4.8	3.4
Electr. time constant	T_{el}	<i>ms</i>	23	26	32	31
Mech. time constant	T_{mech}	<i>ms</i>	0.98	0.66	0.50	0.49
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	47	65	79	90
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	483	483	483	483
Number of motor poles	p_{mot}	-	6	6	6	6
Rated data						
Rated torque	M_n	<i>Nm</i>	30.0	56	70	85
Rated speed	n_n	<i>rpm</i>	3,000	2,000	2,000	2,000
Continuous rated current	I_n	<i>A</i>	17.8	22.0	25.3	32.4
Maximum values						
Max. torque	M_{max}	<i>Nm</i>	120	204	279	345
Max. current	I_{max}	<i>A</i>	85	99	129	164
Max. speed	n_{max}	<i>rpm</i>	3,600	3,600	3,600	3,600
Mechanical parameters						
Rotor inertia	J	<i>kg*cm²</i>	76	114	153	190
Weight without brake	m	<i>kg</i>	41.00	56.00	73.00	89.00
Axial load	F_A	<i>N</i>	323	337	337	346
Radial load	F_R	<i>N</i>	1702	1775	1775	1823

Torque-speed characteristic - JL8 motors

DC link voltage DC 560 V



3 Servo motors of the JK series

General technical data

General technical information on JK motors is listed below:

Type of data	Value
Design	B5, V1, V3
Coating	Matt black to RAL 9005 (no stability to solvents, such as Trilene, thinners, etc.)
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
Cooling	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	KTY83-110 or thermoswitch 145 °C, alternative: PTC thermistor
Derating at altitudes higher than 1000 m above sea level when the motor has come to a standstill at 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 derated by the following formula: $M_{red} = M_0 * \sqrt{1 - (H - 1000) / 10000}$	

Rated data - Resolver

The rated resolver data for JK motors are listed below:

Type of data	Value
Input voltage	7 V
Input frequency	10 kHz
Number of poles	2
Speed ratio	0.5
Accuracy	± 10 arcmin

3 Servo motors of the JK series

Standard configuration

The standard motor configuration includes the following features:

- KTY83-110
 - No brake
 - Plain shaft
 - Two straight flange sockets for power and signal
 - Resolver
 - Runout tolerance = R
 - Degree of protection IP65
-

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3.1 Motor type JK4 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JK4
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

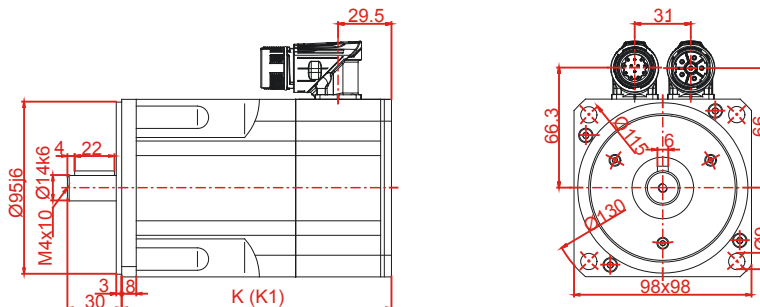
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Frame size JK4

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JK4 motor equipped with a resolver.



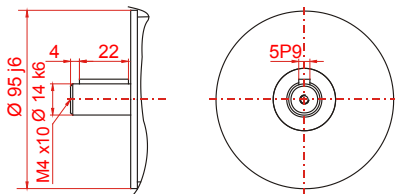
Motor type	JK4-0100
K (without brake)	91
K1 (with brake)	128

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JK4 motors can be supplied with keyway/feather key 5x5x22 to DIN 6885-A.



JK4 - General technical data

Type of connections

Motor type JK4 is connected to power by the power connector, see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JK4 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

The technical data of the brake for motor type JK4 are listed below:

Technical specifications	Value		
Holding torque	M_{BR}	Nm	4.5
Supply voltage	U_{BR}	V	DC 24 V (-10 % to +6 %)
Rated power	P_{BR}	W	12
Rotor inertia	J_{BR}	$kg \cdot cm^2$	0.18
Weight	m_{BR}	kg	0.65

3 Servo motors of the JK series

JK4 - Specific technical data (DC link voltage DC 320 V)

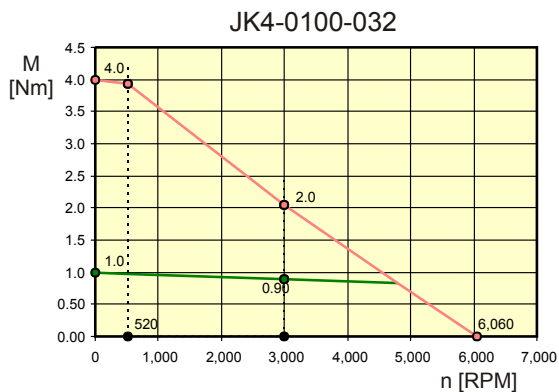
Motor type			JK4-0100-032
Motor data			
Holding torque	M_o	<i>Nm</i>	1.00
Continuous stall current	I_o	<i>A</i>	1.83
Back EMF constant	K_E	<i>V/kRPM</i>	33.0
Torque constant	K_T	<i>Nm/A</i>	0.55
Winding resistance - Phase to phase	R_{Ph}	Ω	13.5
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	25.7
Electr. time constant	T_{el}	<i>ms</i>	1.9
Mech. time constant	T_{mech}	<i>ms</i>	6.2
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	45
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	58
Number of motor poles	p_{mot}	-	6
Rated data			
Rated torque	M_n	<i>Nm</i>	0.90
Rated speed	n_n	<i>rpm</i>	3,000
Continuous rated current	I_n	<i>A</i>	1.80
Maximum values			
Max. torque	M_{max}	<i>Nm</i>	4.0
Max. current	I_{max}	<i>A</i>	11.0
Max. speed	n_{max}	<i>rpm</i>	12,000
Mechanical parameters			
Rotor inertia	J	<i>kg*cm²</i>	0.79
Weight without brake	m	<i>kg</i>	2.70
Axial load	F_A	<i>N</i>	62
Radial load	F_R	<i>N</i>	328

JK4 - Specific technical data (DC link voltage DC 560 V)

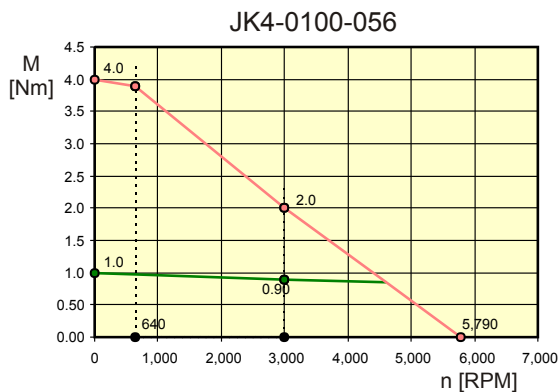
Motor type	JK4-0100-056		
Motor data			
Holding torque	M_o	<i>Nm</i>	1.00
Continuous stall current	I_o	<i>A</i>	1.06
Back EMF constant	K_E	<i>V/kRPM</i>	57.0
Torque constant	K_T	<i>Nm/A</i>	0.94
Winding resistance - Phase to phase	R_{Ph}	Ω	36.3
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	75
Electr. time constant	T_{el}	<i>ms</i>	2.1
Mech. time constant	T_{mech}	<i>ms</i>	5.6
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	45
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	58
Number of motor poles	p_{mot}	-	6
Rated data			
Rated torque	M_n	<i>Nm</i>	0.90
Rated speed	n_n	<i>rpm</i>	3,000
Continuous rated current	I_n	<i>A</i>	1.05
Maximum values			
Max. torque	M_{max}	<i>Nm</i>	4.0
Max. current	I_{max}	<i>A</i>	6.4
Max. speed	n_{max}	<i>rpm</i>	12,000
Mechanical parameters			
Rotor inertia	J	<i>kg*cm²</i>	0.79
Weight without brake	m	<i>kg</i>	2.70
Axial load	F_A	<i>N</i>	62
Radial load	F_R	<i>N</i>	328

Torque-speed characteristic - JK4 motors

DC link voltage DC 320 V



DC link voltage DC 560 V



3.2 Motor type JK5 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JK5
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

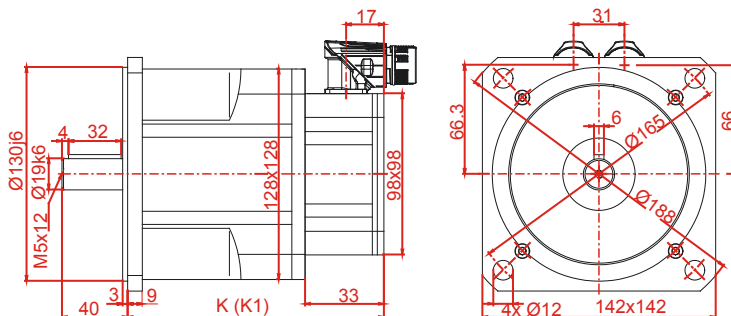
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Frame size JK5

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JK5 motor equipped with a resolver.



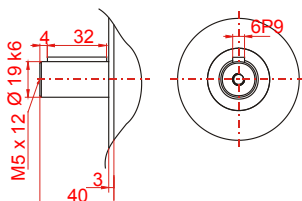
Motor type	JK5-0210	JK5-0430
K (without brake)	124	141
K1 (with brake)	160	177

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JK5 motors can be supplied with keyway/feather key 6x6x32 to DIN 6885-A.



JK5 - General technical data

Type of connections

Motor type JK5 is connected to power by the power connector, see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JK5 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

The technical data of the brake for motor type JK5 are listed below:

Technical specifications	Value		
Holding torque	M_{BR}	Nm	9
Supply voltage	U_{BR}	V	DC 24 V (-10 % to +6 %)
Rated power	P_{BR}	W	18
Rotor inertia	J_{BR}	$kg \cdot cm^2$	0.54
Weight	m_{BR}	kg	1.35

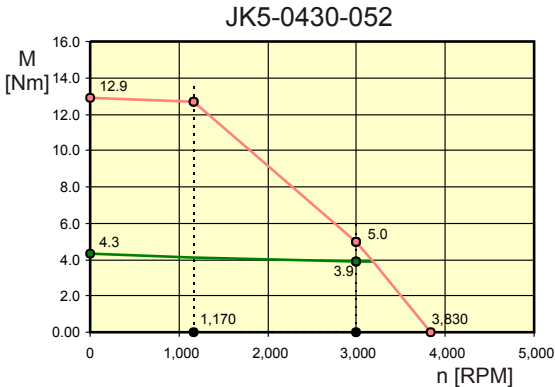
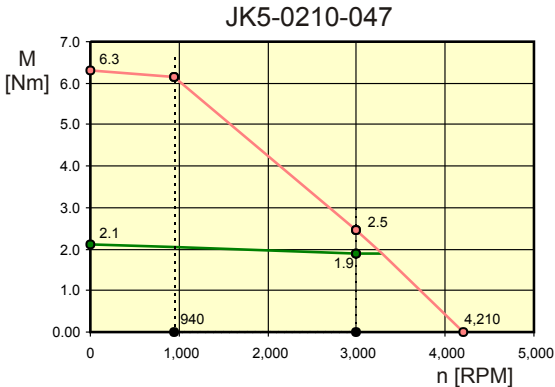
3 Servo motors of the JK series

JK5 - Specific technical data (DC link voltage DC 320 V)

Motor type			JK5-0210-047	JK5-0430-052
Motor data				
Holding torque	M_o	<i>Nm</i>	2.1	4.3
Continuous stall current	I_o	<i>A</i>	2.7	5.0
Back EMF constant	K_E	<i>V/kRPM</i>	47.0	52.0
Torque constant	K_T	<i>Nm/A</i>	0.78	0.86
Winding resistance - Phase to phase	R_{Ph}	Ω	7.4	2.7
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	29.2	15.3
Electr. time constant	T_{el}	<i>ms</i>	4.0	5.6
Mech. time constant	T_{mech}	<i>ms</i>	4.2	1.8
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	33	34
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	87	87
Number of motor poles	p_{mot}	-	6	6
Rated data				
Rated torque	M_n	<i>Nm</i>	1.90	3.9
Rated speed	n_n	<i>rpm</i>	3,000	3,000
Continuous rated current	I_n	<i>A</i>	2.6	4.8
Maximum values				
Max. torque	M_{max}	<i>Nm</i>	6.3	12.9
Max. current	I_{max}	<i>A</i>	13.5	25
Max. speed	n_{max}	<i>rpm</i>	9,000	9,000
Mechanical parameters				
Rotor inertia	J	<i>kg*cm²</i>	2.0	2.9
Weight without brake	m	<i>kg</i>	3.90	6.80
Axial load	F_A	<i>N</i>	118	126
Radial load	F_R	<i>N</i>	622	665

Drehmoment-Drehzahl-Kennlinien JK5

DC link voltage DC 320 V



3.3 Motor type JK6 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of Motor type JK6
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

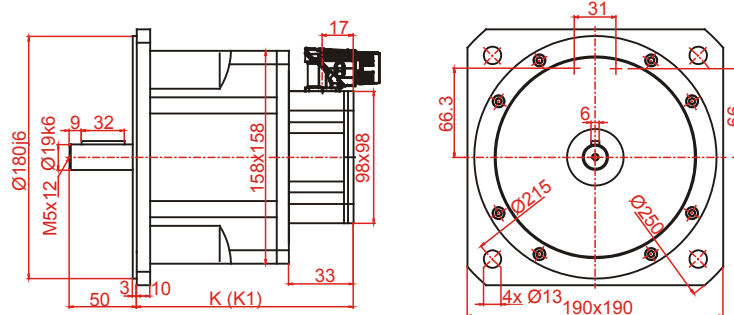
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Frame size JK6

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JK6 motor equipped with a resolver.



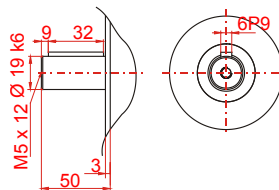
Motor type	JK6-0350	JK6-0700
K (without brake)	128	145
K1 (with brake)	171	188

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

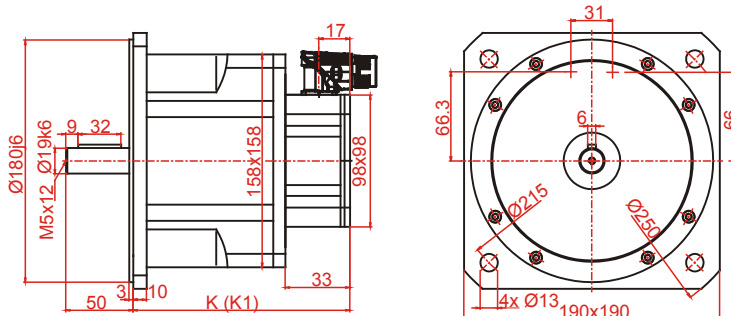
As an option, JK6 motors can be supplied with keyway/feather key 6x6x32 to DIN 6885-A.



Frame size JK6-0860

Physical dimensions

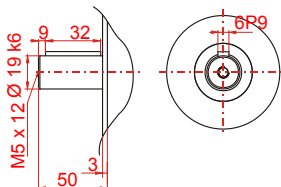
The following illustration shows the dimensions of a JK6-0860 motor.



Motor type	JK6-0860
K (without brake)	119

Keyway/feather key

As an option, JK6 motors can be supplied with keyway/feather key 6x6x32 to DIN 6885-A.



JK6 - General technical data

Type of connections

Motor type JK6 is connected to power by the power connector, see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JK6 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

The technical data of the brake for motor type JK6 are listed below:

Technical specifications	Value		
Holding torque	M_{BR}	Nm	9
Supply voltage	U_{BR}	V	DC 24 V (-10 % to +6 %)
Rated power	P_{BR}	W	18
Rotor inertia	J_{BR}	$kg \cdot cm^2$	0.54
Weight	m_{BR}	kg	1.7

3 Servo motors of the JK series

JK6 - Specific technical data (DC link voltage DC 320 V)

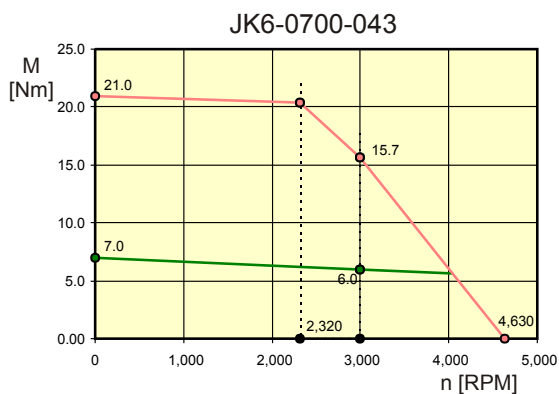
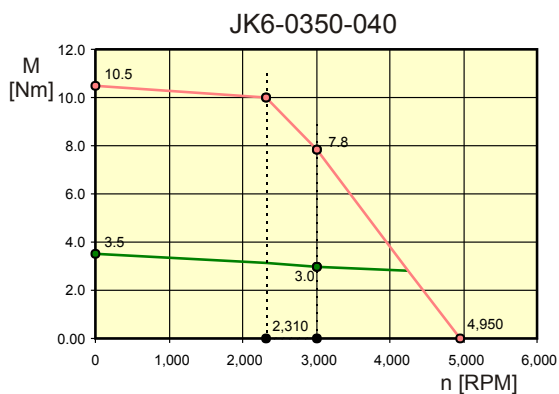
Motor type			JK6-0350-040	JK6-0700-043
Motor data				
Holding torque	M_o	<i>Nm</i>	3.5	7.0
Continuous stall current	I_o	<i>A</i>	5.3	9.8
Back EMF constant	K_E	<i>V/kRPM</i>	40.0	43.0
Torque constant	K_T	<i>Nm/A</i>	0.66	0.71
Winding resistance - Phase to phase	R_{Ph}	Ω	1.93	0.71
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	8.5	4.9
Electr. time constant	T_{el}	<i>ms</i>	4.4	6.9
Mech. time constant	T_{mech}	<i>ms</i>	3.6	1.9
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	36	40
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	203	203
Number of motor poles	p_{mot}	-	6	6
Rated data				
Rated torque	M_n	<i>Nm</i>	3.0	6.0
Rated speed	n_n	<i>rpm</i>	3,000	3,000
Continuous rated current	I_n	<i>A</i>	5.3	9.3
Maximum values				
Max. torque	M_{max}	<i>Nm</i>	10.5	21
Max. current	I_{max}	<i>A</i>	22	42
Max. speed	n_{max}	<i>rpm</i>	6,000	6,000
Mechanical parameters				
Rotor inertia	J	<i>kg*cm²</i>	4.7	7.8
Weight without brake	m	<i>kg</i>	7.50	9.69
Axial load	F_A	<i>N</i>	113	121
Radial load	F_R	<i>N</i>	595	639

JK6 - Specific technical data (DC link voltage DC 560 V)

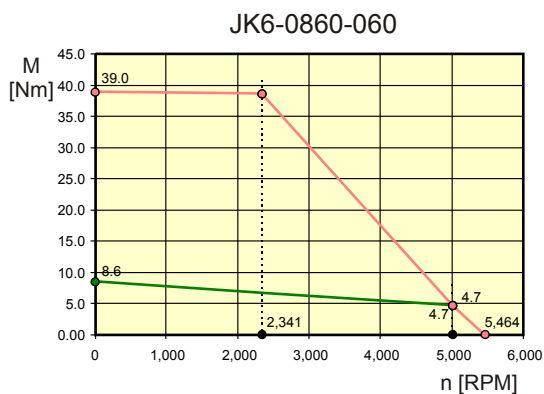
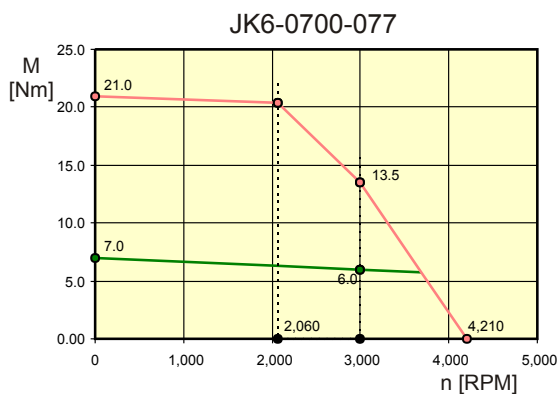
Motor type			JK6-0700-077	JK6-0860-060
Motor data				
Holding torque	M_o	<i>Nm</i>	7.0	8.6
Continuous stall current	I_o	<i>A</i>	5.4	9.8
Back EMF constant	K_E	<i>V/kRPM</i>	78.0	60.0
Torque constant	K_T	<i>Nm/A</i>	1.29	1.00
Winding resistance - Phase to phase	R_{Ph}	Ω	2.3	1.01
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	16.2	3.1
Electr. time constant	T_{el}	<i>ms</i>	6.9	3.1
Mech. time constant	T_{mech}	<i>ms</i>	1.9	3.5
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	40	31
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	203	203
Number of motor poles	p_{mot}	-	6	12
Rated data				
Rated torque	M_n	<i>Nm</i>	6.0	4.7
Rated speed	n_n	<i>rpm</i>	3,000	5,000
Continuous rated current	I_n	<i>A</i>	5.1	5.7
Maximum values				
Max. torque	M_{max}	<i>Nm</i>	21	39
Max. current	I_{max}	<i>A</i>	23	56
Max. speed	n_{max}	<i>rpm</i>	6,000	5,000
Mechanical parameters				
Rotor inertia	J	<i>kg*cm²</i>	7.8	23
Weight without brake	m	<i>kg</i>	9.69	7.8
Axial load	F_A	<i>N</i>	121	260
Radial load	F_R	<i>N</i>	639	917

Torque-speed characteristic - JK6 motors

DC link voltage DC 320 V



DC link voltage DC 560 V



4 Servo motors of the JH series

General technical data

General technical data on JH motors are listed below:

Type of data	Value
Design	B5, V1, V3
Coating	Matt black to RAL 9005 (no stability to solvents, such as Trilene, thinners, etc.)
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
Cooling	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	KTY83-110 or PTC thermistor
Derating at altitudes higher than 1000 m above sea level when the motor has come to a standstill at 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 derated by the following formula: $M_{red} = M_0 * \sqrt{1 - (H - 1000) / 10000}$	

Rated data - Resolver

The rated resolver data for JH motors are listed below:

Type of data	Value
Input voltage	7 V
Input frequency	10 kHz
Number of poles	2
Speed ratio	0.5
Accuracy	± 10 arcmin

4 Servo motors of the JH series

Standard configuration

The standard motor configuration includes the following features:

- KTY83-110
 - No brake
 - Plain shaft
 - Two straight flange sockets for power and signal
 - Resolver
 - Runout tolerance = R
 - Degree of protection IP65
-

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4.1 Motor type JH2 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JH2
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

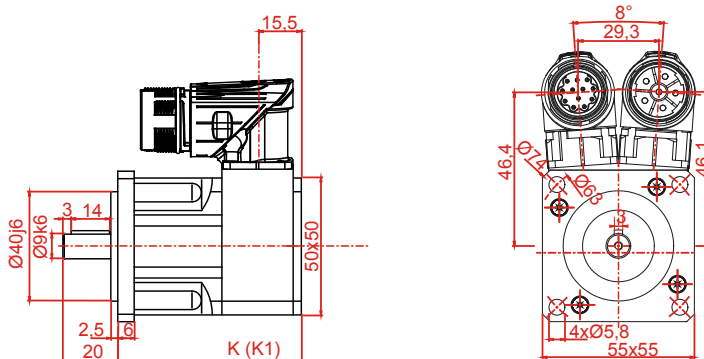
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JH2 - Frame size

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JH2 motor equipped with a resolver.



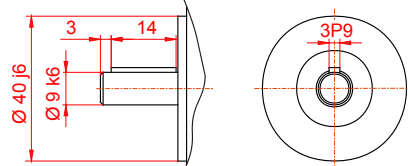
Motor type	JH2-0026	JH2-0053	JH2-0074	JH2-0095
K (without brake)	67	82	97	112
K1 (with brake)	105	120	135	150

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JH2 motors can be supplied with a keyway/feather key 3x3x18 to DIN 6885-A.



JH2 - General technical data

Type of connections

Motor type JH2 is connected to power by the power connector, see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JH2 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

The technical data of the brake for motor type JH2 are listed below:

Technical specifications	Value		
Holding torque	M_{BR}	Nm	2
Supply voltage	U_{BR}	V	DC 24 V (-10 % to +6 %)
Rated power	P_{BR}	W	11
Rotor inertia	J_{BR}	$kg \cdot cm^2$	0.068
Weight	m_{BR}	kg	0.47

4 Servo motors of the JH series

JH2 - Specific technical data (DC link voltage DC 48 V)

Motor type			JH2-0026-005	JH2-0053-006	JH2-0074-006
Motor data					
Continuous stall torque	M_o	<i>Nm</i>	0.26	0.53	0.74
Continuous stall current	I_o	<i>A</i>	3.1	5.8	7.5
Back EMF constant	K_E	<i>V/kRPM</i>	5.0	5.5	6.0
Torque constant	K_T	<i>Nm/A</i>	0.08	0.09	0.10
Winding resistance - Phase to phase	R_{Ph}	Ω	1.83	0.83	0.60
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	3.1	1.60	1.10
Electr. time constant	T_{el}	<i>ms</i>	1.7	1.9	1.8
Mech. time constant	T_{mech}	<i>ms</i>	2.8	1.4	1.1
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	13	15	20
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	16	16	16
Number of motor poles	p_{mot}	-	6	6	6
Rated data					
Rated torque	M_n	<i>Nm</i>	0.25	0.49	0.70
Rated speed	n_n	<i>rpm</i>	3,000	3,000	3,000
Continuous rated current	I_n	<i>A</i>	3.2	5.6	7.3
Maximum values					
Max. torque	M_{max}	<i>Nm</i>	1.0	2.0	2.8
Max. current	I_{max}	<i>A</i>	13.0	24	31
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000
Mechanical parameters					
Rotor inertia	J	<i>kg*cm²</i>	0.06	0.08	0.10
Weight without brake	m	<i>kg</i>	0.75	0.92	1.09
Axial load	F_A	<i>N</i>	42	45	46
Radial load	F_R	<i>N</i>	219	234	245

JH2 - Specific technical data (DC link voltage DC 320 V)

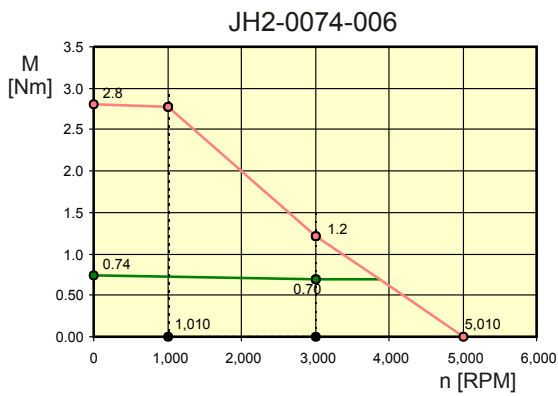
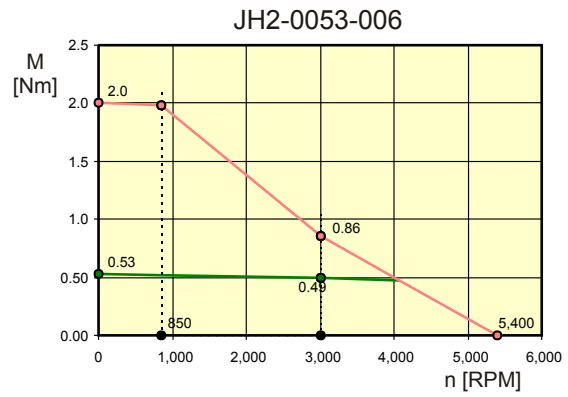
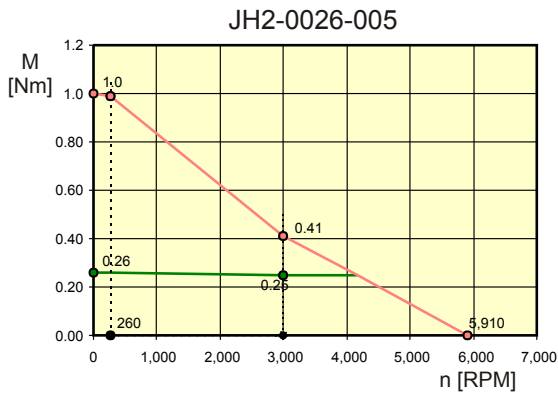
Motor type			JH2-0026-021	JH2-0053-026	JH2-0074-027	JH2-0095-028
Motor data						
Holding torque	M_o	<i>Nm</i>	0.26	0.53	0.74	0.95
Continuous stall current	I_o	<i>A</i>	0.70	1.26	1.66	2.1
Back EMF constant	K_E	<i>V/kRPM</i>	21.0	25.5	27.0	27.5
Torque constant	K_T	<i>Nm/A</i>	0.37	0.42	0.45	0.45
Winding resistance - Phase to phase	R_{Ph}	Ω	36.8	17.4	12.1	8.4
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	62	34.1	22.8	19.4
Electr. time constant	T_{el}	<i>ms</i>	1.7	2.0	1.9	2.3
Mech. time constant	T_{mech}	<i>ms</i>	3.2	1.4	1.0	0.84
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	13	15	20	22
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	16	16	16	16
Number of motor poles	p_{mot}	-	6	6	6	6
Rated data						
Rated torque	M_n	<i>Nm</i>	0.24	0.45	0.67	0.84
Rated speed	n_n	<i>rpm</i>	4,500	4,500	4,500	4,500
Continuous rated current	I_n	<i>A</i>	0.68	1.11	1.55	1.90
Maximum values						
Max. torque	M_{max}	<i>Nm</i>	1.0	2.0	2.8	3.6
Max. current	I_{max}	<i>A</i>	2.9	5.1	6.7	8.5
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000	12,000
Mechanical parameters						
Rotor inertia	J	<i>kg*cm²</i>	0.06	0.08	0.10	0.12
Weight without brake	m	<i>kg</i>	0.75	0.92	1.09	1.26
Axial load	F_A	<i>N</i>	42	45	46	48
Radial load	F_R	<i>N</i>	219	234	245	252

JH2 - Specific technical data (DC link voltage DC 560 V)

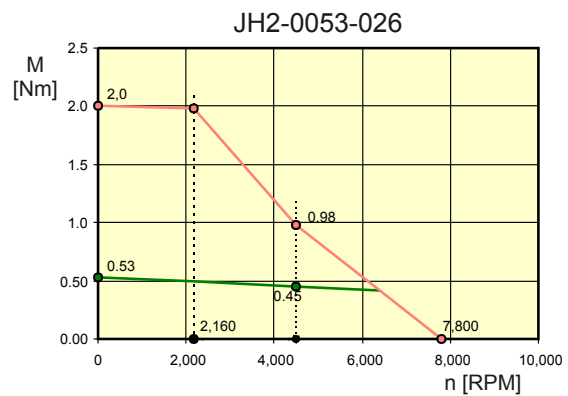
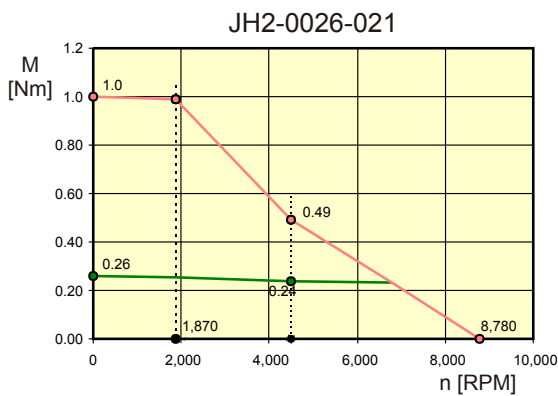
Motor type	JH2-0095-044		
Motor data			
Holding torque	M_o	<i>Nm</i>	0.95
Continuous stall current	I_o	<i>A</i>	1.31
Back EMF constant	K_E	<i>V/kRPM</i>	44.0
Torque constant	K_T	<i>Nm/A</i>	0.73
Winding resistance - Phase to phase	R_{Ph}	Ω	21.6
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	49.1
Electr. time constant	T_{el}	<i>ms</i>	2.3
Mech. time constant	T_{mech}	<i>ms</i>	0.85
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	22
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	16
Number of motor poles	p_{mot}	-	6
Rated data			
Rated torque	M_n	<i>Nm</i>	0.84
Rated speed	n_n	<i>rpm</i>	4,500
Continuous rated current	I_n	<i>A</i>	1.19
Maximum values			
Max. torque	M_{max}	<i>Nm</i>	3.6
Max. current	I_{max}	<i>A</i>	5.3
Max. speed	n_{max}	<i>rpm</i>	12,000
Mechanical parameters			
Rotor inertia	J	<i>kg*cm²</i>	0.12
Weight without brake	m	<i>kg</i>	1.26
Axial load	F_A	<i>N</i>	48
Radial load	F_R	<i>N</i>	252

JH2 - Torque-speed characteristic curves

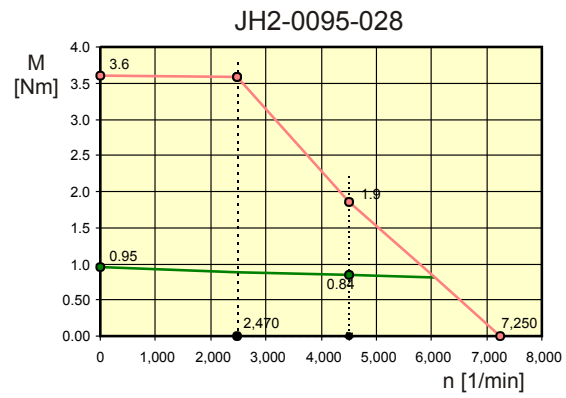
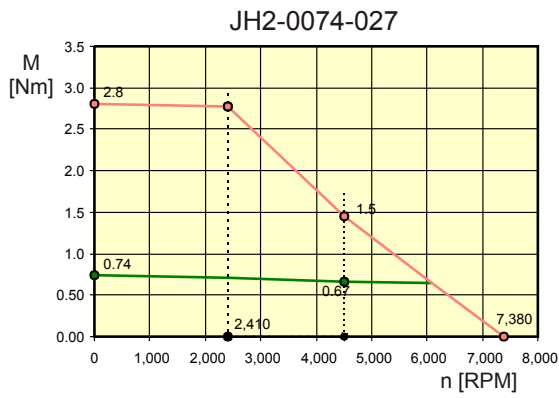
DC link voltage DC 48 V



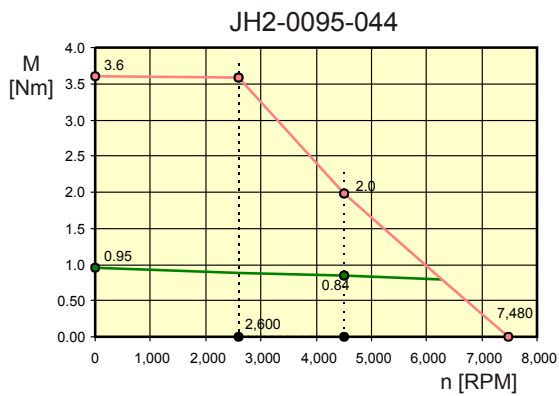
DC link voltage DC 320 V



4 Servo motors of the JH series



DC link voltage DC 560 V



4.2 Motor type JH3 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JH3
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

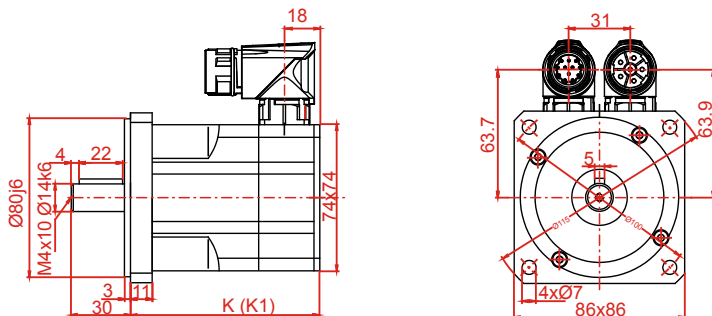
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JH3 - Specific technical data (DC link voltage DC 320 V)	114
JH3 - Torque-speed characteristic curves	115

JH3 - Frame size

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JH3 motor equipped with a resolver.



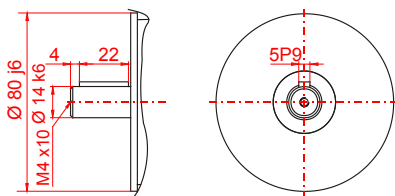
Motor type	JH3-0095	JH3-0190	JH3-0320	JH3-0420
K (without brake)	96	138	150	186
K1 (with brake)	138	156	192	228

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JH3 motors can be supplied with a keyway/feather key 6x6x22 to DIN 6885-A.



JH3 - General technical data

Type of connections

Motor type JH3 is connected to power by the power connector, see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JH3 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

The technical data of the brake for motor type JH3 are listed below:

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

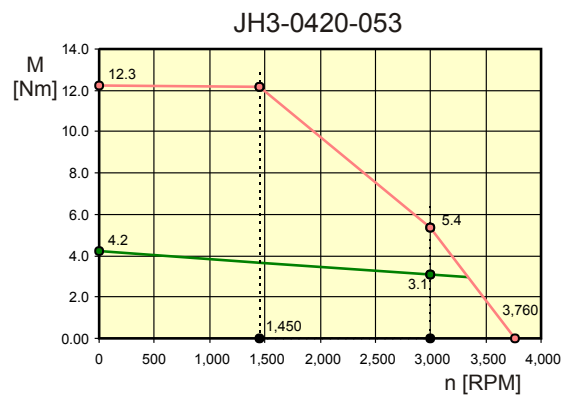
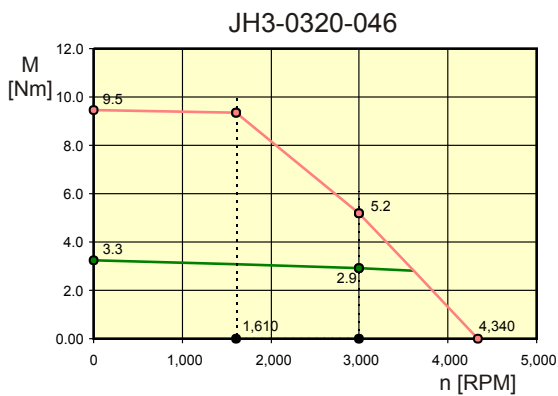
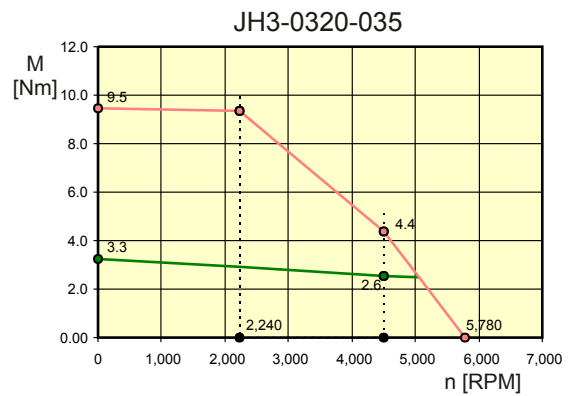
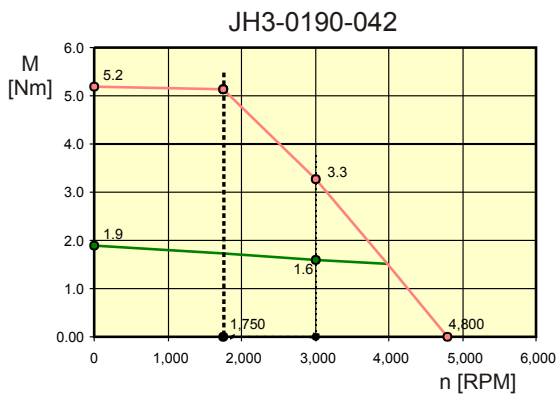
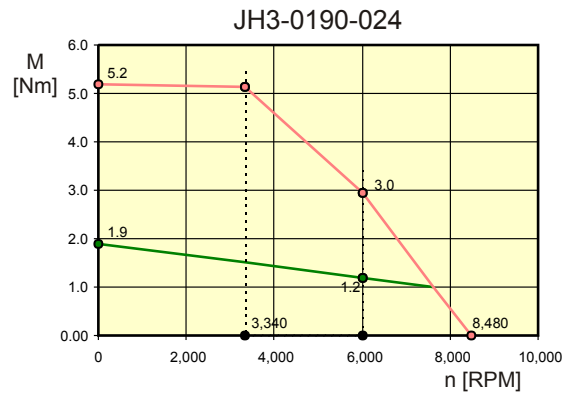
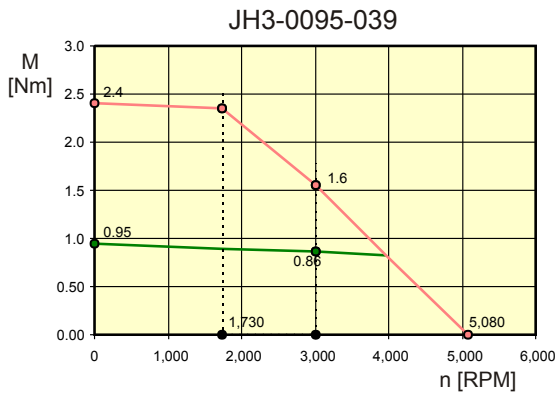
4 Servo motors of the JH series

JH3 - Specific technical data (DC link voltage DC 320 V)

Motor type			JH3-0095-039	JH3-0190-024	JH3-0190-042	JH3-0320-035	JH3-0320-046	JH3-0420-053
Motor data								
Holding torque	M_o	<i>Nm</i>	0.95	1.90	1.90	3.3	3.3	4.2
Continuous stall current	I_o	<i>A</i>	1.47	4.9	2.8	5.7	4.3	4.8
Back EMF constant	K_E	<i>V/kRPM</i>	39.0	23.5	41.5	34.5	46.0	53.0
Torque constant	K_T	<i>Nm/A</i>	0.65	0.39	0.69	0.57	0.76	0.88
Winding resistance - Phase to phase	R_{Ph}	Ω	9.9	1.27	4.0	1.32	2.2	1.77
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	30.6	4.9	15.4	5.5	9.8	7.6
Electr. time constant	T_{el}	<i>ms</i>	3.1	3.9	3.9	4.2	4.5	5.6
Mech. time constant	T_{mech}	<i>ms</i>	2.1	1.0	1.0	0.77	0.72	0.60
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	25	30	30	33	33	36
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	35	35	35	35	35	35
Number of motor poles	p_{mot}	-	10	10	10	10	10	10
Rated data								
Rated torque	M_n	<i>Nm</i>	0.86	1.20	1.60	2.6	2.9	3.1
Rated speed	n_n	<i>rpm</i>	3,000	6,000	3,000	4,500	3,000	3,000
Continuous rated current	I_n	<i>A</i>	1.43	3.3	2.4	4.7	4.0	3.7
Maximum values								
Max. torque	M_{max}	<i>Nm</i>	2.4	5.2	5.2	9.5	9.5	12.3
Max. current	I_{max}	<i>A</i>	5.4	19.6	11.1	25	18.6	21
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000	12,000	12,000	12,000
Mechanical parameters								
Rotor inertia	J	<i>kg*cm²</i>	0.50	0.70	0.70	1.1	1.1	1.5
Weight without brake	m	<i>kg</i>	1.52	2.09	2.09	3.22	3.22	4.35
Axial load	F_A	<i>N</i>	64	70	70	77	77	81
Radial load	F_R	<i>N</i>	335	368	368	406	406	427

JH3 - Torque-speed characteristic curves

DC link voltage DC 320 V



4.3 Motor type JH4 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JH4
 - Connector types
 - Technical data of the brake
-

Options

We supply further options of the motor type on request.

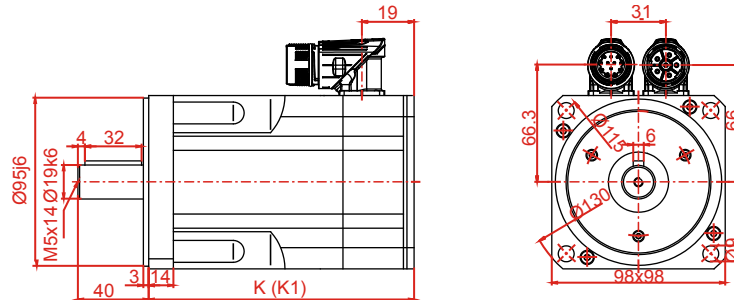
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JH4 - Specific technical data (DC link voltage DC 560 V)	120
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JH4 - Frame size

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JH4 motor equipped with a resolver.



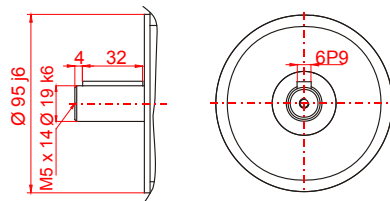
Motor type	JH4-0410	JH4-0630	JH4-0860
K (without brake)	129	159	189
K1 (with brake)	170	200	230

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JH4 motors can be supplied with a keyway/feather key 6x6x32 to DIN 6885-A.



JH4 - General technical data

Type of connections

Motor type JH4 is connected to power by the power connector, see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JH4 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

The technical data of the brake for motor type JH4 are listed below:

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

JH4 - Specific technical data (DC link voltage DC 320 V)

Motor type			JH4-0410-041	JH4-0630-042
Motor data				
Holding torque	M_o	<i>Nm</i>	4.1	6.3
Continuous stall current	I_o	<i>A</i>	6.0	9.2
Back EMF constant	K_E	<i>V/kRPM</i>	40.5	41.5
Torque constant	K_T	<i>Nm/A</i>	0.67	0.69
Winding resistance - Phase to phase	R_{Ph}	Ω	1.24	0.70
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	10.6	6.9
Electr. time constant	T_{el}	<i>ms</i>	8.5	9.9
Mech. time constant	T_{mech}	<i>ms</i>	0.81	0.67
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	29	31
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	59	59
Number of motor poles	p_{mot}	-	10	10
Rated data				
Rated torque	M_n	<i>Nm</i>	3.2	4.6
Rated speed	n_n	<i>rpm</i>	3,000	3,000
Continuous rated current	I_n	<i>A</i>	5.0	7.0
Maximum values				
Max. torque	M_{max}	<i>Nm</i>	11.1	18.5
Max. current	I_{max}	<i>A</i>	24	40
Max. speed	n_{max}	<i>rpm</i>	9,000	9,000
Mechanical parameters				
Rotor inertia	J	<i>kg*cm²</i>	1.7	2.6
Weight without brake	m	<i>kg</i>	4.28	5.34
Axial load	F_A	<i>N</i>	113	123
Radial load	F_R	<i>N</i>	594	648

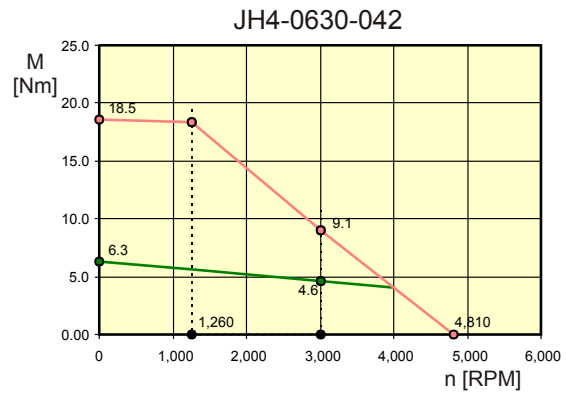
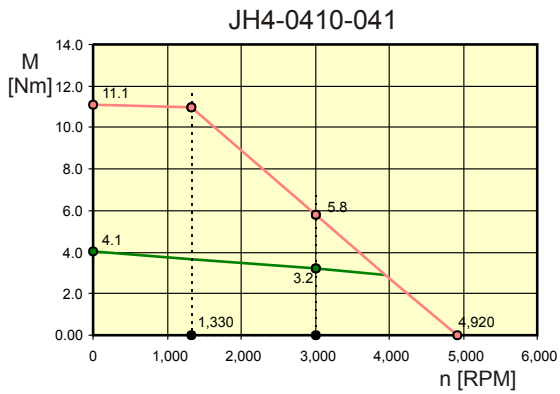
4 Servo motors of the JH series

JH4 - Specific technical data (DC link voltage DC 560 V)

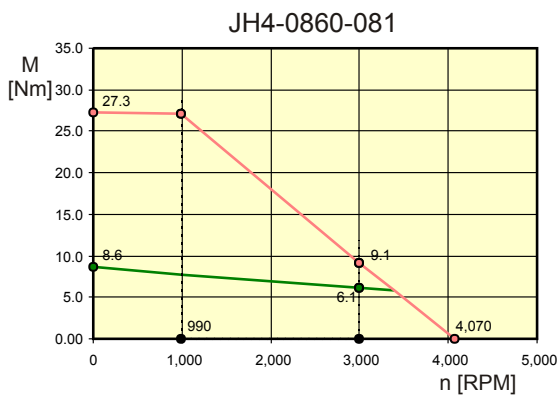
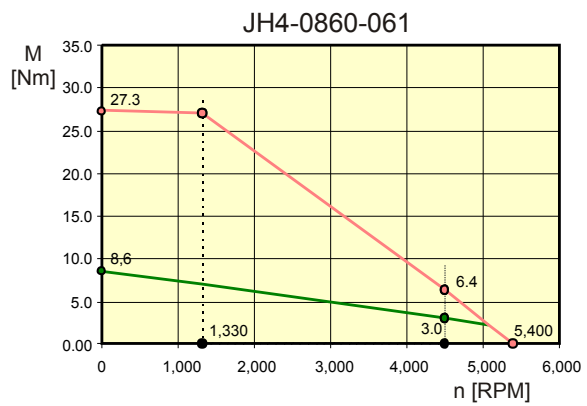
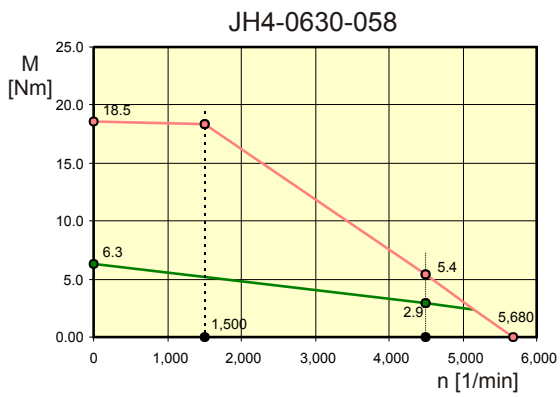
Motor type			JH4-0630-058	JH4-0860-061	JH4-0860-081
Motor data					
Holding torque	M_o	<i>Nm</i>	6.3	8.6	8.6
Continuous stall current	I_o	<i>A</i>	6.6	8.5	6.4
Back EMF constant	K_E	<i>V/kRPM</i>	58.0	61.0	81.0
Torque constant	K_T	<i>Nm/A</i>	0.96	1.01	1.34
Winding resistance - Phase to phase	R_{Ph}	Ω	1.40	1.02	1.81
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	13.6	10.7	18.6
Electr. time constant	T_{el}	<i>ms</i>	9.7	10.5	10.3
Mech. time constant	T_{mech}	<i>ms</i>	0.68	0.61	0.61
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	31	33	33
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	59	59	59
Number of motor poles	p_{mot}	-	10	10	10
Rated data					
Rated torque	M_n	<i>Nm</i>	2.9	3.0	6.1
Rated speed	n_n	<i>rpm</i>	4,500	4,500	3,000
Continuous rated current	I_n	<i>A</i>	3.3	3.3	4.8
Maximum values					
Max. torque	M_{max}	<i>Nm</i>	18.5	27	27
Max. current	I_{max}	<i>A</i>	28	41	31
Max. speed	n_{max}	<i>rpm</i>	9,000	9,000	9,000
Mechanical parameters					
Rotor inertia	J	<i>kg*cm²</i>	2.6	3.5	3.5
Weight without brake	m	<i>kg</i>	5.34	6.96	6.96
Axial load	F_A	<i>N</i>	123	130	130
Radial load	F_R	<i>N</i>	648	682	682

JH4 - Torque-speed characteristic curves

DC link voltage DC 320 V



DC link voltage DC 560 V



4.4 Motor type JH5 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JH5
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

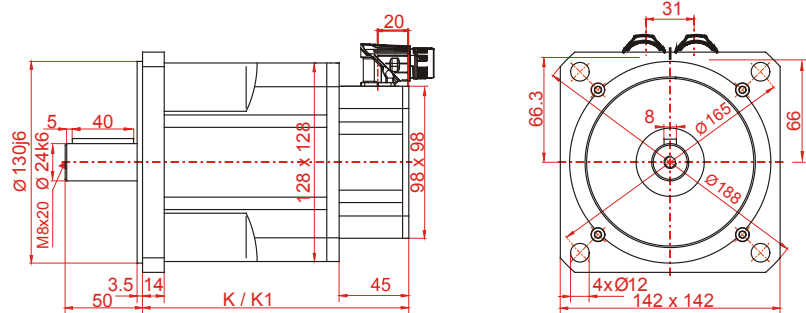
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JH5 - Torque-speed characteristic curves	126

JH5 - Frame size

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JH5 motor equipped with a resolver.



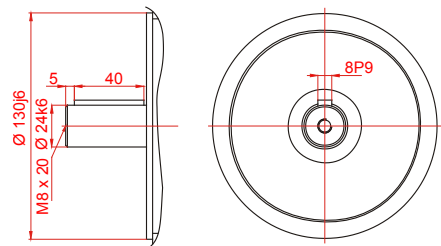
Motor type	JH5-1160	JH5-1490	JH5-1870	JH5-2730
K (without brake)	172	200	230	290
K1 (with brake)	224	252	282	342

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JH5 motors can be supplied with a keyway/feather key 7x8x40 to DIN 6885-A.



JH5 - General technical data

Type of connections

Motor type JH5 is connected to power by the power connector, see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JH5 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

The technical data of the brake for motor type JH5 are listed below:

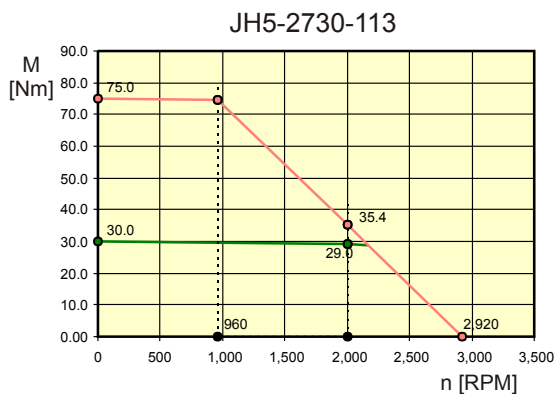
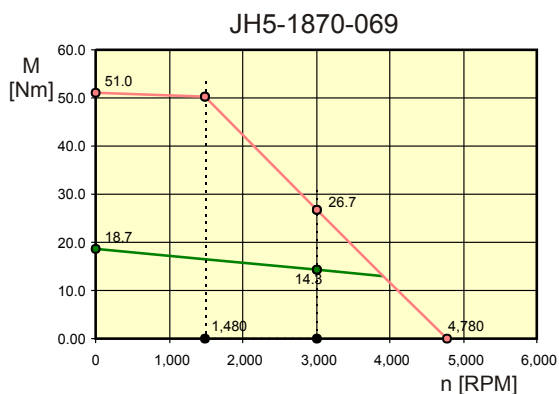
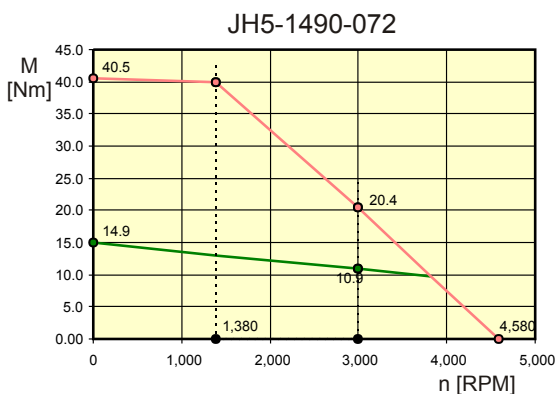
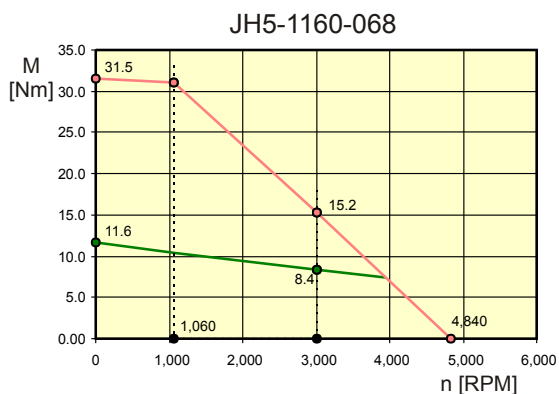
Technical specifications	Value		
Holding torque	M_{BR}	Nm	18
Supply voltage	U_{BR}	V	DC 24 V (-10 % to +6 %)
Rated power	P_{BR}	W	24
Rotor inertia	J_{BR}	$kg \cdot cm^2$	1.66
Weight	m_{BR}	kg	1.08

JH5 - Specific technical data (DC link voltage DC 560 V)

Motor type			JH5- 1160- 068	JH5- 1490- 072	JH5- 1870- 069	JH5- 2730- 087	JH5- 2730- 113
Motor data							
Holding torque	M_o	<i>Nm</i>	11.6	14.9	18.7	27.3	30.0
Continuous stall current	I_o	<i>A</i>	10.3	12.5	16.4	19.0	16.1
Back EMF constant	K_E	<i>V/kRPM</i>	68.0	72.0	69.0	87.0	113.0
Torque constant	K_T	<i>Nm/A</i>	1.12	1.19	1.14	1.44	1.87
Winding resistance - Phase to phase	R_{Ph}	Ω	0.71	0.48	0.35	0.32	0.54
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	11.4	8.5	6.4	6.8	11.4
Electr. time constant	T_{el}	<i>ms</i>	16.1	17.7	18.3	21	21
Mech. time constant	T_{mech}	<i>ms</i>	0.66	0.48	0.51	0.41	0.41
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	50	55	60	75	75
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	97	97	97	97	97
Number of motor poles	p_{mot}	-	10	10	10	10	10
Rated data							
Rated torque	M_n	<i>Nm</i>	8.4	10.9	14.3	21.0	29.0
Rated speed	n_n	<i>rpm</i>	3,000	3,000	3,000	3,000	2,000
Continuous rated current	I_n	<i>A</i>	7.9	9.6	13.1	14.9	15.7
Maximum values							
Max. torque	M_{max}	<i>Nm</i>	32	41	51	75	75
Max. current	I_{max}	<i>A</i>	49	49	61	68	52
Max. speed	n_{max}	<i>rpm</i>	9,000	9,000	9,000	9,000	9,000
Mechanical parameters							
Rotor inertia	J	<i>kg*cm²</i>	6.8	8.3	11.0	15.3	15.3
Weight without brake	m	<i>kg</i>	8.10	10.10	12.10	16.10	16.10
Axial load	F_A	<i>N</i>	128	135	141	149	149
Radial load	F_R	<i>N</i>	672	713	743	783	783

JH5 - Torque-speed characteristic curves

DC link voltage DC 560 V



5 Servo motors of the JHN series

General technical data

General technical data on JHN motors are listed below:

Type of data	Value
Design	B5, V1, V3
Coating	Matt black to RAL 9005 (no stability to solvents, such as Trilene, thinners, etc.)
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
Cooling	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	KTY83-110
Derating at altitudes higher than 1000 m above sea level when the motor has come to a standstill at 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 derated by the following formula: $M_{red} = M_0 * \sqrt{1 - (H - 1000) / (10000)}$	

Rated data - Resolver

The rated resolver data for JHN motors are listed below:

Type of data	Value
Input voltage	7 V
Input frequency	10 kHz
Number of poles	2
Speed ratio	0.5
Accuracy	± 10 arcmin

5 Servo motors of the JHN series

Standard configuration The standard motor configuration includes the following features:

- KTY83-110
 - No brake
 - Plain shaft
 - Two straight flange sockets for power and signal
 - Resolver
 - Runout tolerance = R
 - Degree of protection IP65
-

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5.1 Motor type JHN2 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JHN2
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

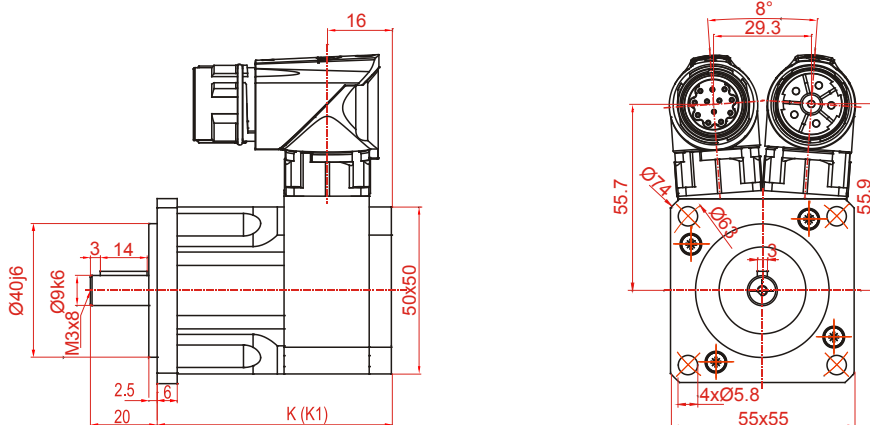
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JHN2 - Specific technical data (DC link voltage DC 320 V)	133
JHN2 - Specific technical data (DC link voltage DC 560 V)	134
JHN2 - Torque-speed characteristic curves.....	135

JHN2 - Frame size

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JHN2 motor equipped with a resolver.



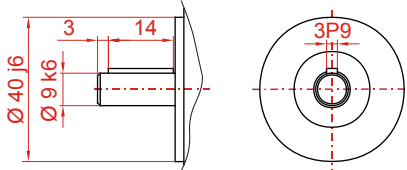
Motor type	JHN2-0028	JHN2-0054	JHN2-0075	JHN2-0095
K (without brake)	67	82	97	112
K1 (with brake)	105	120	135	150

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JHN2 motors can be supplied with a keyway/feather key 3x3x14 to DIN 6885-A.



JHN2 - General technical data

Type of connections

Motor type JHN2 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHN2 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JHN2 - Specific technical data (DC link voltage DC 48 V)

Motor type			JHN2-0028-005	JHN2-0054-006	JHN2-0075-006	JHN2-0095-008
Motor data						
Continuous stall torque	M_o	<i>Nm</i>	0.28	0.54	0.75	0.95
Continuous stall current	I_o	<i>A</i>	3.5	6.0	7.7	7.3
Back EMF constant	K_E	<i>V/kRPM</i>	4.9	5.5	5.9	7.8
Torque constant	K_T	<i>Nm/A</i>	0.08	0.09	0.10	0.13
Winding resistance - Phase to phase	R_{Ph}	Ω	2.2	0.99	0.66	0.82
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	2.2	1.24	0.89	1.18
Electr. time constant	T_{el}	<i>ms</i>	0.98	1.2	1.3	1.4
Mech. time constant	T_{mech}	<i>ms</i>	2.8	1.5	1.1	0.94
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	10	12	12	18
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	16	16	16	16
Number of motor poles	p_{mot}	-	6	6	6	6
Rated data						
Rated torque	M_n	<i>Nm</i>	0.26	0.51	0.71	0.91
Rated speed	n_n	<i>rpm</i>	3,000	3,000	3,000	3,000
Continuous rated current	I_n	<i>A</i>	3.5	6.0	7.7	7.3
Maximum values						
Max. torque	M_{max}	<i>Nm</i>	0.96	1.0	3.3	3.8
Max. current	I_{max}	<i>A</i>	13.0	27	36	33
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000	12,000
Mechanical parameters						
Rotor inertia	J	<i>kg*cm²</i>	0.05	0.07	0.09	0.11
Weight without brake	m	<i>kg</i>	0.74	0.93	1.1	1.3
Axial load	F_A	<i>N</i>	41	45	47	48
Radial load	F_R	<i>N</i>	216	234	246	254

JHN2 - Specific technical data (DC link voltage DC 320 V)

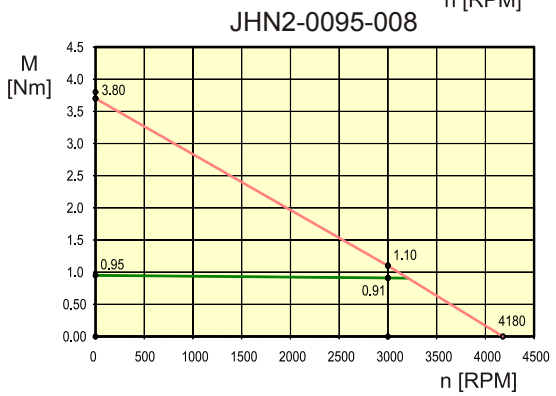
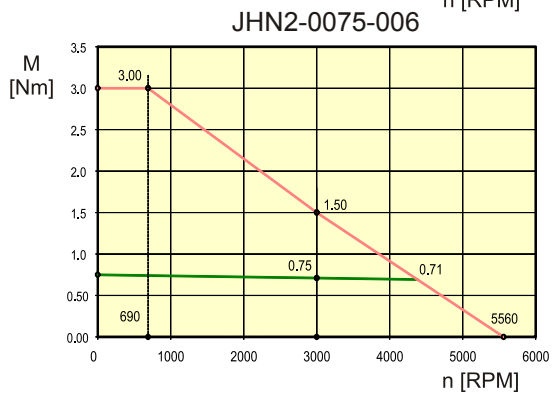
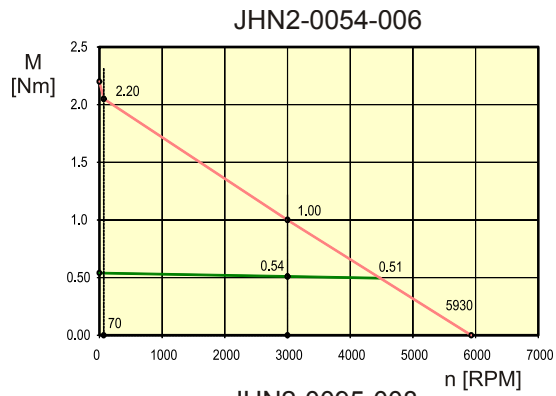
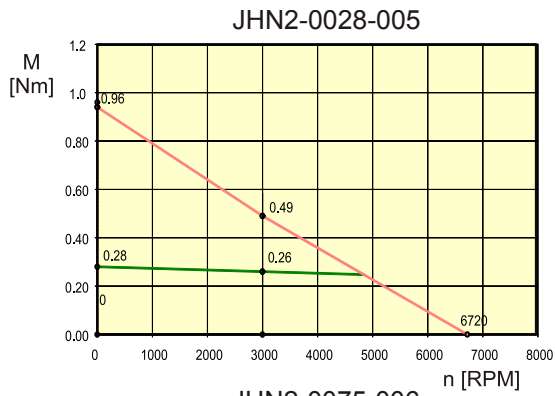
Motor type			JHN2-0028-018	JHN2-0054-028	JHN2-0075-027	JHN2-0095-032
Motor data						
Continuous stall torque	M_o	<i>Nm</i>	0.28	0.54	0.75	0.95
Continuous stall current	I_o	<i>A</i>	0.97	1.17	1.71	1.82
Back EMF constant	K_E	<i>V/kRPM</i>	17.5	28.0	26.5	31.5
Torque constant	K_T	<i>Nm/A</i>	0.29	0.46	0.44	0.52
Winding resistance - Phase to phase	R_{Ph}	Ω	28.3	25.9	13.4	13.1
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	28.4	32.3	18.0	19.0
Electr. time constant	T_{el}	<i>ms</i>	1.0	1.2	1.3	1.5
Mech. time constant	T_{mech}	<i>ms</i>	2.9	1.5	1.1	0.92
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	10	12	12	18
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	16	16	16	16
Number of motor poles	p_{mot}	-	6	6	6	6
Rated data						
Rated torque	M_n	<i>Nm</i>	0.25	0.48	0.64	0.85
Rated speed	n_n	<i>rpm</i>	4,500	4,500	6,000	4,500
Continuous rated current	I_n	<i>A</i>	0.96	1.12	1.57	1.7
Maximum values						
Max. torque	M_{max}	<i>Nm</i>	1.1	2.2	3.0	3.8
Max. current	I_{max}	<i>A</i>	4.4	5.4	7.9	8.4
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000	12,000
Mechanical parameters						
Rotor inertia	J	<i>kg*cm²</i>	0.05	0.07	0.09	0.11
Weight without brake	m	<i>kg</i>	0.74	0.93	1.1	1.3
Axial load	F_A	<i>N</i>	41	45	47	48
Radial load	F_R	<i>N</i>	216	234	246	254

JHN2 - Specific technical data (DC link voltage DC 560 V)

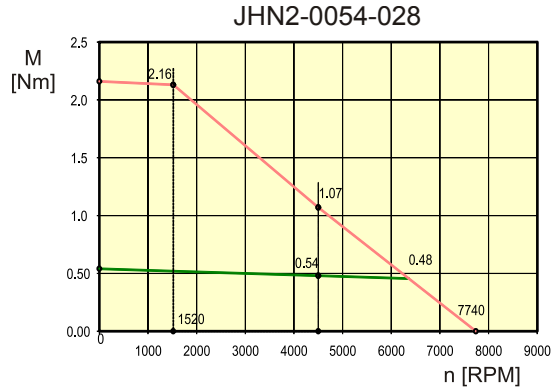
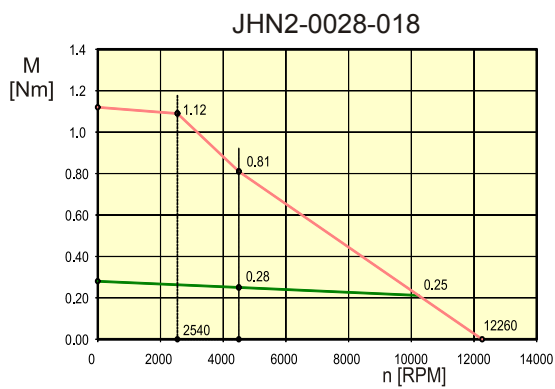
Motor type			JHN2-0075-053	JHN2-0095-050
Motor data				
Continuous stall torque	M_o	<i>Nm</i>	0.75	0.95
Continuous stall current	I_o	<i>A</i>	0.86	1.15
Back EMF constant	K_E	<i>V/kRPM</i>	53.0	50.0
Torque constant	K_T	<i>Nm/A</i>	0.88	0.83
Winding resistance - Phase to phase	R_{Ph}	Ω	54	33.6
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	72	48.5
Electr. time constant	T_{el}	<i>ms</i>	1.3	1.4
Mech. time constant	T_{mech}	<i>ms</i>	1.1	0.93
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	12	18
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	16	16
Number of motor poles	p_{mot}	-	6	6
Rated data				
Rated torque	M_n	<i>Nm</i>	0.68	0.85
Rated speed	n_n	<i>rpm</i>	4,500	4,500
Continuous rated current	I_n	<i>A</i>	0.83	1.07
Maximum values				
Max. torque	M_{max}	<i>Nm</i>	3.0	3.8
Max. current	I_{max}	<i>A</i>	3.9	5.3
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000
Mechanical parameters				
Rotor inertia	J	<i>kg*cm²</i>	0.09	0.11
Weight without brake	m	<i>kg</i>	1.1	1.3
Axial load	F_A	<i>N</i>	47	48
Radial load	F_R	<i>N</i>	246	254

JHN2 - Torque-speed characteristic curves

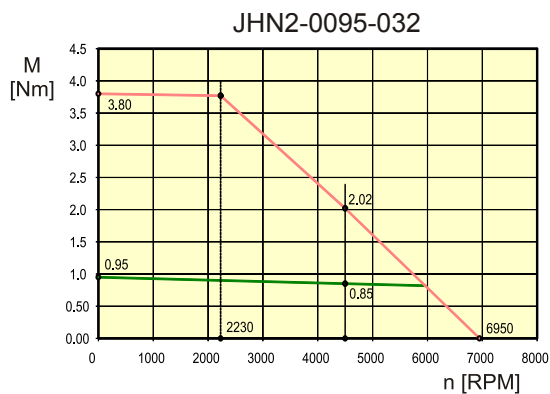
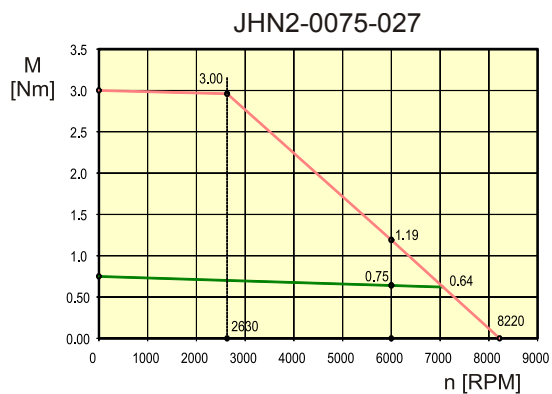
DC link voltage DC 48 V



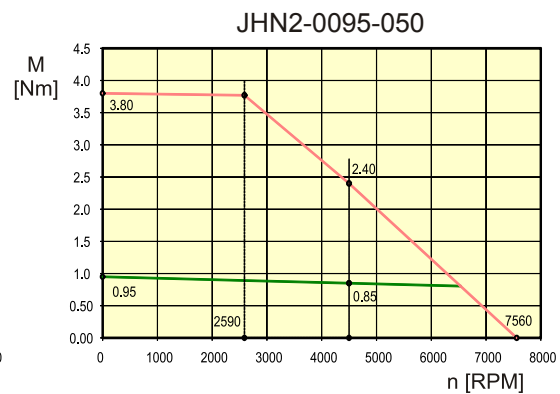
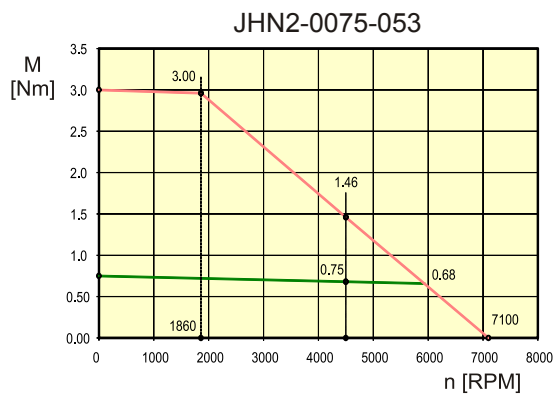
DC link voltage DC 320 V



5 Servo motors of the JHN series



DC link voltage DC 560 V



5.2 Motor type JHN3 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JHN3
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

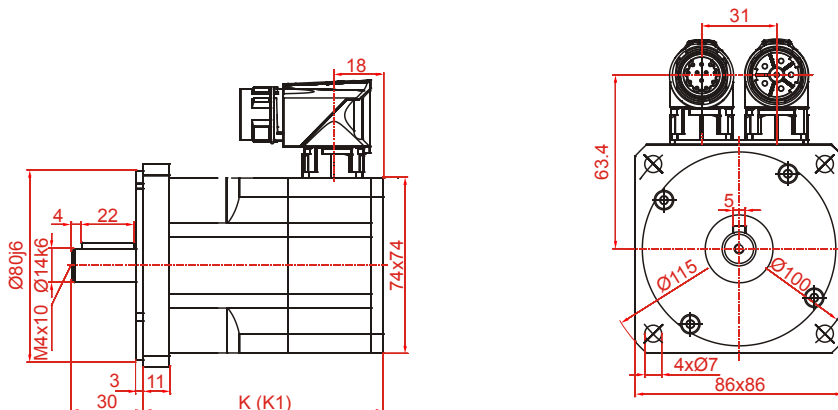
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JHN3 - Frame size

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JHN3 motor equipped with a resolver.



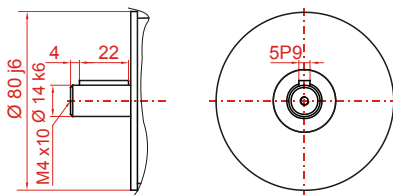
Motor type	JHN3-0115	JHN3-0205	JHN3-0350	JHN3-0480
K (without brake)	82	100	136	172
K1 (with brake)	120	138	174	210

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JHN3 motors can be supplied with a keyway/feather key 5x5x22 to DIN 6885-A.



JHN3 - General technical data

Type of connections

Motor type JHN3 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHN3 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JHN3 - Specific technical data (DC link voltage DC 48 V)

Motor type	JHN3-0115-007		
Motor data			
Continuous stall torque	M_o	Nm	1.15
Continuous stall current	I_o	A	10.0
Back EMF constant	K_E	$V/kRPM$	6.9
Torque constant	K_T	Nm/A	0.11
Winding resistance - Phase to phase	R_{Ph}	Ω	0.34
Winding inductance - Phase to phase	L_{Ph}	mH	0.75
Electr. time constant	T_{el}	ms	2.2
Mech. time constant	T_{mech}	ms	1.4
Thermal time constant - Entire motor	T_{ther}	min	21
Thermal time constant - Copper winding	T_{ther_C} U	s	30
Number of motor poles	p_{mot}	-	10
Rated data			
Rated torque	M_n	Nm	1.15
Rated speed	n_n	rpm	1,500
Continuous rated current	I_n	A	11.3
Maximum values			
Max. torque	M_{max}	Nm	3.5
Max. current	I_{max}	A	44
Max. speed	n_{max}	rpm	12,000
Mechanical parameters			
Rotor inertia	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

JHN3 - Specific technical data (DC link voltage DC 320 V)

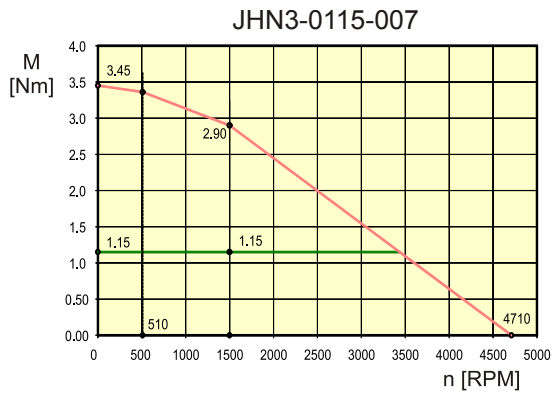
Motor type			JHN3-0115-035	JHN3-0205-025	JHN3-0205-045	JHN3-0350-035	JHN3-0350-050	JHN3-0480-060
Motor data								
Continuous stall torque	M_o	<i>Nm</i>	1.15	2.1	2.1	3.5	3.5	4.8
Continuous stall current	I_o	<i>A</i>	2.0	5.1	2.8	6.0	4.2	4.8
Back EMF constant	K_E	<i>V/kRPM</i>	34.5	24.5	44.5	35.0	50.0	60.0
Torque constant	K_T	<i>Nm/A</i>	0.57	0.41	0.74	0.58	0.83	0.99
Winding resistance - Phase to phase	R_{Ph}	Ω	8.4	1.68	5.4	1.36	2.8	2.5
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	18.0	4.1	13.3	3.9	8.1	7.5
Electr. time constant	T_{el}	<i>ms</i>	2.1	2.4	2.5	2.9	2.9	3.0
Mech. time constant	T_{mech}	<i>ms</i>	1.4	0.97	0.95	0.73	0.74	0.67
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	21	23	23	27	27	30
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	30	30	30	30	30	30
Number of motor poles	p_{mot}	-	10	10	10	10	10	10
Rated data								
Rated torque	M_n	<i>Nm</i>	1.13	1.65	1.90	2.8	3.0	3.7
Rated speed	n_n	<i>rpm</i>	3,000	6,000	3,000	4,500	3,000	3,000
Continuous rated current	I_n	<i>A</i>	2.3	5.5	3.1	6.1	4.3	4.5
Maximum values								
Max. torque	M_{max}	<i>Nm</i>	3.5	6.2	6.2	10.5	10.5	14.4
Max. current	I_{max}	<i>A</i>	9.2	21	12.7	28	19.4	17.3
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000	12,000	12,000	12,000
Mechanical parameters								
Rotor inertia	J	<i>kg*cm²</i>	0.31	0.55	0.55	1.0	1.0	1.5
Weight without brake	m	<i>kg</i>	1.5	2.0	2.0	2.9	2.9	3.8
Axial load	F_A	<i>N</i>	54	62	62	68	68	75
Radial load	F_R	<i>N</i>	283	327	327	356	356	392

JHN3 - Specific technical data (DC link voltage DC 560 V)

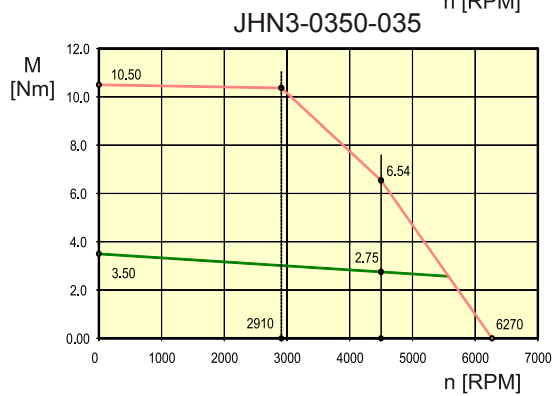
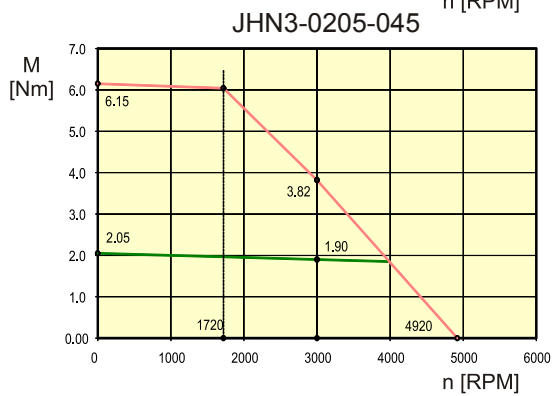
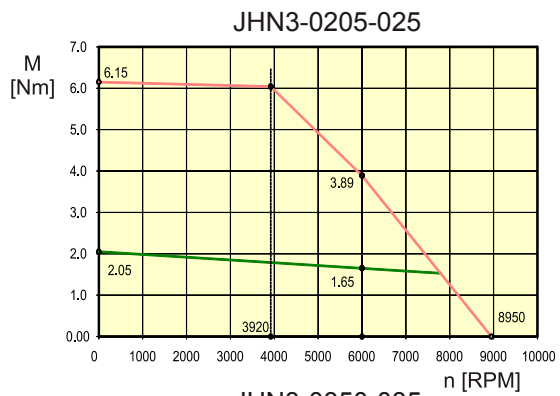
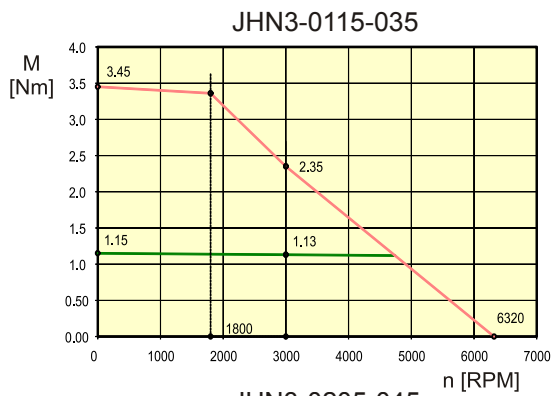
Motor type			JHN3-0115-039	JHN3-0115-063	JHN3-0205-079	JHN3-0350-070	JHN3-0350-089	JHN3-0480-103
Motor data								
Continuous stall torque	M_o	<i>Nm</i>	1.15	1.15	2.1	3.5	3.5	4.8
Continuous stall current	I_o	<i>A</i>	1.78	1.10	1.57	3.0	2.4	2.8
Back EMF constant	K_E	<i>V/kRPM</i>	39.0	63.0	79.0	70.0	89.0	103.0
Torque constant	K_T	<i>Nm/A</i>	0.65	1.04	1.31	1.16	1.47	1.70
Winding resistance - Phase to phase	R_{Ph}	Ω	10.7	27.8	17.3	5.5	8.9	7.5
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	23	59	42.2	15.9	25.5	22.7
Electr. time constant	T_{el}	<i>ms</i>	2.1	2.1	2.5	2.9	2.9	3.0
Mech. time constant	T_{mech}	<i>ms</i>	1.4	1.4	0.96	0.73	0.74	0.68
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	21	21	23	27	27	30
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	30	30	30	30	30	30
Number of motor poles	p_{mot}	-	10	10	10	10	10	10
Rated data								
Rated torque	M_n	<i>Nm</i>	1.01	1.13	1.90	2.8	3.0	3.7
Rated speed	n_n	<i>rpm</i>	6,000	3,000	3,000	4,500	3,000	3,000
Continuous rated current	I_n	<i>A</i>	1.99	1.26	1.72	3.0	2.4	2.6
Maximum values								
Max. torque	M_{max}	<i>Nm</i>	3.5	3.5	6.2	10.5	10.5	14.4
Max. current	I_{max}	<i>A</i>	7.8	5.0	7.2	10.9	10.9	10.1
Max. speed	n_{max}	<i>rpm</i>	12,000	12,000	12,000	12,000	12,000	12,000
Mechanical parameters								
Rotor inertia	J	<i>kg*cm²</i>	0.31	0.31	0.55	1.0	1.0	1.5
Weight without brake	m	<i>kg</i>	1.5	1.5	2.0	2.9	2.9	3.8
Axial load	F_A	<i>N</i>	54	54	62	68	68	75
Radial load	F_R	<i>N</i>	283	283	327	356	356	392

JHN3 - Torque-speed characteristic curves

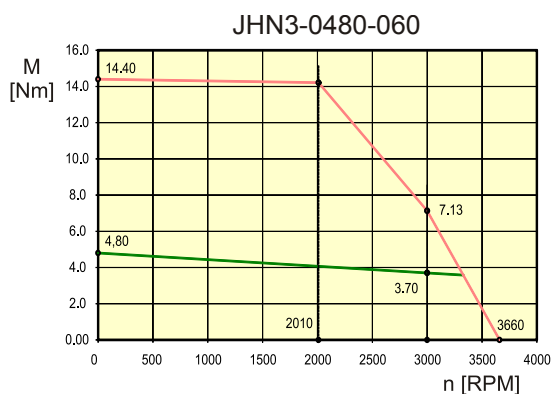
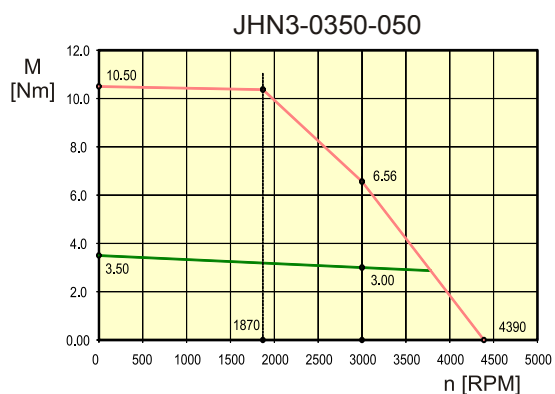
DC link voltage DC 48 V



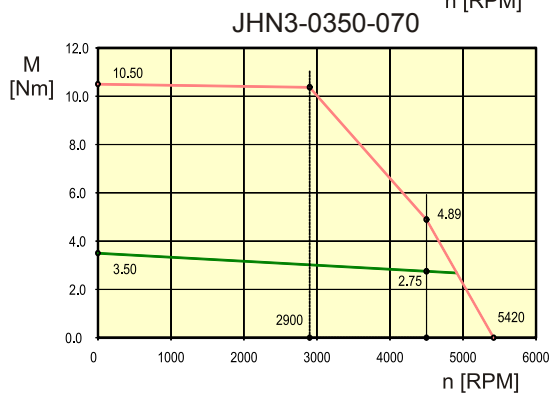
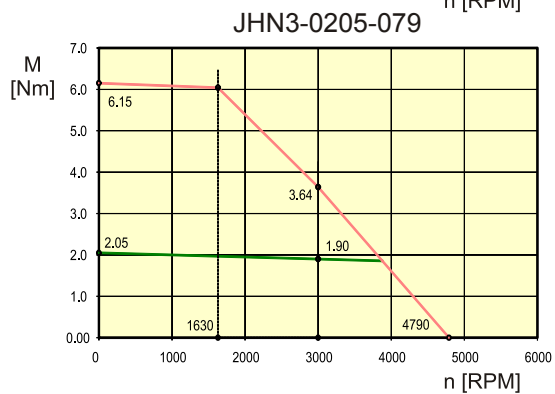
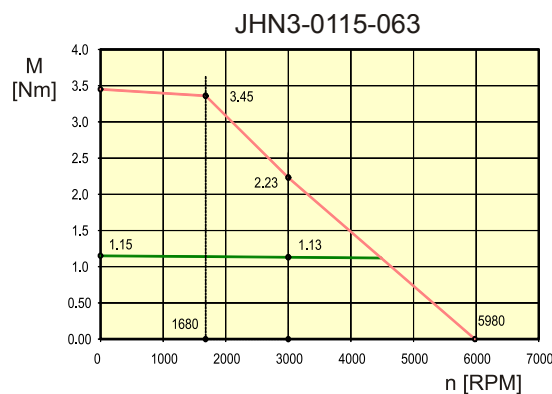
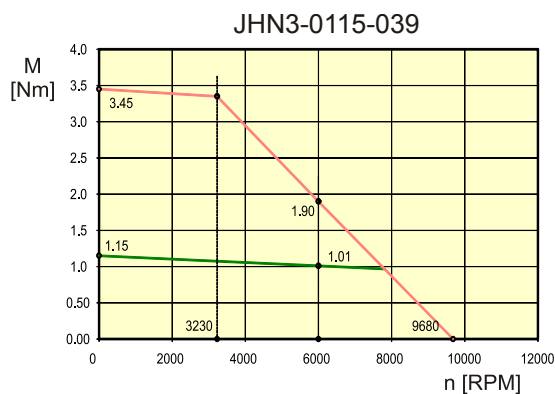
DC link voltage DC 320 V

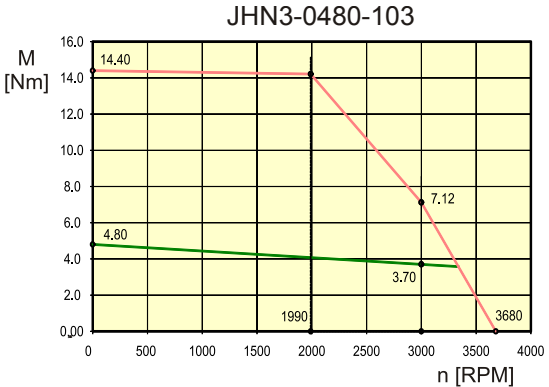
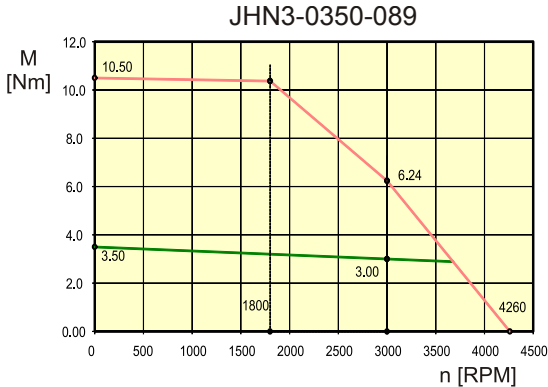


5 Servo motors of the JHN series



DC link voltage DC 560 V





5.3 Motor type JHN4 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JHN4
 - Connector types
 - Technical data of the brake
-

Options

We supply further options of the motor type on request.

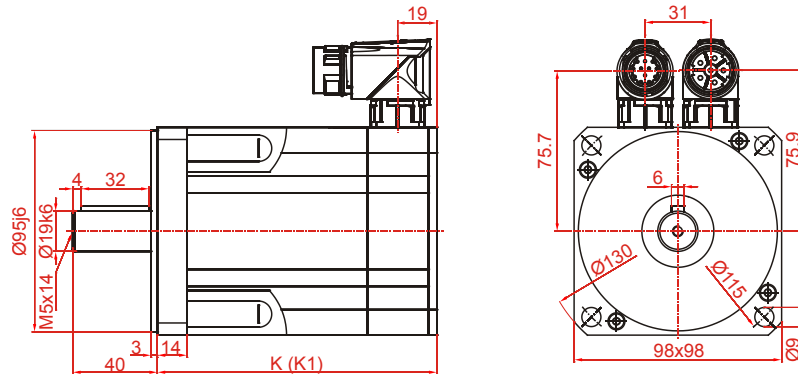
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JHN4 - Specific technical data (DC link voltage DC 320 V).....	149
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JHN4 - Torque-speed characteristic curves	151

JHN4 - Frame size

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JHN4 motor equipped with a resolver.



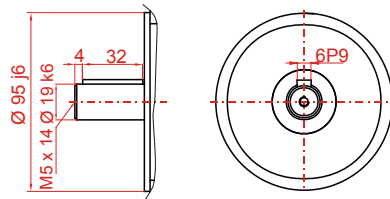
Motor type	JHN4-0510	JHN4-0750	JHN4-0960	JHN4-1130
K (without brake)	113	143	173	203
K1 (with brake)	154	184	214	244

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JHN4 motors can be supplied with a keyway/feather key 6x6x32 to DIN 6885-A.



JHN4 - General technical data

Type of connections

The motor type JHN4 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHN4 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JHN4 - Specific technical data (DC link voltage DC 320 V)

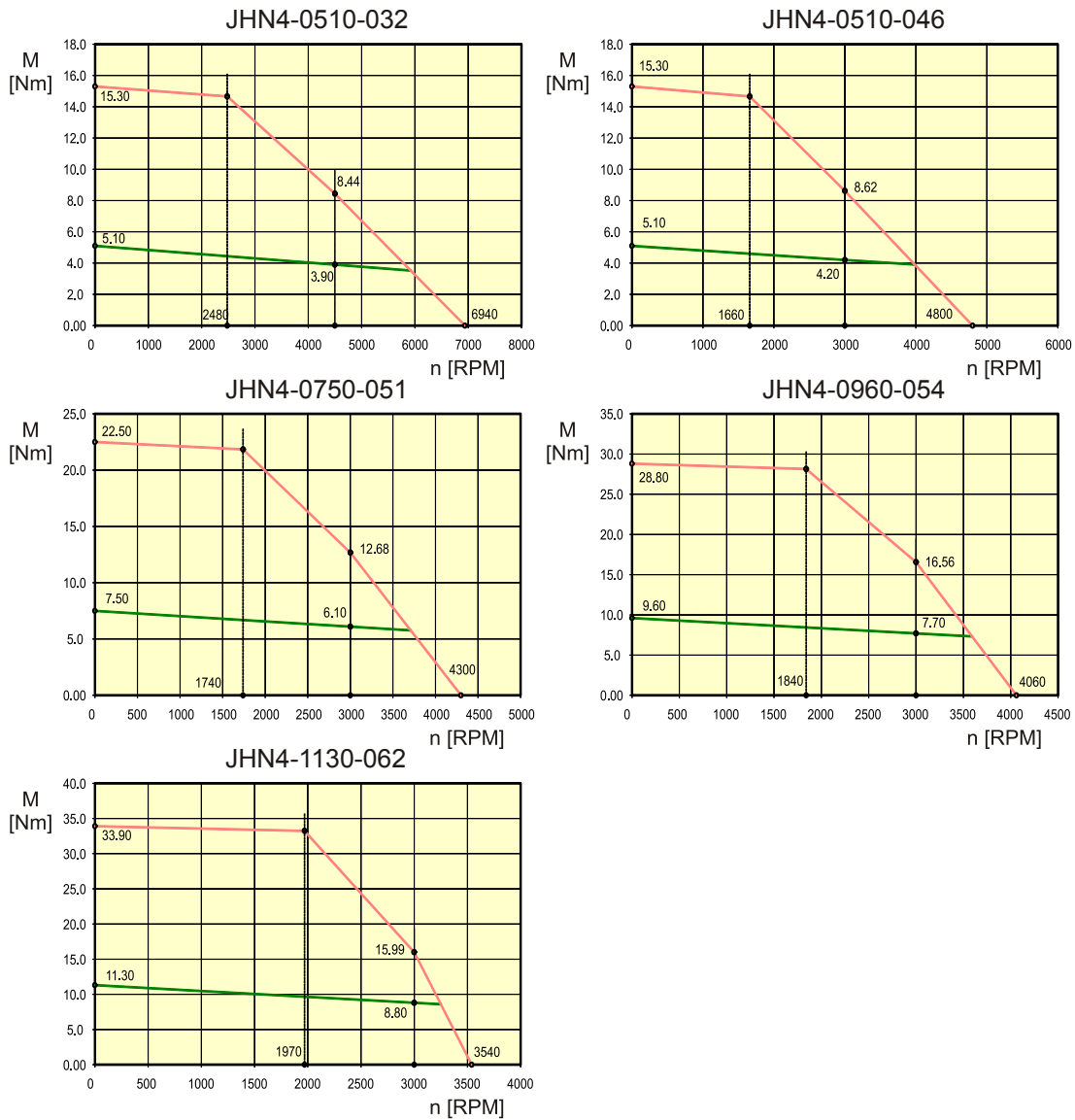
Motor type			JHN4- 0510- 032	JHN4- 0510- 046	JHN4- 0750- 051	JHN4- 0960- 054	JHN4- 1130- 062
Motor data							
Continuous stall torque	M_o	<i>Nm</i>	5.1	5.1	7.5	9.6	11.3
Continuous stall current	I_o	<i>A</i>	9.8	6.8	8.9	10.7	11.0
Back EMF constant	K_E	<i>V/kRPM</i>	31.5	45.5	51.0	54.0	62.0
Torque constant	K_T	<i>Nm/A</i>	0.52	0.75	0.84	0.89	1.03
Winding resistance - Phase to phase	R_{Ph}	Ω	0.61	1.24	0.79	0.62	0.61
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	3.3	6.8	4.8	3.6	3.8
Electr. time constant	T_{el}	<i>ms</i>	5.4	5.5	6.1	5.8	6.2
Mech. time constant	T_{mech}	<i>ms</i>	0.79	0.77	0.63	0.60	0.57
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	25	25	30	35	40
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	48	48	48	48	48
Number of motor poles	p_{mot}	-	10	10	10	10	10
Rated data							
Rated torque	M_n	<i>Nm</i>	3.9	4.2	6.1	7.7	8.8
Rated speed	n_n	<i>rpm</i>	4,500	3,000	3,000	3,000	3,000
Continuous rated current	I_n	<i>A</i>	9.9	7.0	8.8	10.8	10.7
Maximum values							
Max. torque	M_{max}	<i>Nm</i>	15.3	15.3	23	29	34
Max. current	I_{max}	<i>A</i>	45	31	41	49	41
Max. speed	n_{max}	<i>rpm</i>	9,000	9,000	9,000	9,000	9,000
Mechanical parameters							
Rotor inertia	J	<i>kg*cm²</i>	2.0	2.0	3.3	4.5	5.7
Weight without brake	m	<i>kg</i>	3.9	3.9	5.2	6.5	7.8
Axial load	F_A	<i>N</i>	113	113	124	131	135
Radial load	F_R	<i>N</i>	595	595	653	689	713

JHN4 - Specific technical data (DC link voltage DC 560 V)

Motor type			JHN4-0510-081	JHN4-0750-087	JHN4-0960-068	JHN4-0960-097	JHN4-1130-091
Motor data							
Continuous stall torque	M_o	<i>Nm</i>	5.1	7.5	9.6	9.6	11.3
Continuous stall current	I_o	<i>A</i>	3.8	5.2	8.5	6.0	7.5
Back EMF constant	K_E	<i>V/kRPM</i>	81.0	87.0	68.0	97.0	91.0
Torque constant	K_T	<i>Nm/A</i>	1.34	1.44	1.12	1.60	1.51
Winding resistance - Phase to phase	R_{Ph}	Ω	4.0	2.3	0.97	2.0	1.42
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	21.7	13.5	5.8	11.9	8.9
Electr. time constant	T_{el}	<i>ms</i>	5.5	5.9	6.0	6.0	6.3
Mech. time constant	T_{mech}	<i>ms</i>	0.78	0.62	0.60	0.60	0.62
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	25	30	35	35	40
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	48	48	48	48	48
Number of motor poles	p_{mot}	-	10	10	10	10	10
Rated data							
Rated torque	M_n	<i>Nm</i>	4.2	6.1	6.3	7.7	8.8
Rated speed	n_n	<i>rpm</i>	3,000	3,000	4,500	3,000	3,000
Continuous rated current	I_n	<i>A</i>	3.9	5.1	7.8	6.0	7.4
Maximum values							
Max. torque	M_{max}	<i>Nm</i>	15.3	23	29	29	34
Max. current	I_{max}	<i>A</i>	17.4	24	32	27	28
Max. speed	n_{max}	<i>rpm</i>	9,000	9,000	9,000	9,000	9,000
Mechanical parameters							
Rotor inertia	J	<i>kg*cm²</i>	2.0	3.3	4.5	4.5	5.7
Weight without brake	m	<i>kg</i>	3.9	5.2	6.5	6.5	7.8
Axial load	F_A	<i>N</i>	113	124	131	131	135
Radial load	F_R	<i>N</i>	595	653	689	689	713

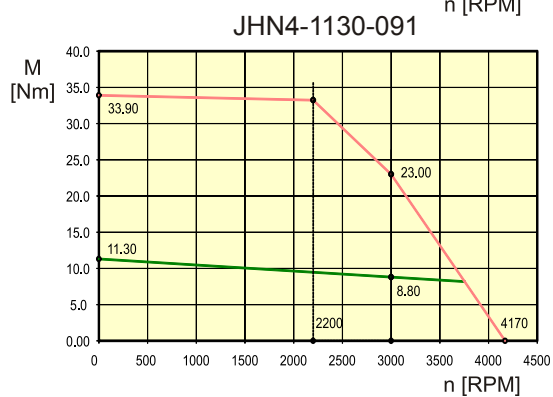
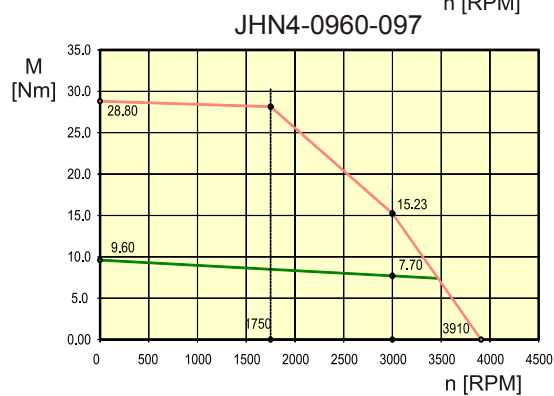
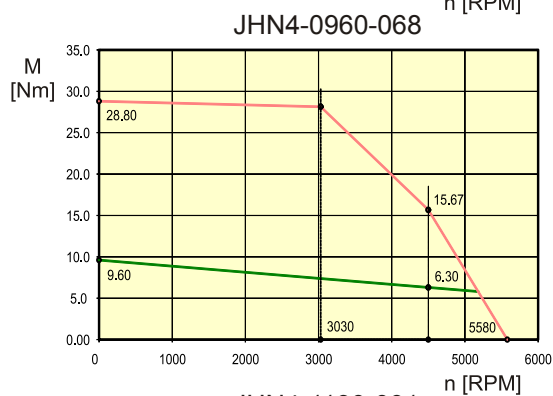
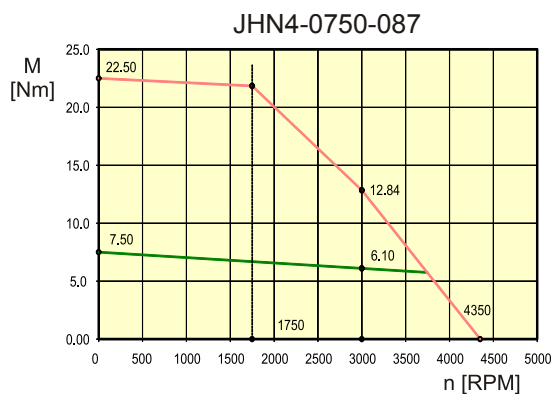
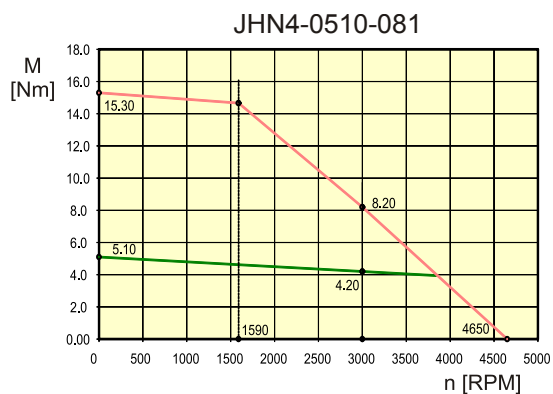
JHN4 - Torque-speed characteristic curves

DC link voltage DC 320 V



5 Servo motors of the JHN series

DC link voltage DC 560 V



5.4 Motor type JHN5 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JHN5
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

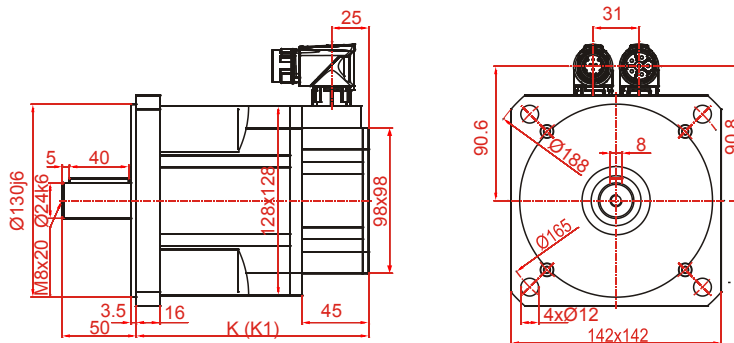
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Frame size - JHN5

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JHN5 motor equipped with a resolver.



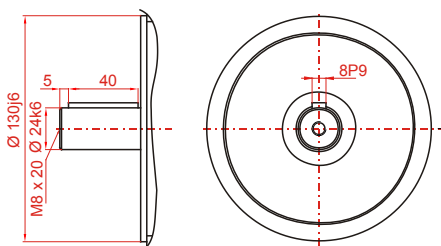
Motor type	JHN5-1200	JHN5-1600	JHN5-2000	JHN5-2400
K (without brake)	157	187	217	247
K1 (with brake)	193	223	253	283

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JHN5 motors can be supplied with a keyway/feather key 7x8x40 to DIN 6885-A.



JHN5 - General technical data

Type of connections

Motor type JHN5 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHN5 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JHN5 - Specific technical data (DC link voltage DC 320 V)

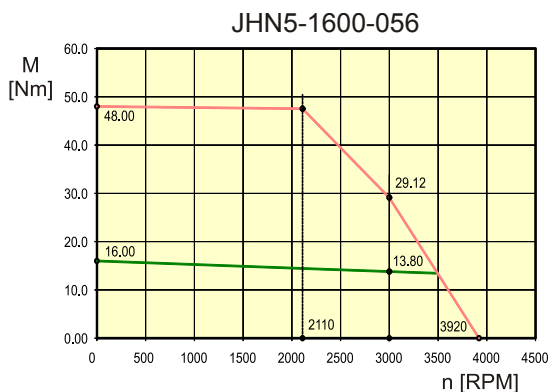
Motor type	JHN5-1600-056		
Motor data			
Continuous stall torque	M_o	<i>Nm</i>	16.0
Continuous stall current	I_o	<i>A</i>	17.3
Back EMF constant	K_E	<i>V/kRPM</i>	56.0
Torque constant	K_T	<i>Nm/A</i>	0.93
Winding resistance - Phase to phase	R_{Ph}	Ω	0.30
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	2.5
Electr. time constant	T_{el}	<i>ms</i>	8.3
Mech. time constant	T_{mech}	<i>ms</i>	0.70
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	55
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	40
Number of motor poles	p_{mot}	-	10
Rated data			
Rated torque	M_n	<i>Nm</i>	13.8
Rated speed	n_n	<i>rpm</i>	3,000
Continuous rated current	I_n	<i>A</i>	17.0
Maximum values			
Max. torque	M_{max}	<i>Nm</i>	48
Max. current	I_{max}	<i>A</i>	61
Max. speed	n_{max}	<i>rpm</i>	9,000
Mechanical parameters			
Rotor inertia	J	<i>kg*cm²</i>	11.5
Weight without brake	m	<i>kg</i>	9.5
Axial load	F_A	<i>N</i>	136
Radial load	F_R	<i>N</i>	713

JHN5 - Specific technical data (DC link voltage DC 560 V)

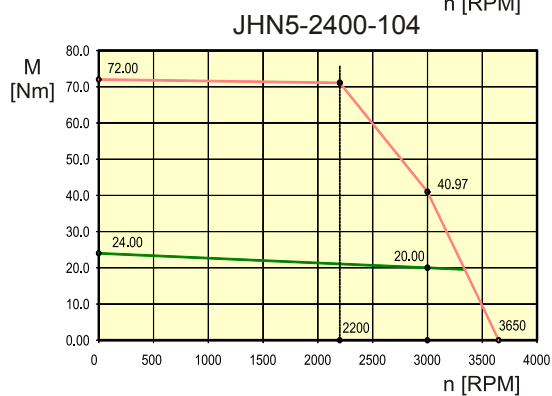
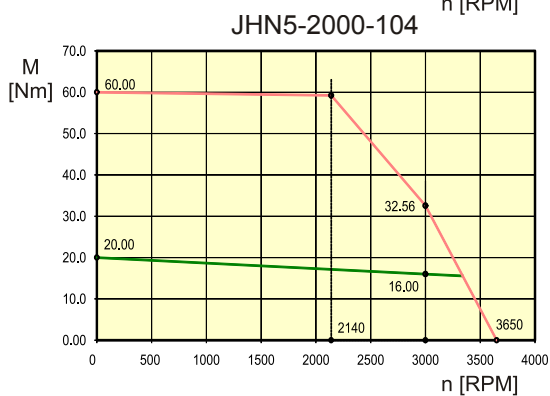
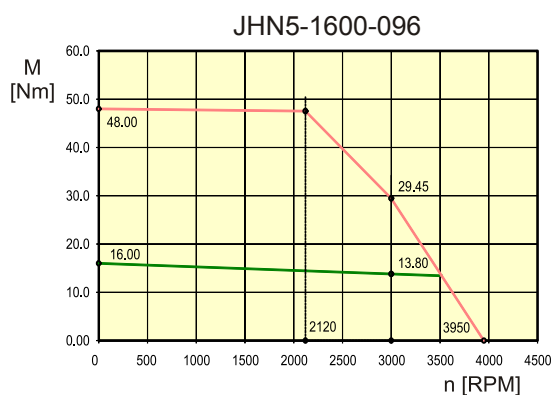
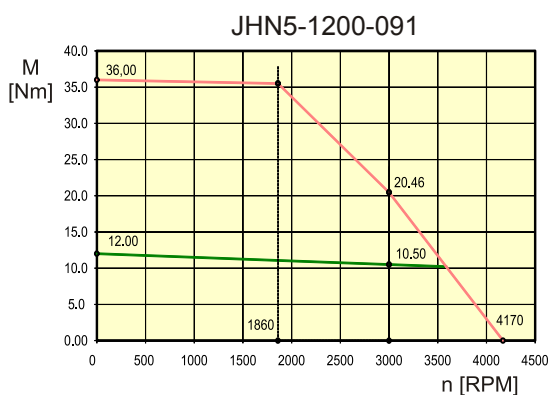
Motor type			JHN5- 1200- 091	JHN5- 1600- 096	JHN5- 2000- 104	JHN5- 2400- 104
Motor data						
Continuous stall torque	M_o	<i>Nm</i>	12.0	16.0	20.0	24.0
Continuous stall current	I_o	<i>A</i>	8.0	10.1	11.6	14.0
Back EMF constant	K_E	<i>V/kRPM</i>	91.0	96.0	104.0	104.0
Torque constant	K_T	<i>Nm/A</i>	1.51	1.59	1.72	1.72
Winding resistance - Phase to phase	R_{Ph}	Ω	1.33	0.88	0.72	0.56
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	10.9	7.5	6.3	5.0
Electr. time constant	T_{el}	<i>ms</i>	8.2	8.5	8.8	8.9
Mech. time constant	T_{mech}	<i>ms</i>	0.80	0.70	0.64	0.61
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	45	55	65	75
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	40	40	40	40
Number of motor poles	p_{mot}	-	10	10	10	10
Rated data						
Rated torque	M_n	<i>Nm</i>	10.5	13.8	16.0	20.0
Rated speed	n_n	<i>rpm</i>	3,000	3,000	3,000	3,000
Continuous rated current	I_n	<i>A</i>	8.3	9.9	11.5	14.4
Maximum values						
Max. torque	M_{max}	<i>Nm</i>	36	48	60	72
Max. current	I_{max}	<i>A</i>	29	36	40	48
Max. speed	n_{max}	<i>rpm</i>	9,000	9,000	9,000	9,000
Mechanical parameters						
Rotor inertia	J	<i>kg*cm²</i>	7.9	11.5	15.1	18.7
Weight without brake	m	<i>kg</i>	7.4	9.5	11.6	13.7
Axial load	F_A	<i>N</i>	126	136	142	146
Radial load	F_R	<i>N</i>	665	713	746	770

JHN5 - Torque-speed characteristic curves

DC link voltage DC 320 V



DC link voltage DC 560 V



5.5 Motor type JHN6 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JHN6
- Connector types
- Technical data of the brake

Options

We supply further options of the motor type on request.

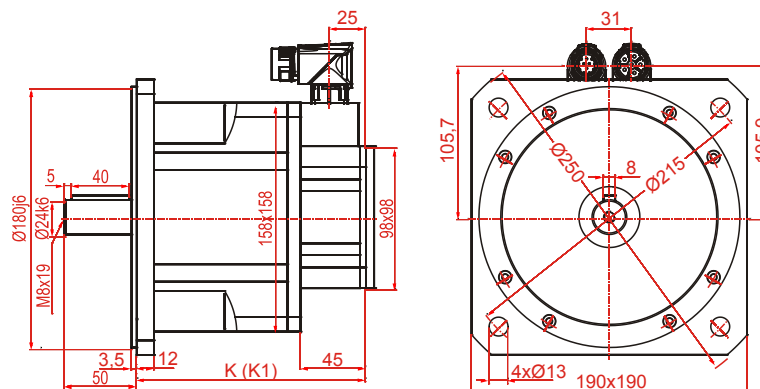
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JHN6 - Frame size

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JHN6 motor equipped with a resolver.



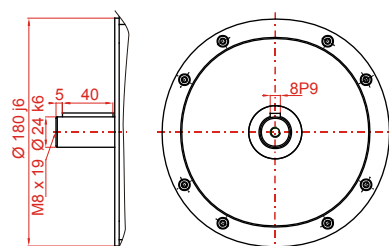
Motor type	JHN6-180 0	JHN6-240 0	JHN6-300 0	JHN6-380 0	JHN6-440 0
K (without brake)	158	183	208	233	258
K1 (with brake)	222	247	272	297	322

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JHN6 motors can be supplied with a keyway/feather key 7x8x40 to DIN 6885-A.



JHN6 - General technical data

Type of connections

Motor type JHN6 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHN6 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

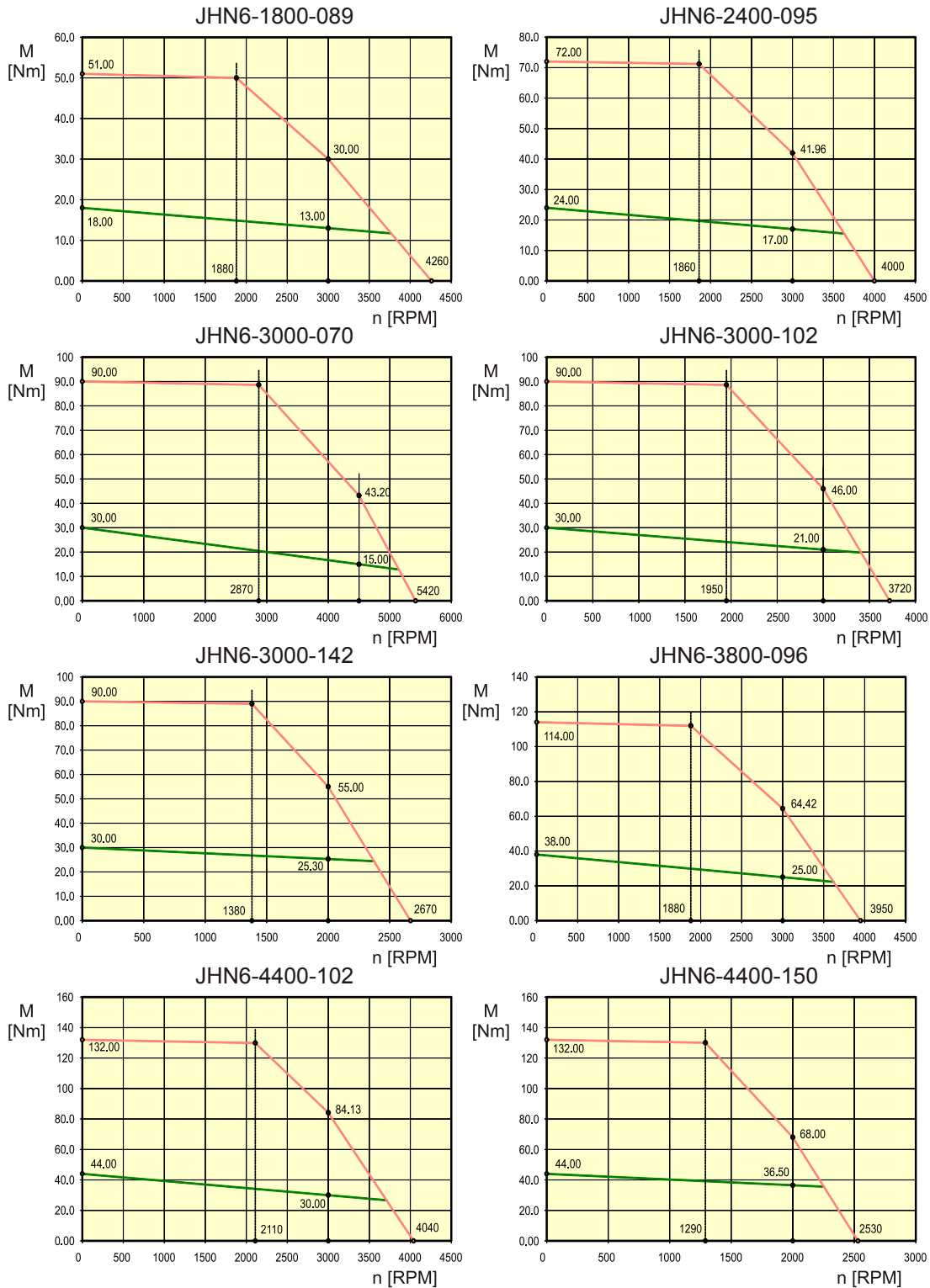
Technical specifications	Value		
Holding torque	M_{BR}	Nm	36
Supply voltage	U_{BR}	V	DC 24 V (-10 % to +6 %)
Rated power	P_{BR}	W	26
Rotor inertia	J_{BR}	$kg \cdot cm^2$	5.56
Weight	m_{BR}	kg	2.86

JHN6 - Specific technical data (DC link voltage DC 560 V)

Motor type			JHN6-1800-089	JHN6-2400-095	JHN6-3000-070	JHN6-3000-102	JHN6-3000-142	JHN6-3800-096	JHN6-4400-102	JHN6-4400-150
Motor data										
Continuous stall torque	M_o	<i>Nm</i>	18.0	24.0	30.0	30.0	30.0	38.0	44.0	44.0
Continuous stall current	I_o	<i>A</i>	12.2	15.3	25.9	17.8	12.8	23.9	28.3	17.7
Back EMF constant	K_E	<i>V/kRPM</i>	89.0	95.0	70.0	102.0	142.0	96.0	94.0	150.0
Torque constant	K_T	<i>Nm/A</i>	1.47	1.57	1.16	1.69	2.4	1.59	1.55	2.5
Winding resistance - Phase to phase	R_{Ph}	Ω	0.62	0.41	0.16	0.33	0.63	0.25	0.19	0.49
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	7.2	5.5	2.2	4.7	9.2	3.5	2.8	7.0
Electr. time constant	T_{el}	<i>ms</i>	11.6	13.4	13.9	14.2	14.5	14.0	14.7	14.4
Mech. time constant	T_{mech}	<i>ms</i>	0.92	0.74	0.68	0.66	0.65	0.69	0.64	0.65
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	42	47	52	52	52	57	62	62
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	90	90	90	90	90	90	90	90
Number of motor poles	p_{mot}	-	10	10	10	10	10	10	10	10
Rated data										
Rated torque	M_n	<i>Nm</i>	13.0	17.0	15.0	21.0	25.3	25.0	30.0	36.5
Rated speed	n_n	<i>rpm</i>	3,000	3,000	4,500	3,000	2,000	3,000	3,000	2,000
Continuous rated current	I_n	<i>A</i>	11.0	13.8	19.4	16.2	12.9	19.7	24.4	17.3
Maximum values										
Max. torque	M_{max}	<i>Nm</i>	51	72	90	90	90	114	132	132
Max. current	I_{max}	<i>A</i>	45	60	93	64	46	93	102	64
Max. speed	n_{max}	<i>rpm</i>	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Mechanical parameters										
Rotor inertia	J	<i>kg*cm²</i>	18.5	26	33	33	33	40	47	47
Weight without brake	m	<i>kg</i>	10.1	12.8	15.5	15.5	15.5	18.3	21	21
Axial load	F_A	<i>N</i>	121	130	136	136	136	141	145	145
Radial load	F_R	<i>N</i>	637	684	717	717	717	741	761	761

JHN6 - Torque-speed characteristic curves

DC link voltage DC 560 V



5.6 Motor type JHN7 - Properties

Introduction

Contents of this chapter:

- Physical dimensions and technical data of motor type JHN7
 - Connector types
 - Technical data of the brake
-

Options

We supply further options of the motor type on request.

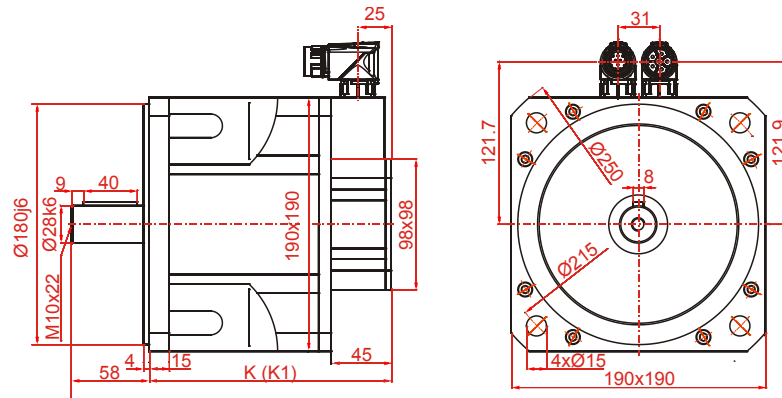
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Frame size - JHN7

Physical dimensions of the motor with resolver

The following illustration shows the dimensions of a JHN7 motor equipped with a resolver.



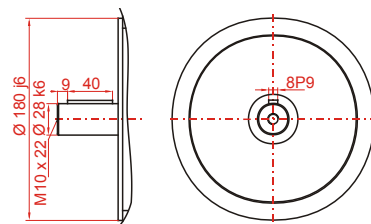
Motor type	JHN7-300 0-111	JHN7-400 0-092	JHN7-500 0-133	JHN7-500 0-096	JHN7-600 0-121
K (without brake)	181	211	241	241	271
K1 (with brake)	240	270	300	300	330

Physical dimensions of the motor with HIPERFACE

You can download the physical dimensions of the motor with HIPERFACE from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Keyway/feather key

As an option, JHN7 motors can be supplied with a keyway/feather key 3x3x18 to DIN 6885-A.



JHN7 - General technical data

Type of connections

Motor type JHN7 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHN7 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and

Motor connector, size 1, in 1-cable technology (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

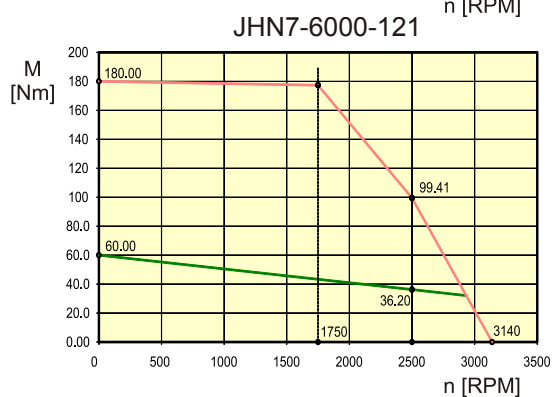
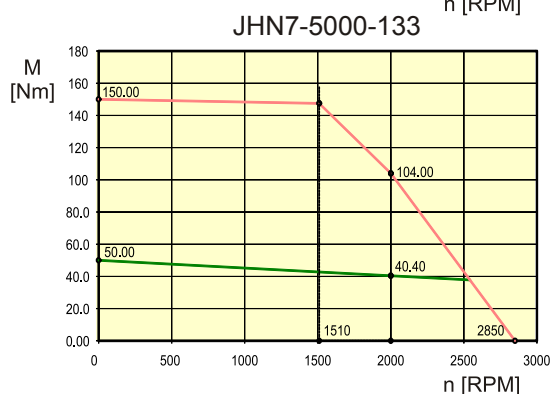
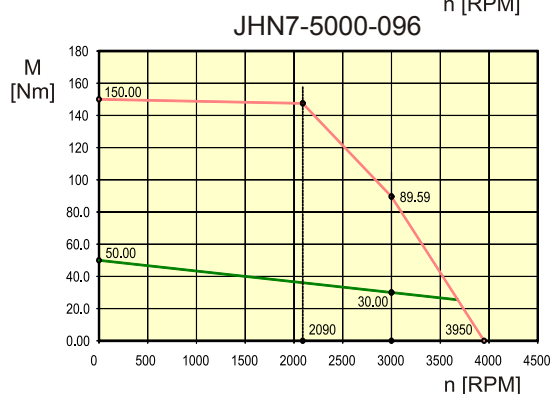
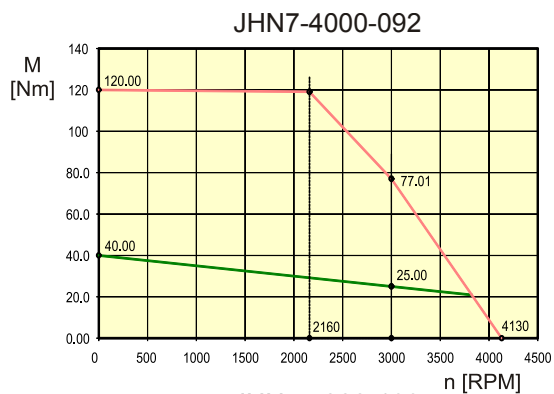
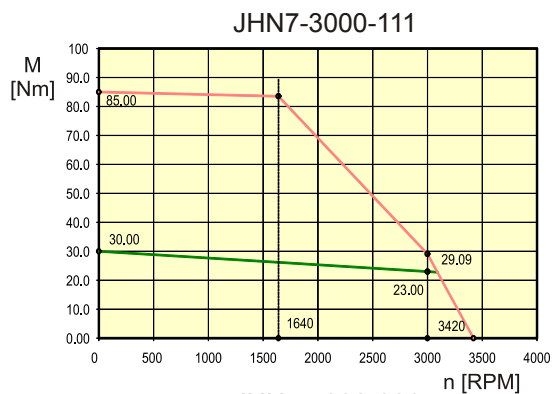
Technical specifications	Value		
Holding torque	MBR	Nm	36
Supply voltage	UBR	V	DC 24 V (-10 % to +6 %)
Rated power	PBR	W	26
Rotor inertia	JBR	kg*cm ²	5.56
Weight	mBR	kg	2.86

JHN7 - Specific technical data (DC link voltage DC 560 V)

Motor type			JHN7- 3000- 111	JHN7- 4000- 092	JHN7- 5000- 096	JHN7- 5000- 133	JHN7- 6000- 121
Motor data							
Continuous stall torque	M_o	<i>Nm</i>	30.0	40.0	50	50	60
Continuous stall current	I_o	<i>A</i>	16.3	26.3	31.5	22.7	30.0
Back EMF constant	K_E	<i>V/kRPM</i>	111.0	92.0	96.0	133.0	121.0
Torque constant	K_T	<i>Nm/A</i>	1.84	1.52	1.59	2.2	2.0
Winding resistance - Phase to phase	R_{Ph}	Ω	0.41	0.17	0.13	0.25	0.16
Winding inductance - Phase to phase	L_{Ph}	<i>mH</i>	6.4	3.1	2.6	4.9	3.3
Electr. time constant	T_{el}	<i>ms</i>	15.6	18.2	20	19.6	21
Mech. time constant	T_{mech}	<i>ms</i>	1.0	0.88	0.79	0.79	0.74
Thermal time constant - Entire motor	T_{ther}	<i>min</i>	80	90	100	100	108
Thermal time constant - Copper winding	T_{ther_CU}	<i>s</i>	100	100	100	100	100
Number of motor poles	p_{mot}	-	10	10	10	10	10
Rated data							
Rated torque	M_n	<i>Nm</i>	23.0	25.0	30.0	40.4	36.2
Rated speed	n_n	<i>rpm</i>	3,000	3,000	3,000	2,000	2,500
Continuous rated current	I_n	<i>A</i>	15.5	20.1	24.4	21.8	20.7
Maximum values							
Max. torque	M_{max}	<i>Nm</i>	85	120	150	150	180
Max. current	I_{max}	<i>A</i>	58	90	109	79	102
Max. speed	n_{max}	<i>rpm</i>	6,000	6,000	6,000	6,000	6,000
Mechanical parameters							
Rotor inertia	J	<i>kg*cm²</i>	50	69	88	88	107
Weight without brake	m	<i>kg</i>	16.5	22	27	27	32
Axial load	F_A	<i>N</i>	231	245	256	256	264
Radial load	F_R	<i>N</i>	1214	1291	1346	1346	1388

JHN7 - Torque-speed characteristic curves

DC link voltage DC 560 V



6 Servo motors of the JHQ series

Introduction

This chapter covers the following topics:

- General technical data
- Rated data - Resolver
- Standard and optional configurations
- Example: Nameplate of a JHQ motor
- Available encoder types for JHQ motors
- Frame sizes, torque-speed characteristic curves
- Motor brakes of frame size 2 through 8 - Properties

General technical data

General technical data on JHQ motors are listed below:

Type of data	Value
Design	B5, V1, V3
Coating	Matt black to RAL 9005 (no stability to solvents, such as Trilene, thinners, etc.)
Ball bearing service life	> 20,000 operating hours
Flange	Flange size to IEC standard, fit j6, accuracy to DIN 42955 Tolerance class: N, option R
Degree of protection	IP65 Degree of protection IP64 for JHQ2, drive end
Insulation class	F acc. to VDE 0350
Cooling	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	KTY83-110

Rated data - Resolver

The rated resolver data for JHQ motors are listed below:

Type of data	Value
Input voltage	7 V
Input frequency	10 kHz
Number of poles	2
Speed ratio	0.5
Accuracy	+10 arcmin

6 Servo motors of the JHQ series

Standard configuration

The standard motor configuration includes the following features:

- KTY83-110
- No brake
- Plain shaft
- Two swivel-mounted flange sockets for power and signal
- Resolver
- Runout tolerance = N
- Without shaft seal
- Degree of protection IP65
- Degree of protection IP64 for JHQ2, drive end

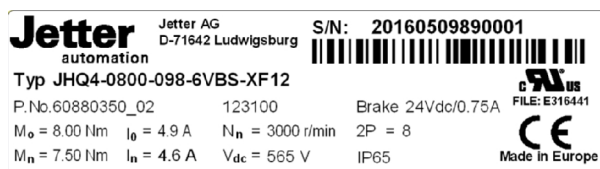
Other than it is the case with JL, JH, JK and JHN motors, the default connector configuration of JHQ motors is angled and rotatory (option S-X). The pinout of the JHQ motor and encoder connectors is identical with the connector pinout of the other motors.

As to hole circle, centering and shaft, all motors are compatible. For flange measurements, please turn to the beginning of the document at **Motor types - Overview** (see page 14) in **Jetter motor series JL, JK, JH, JHN and JHQ - Flange and shaft measurements**.

Options

We supply further options of the motor type on request.

Example: Nameplate of a JHQ motor



Nameplate - JHQ motor of flange size 4, 8 Nm

Encoder options for individual flange sizes of JHQ motors

Encoder type		JHQ2/ JHQ23	JHQ3	JHQ4/ JHQ45	JHQ5	JHQ6/ JHQ7	JHQ8
Resolver	size 15	ok	ok	ok	ok	ok	ok
F11/F12	SEK/ SEL37	ok	ok	No	No	No	No
F11/F12	SEK/ SEL52	No	No	ok	ok	ok	ok
F13/F14	SKS/ SKM36	ok	ok	ok	ok	ok	ok
F15/F16	SRS/ SRM50	No	No	ok	ok	ok	ok
F17/F18	EES EEM34	For JHN and JHQ in preparation					
F17/F18	EES/ EEM37						
F17/F18	EES/ EEM52						
F19/F20	EKS/ EKM36						

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JHQ2-JHQ8 - Frame size, specific technical data and characteristic curves

Frame size You can download the CAD data of the servo motors from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

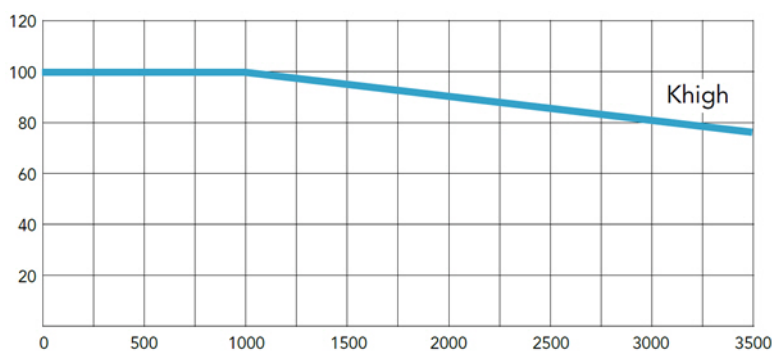
Specific technical data You can download the specific technical data of the servo motors, such as motor data, rated data, peak values and mechanical measures from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Torque-speed characteristic curves You can download the torque-speed characteristic curves from the Jetter AG **Homepage** <http://www.jetter.de> in the *Downloads* area of the respective product.

Derating **Derating, depending on the altitude above sea level**

y-axis: Supported torque in % of the set torque

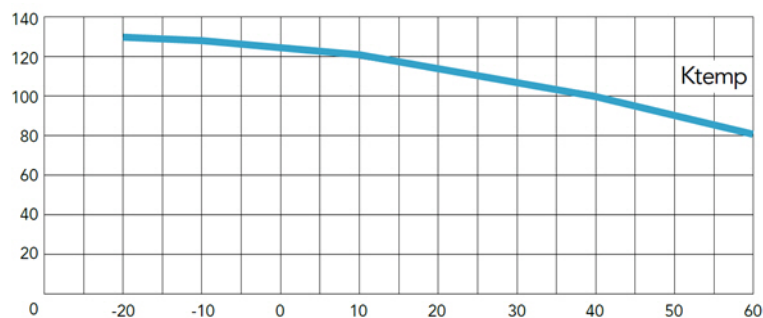
x-axis: Altitude above sea level



Derating, depending on the ambient temperature

y-axis: Supported torque in % of the set torque

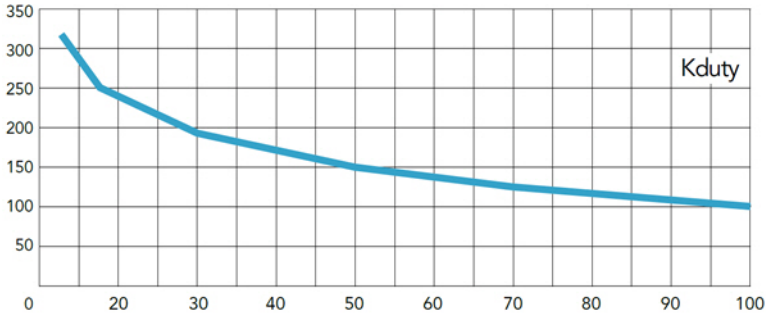
x-axis: Ambient temperature



Derating, depending on the duty cycle

y-axis: Supported torque in % of the set torque

x-axis: Duty cycle in %



JHQ2 - General technical data

Type of connections

Motor type JHQ2 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHQ2 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JHQ23 - General technical data

Type of connections

Motor type JHQ23 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHQ23 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JHQ3 - General technical data

Type of connections

Motor type JHQ3 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHQ3 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JHQ4 - General technical data

Type of connections

Motor type JHQ4 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHQ4 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JHQ45 - General technical data

Type of connections

Motor type JHQ45 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHQ45 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JHQ5 - General technical data

Type of connections

Motor type JHQ5 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHQ5 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

JHQ5-2900 - General technical data

Type of connections

Motor type JHQ5-2900 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHQ5-2900 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

The technical data of the brake for motor type JHQ5-2900 are listed below:

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

JHQ6 - General technical data

Type of connections

Motor type JHQ6 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHQ6 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

The technical data of the brake for motor type JHQ6 are listed below:

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

JHQ7 - General technical data

Type of connections

Motor type JHQ7 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1, in 2-cable technology - Pin assignment** (see page 186) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHQ7 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and **Motor connector, size 1, in 1-cable technology** (see page 190).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

The technical data of the brake for motor type JHQ7 are listed below:

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

JHQ8 - General technical data

Type of connections

Motor type JHQ8 is connected to power by the power connector (2-cable technology), respectively by the motor connector (1-cable technology), see **Power connector, size 1.5, in 2-cable technology - Pin assignment** (see page 187) and **Motor connector, size 1.5, in 1-cable technology** (see page 191).

For connection to the servo amplifier prefabricated power supply cables are available.

Motor type JHQ8 is connected to the encoder by the encoder connector, see **Encoder connector, size 1, in 2-cable technology - Pin assignment** (see page 188) and **Motor connector, size 1.5, in 1-cable technology** (see page 191).

For connection to the servo amplifier prefabricated resolver and HIPERFACE cables are available.

Brake (option)

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

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

7 Pinout of the power connector in 2-cable technology

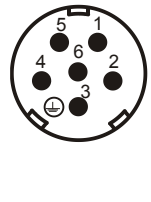

This chapter describes the pinout of the power connectors, size 1 and size 1.5, and the pinout of the encoder connector, size 1 in 2-cable technology.

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Pinout of the power connector, size 1, in 2-cable technology

Motor winding and brake The following table shows the pinout of the power connector, size 1 (M23 x 1). This illustration shows the pinout of the male connector.

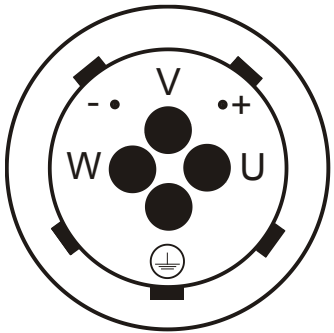

View	Pin	Signal	Remarks	
	1	Phase 1		
	5	Phase 2		
	2	Phase 3		
			PE conductor	
	6	Brake +		
	4	Brake -		

Mating connector You can order the respective mating connector from Jetter AG.
The motor mating connector of the internal thread M23 x 1 goes with the following motor types:
JL2 to JL4, JL5 with option C1, JK4 to JK6, JH2 to JH5, JHN2 to JHN7, JHQ2 to JHQ7

Pinout of the power connector, size 1.5, in 2-cable technology

Motor winding and brake

The following table shows the pinout of the power connector, size 1.5 (M40 x 1.5). This illustration shows the pinout of the male connector.

View	Pin	Signal	Remarks
	U	Phase 1	
	V	Phase 2	
	W	Phase 3	
		PE conductor	
	+	Brake +	
	-	Brake -	

Mating connector

You can order the respective mating connector from Jetter AG.


The motor mating connector of the internal thread M40 x 1.5 goes with the following motor types:

JL5 to JL8, JHQ8

Pinout of the encoder connector, size 1, in 2-cable technology


Resolver connection

The following table shows the assignment of an encoder connector size 1 (M23 x 1) for a motor equipped with a resolver. This illustration shows the pinout of the male connector.

View	Pin	Signal	Remarks
	1	S1 (cosine +)	
	2	S3 (cosine -)	
	3	S4 (sine -)	
	4	S2 (sine +)	
	5	R1R (exciter winding +)	
	6	R2L (exciter winding -)	
	7	Th1 (thermal sensor)	
	8	Th2 (thermal sensor)	
	9 - 12	Unassigned	

HIPERFACE connection

The following table shows the assignment of an encoder connector size 1 (M23 x 1) for a motor equipped with HIPERFACE. This illustration shows the pinout of the male connector.

View	Pin	Signal	Remarks
	1 - 2	Unassigned	
	3	Sine +	
	4	Reference sine	
	5	Cosine +	
	6	Reference cosine	
	7	DATA - (RS-485)	
	8	DATA + (RS-485)	
	9	0 V	
	10	Power supply (7 through 12 V)	
	11	Thermal sensor +	
	12	Thermal sensor -	Connect to pin 9

Mating connector

You can order the respective mating connector of the internal thread M23 x 1 from Jetter AG.

This mating connector goes with all motor types.

8 Pinout of the motor connector in 1-cable technology



- Apply 1-cable technology ONLY with servo amplifiers which are also able to read out HIPERFACE-DSL encoders. These may be, for example, JM-1000 or JM-3000 with the option TD in the servo amplifier.
- If 1-cable technology is applied, the motor temperature sensor will already been connected with the HDSL encoder by the motor manufacturer.

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Pinout of the motor connector, size 1, in 1-cable technology

Connection - Motor winding, brake, and encoder

The following table shows the pinout of the motor connector, size 1 (M23 x 1). This illustration shows the pinout of the male connector.

View	Pin	Signal	Remarks
	A	Phase 1	
	B	Phase 2	
	C	Phase 3	
	(D)	PE conductor	
	G	Brake +	
	F	Brake -	
	E	DSL+	
	H	DSL-	
	L	DSL - Shielding	<p>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.</p>
		Enclosure	Place the all-over shielding and the brake shielding on the connector housing.

Mating connector

You can order the respective mating connector from Jetter AG.

The mating connector of the internal thread M23 x 1 goes with the following motor types:

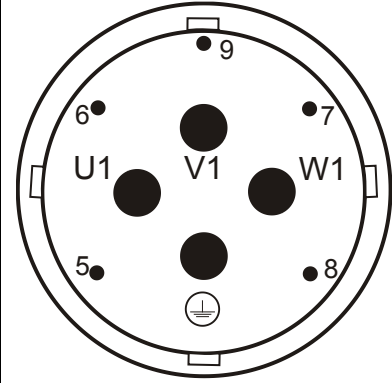

- JHN2 through JHN7
- JHQ2 through JHQ7

Pinout of the motor connector, size 1.5, in 1-cable technology

**Connection -
Motor winding, brake,
and encoder**

The motor connector in 1-cable technology consists of a 2-wire connection and a supply connection of the encoder.

The following table shows the assignment of motor connector, size 1.5 (M40 x 1.5). It belongs to motor type JHQ8. This illustration shows the pinout of the male connector.

View	Pin	Signal	Remarks
	U1	Phase 1	
	V1	Phase 2	
	W1	Phase 3	
	PE	PE conductor	
	6	Brake +	
	5	Brake -	
	7	DSL+	
	8	DSL-	
	9	DSL - Shielding	 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.
		Enclosure	Place the all-over shielding and the brake shielding on the connector housing.

Mating connector

You can order the respective mating connector from Jetter AG.

The mating connector of the internal thread M40 x 1.5 goes with the following motor types:

- JHQ8

9 Definitions of terms and calculation formulas

Introduction

This chapter contains definitions of terms and describes the formulas for calculating spindle drives, rack-and-pinion drives and belt drives.

Note:

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

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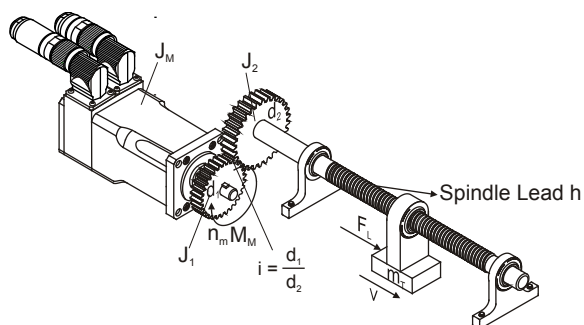
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Definitions of terms

Continuous stall torque M [Nm]	Thermal limit torque which can be output for any length of time at standstill of the motor ($n = 0$ RPM) and the set ambient conditions.
Rated torque M_n [Nm]	When the motor is drawing its rated current at its rated speed of n_n , it can produce the rated torque for an unlimited time in operating mode S1.
Continuous stall current I_o [A]	The amount of RMS current required to develop continuous stall torque M_o . This parameter refers to the sine-effective current value.
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_{ma} [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 min⁻¹]	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 [kgcm²]	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.

Formulas for spindle drive calculations

Schematic of a spindle drive

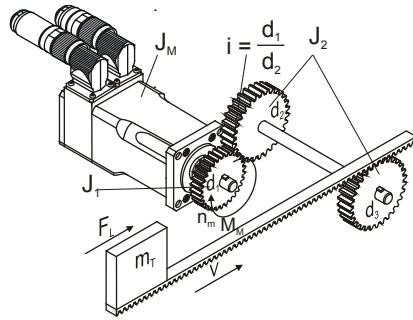


Formulas

Motor speed	$n_m = (v \times 6 \times 10^4) / (h \times i)$	[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]
For steel the following formula is to be used:	$J_R = 7.7 \times d^4 \times l \times 10^{-13}$	[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 $M_B = f(n_M)$	$M_B = (2 \times \pi \times n_M \times J) / (60 \times t_B) = (n_M \times J) / (9.55 \times t_B)$	[Nm]
Acceleration or deceleration torque $M_B = f(s_M)$	$M_B = (4 \times \pi \times s_B \times J) / (h \times i \times t_B^2)$	[Nm]
Acceleration or deceleration time $t_B = f(n_M)$	$t_B = (2 \times \pi \times n_M \times J) / (60 \times M_B) = (n_M \times J) / (9.55 \times M_B)$	[s]
Acceleration or deceleration time $t_B = f(s_B)$	$t_B = \sqrt{(4 \times \pi \times s_B \times J) / (h \times i \times M_B)}$	[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]

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

Schematic of a rack-and-pinion drive



Formulas

Motor speed	$n_m = (v \times 6 \times 10^4) / (\pi \times d_3 \times i)$	[RPM]
Load torque	$M_L = d_3 \times i \times (F_L / 2,000)$	[Nm]
Translatory mass moment of inertia	$J_T = m_T \times (d_3 / (2 \times \pi))^2 \times 10^{-6}$	[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]
For steel the following formula is to be used:	$J_R = 7.7 \times d^4 \times l \times 10^{-13}$	[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 $M_B = f(n_M)$	$M_B = (2 \times \pi \times n_M \times J) / (60 \times t_B) = (n_M \times J) / (9.55 \times t_B)$	[Nm]
Acceleration or deceleration torque $M_B = f(s_M)$	$M_B = (4 \times s_B \times J) / (d_3 \times i \times t_B^2)$	[Nm]
Acceleration or deceleration time $t_B = f(n_M)$	$t_B = (2 \times \pi \times n_M \times J) / (60 \times M_B) = (n_M \times J) / (9.55 \times M_B)$	[s]
Acceleration or deceleration time $t_B = f(s_B)$	$t_B = \sqrt{(4 \times s_B \times J) / (d_3 \times i \times M_B)}$	[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]

Legend

Legend

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

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.

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