



Installation Manual

JHN, JHQ and JL - Servo Motors

60881738

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Reference to products

This Installation Manual is an integral part of the JHN, JHQ and JL servo motors:

Type: _____

Serial #: _____

Year of manufacture: _____

Order #: _____



To be entered by the customer:

Inventory #: _____

Place of operation: _____

Hazard levels

Introduction

This topic describes the safety labels and hazard levels used in this manual.

Safety labels



Signs using this symbol are to warn you of injuries or even death. Follow the instructions given in the corresponding topic to prevent hazards.

Hazard levels

Safety information is classified into the following hazard levels:




Hazard level	Consequences	Probability
 DANGER	Death/severe injury (irreversible)	The hazard is imminent.
 WARNING	Death/severe injury (irreversible)	Potential occurrence
 CAUTION	Slight injury (reversible)	Potential occurrence
NOTICE	Material damage	Potential occurrence

Table of Contents

- Hazard levels4
- Introduction7
- Basic safety instructions9
- Residual dangers and protective measures - Motors11
- Scope of delivery.....14
- Nameplate, identification.....15
- Place of installation, ambient conditions19
- Mechanical installation21
- Electrical Installation - Hazards.....25
- Connections - New terminology, important notes on motor connections and wiring28
- Electrical installation - Wiring description for 2-cable technology30
- Electrical installation - Wiring description for 1-cable technology37
- Instructions on EMC.....40
- Overview: Product-specific documentation related to Jetter AG motion systems41
- Overview: General product documentation and tools42

Introduction

Introduction

This document is part of the product documentation describing Jetter drive technology and must be read and understood before using the motor. It contains important and safety-relevant information to install and operate the motor properly and in accordance with its intended use. It also contains type designations for synchronous servo motors by Jetter AG.

Target groups

This document is intended for specialists with appropriate qualifications. The device may only be installed and commissioned by trained and qualified personnel who will observe the standards DIN EN 50110-1 and DIN IEC 60364 in their work.

During the whole product life cycle, safe handling and operation of the device must be ensured.

In the case of missing or inadequate technical knowledge or knowledge of this document any liability is excluded.

Availability of information

Make sure this document is kept at the ready in the vicinity of the product throughout its service life.

For information on new revisions of this document, visit the download area on our website.

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<https://www.jetter.de/en/downloads.html>

This document is not subject to any updating service.

An overview of Jetter Drive Technology related product documentation and where to find it is described in this document, see **Overview of Jetter Drive Technology Product Documentation** (see page 41)

An overview of cross-product documentation and tools and where to find them is described in this document, see **Overview of Cross-Product Documentation and Tools** (see page 42).

Kundendienst

Bei Fragen, Anregungen oder Problemen stehen Ihnen die Experten unseres Kundendienstes zur Verfügung. Diese können Sie telefonisch über unsere Technische Hotline oder über unser Kontaktformular auf unserer Homepage erreichen.

Technical hotline | Jetter - We automate your success
<https://www.jetter.de/en/contact-us/hotline.html>

Oder schreiben Sie eine E-Mail an die Technische Hotline:

hotline@jetter.de <mailto:hotline@jetter.de>

Warranty information

Your product has left our factory fully tested and ready to use.
The information on the nameplate applies to rated operating conditions.
Warranty claims only apply to Jetter AG products.
Any warranty claims for a complete system in combination with third-party products are excluded.

Repairs shall only be carried out by the manufacturer.
Warranty claims become void if the device is opened or if modifications are made.

The following actions will void the warranty:

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

Storage and shipment

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

For protection against impacts and shocks, transport must take place in the original packaging. In case of damaged packaging inspect the device for any visible damage, and immediately inform your freight forwarder and Jetter AG of the damage caused during shipment.

In case of damage or after a fall, do not commission the motor.

Basic safety instructions

General information

At the time of placing on the market, this product corresponds to the current state of the art and meets the recognized safety rules.

Besides this user manual, laws and regulations in the operator's country are relevant to the operation of the product. The operator is responsible for complying with the obligations laid down therein.

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

Intended use

The servo motors are intended for industrial or commercial applications.

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

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

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

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

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

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

The servomotors may only be put into operation after the EMC installation of the complete system.


Usage other than intended

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

JHN, JHQ and JL servo motors are no safety-related parts as per Machinery Directive 2006/42/EC. The motors do not provide safety-related features. When used in safety functions, a higher-level safety system is required and an additional monitoring and protective device must be provided in accordance with the applicable safety regulations.

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



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



NOTICE	
	<p>Destruction of the servomotor!</p> <p>The servomotor is not intended for direct connection to the three-phase mains. Direct connection to the mains will result in its destruction.</p> <p>➤ They have explicitly been designed for being torque, speed, and/or position controlled by specific servo amplifiers, such as the JetMove series by Jetter AG.</p>



Residual dangers and protective measures - Motors




Residual dangers



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



	 DANGER
	<p>Hazard caused by high operating voltage! Extremely hazardous voltages of up to DC 900 V may occur!</p> <p>The high operating voltage may cause muscle cramps, burns, unconsciousness, respiratory standstill, or death.</p> <ul style="list-style-type: none">➤ Do not remove any cover plates and keep all control cabinet doors closed during operation.➤ Check all live parts for protection by an electrical barrier.➤ Do not open the device.➤ While the device is in operation, do not touch the following terminals: Power supply, motor voltage and DC link voltage.



	 DANGER
	<p>Danger in potentially explosive atmospheres! Do not disconnect any plugs during operation!</p> <p>The drive can become an ignition source in potentially explosive areas if you disconnect the control or power plugs of the drive during operation.</p> <ul style="list-style-type: none">➤ Never pull the motor connector while the motor is energized.➤ Do not disconnect any connectors on the servo amplifier and the control unit while higher currents are flowing.

	 DANGER
	<p>Danger in potentially explosive atmospheres! Motor power limitations!</p> <p>The motor can become an ignition source in potentially explosive areas if the following instructions are not followed during operation.</p> <ul style="list-style-type: none">➤ Limit electrical disturbances and vibrations by fine-tuning the control parameters.➤ The maximum speed must never be exceeded.➤ The RMS value of the rated current must not exceed the specifications on the nameplate.➤ For a rated speed close to 0, the RMS value for rated current indicated on the nameplate must be halved.

 	 DANGER
	<p>Danger for persons with pacemakers and implants! Operational electromagnetic fields caused by the drive!</p> <p>Electric, magnetic and electromagnetic fields pose a particular hazard to people with pacemakers, implants or similar devices.</p> <ul style="list-style-type: none">➤ You must not be in the immediate vicinity of the drive if you belong to the above group of persons.

	 WARNING
	<p>Warning of unguarded moving machine parts!</p> <p>The drive shaft of the motor moves mechanical parts, some of which have sharp edges. You could get caught in the rotating drive shaft and incur crushes and cuts.</p> <ul style="list-style-type: none"> ➤ Never touch a rotating drive shaft. ➤ Wear tight-fitting clothing only. ➤ Do not wear gloves. ➤ Monitoring and protective devices in accordance with the applicable safety regulations must be provided. ➤ Before working on the motor, disconnect it from the power supply and make sure that the motor cannot move. ➤ Make sure that there will be no danger to persons or damage to property even if the drive starts moving unintentionally.

	 WARNING
	<p>Warning of a feather key coming loose!</p> <p>Some motor shafts come with a feather key. If such a shaft is not equipped with a power output element (e.g. gearwheel, sprocket, pulley), the feather key can come loose when the shaft is spinning.</p> <ul style="list-style-type: none"> ➤ Mount a power output element or the yellow or black protective bracket for the feather key which comes with new motors before operating a motor. ➤ Wear goggles.



	 WARNING
	<p>Warning of falling loads!</p> <p>Hanging loads can fall because the holding brakes installed in the motor are not functionally safe. If the load hits you, you may be injured or killed.</p> <ul style="list-style-type: none"> ➤ Functional safety can only be achieved with an additional external mechanical brake.

Scope of delivery

Scope of delivery

When ordering a motor/gearbox combination, the motor is delivered with mounted gearbox. Motors with feather keys are delivered with the feather key in the keyway of the motor shaft. If only the feather key is mounted (without drive element), the feather key must be covered with the protective cap. To avoid the risk of injury, the key protection cap is an essential part of the scope of delivery. The delivery also includes plastic caps, which are plugged onto the plug connections for protection.

Please notify us if one of the protective caps is not included in the delivery.

	 WARNING
	<p>Warning of a feather key coming loose!</p> <p>Some motor shafts come with a feather key. If such a shaft is not equipped with a power output element (e.g. gearwheel, sprocket, pulley), the feather key can come loose when the shaft is spinning.</p> <ul style="list-style-type: none">➤ Mount a power output element or the yellow or black protective bracket for the feather key which comes with new motors before operating a motor.➤ Wear goggles.

Nameplate, identification

Important information on the nameplate

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

The operating conditions must correspond to the data on the nameplate.

Information for the hotline

The nameplate contains important information about the motor. If you wish to contact the hotline of Jetter AG regarding a motor, please have the following information ready:


- Type designation
- Serial number


Nameplate of JHN and JL motors with UL Certification Mark

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


Jetter

automation





0 1 1 6 0 7 8 5



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


Made in EU
D-71642 Ludwigsburg

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

Icon	Product designation	Value
Type	Product designation	JHN3-0350-050-6RVBP
AN	Item number	60881602_2
24/19	Date of manufacture	Week 24/year 2019
SN	Serial number	1160785
M _o	Continuous stall torque [Nm]	3.5
U _{DC}	Winding supply voltage [VDC]	320/560V
N _n	Rated speed [RPM]	3000
I _n	Rated current [A]	4.31
P _n	Rated power [kW]	0,942
Class	Insulation class	F
IP	Degree of protection	IP65





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

Nameplate, identification

JHN3-0350-050-6RVBP		
3 PH. PM SERVOMOTOR		
Io 4.23A		
Tamb 40°C	Class F SMJ	
VPWM driven		
Brake 24VDC		

Nameplate of JL motors with UL and ATEX approval



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

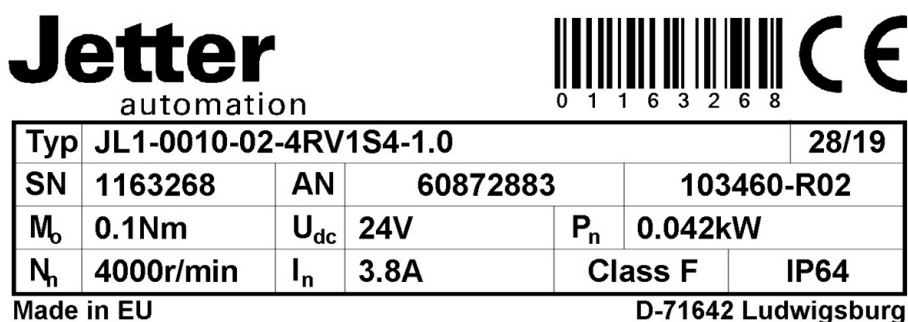
Typ	JL2-0080-25-4RVS-XE1			19/19
SN	1157925	AN	60878007_2	103460-R02
M _b	0.8Nm	U _{dc}	320V	P _n 0.339kW
N _n	4500r/min	I _n	1.76A	Class F IP65

Made in EU D-71642 Ludwigsburg

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

T2-0080-45-320/VUS4E		
3 PH. PM SERVOMOTOR		
Io 1.86A	S1	
Tamb 40°C	Class F SMJ	
VPWM driven min. 8 kHz		
AVEKO Servomotory, s.r.o. CZ-60200 Brno		 II 3GD Ex nA II 155°C Ex tc IIIC 155°C AVEKO 11.0002X

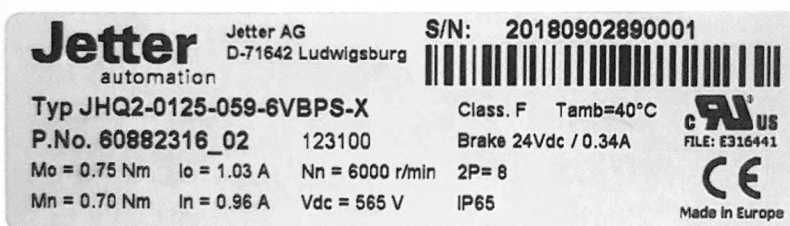
Nameplate of JL1 motors The nameplate is attached to the motor and outer carton of JL1 motors:



The JL1 motor has no UL or ATEX approval.

Nameplate of JHQ motors with UL Certification Mark

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

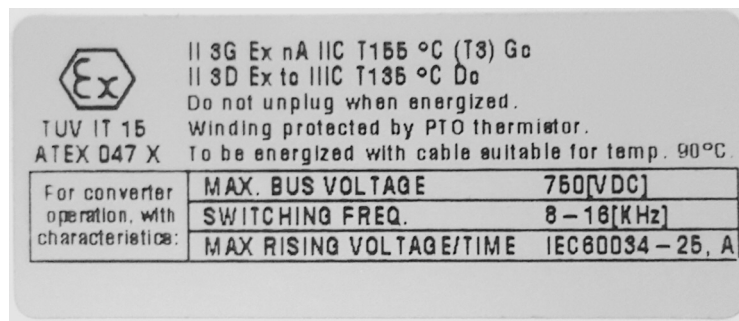


The information on the above nameplate can be broken down as follows:

Icon	Product designation	Value
Type	Product designation	JHQ2-0125-059-6VBPS-X
AN	Item number	60882316_02
S/N	Serial number	20180902890001
M _o	Continuous stall torque [Nm]	0.75
M _n	Rated torque [Nm]	0.70
I _o	Continuous stall current [A]	1.03
I _n	Rated current [A]	3000
N _n	Rated speed [RPM]	3000
V _{DC}	Winding supply voltage [VDC]	565 V
Brake	Brake	DC 24 V 0.34A
2P	Number of motor poles	8
Class	Insulation class	F
Tamb	Ambient temperature	40 °C
IP	Degree of protection	IP65

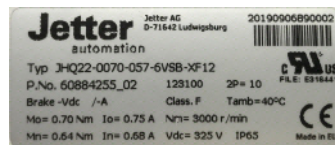
Nameplate, identification

Additional nameplate on JHQ motors with ATEX approval



Nameplate of JHQ22 motors with UL Certification Mark

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



Type designation


For more information on the type designation refer to the type code. A detailed description of this is given in the User Manual of the servo motors.

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<https://www.jetter.de/en/downloads/motion-systems/servo-motors.html>

Place of installation, ambient conditions

Check the servo motor before installation

	NOTICE
	<p>Handle servo motors with care!</p> <p>The following actions will void the warranty:</p> <ul style="list-style-type: none"> ▪ Dismantling or opening of gearbox, motor or electronics. ▪ Incorrect connection of the drive shaft which generates excessive forces on the bearings of the shaft. ▪ Mechanical modifications to the shaft, the flange, the connector or the encoder housing.



	NOTICE
	<p>Check servo motor before installation!</p> <p>The servo motor may be damaged.</p> <ul style="list-style-type: none"> ▪ Check the motor for external damage and faulty connections. ▪ Do not install damaged motors.

Unsuitable installation sites! Reduced service life

The kinds of environment listed below are not apt for installing a servo motor, as they will have negative effects on the service life of the motor.



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

Motor as ignition source in potentially explosive atmosphere

	 DANGER
	<p>Danger in potentially explosive atmospheres!</p> <p>The motor can become a source of ignition in potentially explosive atmospheres.</p> <ul style="list-style-type: none">➤ When using a motor in an area with potentially explosive atmosphere, it must have an ATEX approval corresponding to the respective protection zone. <p>Jetter servo amplifiers do not have ATEX approval and must therefore not be installed in hazardous areas.</p>

Caution when assuming the wrong degree of protection

The servo motors comply with the degree of protection IP65.

	 CAUTION
	<p>Observe the degree of protection at installing the motor!</p> <p>If an incorrect degree of protection is assumed, personal injury and damage to property may occur.</p> <ul style="list-style-type: none">➤ Install the motor with the degree of protection required for the application.➤ Protect the motor from harmful environmental influences.

Suitable places of installation

- The motor must be easily accessible.
- Operating temperature: -15 ... +40 °C
- Operating altitude: Max. 1,000 m above sea level
- Relative humidity: 15 ... 85 %, non-condensing

Important:

Operation at higher temperatures and altitudes will necessarily require a derating.

The power reduction (derating) depending on the operating altitude and operating temperature is:

- From 1,000 to 4,000 m 0.6 % per 100 m increase in altitude
- From 40 °C to 80 °C 6 % per 1,000 m increase in altitude.

Environmental conditions - General information

For further technical data, please refer to the User Manual of the servo motors.


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<https://www.jetter.de/en/downloads/motion-systems/servo-motors.html>

Mechanical installation


Installation location


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

Mechanical equipment, tools

	NOTICE
	<p>Avoid damage to the servomotor!</p> <p>If not handled properly, the servo motor can be damaged.</p> <ul style="list-style-type: none"> ▪ Do by all means refrain from applying hard blows or shocks to the motor flange or shaft. ▪ For fitting backlash-free power output shafts with friction locking, only use the specifically designed tightening thread in the motor shaft. If possible, heat the output elements. <p>Fitting the power output elements may only be carried out by means of suitable tools. Please follow the instructions given by the power output element manufacturers.</p> <p>A special hint: Use double-conical collets.</p>

Clutch, timing belt, radial and axial load

	DANGER
	<p>Danger in potentially explosive atmospheres!</p> <p>Avoid electrostatic charging!</p> <p>When using pulleys/toothed belt pulleys, unsuitable belts cause electrostatic charge which can cause an explosion.</p> <p>➤ Only use belts that do not cause electrostatic charging.</p>

NOTICE	
	<p>Avoiding damage to the servo motor and maintaining its service life!</p> <p>Improper installation may damage the motor or considerably shorten its service life.</p> <ul style="list-style-type: none">Make sure the clutch is aligned correctly. Please follow the instructions given by the manufacturer of the clutch. An offset will produce intolerable vibrations and will damage ball bearings and clutch.When using timing belts, observe the permissible radial forces F_R. Radial loads exceeding the limits will significantly reduce the service life of motors. If a belt drive is used, the minimum permitted diameter of the pinion, for example, is calculated as follows: $d_{\min} \geq M_0/F_R \times 2.$Avoid axial load of the motor shaft. Axial load will significantly shorten the service life of the motor.

Thermal sensor

Make sure there is sufficient heat dissipation, especially at the flange side of the motor. Derate the motor output, if necessary.

The rated data of the motor are reached, if the flange temperature does not exceed 65 °C during operation.

Higher temperatures require a derating. For derating tables in case of operating the motor at higher temperatures, please turn to the motor catalog of Jetter AG.

- Integrate the thermistor of the motor into the monitoring system of the servo amplifiers.
- Never operate the motors without incorporating and evaluating these sensors. To this end, connect the thermal sensor of the encoder connector for the motor with the corresponding input of the servo amplifier. For older devices, appropriate thermal sensors must be used.

Cooling plate

All torque data have been determined for motors equipped with cooling plates.

For calculating the dimensions of a cooling plate with a thickness of 3.5 mm, the following formula has been applied:

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

Example for a JL2-0040-.... motor:

The motor flange size of 55 mm results in a cooling plate length of 2.5 x 55 mm = 137.5 mm.

Thus, the dimensions of the cooling plate are: 137.5 mm x 137.5 mm x 3.5 mm

Carrying out the mechanical installation

For mechanical installation, proceed as follows:

Step	Action				
1	<p>Prior to installing the motor, check it for possible damages in transit or storage.</p> <p>Please do notify Jetter AG without delay of possibly damaged mechanical equipment, as well as of corrosion damages to shaft or flange.</p> <p>If there is a brake, release it first. Try to turn the rotor by hand; it must react easily. Watch out for unusual scraping noises.</p>				
2	<p>At manufacturing, the rotor of the motor is balanced electronically. Before fitting the power output elements to the end of the shaft, remove the corrosion protection that it might still be covered with.</p>				
3	<p>For fitting couplings, gear wheels or pulleys use the motor shaft thread intended for this purpose. Warm up the power output elements, if possible.</p> <div data-bbox="678 772 1220 1299" style="text-align: center;"> </div> <table border="1" data-bbox="660 1299 1461 1395"> <thead> <tr> <th data-bbox="660 1299 1058 1350">Number</th> <th data-bbox="1058 1299 1461 1350">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="660 1350 1058 1395">1</td> <td data-bbox="1058 1350 1461 1395">Spacer washer</td> </tr> </tbody> </table>	Number	Description	1	Spacer washer
Number	Description				
1	Spacer washer				
4	<p>Check power output elements (coupling, gearbox, pulley) for tight fit and correct set-up.</p>				
5	<p>Under all circumstances avoid a hyperstatic arrangement of the motor shaft bearings, for example, by using a rigid coupling and an external additional bearing (e.g. in the gearbox).</p>				


Step	Action												
<p data-bbox="517 304 533 327">6</p>	<p data-bbox="592 304 1382 360">Protect the motors against liquids soaking into the bearing, if design V1 is applied, where the shaft end is installed upwards.</p> <div data-bbox="598 365 1252 734"> </div> <table border="1" data-bbox="585 734 1390 1014"> <thead> <tr> <th data-bbox="585 734 983 779">Number</th> <th data-bbox="983 734 1390 779">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="585 779 983 824">1</td> <td data-bbox="983 779 1390 824">IM B 5 (B5)</td> </tr> <tr> <td data-bbox="585 824 983 869">2</td> <td data-bbox="983 824 1390 869">IM V 1 (V1)</td> </tr> <tr> <td data-bbox="585 869 983 913">3</td> <td data-bbox="983 869 1390 913">IM V 3 (V3)</td> </tr> <tr> <td data-bbox="585 913 983 958">4</td> <td data-bbox="983 913 1390 958">D end</td> </tr> <tr> <td data-bbox="585 958 983 1014">5</td> <td data-bbox="983 958 1390 1014">ND end</td> </tr> </tbody> </table>	Number	Description	1	IM B 5 (B5)	2	IM V 1 (V1)	3	IM V 3 (V3)	4	D end	5	ND end
Number	Description												
1	IM B 5 (B5)												
2	IM V 1 (V1)												
3	IM V 3 (V3)												
4	D end												
5	ND end												
<p data-bbox="517 1025 533 1048">7</p>	<p data-bbox="592 1025 1382 1133">Ensure unobstructed ventilation of the motor. Observe the allowed ambient and flange temperature. The rated data of the motor are reached as long as the flange temperature does not exceed 65 °C during operation.</p>												
<p data-bbox="517 1155 533 1178">8</p>	<p data-bbox="592 1155 1299 1178">In order to remove gears, pulleys etc. please use a pulling device.</p> <div data-bbox="598 1189 1181 1742"> </div> <table border="1" data-bbox="585 1742 1390 1832"> <thead> <tr> <th data-bbox="585 1742 983 1787">Number</th> <th data-bbox="983 1742 1390 1787">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="585 1787 983 1832">1</td> <td data-bbox="983 1787 1390 1832">Spacer screw</td> </tr> </tbody> </table>	Number	Description	1	Spacer screw								
Number	Description												
1	Spacer screw												

Electrical Installation - Hazards



Hazards during installation

The following hazards exist during installation. Please proceed carefully and professionally.



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

	NOTICE
	<p>Protect the servomotor from overheating!</p> <p>Without monitoring the temperature in the motor by means of suitable sensors, the motor can become too hot.</p> <ul style="list-style-type: none"> ➤ Integrate the thermistor of the motor into the monitoring system of the servo amplifiers. ➤ Never operate the motor without integrating and evaluating the built-in temperature sensor KTY83-110 (PTC). To do this, route the temperature sensor signal in the encoder connector of the motor to the respective input of the servo amplifier. For older motors, appropriate thermal sensors must be used. ➤ If the temperature monitor detects that the resistance of the temperature sensor is greater than 2150 Ohm, the servo amplifier must switch the motor off and issue the message "Motor temperature error". <p>The JM-2xx, JM-35xx and JM-1yxx servo amplifiers support motor temperature monitoring and switching off in the event of overheating.</p> <ul style="list-style-type: none"> ➤ Our motors comply with insulation class F. Thus, the insulating materials of the motor are designed for a maximum temperature of 155 °C. <p>According to the ATEX directive, the temperature must therefore not exceed 155 °C.</p>



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

 WARNING	
	<p>Warning of hot surfaces!</p> <p>The motor heats up during operation. The surface temperature can exceed 130 °C.</p> <ul style="list-style-type: none">➤ Take protective measures to prevent inadvertent contact with the motor, e.g. install guards.➤ Make sure that no temperature-sensitive parts, e.g. connection cables, are attached or fastened to the motor.➤ Provide sufficient heat dissipation. For the following locations of the motor, the respective maximum temperatures apply: Connector: ≤ 130 °C Cable: ≤ 90 °C Flange: ≤ 65 °C Higher temperatures require a derating. Derating tables for operating the motors at higher temperatures can be found in the User Manual for servomotors by Jetter AG.➤ Allow the motor to cool down for some time before you start working on it, e.g. to carry out maintenance jobs.➤ If necessary, take additional measures for specific applications and operating conditions.

Danger due to high operating voltage



 DANGER	
	<p>Hazard caused by high operating voltage!</p> <p>Risk of electric shock due to wrong grounding of the frame</p> <p>Wrong grounding can cause a high voltage to be present on the frame. This may lead to muscle cramps, burns, unconsciousness, respiratory standstill, or death.</p> <ul style="list-style-type: none">➤ Please mind proper earthing of servo amplifier and servo motor, such as servo motor.➤ Please ensure correct, low-resistance grounding of the frame by PE reference potential in the control cabinet.➤ The frame must have a conductive, low-resistance connection with the machine into which the motor has been integrated.

Danger from electrical leakage and stray currents

	 DANGER
	<p>Danger in potentially explosive atmospheres! Sparking caused by electrical leakage currents in conductive parts of the motor!</p> <p>The motor can become an ignition source in potentially explosive atmospheres if leakage currents flow in conductive parts of the motor. This can lead to overheating of surfaces or dangerous corrosion.</p> <ul style="list-style-type: none"> ➤ Ensure balanced voltage potentials so that no stray or leakage currents can occur. ➤ According to DIN EN 60079-14 and DIN EN 61241-0, there must be a connection to an equipotential bonding system. The grounding conductor must be fixed with a suitable PE bolt of size 4 mm² or more or equal to the supply line.

Caution when assuming the wrong degree of protection


The servo motors comply with the degree of protection IP65.

	 CAUTION
	<p>Observe the degree of protection at installing the motor!</p> <p>If an incorrect degree of protection is assumed, personal injury and damage to property may occur.</p> <ul style="list-style-type: none"> ➤ Install the motor with the degree of protection required for the application. ➤ Protect the motor from harmful environmental influences.

Connections - New terminology, important notes on motor connections and wiring

Power connector	This is the new name for the former <i>motor connector</i> in contrast to the encoder connector.
Motor connector	Now, motor connector stands for a combination of power and encoder connector. For this, please note the explanations on 1-cable technology below.
1-cable technology	With 1-cable technology, the motor power is transmitted together with the encoder signal in a hybrid cable.
2-cable technology	In 2-cable technology, the servomotor has two connectors, one encoder connector and one power connector. The encoder is connected to the encoder connector. The load current of the motor is fed through the power connector.
HIPERFACE DSL®	With HIPERFACE DSL®, the encoder signal (DSL) is modulated onto the power supply line, so only 2 conductors are needed.. These 2 conductors are routed in one cable in addition to the brake signal and the motor power. The HIPERFACE DSL® interface can therefore be recognized by the fact that the motor only has one connector.

Important note on the encoder connector

NOTICE	
	<p>Malfunction</p> <p>Malfunctions of the encoder caused by missing contacts of the pins will result in malfunctioning of the motor.</p> <ul style="list-style-type: none">➤ Ensure vertical position of the encoder connector. The encoder connector must not cant.➤ Please mind correct pin assignment and coding of the encoder connector.➤ If there are several codings on the connector, make sure you use the correct one.

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

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

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

**Power and encoder
mating connectors**

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

Electrical installation - Wiring description for 2-cable technology

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

Jetter AG prefers the use of variants 2 or 3 to variant 1.

A few motors of the JHN2 series also have the electrical connection S3-x.xx.

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



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

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

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

Resolver cable signal	Core color with option S3-x.xx	Pin assignment for option S4-x.xx
S1 (cosine+)	Brown	1
S3 (cosine-)	White	2
S4 (sine-)	Green	3
S2 (sine+)	Yellow	4
R1R (exciter winding+)	Pink	5
R2L (exciter winding-)	Gray	6
Th1 (PTC)	Blue	7
Th2 (PTC)	Red	8
Not assigned		9 - 12

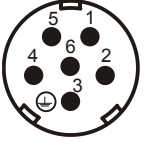


JL1 motor, variant 2 (electrical connection S4-x.xx)

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

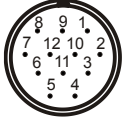

The motor has two cable glands with cables for the power and encoder cables. The cable length must be specified in the order according to the type designation S4-x.xx in meters. The ends of the cables are fitted with connectors as shown in the figure below:



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

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

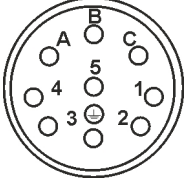


The following table shows the pinout of the encoder connector, size 1 (M23 x 1):

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

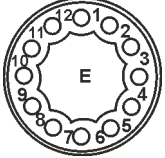

Suitable cables for these connectors can also be found in the Industrial Automation Catalog, Products and Services.

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

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

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

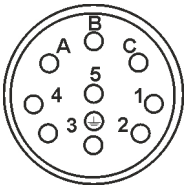


The following table shows the pinout of the Y-Tec encoder connector with M17 quick release:

Front view	Pin	Resolver signal
 <p>Green, 12-pole, pins</p>  <p>Y-Tec connector</p>	1	S1 (cosine+)
	2	S3 (cosine-)
	3	S4 (sine-)
	4	S2 (sine+)
	5	R1 (exciter winding+)
	6	R2 (exciter winding-)
	7	Th1 (PTC)
	8	Th2 (PTC)
	9	-
	10	-
	11	-
	12	-
Housing	The outer shield is connected to the connector housing.	

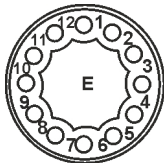

Suitable cables for these connectors can also be found in the Industrial Automation Catalog, Products and Services.

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

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

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

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

Front view	Pin	Resolver signal	HIPERFACE® signal
 Green, 12-pole, pins  Y-Tec connector	1	S1 (cosine+)	-
	2	S3 (cosine-)	-
	3	S4 (sine-)	Sine+
	4	S2 (sine+)	Sine-
	5	R1 (exciter winding+)	Cosine+
	6	R2 (exciter winding-)	Cosine-
	7	Th1 (PTC)	Data- (RS-485)
	8	Th2 (PTC)	Data+ (RS-485)
	9	-	0 V
	10	-	Power supply (7 ... 12 V)
	11	-	Thermal sensor+
	12	-	Thermal sensor-
Housing	The outer shield is connected to the connector housing.	The outer shield is connected to the connector housing.	




Comment on the HIPERFACE® encoder:

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

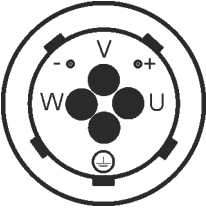


Suitable cables for these connectors can also be found in the Industrial Automation Catalog, Products and Services.

All other motors



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

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

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

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

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

Front view	Pin	Resolver signal	HIPERFACE® signal
 <p>12-pole, pins</p>  <p>Plug connector M23 (with thread)</p>	1	S1 (cosine+)	-
	2	S3 (cosine-)	-
	3	S4 (sine-)	Sine+
	4	S2 (sine+)	Sine-
	5	R1 (exciter winding+)	Cosine+
	6	R2 (exciter winding-)	Cosine-
	7	Th1 (PTC)	Data- (RS-485)
	8	Th2 (PTC)	Data+ (RS-485)
	9	-	0 V
	10	-	Power supply (7 ... 12 V)
	11	-	Thermal sensor+
	12	-	Thermal sensor-
Housing	The outer shield is connected to the connector housing.		The outer shield is connected to the connector housing.


Comment on the HIPERFACE® encoder:

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

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

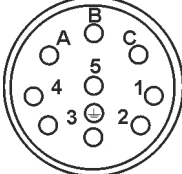


Electrical installation - Wiring description for 1-cable technology

Important note on 1-cable technology

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

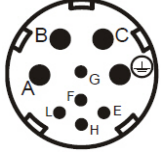



JHQ12, JHQ22 and JHQ24 motors

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

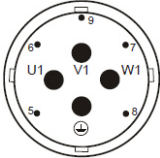


Front view	Pin	Signal
 <p>Orange, 9-pole, pins</p>  <p>Connector I-Tec</p>	A	Phase 1
	B	Phase 2
	C	Phase 3
		PE conductor
	1	Brake+
	2	Brake-
	3	DSL+
	4	DSL-
	5	DSL shield
Housing	Place the all-over shielding and the brake shielding on the connector housing.	

All other motors

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

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

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

Front view	Pin	Signal
 <p>9-pole, pins</p>  <p>Connector M40</p>	U1	Phase 1
	V1	Phase 2
	W1	Phase 3
		PE conductor
	6	Brake+
	5	Brake-
	7	DSL+
	8	DSL-
	9	DSL shield
Housing	Place the all-over shielding and the brake shielding on the connector housing.	

Instructions on EMC

Applicability of the EMC Directive	<p>The EU Electromagnetic Compatibility Directive (2004/108/EC) applies to equipment that may cause electromagnetic emissions or whose operation may be affected by such emissions.</p> <p>The instructions for ensuring EMC must be followed in order to guarantee EMC safety of the machine.</p>
Applicable special standard:	<p>DIN EN IEC 61800-3: Adjustable speed electrical power drive systems, Part 3: EMC requirements and specific test methods</p>
Measures to be taken	<p>Special measures to increase the immunity to interference in plants are listed below:</p> <ul style="list-style-type: none">▪ Ground the panel and the frame:<ul style="list-style-type: none">• via attached flange - the D end is not grounded• via machine• via PE of the motor line connected to the servo amplifier• via grounding terminals in the control cabinet▪ Connect the resolver or the HIPERFACE®▪ Connect the motor lines. The toroidal cores or the motor choke must be placed near the servo amplifier. Shield cables on both ends.▪ Connect holding brake, if available, and connect the shield on both ends of the cable.▪ If you use a motor power cable which includes conductors for brake control, the brake control conductors must be shielded separately. Ground the shielding braid on both ends.
Application Note 016	<p>Follow the instructions given in Application Note 016 "EMC-Compatible Installation of the Electric Cabinet".</p>
Downloading Application Note 016	<p>You can download Application Note 016 <i>EMC-Compatible Installation of Electric Cabinets</i> from the Jetter AG homepage http://www.jetter.de. In order to download Application Note 016, browse the following path: <i>Downloads - Product-independent Documentation - Application Notes</i>.</p>

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

Jetter motors and drives				
	Document specification	Content	Format	Storage location
1	Motor User Manual	Engineering/selecting the motor	*.docx, *.pdf, *.html	On the Jetter homepage under <i>Downloads - Drives - Servomotors</i>
2	CAD- drawings for motors		*.pdf, *.dxf and *.stp	On the Jetter homepage under <i>Downloads - Drives - Servomotors</i>
3	Motor Installation Manual	Installation of motors and instructions for commissioning	*.docx, *.pdf, *.html	On the Jetter homepage under <i>Downloads - Drives - Servomotors</i>
4	Gearing catalogs	Selecting planetary gear boxes, mounting on Jetter motors, servicing of gearboxes, etc.	*.docx, *.pdf, *.html	To be obtained from Jetter AG on request
5	CAD-drawings and datasheets for gearings		*.pdf, *.dxf and *.stp	To be obtained from Jetter AG on request
6	Industrial automation catalog	Products and Services	*.pdf	On the Jetter homepage under <i>Downloads</i>

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

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

Overview: General product documentation and tools

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

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

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