



Installation Manual

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

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Reference to products

This Installation Manual is an integral part of the JL, JK, JH, JHN and JHQ 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
CAUTION	Material damage	Potential occurrence

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Basic safety instructions

Introduction

This device complies with the valid safety regulations and standards. Jetter AG attaches great importance to the safety of the users.

Of course, the user should adhere to the following regulations:

- Relevant accident prevention regulations
 - Accepted safety rules
 - EC guidelines and other country-specific regulations
-

Intended conditions of use

Intended conditions of use include operation in accordance with this Installation Manual.

The servo motors are installed in machines; they may only be commissioned as devices integrated in specific plants. They belong to the category of brushless permanently excited precision motors of sine-shaped induced voltage.

They have explicitly been designed for being torque, speed, and/or position controlled by specific servo amplifiers, such as JetMove xxx made by Jetter AG. They have not been designed for direct connection to the three-phase supply network. Direct connection to the mains will result in their destruction.

The servo motors have especially been designed as drives for machines that put high demands on dynamic performance and endurance. They may only be run under the operating conditions specified in this installation manual. They are used to drive machinery, such as conveyors, production machines, and handling machines.

They may only be operated within the limits set forth in the technical specifications.

The values rendered by the thermistor that is integrated into the motor windings must be evaluated and monitored.

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

Usage other than intended

The servo motors must not be used in technical systems which to a high degree have to be fail-safe, such as, for example, in ropeways and airplanes.

The servo motors JL, JK, JH, JHN and JHQ are no safety-related parts as per Machinery Directive 2006/42/EC. For this reason, they are not qualified for safety-relevant applications and must, therefore, NOT be used to protect persons.

If you intend to operate the servo motors at ambient conditions not being in conformity with the permitted operating conditions, please contact Jetter AG beforehand.

Personnel qualification

Depending on the life cycle of the product, the persons involved must possess different qualifications. These qualifications are required to ensure proper handling of the device in the corresponding life cycle.

Product life cycle	Minimum qualification
Transport/storage:	Trained and instructed personnel with knowledge in handling electrostatic sensitive components.
Mounting/installation:	Specialized personnel with training in electrical engineering, such as industrial electronics technician.
Commissioning/programming:	Trained and instructed experts with profound knowledge of, and experience with, electrical/drive engineering, such as electronics engineer for automation technology.
Operation:	Trained, instructed and assigned personnel with knowledge in operating electronic devices.
Decommissioning/disposal:	Specialized personnel with training in electrical engineering, such as industrial electronics technician.

Modifications and alterations to the module

For safety reasons, no modifications and changes to the device and its functions are permitted.

Any modifications to the device not expressly authorized by Jetter AG will result in a loss of any liability claims to Jetter AG.

The original parts are specifically designed for the device. Parts and equipment from other manufacturers have not been tested by Jetter AG and are, therefore, not released by Jetter AG.

The installation of such parts may impair the safety and the proper functioning of the device.

Any liability on the part of Jetter AG for any damages resulting from the use of non-original parts and equipment is excluded.

Disposing

When disposing of the servo motors, the local environmental regulations must be complied with.

Additional safety precautions

Make sure that appropriate safety precautions have been taken, for instance, a second set of limit switches (interrupting the power supply of the motor) or safety guards.

Make sure that hazards to persons or material damage are precluded even when the drive starts unintentionally.

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 in explosive gas atmosphere!</p> <p>This device can become a source of ignition in potentially explosive atmospheres.</p> <p>➤ Do not use this device in potentially explosive atmospheres.</p>

	 DANGER
	<p>Hot surface hazard!</p> <p>The JL, JK, JH, JHN and JHQ motor heats up during operation. Its surface temperature can exceed 130 °C.</p> <p>➤ Take protective measures to prevent inadvertent contact with the motor, e.g. install protective covers.</p> <p>➤ Make sure that no temperature-sensitive parts have been connected or fastened to the motor.</p> <p>➤ Allow the motor to cool down for some time before you start working on it, e.g. to carry out maintenance jobs.</p>

	 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> <p>➤ Please mind proper earthing of servo amplifier and servo motor, such as JL, JK, JH, JHN, and JHQ.</p> <p>➤ Please ensure correct, low-resistance grounding of the frame by PE reference potential in the control cabinet.</p> <p>➤ The frame must have a conductive, low-resistance connection with the machine into which the motor has been integrated.</p>

	 DANGER
	<p>Hazard caused by high operating voltage! Risk of electric shock due to residual voltage in the capacitors of the servo amplifier!</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. ➤ 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.

	 WARNING
	<p>Warning: Unguarded moving machine parts!</p> <p>The drive shaft of the motor is to move machine parts or parts with 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. ➤ Do not wear loose-fitting clothing. ➤ Do not wear gloves.

	 DANGER
	<p>Danger 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 protective bracket for the feather key which comes with new motors before operating a motor. ➤ Wear goggles.

Malfunctions and troubleshooting

	 CAUTION
	Malfunction Neither controller nor motor are functioning any more. <ul style="list-style-type: none">➤ Only use servo cables supplied by Jetter AG. They meet the respective requirements on the motor, brake and encoder shielding.➤ Use a separate PSU for power supply of the brake. This way, you prevent disturbances caused by the motor respectively brake lines from being transmitted to the DC 24 V supply of the controller or to other sensitive sensors.

	 CAUTION
	Malfunction The motor is humming and does not follow the setpoint. <ul style="list-style-type: none">➤ Immediately deactivate the ENABLE signal to prevent the motor winding from overheating!➤ Please mind the error messages presented in the table below!

Table of motor faults		
Type of error	Error cause	Remedy
The motor is humming		 <ul style="list-style-type: none"> ▪ Immediately deactivate the ENABLE signal to prevent the motor winding from overheating! ▪ Wait until the motor has cooled off. ▪ Check motor and control parameters.
Neither controller nor motor are functioning any more	<ul style="list-style-type: none"> ▪ The servo amplifier has not been enabled. 	<ul style="list-style-type: none"> ▪ Apply ENABLE signal.
	<ul style="list-style-type: none"> ▪ Not completely protected against disturbances. 	<ul style="list-style-type: none"> ▪ You can prevent disturbances caused by the motor, encoder or brake lines from being transmitted to the voltage supply of the controller or to other sensitive sensors as follows: <ul style="list-style-type: none"> ▪ Use servo cables supplied by Jetter AG ▪ Use a separate power supply unit for the brake
Motor does not rotate	<ul style="list-style-type: none"> ▪ Motor phases are mixed up 	<ul style="list-style-type: none"> ▪ Connect motor phases correctly
	<ul style="list-style-type: none"> ▪ Brake is not released 	<ul style="list-style-type: none"> ▪ Check brake control
	<ul style="list-style-type: none"> ▪ Drive mechanism is jammed 	<ul style="list-style-type: none"> ▪ Check drive mechanism
Motor does not follow the setpoint	<ul style="list-style-type: none"> ▪ Setpoint line has been interrupted 	<ul style="list-style-type: none"> ▪ Check setpoint line
Motor overspeed	<ul style="list-style-type: none"> ▪ Motor phases are mixed up 	<ul style="list-style-type: none"> ▪ Connect motor phases correctly
Motor chatters	<ul style="list-style-type: none"> ▪ Resolver line shielding has been interrupted 	<ul style="list-style-type: none"> ▪ Replace resolver line
	<ul style="list-style-type: none"> ▪ Gain factor too high 	<ul style="list-style-type: none"> ▪ Use motor default values
Brake does not grip	<ul style="list-style-type: none"> ▪ Brake defective 	<ul style="list-style-type: none"> ▪ Replace motor
	<ul style="list-style-type: none"> ▪ Axial motor shaft overload 	<ul style="list-style-type: none"> ▪ Check and reduce axial load ▪ If bearings are defective, replace motor
	<ul style="list-style-type: none"> ▪ Required holding torque is too high 	<ul style="list-style-type: none"> ▪ Check dimensioning
Error message: Brake	<ul style="list-style-type: none"> ▪ Short-circuit in the supply line of the motor holding brake 	<ul style="list-style-type: none"> ▪ Eliminate short circuit

Table of motor faults		
Type of error	Error cause	Remedy
	<ul style="list-style-type: none"> Motor holding brake is defective 	<ul style="list-style-type: none"> Replace motor
Error message: Output stage	<ul style="list-style-type: none"> Short-circuit or ground fault on motor line 	<ul style="list-style-type: none"> Replace cable
	<ul style="list-style-type: none"> Short-circuit or ground fault in motor 	<ul style="list-style-type: none"> Replace motor
Error message: Resolver	<ul style="list-style-type: none"> Resolver connector has not been plugged on properly 	<ul style="list-style-type: none"> Check plug connection
	<ul style="list-style-type: none"> Resolver line interrupted, crushed and the like 	<ul style="list-style-type: none"> Check the lines
Error message: Motor temperature: Motor overtemperature protection tripped		 <ul style="list-style-type: none"> Immediately deactivate the ENABLE signal to prevent the motor winding from overheating! Check whether the frame temperature is greater than 80 °C
	<ul style="list-style-type: none"> The frame temperature is greater than 80 °C 	<ul style="list-style-type: none"> The motor is overheated By means of an oscilloscope, capture motor function measurements in a JetSym motion profile and send it to Jetter AG. Let the motor cool down
	<ul style="list-style-type: none"> The encoder line is loose or interrupted 	<p>With Jetter motors, the thermal sensor values are transmitted to the servo amplifier via encoder line</p> <ul style="list-style-type: none"> Check the connector Possibly replace the encoder line If the error has been fixed, apply ENABLE signal again.
Unusual noise coming from the ball bearing		<ul style="list-style-type: none"> Send the motor to Jetter AG - the ball bearings will be replaced
Unusual noise coming from the motor		<ul style="list-style-type: none"> Put the motor out of operation Deinstall the motor By hand, ensure the motor shaft is moving smoothly If there is still unusual noise to be heard, send the motor to Jetter AG

Repairs

The operator is not allowed to repair the device.
The device does not contain any parts that could be repaired by the operator.
If the device needs repairing, send it to Jetter AG.

Nameplate, identification

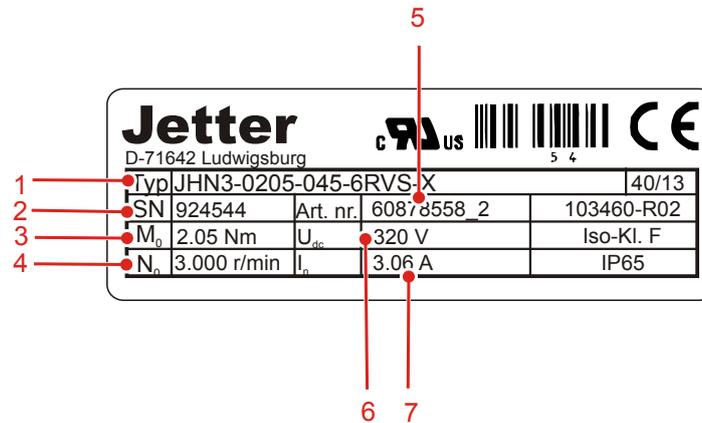
Information for hotline requests

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

- Type designation
- Serial number

Nameplate

The nameplate of a servo motor contains the following information:



Number	Description
1	Device designation
2	Serial number
3	Continuous stall torque
4	Rated speed N_n
5	Item number
6	DC link voltage
7	Continuous rated current

Type designation

For detailed information on type designation, please turn to the motor catalog on the Jetter AG **homepage** <http://www.jetter.de>.

Installation site, surrounding conditions

Degree of protection **The servo motors comply with the degree of protection IP65.**

Installation site

- The motor must be easily accessible.
- Operating temperature: +5 ... +40 °C.
- Maximum height of installation position: 1,000 m above sea level
- Relative humidity: 15 ... 85 %, non-condensing

Important:
In case of a deviation from the ambient conditions specified above, derating might be necessary.

- For the derating scope depending on the respective height of installation, please turn to the motor catalog.
- At altitudes higher than 1,000 m above sea level and a temperature reduction of 10 °C per 1,000 m no derating is required.

Unsuitable installation sites 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 device must not be exposed to rain or a jet of water. Therefore, do not use a steam jet or other such devices to clean the device.
Corrosive or contaminated surrounding area	Corrosive or contaminated surrounding areas can have negative effects on the device.

For further technical data, please turn to the motor catalog.

Environmental conditions – General information For detailed technical data, please turn to the motor catalog.

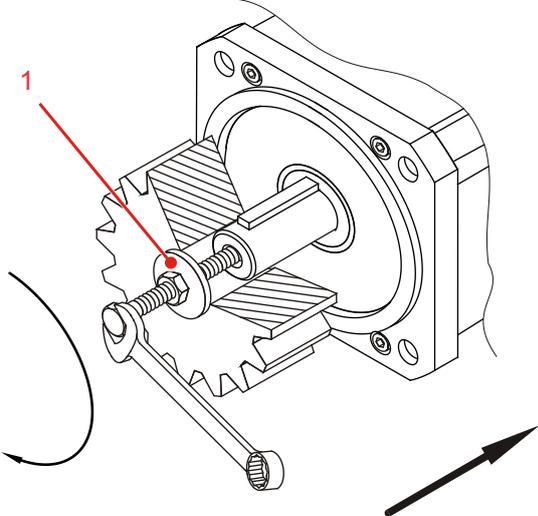
Mechanical installation

Installation location	<ul style="list-style-type: none"> ▪ The installation location must be free from conductive and corrosive substances. ▪ For encapsulated installation, please consult the application department of Jetter AG.
Mechanism, tools	<ul style="list-style-type: none"> ▪ Do by all means refrain from applying hard blows or shocks to the motor flange and shaft. ▪ For fitting backlash-free power output shafts with friction locking, only use the specifically designed tightening thread in the motor shaft. Warm up the power output elements, if possible. Fitting the power output elements may only be carried out by means of suitable tools. Please follow the instructions given by the power output element manufacturers. A special hint: Apply double-conical collets.
Clutch, timing belt, radial and axial load	<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. ▪ Attention: 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	<p>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 will cause derating. For derating tables in case of operating the motor at higher temperatures, please turn to the motor catalog of Jetter AG.</p> <ul style="list-style-type: none"> ▪ 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	<p>All torque data have been determined for motors equipped with cooling plates. For calculating the 3.5 mm thick cooling plates, the following formula has been applied: Length of cooling plate in mm = 2.5 x flange size in mm</p>

Example: Cooling plate for a JL2-0040-...-motor = 2.5 x 55 mm = 137.5 mm
 The following cooling plate will result for JL2 motor types:
 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.</p> <p>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 style="text-align: center;">  </div> <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th>Number</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>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>By all means avoid a hyperstatic arrangement of the motor shaft bearings by using a rigid clutch and an external additional bearing (e.g. in the gearbox).</p>				

Step	Action												
<p data-bbox="592 304 612 333">6</p>	<p data-bbox="668 304 1461 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="675 365 1329 734"> </div> <table border="1" data-bbox="660 734 1469 1014"> <thead> <tr> <th data-bbox="660 734 1059 779">Number</th> <th data-bbox="1059 734 1469 779">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="660 779 1059 824">1</td> <td data-bbox="1059 779 1469 824">IM B 5 (B5)</td> </tr> <tr> <td data-bbox="660 824 1059 869">2</td> <td data-bbox="1059 824 1469 869">IM V 1 (V1)</td> </tr> <tr> <td data-bbox="660 869 1059 913">3</td> <td data-bbox="1059 869 1469 913">IM V 3 (V3)</td> </tr> <tr> <td data-bbox="660 913 1059 958">4</td> <td data-bbox="1059 913 1469 958">D end</td> </tr> <tr> <td data-bbox="660 958 1059 1014">5</td> <td data-bbox="1059 958 1469 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="592 1025 612 1055">7</p>	<p data-bbox="668 1025 1442 1133">Ensure unobstructed ventilation of the JL, JK, JH, JHN and JHQ servo motors. Observe the ambient and flange temperature. The rated data of the motor are reached, if the flange temperature does not exceed 65 °C during operation.</p>												
<p data-bbox="592 1155 612 1184">8</p>	<p data-bbox="668 1155 1374 1184">In order to remove gears, pulleys etc. please use a pulling device.</p> <div data-bbox="675 1189 1257 1742"> </div> <table border="1" data-bbox="660 1742 1469 1834"> <thead> <tr> <th data-bbox="660 1742 1059 1787">Number</th> <th data-bbox="1059 1742 1469 1787">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="660 1787 1059 1834">1</td> <td data-bbox="1059 1787 1469 1834">Spacer screw</td> </tr> </tbody> </table>	Number	Description	1	Spacer screw								
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Instructions on EMC – Electrical installation

Measures to be taken

Measures for increasing EMI in electric plants:

- Ground the panel and the frame:
 - 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 shields on both sides of the cables.
- If you apply a motor power cable which includes cores for brake control, the brake control cores must be shielded separately. Earth the shielding braid on both ends.
- Also refer to Application Note 016 *EMC-compliant installation of electric cabinets* by Jetter AG.

The following instructions are excerpts from Application Note 016:

- **Physically separate** signal and power lines. Jetter AG recommend spacing greater than 20 cm. Cables and lines should cross each other at an angle of 90°.
- The following line cables must be shielded: Analog lines, data lines, motor cables coming from inverter drives (servo output stage, frequency converter), lines between components and interference suppressor filter, if the suppressor filter has not been placed at the component directly.
- Shield cables **at both ends**.
- Unshielded wire ends of shielded cables should be as short as possible.
- The entire shield, **must, in its entire perimeter**, be drawn behind the isolation, and then be clamped under the earthed strain relief **with the greatest possible surface area**.
- All cables must be of a sufficient cross-section.

Downloading Application Note 016

You can download Application Note 016 *EMC-Compatible Installation of Electric Cabinets* from the Jetter AG **homepage** <http://www.jetter.de>. In order to download Application Note 016, browse the following path: *Downloads - Application Notes*.

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

Power connector	"Motor connector" was formerly used for discrimination from "encoder connector".
Motor connector	Now, motor connector stands for a combination of power and encoder connectors. For this, please note the explanations on 1-cable technology below.
1-cable technology	1-cable technology means that both the power and the feedback signals are combined in one hybrid cable.
HIPERFACE DSL®	With HIPERFACE DSL®, the encoder signal and the power supply of the encoder are conducted by 2 wires which have been united in the power connector.

Important note on the encoder connector

 CAUTION	
Malfunction	
Malfunctions of the encoder caused by missing contacts of the pins result in malfunctioning of the motor.	
➤	Ensure vertical position of the encoder connector. The encoder connector must not cant.
➤	Please mind correct pin assignment and coding of the encoder connector.
➤	If there are several codings on the connector, make sure you use the correct one.

Cable size	The cable diameter must be designed according to the continuous rated current of the motor. Please do also observe the ambient conditions, the mode of installation and the local regulations.
Note on the cables	You either order prefabricated cables from Jetter AG or opt for self-made cables.
Encoder mating connector	You can order the respective encoder mating connector from Jetter AG.

Instructions on commissioning

Prerequisites

- Please check the assignments of servo amplifier and servo motor. Referring to the nameplates and wiring diagrams of motor and servo amplifier, compare the continuous rated current and the AC rated voltage of the devices.
- Before activating the servo amplifiers, proper functioning of the safety devices must be ensured. For this reason, carry out a functional test. These safety devices protect the staff from movable machinery parts and against accidental contact with live parts and components.
- When configuring the digital servo amplifier, make sure that the correct number of motor poles and of resolver poles is set.
 - Selecting the motor from the JetSym motor database, further important parameters are set.
 - If third-party motors are used:**
 - Calculate and set pole pair numbers
 - Calculate and set the maximum motor current in the servo amplifier
 - Calculate and set valid control parameters
- Faulty settings can result in overheating and destruction of the motor.
- For detailed information on finding the correct motor and resolver pole number, please turn to the motor catalog.
- Always carry out each commissioning, even a short functional test, with correctly connected PE bus.

Checking the installation

Check the installation by taking the following steps:

Step	Action
1	Check servo motor and servo amplifier wiring and connections by means of the connection diagrams used.
2	A possibly existing holding brake must be checked for proper functioning (attach DC 24 V, the brake must be released then).
3	Check to see whether the rotor of the motor can be turned easily (a possibly existing brake must be released beforehand). Watch out for unusual scraping noises.
4	Check to see whether all necessary protection measures against accidental contact with live or moving parts have been taken.
5	Carry out any other checks specific to or required for your system.
6	Put the drive into operation according to the operating manual of the servo amplifier.
7	When using multi-axis systems, put each drive unit - servo amplifier/motor - into operation separately.

Maintenance and repairs

Maintenance

Motor maintenance is limited to the following work: Exchanging ball bearings and occasionally cleaning the housing if the ball bearings are very dirty.

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

If there are unusual noises coming from the ball bearing:

- Put the motor out of operation. Send it to Jetter AG.
 - Do by no means disassemble the motor, as for reassembling, there are specific instructions and settings to be observed. The service life of ball bearings for the rotor is at least 20,000 service hours under normal operating conditions.
 - The following factors can reduce the service life of the ball bearings:
 - The axial or radial load is too high. This can be cause, for example, by the cogged belts
 - Non-centered installation; smooth running is impeded this way
 - If the bearings are worn, the grease is prone to dry out and to be contaminated which results in a loss of lubricity up to running dry
 - In this case, have the bearings replaced after 20,000 service hours at the latest. For this, please send the motors to Jetter AG.
 - Replacing the bearings before the motor shaft is worn helps to prolong the lifetime of the motor. Replacing a completely damaged rotor exceeds the original price of the motor by about 50 %, which means it is not profitable any more.
 - If there are unusual noises coming from the motor (not from the bearings), put the motor out of operation, dismount the motor, check it for running smoothly and for unusual noises inside the motor by turning the motor shaft manually.
 - Only use isopropanol for cleaning the frame.
 - On no account apply cleaning agents which contain solvents!
 - On no account immerse the motor in diluent or spray it with diluent!
 - On no account use a steam jet for cleaning the motor!
-

Repairs

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

If the motor needs repairing, send it to Jetter AG.

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

Jetter motors and gearings				
	Document specification	Contents	Format	Storage location
1	Jetter motor catalog	Engineering/selecting the motor	*.docx, *.pdf, *.html	On the Jetter AG homepage for download
2	CAD-drawings for motors		*.pdf, *.dxf and *.stp	On the Jetter AG homepage for download
3	Motor installation manuals	Installation and servicing of motors	*.docx, *.pdf, *.html	On the Jetter AG homepage for download
4	Gearing catalogs	Selecting planetary gearings, connecting with Jetter motors, servicing of gearings, etc.	*.docx, *.pdf, *.html	On the Jetter AG homepage for download
5	CAD-drawings and datasheets for gearings		*.pdf, *.dxf, *.stp	To be obtained from Jetter AG on request

JetMove				
	Document specification	Contents	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	As 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	Contents	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	Contents	Format	Storage location
1	Application Note 016 for control cabinet manufacturing and installation	Installation of servo amplifiers and other components, wiring and shielding in the control cabinet	*.docx, *.pdf, *.html	On the Jetter AG homepage for download
2	User manuals	Peripheral modules	*.docx, *.pdf, *.html	On the Jetter AG homepage for download

Engineering and commissioning tools				
	Document specification	Contents	Format	Storage location
1	JetSym software	Jetter AG programming and commissioning tool		For download from the Jetter homepage or on product-specific CD, licensing key included
2	Motor database in JetSym	Characteristic curves and electrical data of all Jetter motors		JetSym programming software
3	Sizing tool SERVOfsoft®	Engineering and selecting Jetter motors, gearboxes, servo amplifiers and further accessories		The license can be obtained from SERVOfsoft® 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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