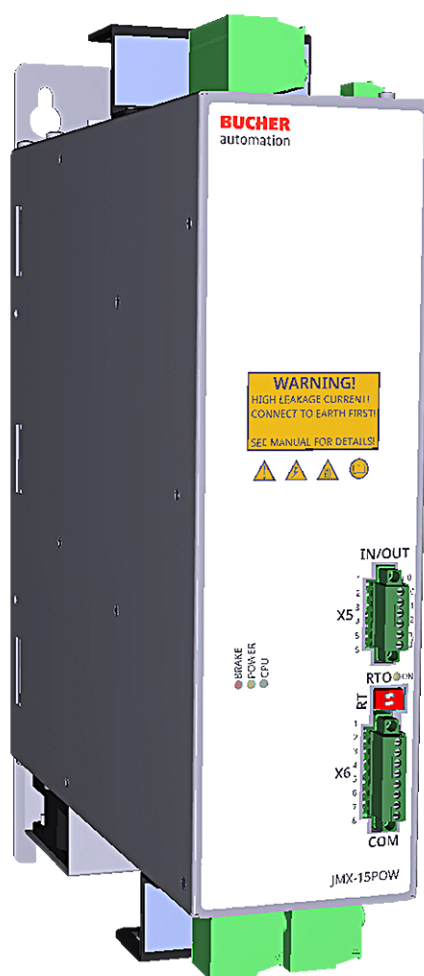


User manual



60887567_00

JMX-15P23-R1A0
Supply unit

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Translation of the german original User Manual

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1 Introduction

1.1 Information on this document

This document forms an integral part of the product and must be read and understood prior to using it. It contains important and safety-related information for the proper use of the product as intended.

Target groups

This document is intended for specialists with appropriate qualifications. Only competent and trained personnel is allowed to put this device into operation. 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. This document is not subject to any updating service.

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For further information refer to the following information products:

- JetSym software Online Help
Detailed description of software functions with application examples
- Application-oriented manuals
Cross-product documentation
- Version updates
Information about new versions of software products or of the operating system of your device

INFO

EtherCAT®

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

1.2 Typographical conventions

This manual uses different typographical effects to support you in finding and classifying information. Below, there is an example of a step-by-step instruction:

- ✓ This symbol indicates requirements which have to be met before executing the following action.
- ▶ This sign or a numbering at the beginning of a paragraph marks an action instruction that must be executed by the user. Execute the instructions one after the other.
- ⇒ The target after a list of instructions indicates reactions to, or results of these actions.

INFO

Further information and practical tips

In the info box you will find helpful information and practical tips about your product.

2 Safety

2.1 General Information

When placed on the market, this product corresponds to the current state of science and technology.

In addition to the operating instructions, the laws, regulations and guidelines of the country of operation or the EU apply to the operation of the product. The operator is responsible for compliance with the relevant accident prevention regulations and generally accepted safety rules.

2.2 Purpose

2.2.1 Intended use

The supply unit JMX-15P23-R1A0 is a component designed for installation in industrial and commercial plants and machines.

Installation is only permitted in stationary equipment. The JM-15 series multi-axis motion system consists of at least one supply unit and at least one servo amplifier. In motor operating mode, the supply unit draws power from the supply network and provides it to the connected servo amplifiers via the DC link.

When the supply unit is installed in a machine, commissioning (i.e. commencement of intended use) is prohibited until it has been determined that the machine complies with Machinery Directive 2006/42/EC. Commissioning (i.e. commencement of intended use) is only permitted if the EMC Directive (2014/30/EU) is complied with.

2.2.2 Non-intended use

Use of the supply unit outside of the application areas given here or under operating ranges and ambient conditions other than those described in the documentation is considered non-intended use.

- The supply unit must not be used outside a control cabinet.
- Servo amplifiers from other manufacturers must not be operated on the supply unit.

The following application areas are considered non-intended use:

- Installation in vehicles. Use of the device in non-stationary equipment is considered an exceptional environmental condition and is only permitted after special agreement.
- Installation in environments where there are hazardous oils, acids, gases, vapors, dusts, rays, etc.
- Use in special application areas (e.g. where there is a risk of explosion, corrosion or fire).
- Untypical generation of higher frequency on-board networks.

2.3 Warnings used in this document

DANGER



High risk

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

WARNING



Medium risk

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

CAUTION



Low risk

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

NOTICE

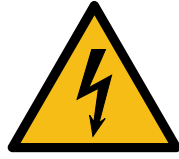


Material damage

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

2.4 General safety instructions

DANGER

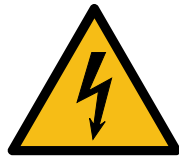


Risk due to high electrical voltage

Touching live parts may result in death or severe injury.

- ▶ Carry out the following steps before starting work to ensure safety.
- ☑ Prepare for turning off the system. Inform everyone involved who will be affected by the process.
- ☑ Isolate the drive system from the power supply and secure it against being turned on again.
- ☑ Wait for the discharge time (approx. 10 minutes) and check all power connections to ensure they are at zero potential.
- ☑ Ground according to requirements.
- ☑ Cover over neighboring live parts.
- ☑ Ensure the drives cannot move.
- ☑ Depressurize the compressed air lines and ensure that the pressure is released.

DANGER



Risk of electric arc due to improper handling

Improper handling can result in an electric arc, which may lead to severe injury or death.

- ▶ Open the plug connections only in de-energized state.
- ▶ Install the device only in an environment where there is no risk of fire, without any flammable gases or vapors.
- ▶ Observe the specified limit values for voltage.
- ▶ Wire according to regulations.

WARNING



Risk of fire due to improper operation of the device

In case of improper operation or due to an error, the device may overheat and cause a fire that may result in serious personal injury or death.

- ▶ Operate the device according to the specification. Never exceed the maximum speed.
- ▶ Do not use any damaged devices.
- ▶ Turn off the device immediately if the temperature is too high.

⚠ WARNING**Risk of crushing due to uncontrolled axis movements**

High mechanical forces due to axis movements and accelerations.

- ▶ Keep out of the hazard zone of the machines.
- ▶ Do not disable any safety equipment.
- ▶ Have malfunctions eliminated by qualified personnel.

⚠ WARNING**Risk of burns due to hot surfaces**

The device may become hot during operation and can cause burns if touched.

- ▶ Take protective measures to prevent inadvertent contact with the device, e.g. protective covers.
- ▶ Make sure that no temperature-sensitive parts, e.g. connection cables, are attached or fastened to the device.
- ▶ Ensure there is adequate heat dissipation and maintain the required distances during installation so as not to prevent or restrict ventilation.
- ▶ Allow the device to cool off for a while before carrying out cleaning or maintenance work.
- ▶ Wear personal protective equipment.
- ▶ Avoid all contact with the braking resistor.
- ▶ Do not place any flammable or heat-sensitive components in the vicinity of the braking resistor.
- ▶ In critical cases, check the temperature of the braking resistor during a test work cycle.

⚠ WARNING**Danger for persons with heart pacemakers and implants!**

Electromagnetic fields are generated during operation. Electrical, magnetic and electromagnetic errors endanger especially persons with heart pacemakers or implants.

- ▶ You must not be in the immediate vicinity of the device if you belong to the above group of persons.
- ▶ As an affected person, maintain a minimum distance of 300 mm from the device.

NOTICE**Material damage due to loose power connection**

Vibrations or insufficient tightening torques can lead to loose power connections. This can lead to fire damage, defects in the device or malfunctions.

- ▶ Tighten all power connections to the specified tightening torques.
- ▶ Check all power connections at regular intervals, especially after transport.

3 Product description

The JMX-15P23-R1A0 supply unit was developed for the supply of drives of the JMX series.

The software with which the JMX-15P23-R1A0 supply unit is equipped is divided into two types:

- **Boot firmware:** This boots the supply unit by activating a set of basic services, and, after an initial phase of identification and diagnostics of the system, runs the firmware
- **Firmware:** This manages all the operating functions of the supply unit

3.1 System overview

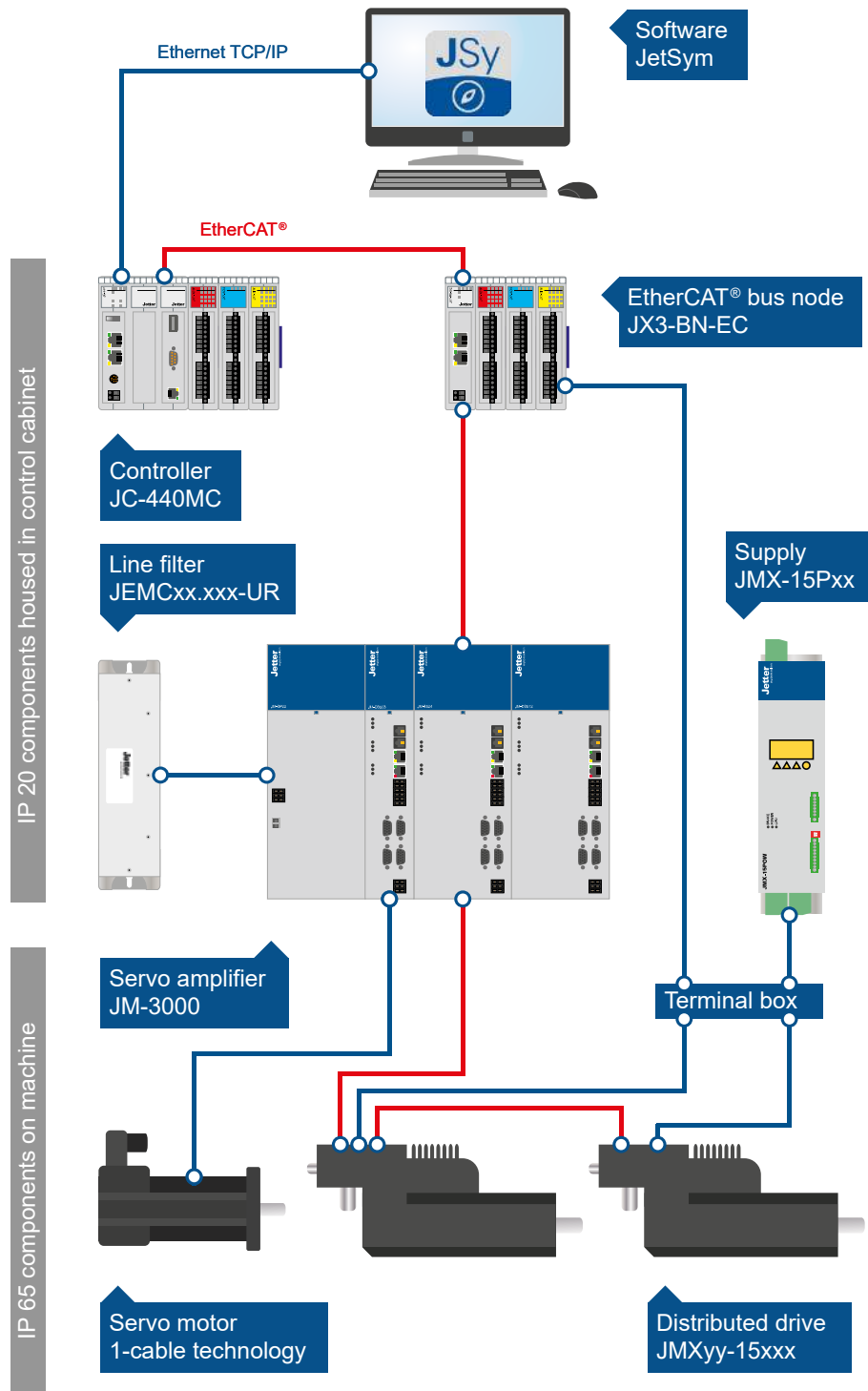


Fig. 1: System overview

3.2 Design

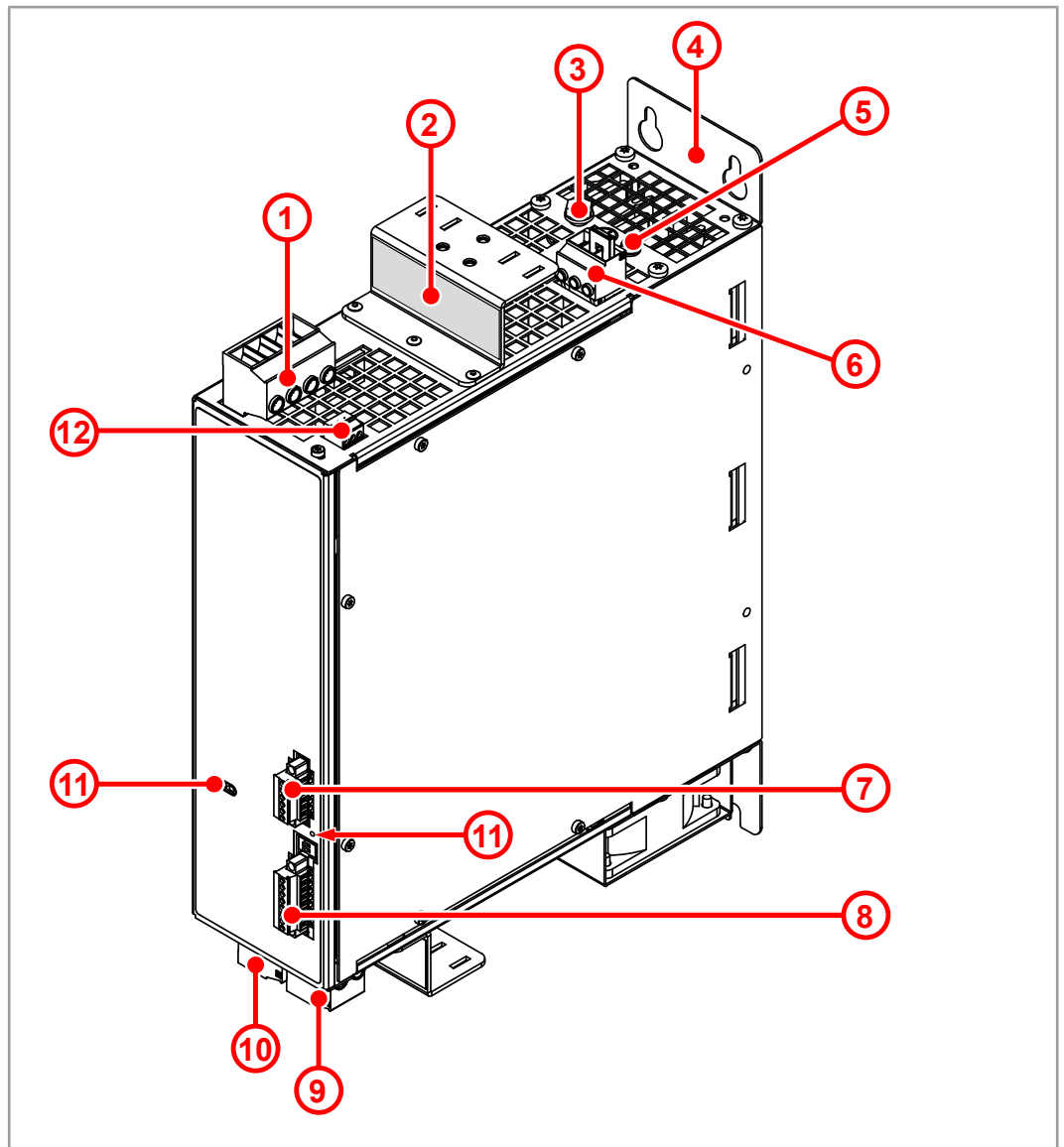


Fig. 2: Design

1	Socket X2: Three-phase power supply
2	Nameplate
3	Connection of the grounding cable
4	Mounting plate
5	Screw for external braking resistor shield
6	Socket X1: Braking resistor
7	Socket X5: I/O interface, RTO contact
8	Socket X6: RS485, n. c.*
9	Socket X8: Output power for channel CH2
10	Socket X7: Output power for channel CH1
11	LEDs
12	Socket X3: 24 V supply of the controller
*n. c. = not connected (= no function)	

3.3 Product features

- The JMX-15P23-R1A0 was developed for the supply of drives of the JMX series
- Built-in overcurrent protective devices
- The DC voltage properties of the DC link are suitable for drives of the JMX series
- Integrated protective functions
 - Overload on the outputs of the DC bus
 - Short circuit in the brake circuit
 - Brake energy overload
 - Charging energy overload
 - Undervoltage/overvoltage/excessive ripple of the DC bus
 - Overtemperature in the power and control section

3.4 Status display

LEDs indicate the communication status of the device as well as the status of the power supply.

Color and status of the LEDs are an excellent source of information for analyzing various states.

The LEDs are located on the front of the JMX-15P23-R1A0.



Fig. 3: Status display

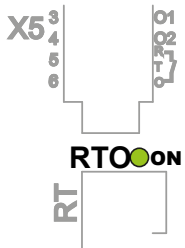


Fig. 4: Status display RTO

3.4.1 Lighting patterns of the LEDs

Parameter	Lighting pattern	Description
OFF	-	LED turned off
ON	Continuously lit	LED turned on
BLK	200 ms on, 200 ms off	Slow continuous flashing

Tab. 1: Flashing patterns of the LEDs

3.4.2 Status display LEDs

LED	Color	Action	Description
BRAKE		OFF ---	Braking chopper not active
	Orange	ON	Braking chopper active, energy < 50 % of the maximum tolerable value
	Red	ON	Braking chopper active, energy \geq 50 % of the maximum tolerable value
POWER		OFF ---	Turned off or in boot mode
	Green	BLK	Start sequence (voltage/current monitoring)
	Green	ON	Ready to operate, output current < 70 % $I_{nom.}$
	Green and orange	BLK	Ready to operate, output current \geq 70 % $I_{nom.}$
	Orange	ON	Device functions, one or several warnings active
	Red	ON	No voltage, one or several errors active
CPU		OFF ---	CPU not working
	Green	ON	CPU in firmware mode
	Orange	ON	CPU in boot mode
	Red	ON	CPU in reset
RTO		OFF ---	Contact open
	Green	ON	Contact closed

Tab. 2: Interpretation of the status of the LEDs

3.5 Nameplate

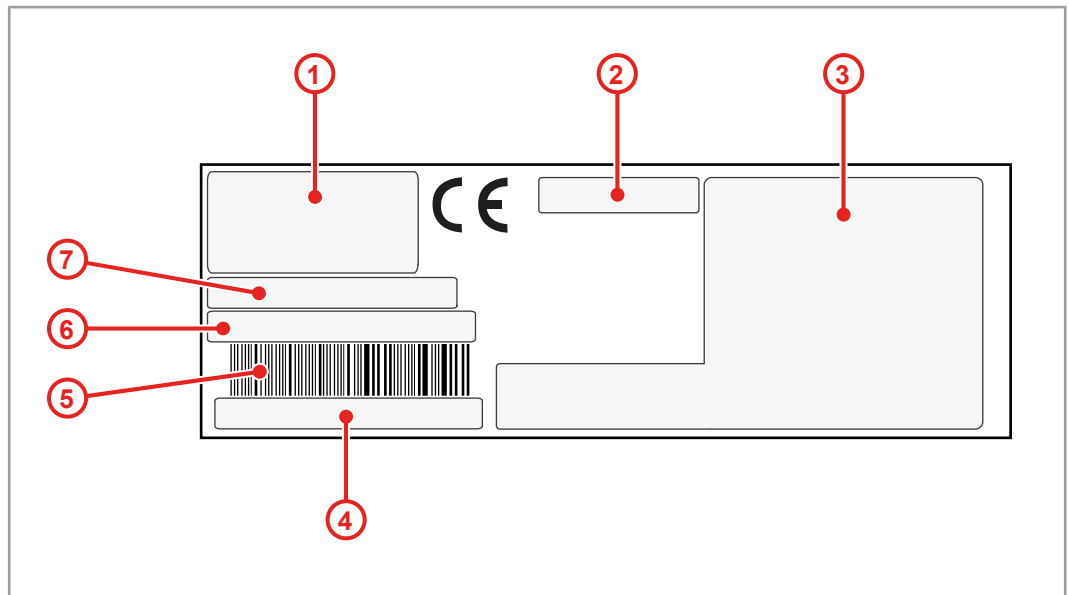


Fig. 5: Nameplate

1	Company logo		
2	Warning signs and mandatory signs		
3	Power data		
		U_{IN}	Input voltage range
		I_{InMax}	Maximum input current
		U_{Out}	Output voltage range
		P_{OutMax}	Maximum output power
		I_{OutMax}	Maximum output current
		U_{Ctr}	Control voltage
		I_{Ctr}	Power consumption on control voltage side
		T_A	Ambient temperature
		HW	Hardware revision
		IP	Degree of protection
4	Serial number		
5	Barcode of the serial number		
6	Item number		
7	Item name (see Order code [► 59])		

3.6 Scope of delivery

Scope of delivery		Item number	Quantity
JMX-15P23-R1A0		60886838_00	1
Phoenix connector plug			
X1	3-pin		1
X2	4-pin		1
X3	3-pin		1
X5	6-pin		1
X7	2-pin		1
X8	2-pin		1
USB stick with complete documentation			1

Cables are not included in the scope of delivery.

Cables and other accessories are available from Bucher Automation AG.

4 Technical data

This chapter contains electrical, mechanical data and operating data of the JMX-15P23-R1A0.

4.1 Dimensions

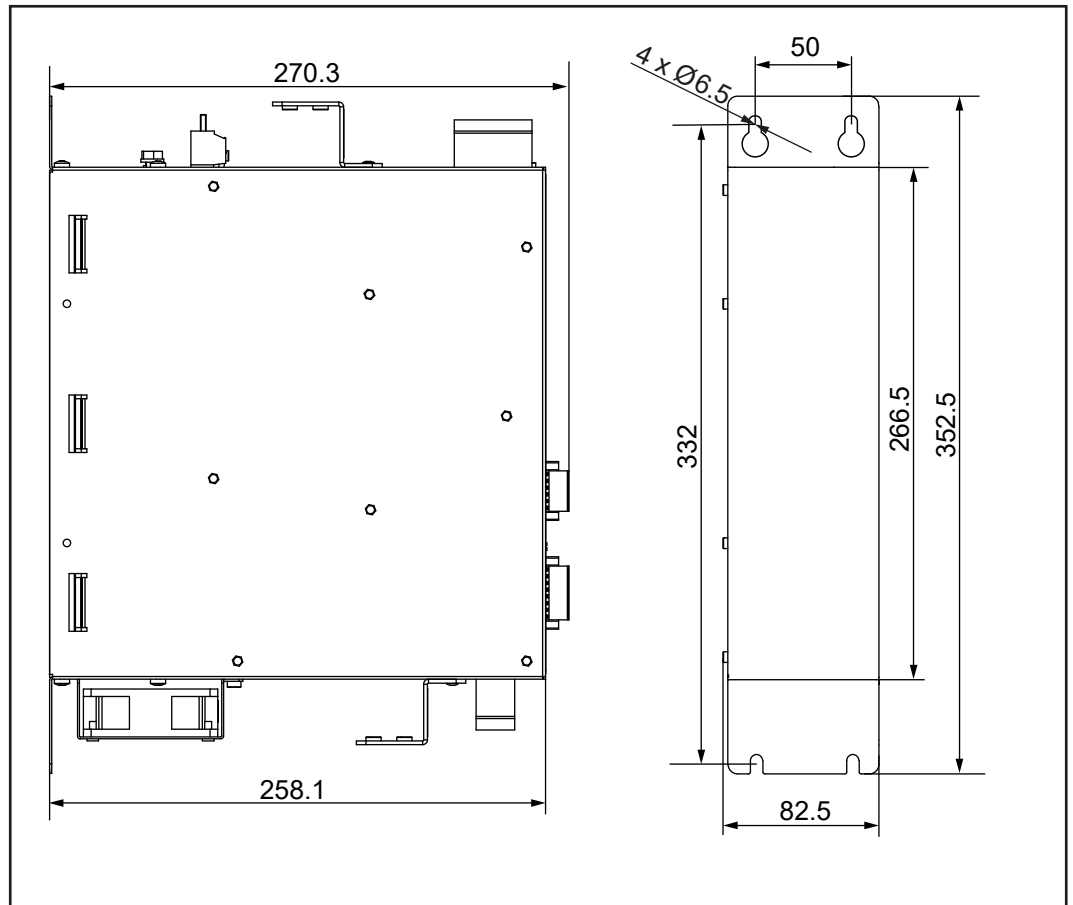


Fig. 6: Dimension in mm

i INFO

CAD data

CAD data of the device can be found in the download area of our [homepage](#).

4.2 Mechanical specifications

Parameter	Description	Standards
Mounting orientation	Vertical	
Weight	5.8 kg	
Housing specifications		
Material	Metal	
Cooling	External fan	
Vibration strength		
Frequency sweeps	1 octave/minute, sinusoidal	DIN EN 61131-2 DIN EN 60068-2-6
Constant acceleration	2 g	5 Hz ≤ f ≤ 500 Hz
Number and direction	10 sweeps for all 3 spatial axes	
Shock resistance		
Type of shock	Half-sine wave	DIN EN 61131-2 DIN EN 60068-2-27
Intensity and duration	20 g for 11 ms	
Number and direction	3 shocks in both directions of the 3 spatial axes	
Degree of protection		
Degree of protection	IP20	DIN EN 60529

Tab. 3: Mechanical specifications

4.3 Electrical properties

Power range

Parameter	Rated voltage (min)	Rated voltage	Rated voltage (max)
Three-phase rated voltage	AC 230 V	AC 400 V	AC 480 V
Type of earthing system	Must connect to a TT network or TN network.		
System voltage (rated voltage between phase and ground)	300 V max Installation category III		
Input voltage range	180 ... 520 V (50/60 Hz)		
Mains voltage unbalance	< 3 % of input voltage		
Short circuit rated current of the line	5 kA max		
Line filter	Integrated		

Parameter	Rated voltage (min)	Rated voltage	Rated voltage (max)
Mains fuses (to be provided by user)	SIBA 50 124 06.50 Alternative fuses (CE): – Bussmann cod. FWP-50A14F – ITALWEBER AQS-F14x51 cod.1480050 or Other fuses providing 50 A rating, fast-switching with $I^2T \leq 700 \text{ A}^2 \text{ s}$		
Power contactor (to be provided by user)	Three power terminals NO + 24 Vdc coil, IEC 60947 compliant or with Schneider series LC1D40 (UL)		
Input current	41 A _{eff}	44 A _{eff}	39 A _{eff}
Input current with line inductance (to be provided by user)	-	34 A _{eff}	-
Output rated voltage	DC 324 V	DC 564 V	DC 677 V
Output rated current (CH1+ CH2)	40 A	40 A	33 A
Output current (max) ($\leq 5 \text{ s}$)	80 A	80 A	66 A
Output rated power	13 kW	22.5 kW	22.5 kW
Output power pulse ($\leq 5 \text{ s}$)	26 kW	46 kW	46 kW
Current of each individual output channel	25 A		
DC link capacity	1500 μF		
Heat dissipation (w/o consideration of braking chopper power dissipation)	200 W		

Tab. 4: Power range data

Control range

Parameter	Description
Supply voltage range	DC 24 V -10 % ... +10 %
Internal fuse	4A-T, not-replaceable
Power consumption on control voltage side	0.6 A (Dig Out Off) Can reach 1.4 A for 100 ms when (AC) mains voltage is applied to JMX-15P and the transition from the HVDC CHECK to the operating state occurs.
Digital outputs	Output voltage DC 24 V
	Type PNP
	Output current = 0.9 A (0.3 A for each output; the output voltage depends on the voltage provided by connection X3).
RTO contact	Maximum voltage: 30 Vac/Vdc Maximum current: 1 A

Tab. 5: Values of control range**Braking resistor socket X1**

Parameter	Description / Value
Type of plug	Phoenix PC 5/ 3-ST1-7,62 (1777736), female
Number of pins	3
Line cross-section	0.2 ... 6 mm ²
Tightening torque	0.8 Nm
Rated voltage	1000 V
Rated current	41 A

Tab. 6: Braking resistor socket X1**Voltage supply power range socket X2**

Parameter	Description / Value
Type of plug	Phoenix PC 16/ 4-ST-10,16 (1967391), female
Number of pins	4
Line cross-section	0.75 ... 16 mm ²
Tightening torque	1.7 ... 1.8 Nm
Rated voltage	1000 V
Rated current	76 A

Tab. 7: Voltage supply power range socket X2

Voltage supply control range socket X3

Parameter	Description / Value
Type of plug	Phoenix MC 1,5/ 3-ST-3,81 (1803581), female
Number of pins	3
Line cross-section	0.14 ... 1.5 mm ²
Tightening torque	0.22 ... 0.25 Nm
Rated voltage	160 V
Rated current	8 A

Tab. 8: Voltage supply control range socket X3

I/O interface socket X5

Parameter	Description / Value
Type of plug	Phoenix MCVR 1,5/ 6-STF-3,5 (1863343), female
Number of pins	6
Line cross-section	0.13 ... 1.5 mm ²
Tightening torque	0.22 ... 0.25 Nm
Rated voltage	160 V
Rated current	8 A
Inputs	1, type PNP
Typical input current @Vin = 24 V	4.8 mA
Input voltage (high or low logic level)	
Nominal	DC +24 V
For Low signals	-30 V ... +5 Vdc
For high signals	+15 V ... +30 Vdc
Outputs	3, type PNP
Max. output current	Per output 300 mA
Supply voltage	24 V (obtained internally from 24 V applied to X3).
Galvanic isolation	via opto-isolators
Protection	Reversal of polarity, additional overvoltage and short circuit for the outputs
RTO contact	
Max. voltage (OFF)	30 V
Max. current (ON)	1 A
Protection against short circuit	Not available

Parameter	Description / Value
Maximum permissible voltage between RTO (pin 5 or 6 of X5) and GND (pin 3 of X3)	50 V*
* Voltage limitation must be achieved using a choke capacitor at the connections of the contactor coil.	
Opening time of the contacts	< 150 ms
Peak voltage generated by the coil	≤ 50 V

Tab. 9: I/O interface socket X5

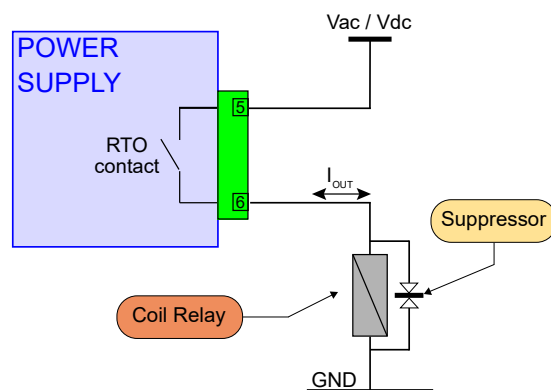


Fig. 7: Example of RTO contact wiring

Output power sockets X7 and X8

Parameter	Description / Value
Type of plug	Phoenix IPC16/2-ST-10,16 (1969373), female
Number of pins	2
Line cross-section	0.75 ... 16 mm ²
Tightening torque	1.7 ... 1.8 Nm
Rated voltage	1000 V
Rated current	76 A

Tab. 10: Output power sockets X7 and X8

4.4 Torque reduction

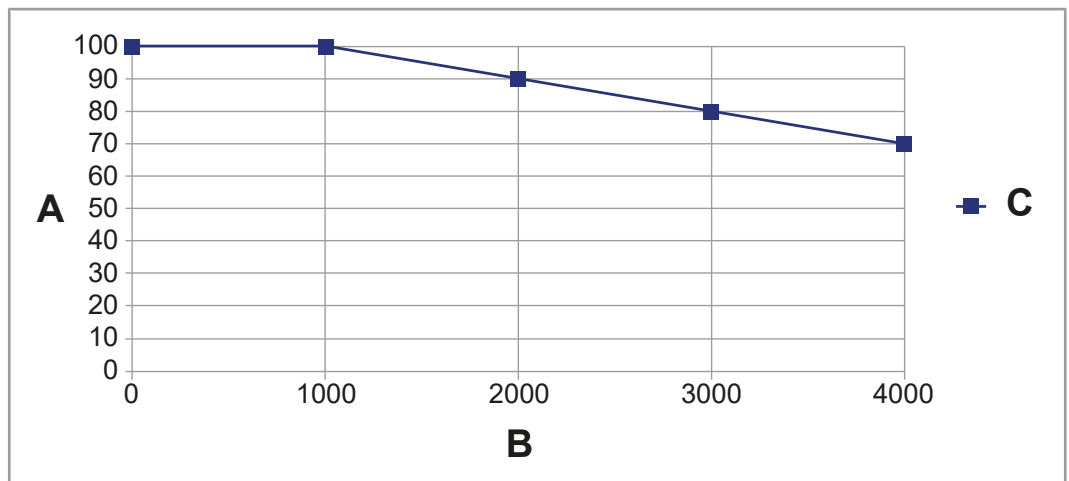


Fig. 8: Torque reduction depending on the altitude

A	Torque in %
B	Altitude in m
C	Torque

The output power depends on the heat dissipation of the power supply unit to the external environment. In case of insufficient dissipation, the overtemperature monitoring of the power section intervenes when the heat sink exceeds a temperature of 90 °C.

Thermal protection is not activated if the output current reaches the nominal value, the ambient temperature does not exceed 40 °C and the braking resistor does not generate excessive heat.

4.5 Environmental conditions

Parameter	Description	Standards
Operating temperature	0 ... +40 °C	DIN EN 61131-2
Storage temperature	-20 °C ... +70 °C	DIN EN 60068-2-1
Relative humidity	5 % ... 95 % at 40 °C, Non-condensing	IEC 60068-2-78
Max. operating altitude	4000 m above sea level	DIN EN 61131-2
<p>NOTICE! For an installation altitude between 2,000 m and 4,000 m above sea level, in order to counteract the transient overvoltages, overvoltage protection must be installed on the machine to restrict the overvoltages of the circuit to overvoltage category II. This can be achieved with a galvanic isolation transformer.</p>		
Installation location	Control cabinet	
Corrosion and chemical resistance	No special measures have been taken in regard to corrosion. The ambient air must be free of high concentrations of acids, alkalis, corrosive agents, salt, metal vapors or other corrosive or electrically conductive impurities.	
Degree of pollution – electronic environment	Level 2	DIN EN 61131-2
	Only non-conductive pollution occurs. Occasionally, however, temporary conductivity due to condensation is to be expected.	

Tab. 11: Environmental conditions

5 Mechanical installation

This chapter describes how to install and remove the JMX-15P23-R1A0.

WARNING



Non-observance of safety instructions may result in personal injury and material damage

- ▶ Prior to installing the device, read and follow the safety precautions and restrictions of use as set out in the Safety chapter.
- ▶ All work on the device must be carried out only by authorized and qualified personnel.

NOTICE



Damaged devices

Damaged devices may cause considerable physical damage.

- ▶ Check the device for external damage and faulty connections.
- ▶ Ensure to install only fully functional devices.

5.1 Installing the supply unit

Perform the following steps to install the JMX-15P23-R1A0:

1. Hold the JMX-15P23-R1A0 vertical on the mounting plate of the control cabinet.
2. Ensure that the distance above and below the supply unit is 100 mm. Maintain a distance of at least 50 mm on both sides.
3. Avoid installation at points in the control cabinet where high temperatures occur.
4. Mark four points on the mounting plate for the mounting holes. Refer to figure [Dimensions \[▶ 18\]](#) for the respective dimensions.
5. Drill the holes and cut the threads.
6. Screw the fastening screws halfway into the threads.
7. Hang the supply unit with the keyholes in the rear panel onto the fastening screws.
8. Tighten the fastening screws.

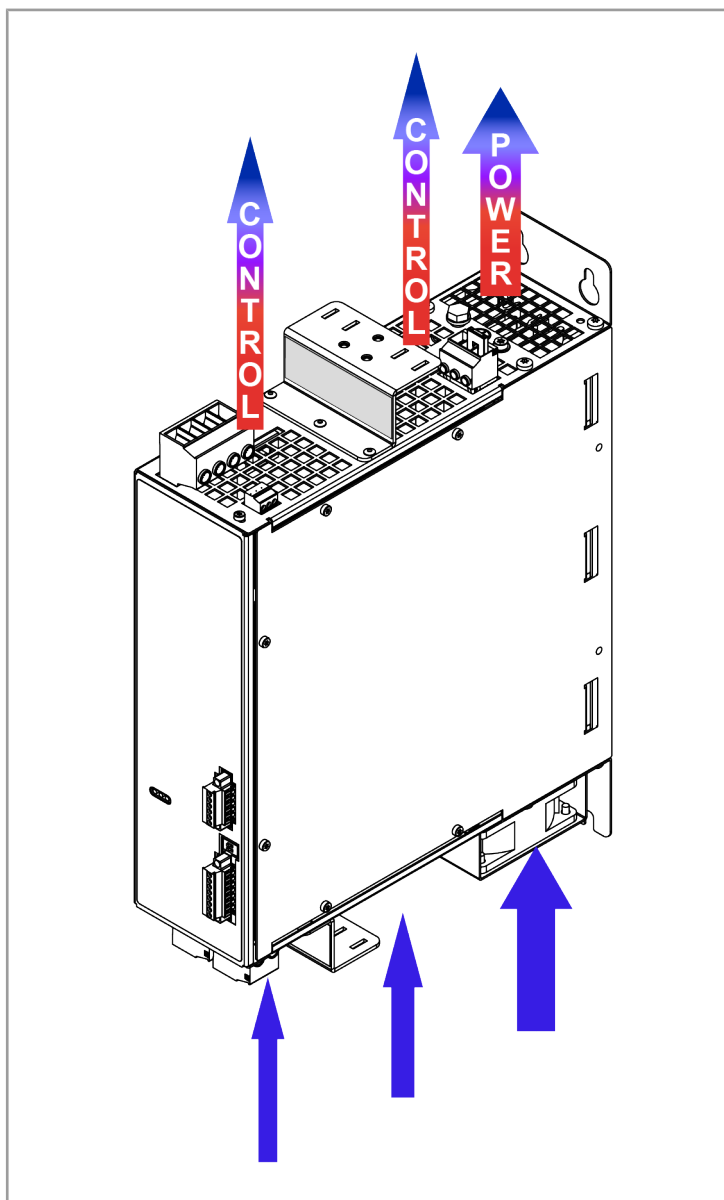


Fig. 9: Heat dissipation

5.2 Dismantling the supply unit

Perform the following steps to dismantle the JMX-15P23-R1A0:

1. Disconnect the JMX-15P23-R1A0 from all possible sources of supply.
2. Unscrew the four fastening screws halfway.
3. Lift the supply unit slightly and remove it from the fastening screws.

6 Electrical connection

This chapter contains information on the complete connection diagram, the interfaces, the pin assignment and the characteristics of the digital inputs and outputs.

DANGER



Electric shock

An incorrect connection can lead to high electrical voltage.

- ▶ Connect the power grid and grounding according to applicable safety requirements.

DANGER



Risk due to high electrical voltage

Touching live parts may result in death or severe injury.

- ▶ Carry out the following steps before starting work to ensure safety.
 - ☑ Prepare for turning off the system. Inform everyone involved who will be affected by the process.
 - ☑ Isolate the drive system from the power supply and secure it against being turned on again.
 - ☑ Wait for the discharge time (approx. 10 minutes) and check all power connections to ensure they are at zero potential.
 - ☑ Ground according to requirements.
 - ☑ Cover over neighboring live parts.
 - ☑ Ensure the drives cannot move.
 - ☑ Depressurize the compressed air lines and ensure that the pressure is released.

DANGER



Risk of electric shock

If the braking resistor is not dimensioned correctly or not available at all, the overvoltage cannot be dissipated. This can lead to unintentional turning off due to overvoltage, which causes the motor to run down.

This might result in fatal accidents, serious personal injury and/or material damage.

- ▶ Before turning on the power supply, always make sure that the braking resistor is plugged into connection X1 and configured correctly.

⚠ WARNING**Risk of burns due to hot surfaces**

The device may become hot during operation and can cause burns if touched.

- ▶ Take protective measures to prevent inadvertent contact with the device, e.g. protective covers.
- ▶ Make sure that no temperature-sensitive parts, e.g. connection cables, are attached or fastened to the device.
- ▶ Ensure there is adequate heat dissipation and maintain the required distances during installation so as not to prevent or restrict ventilation.
- ▶ Allow the device to cool off for a while before carrying out cleaning or maintenance work.
- ▶ Wear personal protective equipment.
- ▶ Avoid all contact with the braking resistor.
- ▶ Do not place any flammable or heat-sensitive components in the vicinity of the braking resistor.
- ▶ In critical cases, check the temperature of the braking resistor during a test work cycle.

⚠ WARNING**Risk of fire or electric arc and damage to the device due to incorrect connection**

- ▶ Never connect an AC or DC voltage outside the intended limit values or with the polarity reversed.
- ▶ Never connect an external voltage to the output connections.

NOTICE**Material damage due to incorrect dimensioning**

Inadequately dimensioned lines can lead to overheating and thus to a risk of fire.

- ▶ The supply unit is intended for a fixed connection to a three-phase power grid type TT or TN. The rated current for the short circuit of the electrical line must be <math>< 5\text{ kA}</math>.
- ▶ Read the operating instructions of the devices you are using before starting with the installation.
- ▶ Do not make the connection for the power supply until after the wiring and the protective devices connected by it are correctly dimensioned.
- ▶ Ensure that the protective devices at the input of the supply unit have adequate interrupt rating.

NOTICE



Damages to material or functional impairment

Improper implementation of the wiring harness may cause mechanical stress.

- ▶ Protect the cables from bending, twisting or chafing.
- ▶ Install strain reliefs for the connecting cables.

6.1 Power supply

1. Make sure that the power source is suitable according to the specifications in [Electrical properties](#) [▶ 19].
2. Ensure that the input protection equipment upstream of the JMX-15P power supply offers sufficient break capacity.

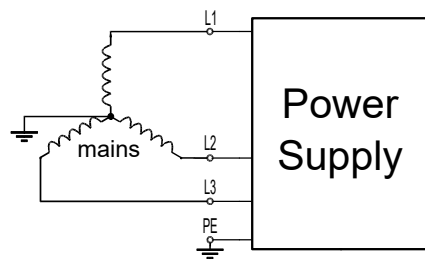


Fig. 10: Power supply

6.1.1 Connection of voltage supply and RTO contact

- ▶ Connect the voltage supplies and the RTO contact as shown in the following figure.

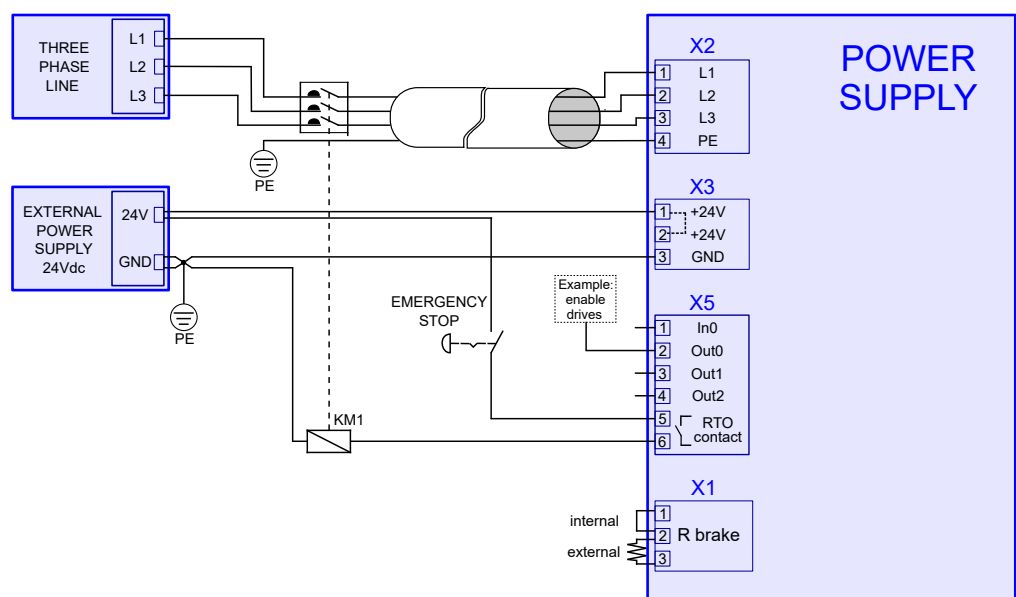


Fig. 11: Connection of power supply and RTO contact

6.2 Block diagram

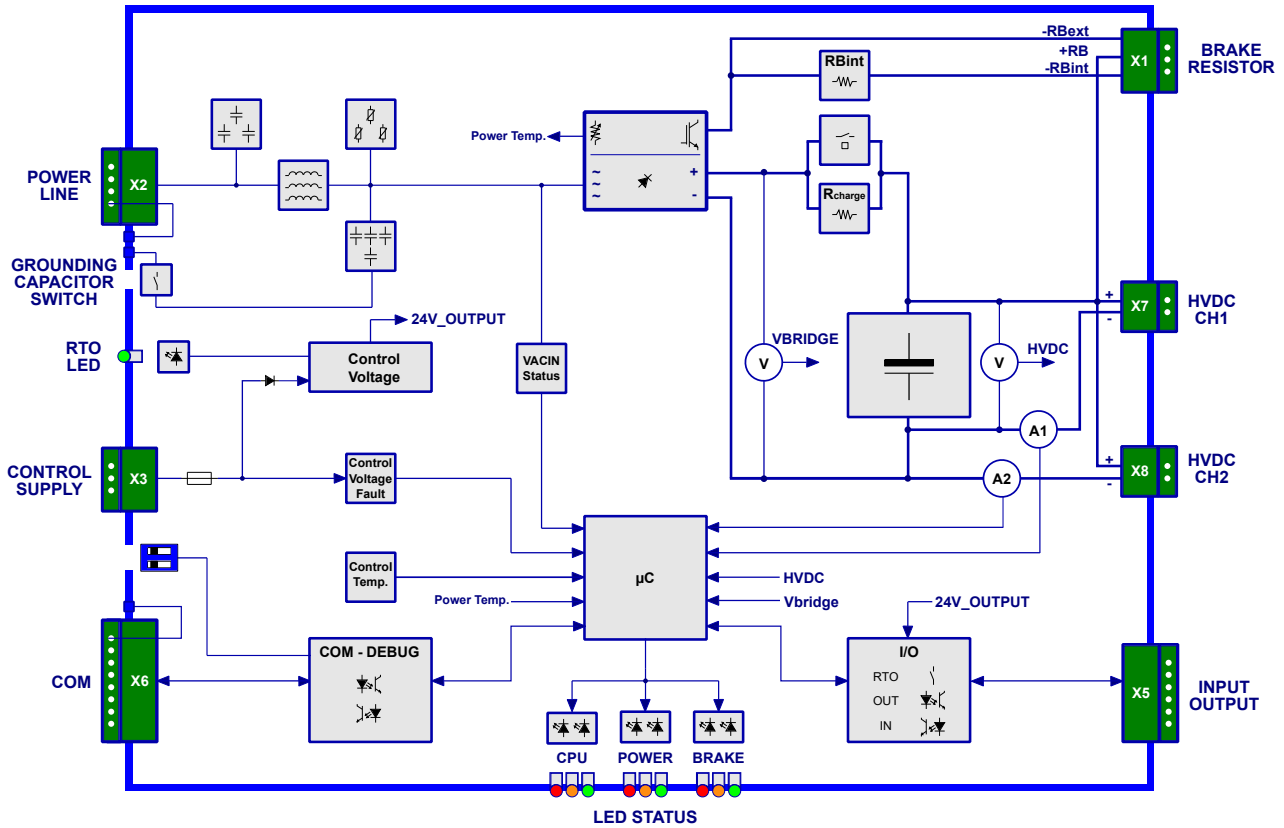


Fig. 12: Block diagram

6.3 Test installation

WARNING! Observe all the relevant safety regulations when performing a quick test installation outside the control cabinet.

- ✓ The input voltages of the system have been selected correctly.
- 1. Also consider the following factors.
- 2. Install the following components to ensure proper functioning of the power supply and adequate protection:
 - Short-circuit protection device (fuses on each phase of the input line)
 - It must immediately protect the internal power electronics of the JMX-15P23-R1A0 in the event of a short circuit in the HVDC.
 - Power contactor controlled via the RTO contact (Ready To Operate) (see [Connection example](#) [▶ 33])
 - Braking resistor connection
 - ▶ Make sure connection X1 of the braking resistor is configured correctly and plugged into the system (see [Connection X1 – braking resistor connection](#) [▶ 41]).

- RCD / RCM device
 - It may be necessary to install a type B residual current device (RCD) or a residual current monitor (RCM) upstream of the input current line.
- Line inductance
 - It may be necessary to install an appropriate three-phase choke upstream of the mains input (see).

Other factors

There are also other factors to consider which, unlike the previous ones, do not cause any damage to the power supply but can lead to a malfunction:

- Checking the 24 V hold-up time (X3 voltage supply)
 - In the absence of control voltage, some of the internal circuits of the power supply unit will not function. Especially if the voltage of the control section falls below the threshold for the missing input voltage at the control section, the RTO contact is opened.
 - The voltage at the control section must be guaranteed for at least 10 seconds after the mains voltage has been interrupted.
- Check the HVDC readiness status
 - Wait for the operating state before releasing the output load (e.g. servo motors) to avoid undervoltage errors or an excessive HVDC ripple. This status can be checked by means of the logical state of the digital output OUT0 (see **HVDC Ready** [▶ 44]).

6.4 Connection example

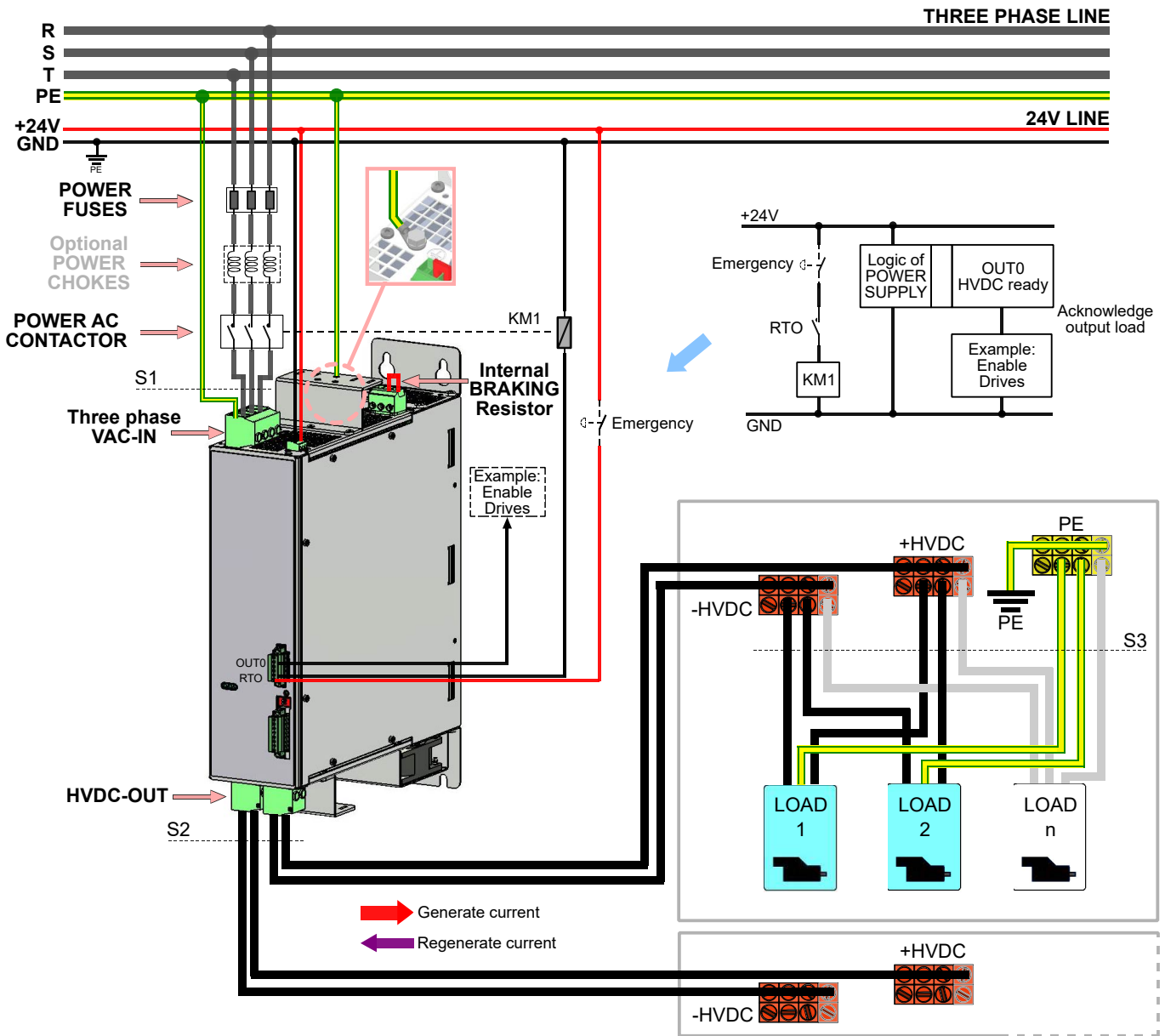


Fig. 13: Connection example

6.4.1 Line cross-sections

The line cross-sections in the following table refer to PVC-insulated copper lines according to installation method C, at an ambient temperature of 40 °C.

Cable name according to figure above	Value
S1 – input line	10 mm ²
S1 - PE	10 mm ²
S2	2.5 mm ²
S3	2.5 mm ²
Line section made from copper strands	

Tab. 12: Line cross-section

NOTICE! For other operating conditions or parameter values, refer to IEC 60204-1, IEC 60364-5-52 or other relevant standards.

6.5 Input connection

Two supplies are required for the system to function correctly:

- For the control range, a DC voltage (direct voltage)
- For the power range, a three-phase AC voltage

To ensure safety and proper operation of the product as well as noise level limitation, it is necessary to establish the protective grounding via a low-impedance conductor (see [Protective conductor connection \[▶ 40\]](#)). This conductor must be connected to the protective conductor of the machine.

The contactor upstream of the power range is controlled by the control section via the RTO contact.

Supply sequence

There are no restrictions regarding the supply sequence: The control voltage can be fed in first and then the power voltage, or vice versa.

But the system cannot be turned on without the control voltage. Therefore, the LEDs do not light up in this situation. See [Status display LEDs \[▶ 15\]](#).

Notes on connection

1. Use a cable with a suitable cross-section to connect the power supply (see [Electrical properties \[▶ 19\]](#)).
2. Secure the cable to the top bracket of the power supply unit with a cable tie.
3. Check whether the value of the supply voltage at the plug of the control section is sufficient. Make sure that this range is observed, especially when using a long mains cable.
4. If necessary, compensate for any voltage drop in the cable by connecting a higher voltage upstream.

6.5.1 Fuses

Control section

The control section is equipped with a NON-REMOVABLE (and non-resettable) fuse. If the fuse blows, the electronics have most probably been damaged.

- ▶ In this case, please contact Bucher Automation AG.

Power section

There are no internal fuses in the power section. An external fuse upstream of each input line is recommended.

6.5.2 Power chokes

Additional input phase chokes may be necessary:

- To limit the error "*The voltage ripple exceeds the limit value of the voltage ripple power section*" see **Error list** (▶ 51]) in case of unbalanced mains voltage or excessive noise.
- To increase the efficiency of the input power section by reducing the input RMS current.

Reactance values of 2-4 % are recommended. If necessary, higher values can also be selected, but they might lead to a reduction in the power of the connected systems due to the voltage drop (reduction in torque at high speeds).

Excessive malfunctions can be caused by the following factors, for example:

- Reactive power compensation devices connected in the vicinity of the frequency inverter.
- Large DC inverters without power chokes or with insufficient components connected to the mains.
- Start-up phase of the motors connected to the mains.

WARNING! These malfunctions can cause excessive current peaks in the input circuit of the power supply, resulting in unexpected alarms.

Causes of malfunctions

Choke current

The following rules must be observed when dimensioning the choke current of the line:

- Continuous rated current: Not lower than the continuous rated current at the input.
- Recurrent peak current: Not lower than twice the continuous rated current at the input.

6.6 Output connection

The power supply provides the HVDC output voltage via the power output connections X7 and X8 (CH1 and CH2). This voltage is available at both channels simultaneously. If one of the two channels fails, the entire system switches to the error state and, as a result, the voltage is no longer present in the other channel either.

DANGER! Channels CH1 and CH2 are not electrically isolated, meaning voltage is always present at both. For example, if only one channel is in use, voltage is still available at the other channel that is not in use.

The total current at the output is divided between outputs CH1 and CH2, which each measure their values via two ampere meters A1 and A2, as shown in the following diagram.

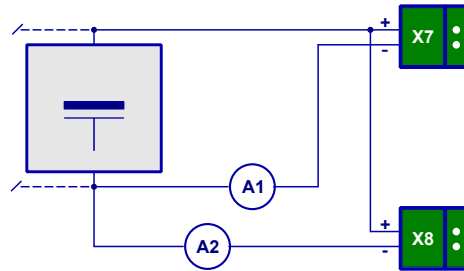


Fig. 14: Block diagram of the output

As such both outputs are protected separately against overcurrent.

Configuration

The output channels can be configured differently:

- Connection to one output channel (where the other channel is free of load)
- Separate connection of the two output channels
- Parallel connection of the two output channels

Correct parallel connection is shown in the following figure.

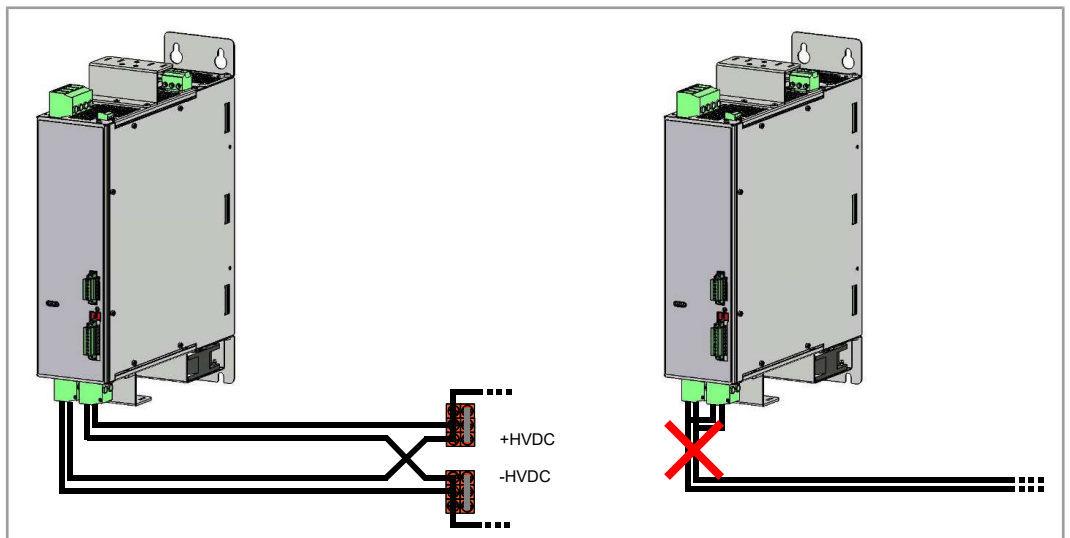


Fig. 15: Parallel connection of the output channels

Each type of connection can be additionally differentiated:

- Connection with unshielded cable:
 - The cable is 0.5 m ... 1 m long.
 - Connection with shielded cable:
 - The cable is 1 m ... 30 m long.
1. In this case, connect the cable shield to the housing with a conductive cable clamp attached to the lower bracket.
 2. When using cable lengths greater than 30 m, please contact Bucher Automation AG.

Notes on connection

- ▶ Use a cable with a suitable cross-section to connect the power outputs (see [Electrical properties](#) [▶ 19]).

Protection against short circuit at the output

Protection is required for:

- Short circuit during commissioning
 - Protection is provided by the start-up circuit, which limits the current, see section [Charging circuit and start phase](#) [▶ 38].
- Short circuit during operation
 - Protection is provided by external fuses, see [Fuses](#) [▶ 35].

6.7 Incorrect connections

Example 1

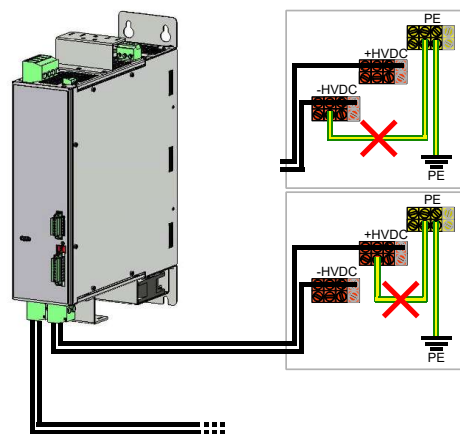


Fig. 16: Incorrect connections diagram 1

The mains supply (TT or TL) is not separated from the grounding (PE)!

- ▶ Always ensure sufficient electrical insulation.
- The HVDC voltage applied to the output of the JMX-15P is obtained from the mains voltage via a three-phase rectifier.
- The + and - HVDC signals must not be connected to PE as this would otherwise cause a short circuit and damage the diode bridge.

Example 2

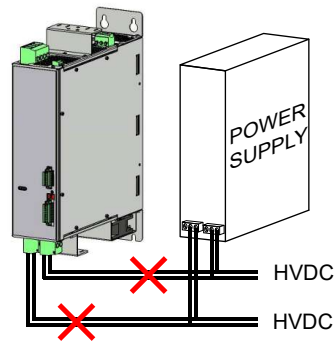


Fig. 17: Incorrect connections diagram 2

Parallel connection of any power supply unit is forbidden.

- In unfavorable cases, the regenerative currents may be asymmetrical and lead to overloading of the power outputs or cause damage.

6.8 Charging circuit and start phase

The charging circuit limits the charging current of the capacitor when turning on the power supply unit.

An excess energy and voltage level control against overheating or circuit disconnection are implemented in the circuit.

NOTICE



Increased malfunctions caused by turning on too frequently

Excessive energy transferred when turning on can lead to an error situation in the charging circuit.

- ▶ Observe the number of reboots per hour (see).

In general, the energy consumed when turning on depends on the VAC mains voltage at the system input and the output current. The worst case is when there is maximum voltage present on the VAC line and a high output current.

- ▶ Only connect loads with a negligible initial current (e.g. servo drivers).
- During start-up, the output load must be mainly capacitive.
- The power-on time of the power supply unit is approx. 2 – 4 s.

6.8.1 Correct functioning of the charging circuit

NOTICE! To understand the meaning of the signals analyzed in the following diagrams, see [Block diagram](#) [▶ 31]

Normal start

- In the start phase, the expected charging time is approx. 2 s.
- During this period, the HVDC output voltage must rise to less than 50 V of the set VBRIDGE voltage.
- $\Delta V1$ (= difference between VBRIDGE and HVDC) must be less than or equal to 50 V.
- If this is the case, the start phase is finished and the power supply moves to the next phase (OPERATIONAL logic state).

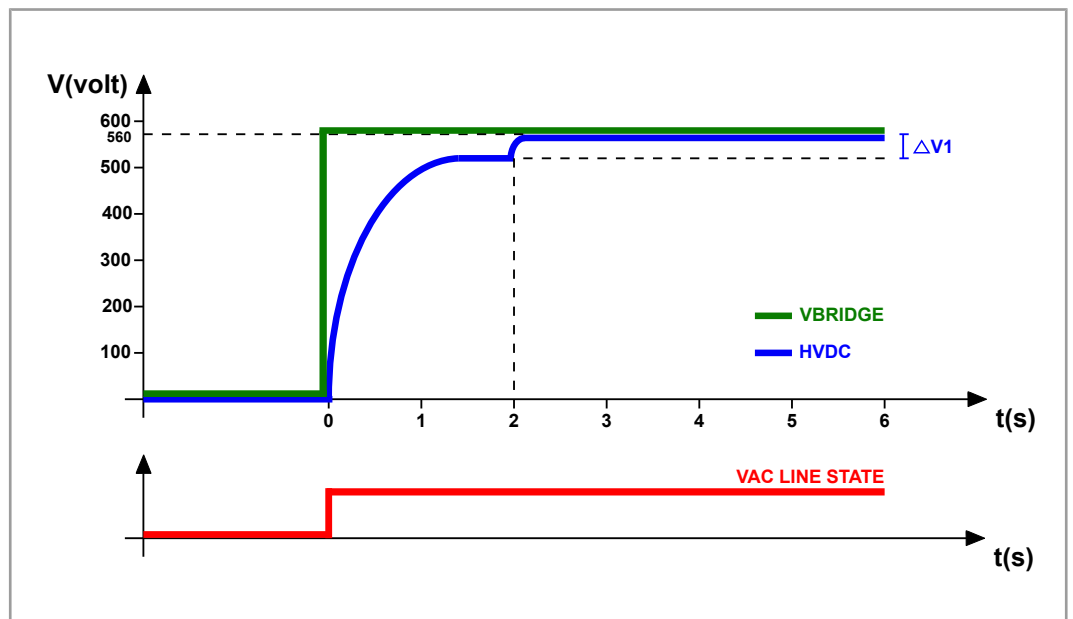


Fig. 18: Normal start example with 400 VAC input voltage

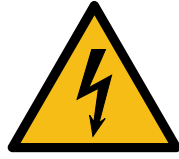
Extended start

- The HVDC output voltage rises very slowly due to a large capacitive load at the output.
- This does not lead to a malfunction as long as the voltage reaches the threshold of [VBRIDGE – 50 V] within at least 4 s.
- If it takes longer for the voltage to rise, the power supply switches to the error status (*Internal circuit ripple exceeds the limit value of the power section* [Error list](#) [▶ 51]).

Other malfunctions may also occur during the charging phase. The most likely one is *overloading of the charging circuit*. [Error list](#) [▶ 51]

6.9 Protective conductor connection

⚠ DANGER



Risk of injury due to high leakage currents at the protective conductor

The power supply can cause leakage currents > 3.5 mA at the protective conductor.

- ▶ Use a protective conductor with a minimum cross-section as specified in [Line cross-sections](#) [▶ 34].
- ▶ Observe the local regulations for the grounding connection.

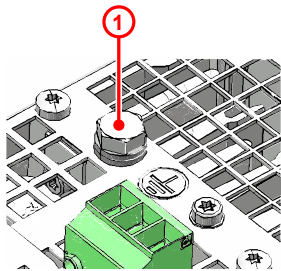


Fig. 19: Protective conductor connection

Position / Pin	Diagram	Description
1	M6	Screw for fixing the protective conductor on the top of the housing
	PE	Grounding

Tab. 13: Protective conductor

6.10 Connection X1 – braking resistor connection

Delivery status

In delivery status, the internal braking resistor has been configured.

- ▶ Do not disconnect the plug connector!

In general, the following configurations are possible:

- Internal resistor for normal applications
- Internal + external resistor for continuous applications with high inertia loads

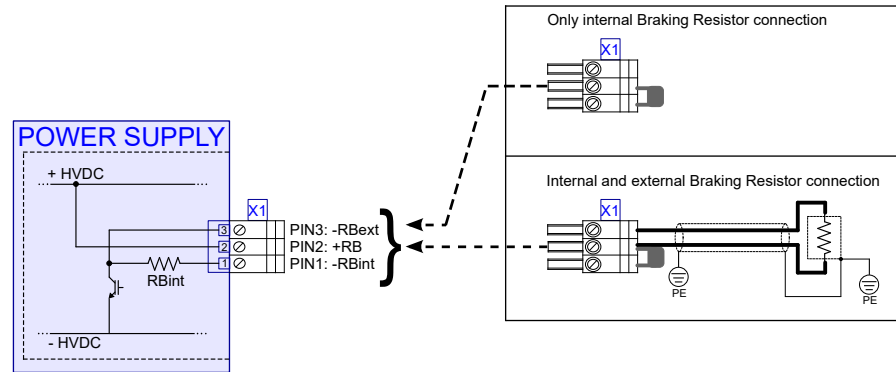


Fig. 20: Braking resistor connection

Interface

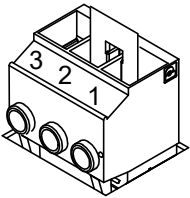


Fig. 21: Socket X1

Connect the following to socket X1:

- Braking resistor
- If an external resistor is connected, connect the cable shield to the M4 screw (see pos. 5 [Design](#) ▶ 13)).

Assignment

Pin	Diagram	Description	V _{pin} > ELV
1		<ul style="list-style-type: none"> ▶ To use the internal braking resistor, short-circuit pins 1 and 2. 	√
2			√
3		<ul style="list-style-type: none"> ▶ To use the external braking resistor, connect it between pins 2 and 3. 	√

Tab. 14: Pin assignment of socket X1

6.11 Connection X2 - three-phase voltage supply

Interface

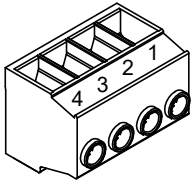


Fig. 22: Socket X2

Assignment

Connect the following to socket X2:

- Voltage supply of the supply unit JMX-15P23-R1A0

Pin	Signal	Description	$V_{pin} > ELV$
1	L1	Phase 1 of the three-phase source	√
2	L2	Phase 2 of the three-phase source	√
3	L3	Phase 3 of the three-phase source	√
4	PE	Grounding	-

Tab. 15: Pin assignment of socket X2

6.12 Connection X3 - control section voltage supply

Interface

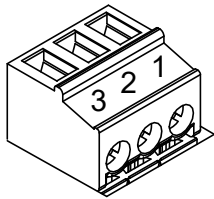


Fig. 23: Socket X3

Connect the following to socket X3:

- Voltage supply of the control section

Assignment

Pin	Signal	Description	V _{pin} > ELV
1	+24 V	+24 Vdc supply voltage	-
2	+24 V	Pins 1 and 2 are connected internally, meaning only one of them needs to be supplied with 24 V.	-
3	GND	Reference potential	-

Tab. 16: Pin assignment of socket X3

6.13 Connection X5 - I/O interface

Interface

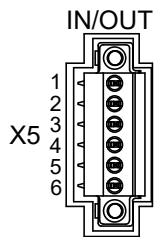


Fig. 24: Socket X5

Connect the digital inputs and outputs to socket X5.

Assignment

Pin	Signal	Description	V _{pin} > ELV
1	IN0	Reset malfunction	-
2	OUT0	HVDC Ready	-
3	OUT1	Status Vac Line	-
4	OUT2	Malfunction	-
5		Ready To Operate activating/deactivating the power supply	-
6			-

Tab. 17: Pin assignment of socket X5

6.13.1 Functions of the I/O resources

Reset malfunction

- In the event of an error state, the function attempts to restore the normal operation of the power supply.
- A minimum 100 ms positive pulse must be applied to initiate a reset.

HVDC Ready

- Output OUT0 is active (ON state, transistor turned on) when the power supply is ready to operate and malfunction free.
- If a malfunction is signaled and the RTO contact is subsequently deactivated, the output becomes inactive (OFF state, transistor turned off).

Status Vac Line

- Output OUT1 indicates the AC voltage status at connection X2 (voltage supply).
- This output is active (ON state, transistor turned on) when a three-phase or a two-phase AC voltage is present at the system input and is higher than the expected minimum value.
- The delay time for displaying the voltage state is approx. 20 ms.

Malfunction

- Output OUT2 indicates the error state of the power supply.
- If turned on, a malfunction has been detected (see [Errors and warnings](#) [▶ 49]).

6.13.2 RTO contact

- The RTO contact is used to activate/deactivate the contactor upstream of the LINE input (L1, L2 and L3 of connection X2) to the JMX-15P23-R1A0.
- The RTO contact is isolated (opto-isolated) from the other internal circuits.
- In the event of a malfunction, the RTO contact and the upstream contact are opened. As a result, the HVDC output voltage drops according to the applied load, while the connected drives generate the *Undervoltage* error message and are deactivated.

See [Fig. 7 Example of RTO contact wiring](#) under .

INFO

Reset error

A power supply error can only be reset via digital input IN0. This can be ensured, for example, via a digital output of the controller. Resetting is not possible via the bus connection to the controller.

6.14 Connection X7 and X8 - output power

Interface

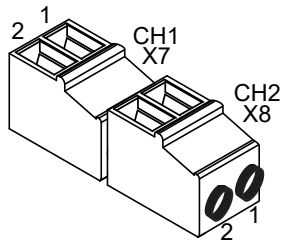


Fig. 25: Sockets X7 and X8

- Connections for the HVDC output channels. Channels CH1 and CH2 are both connected to connections X7 and X8.

Assignment

Pin	Signal	Description	$V_{pin} > ELV$
1	+HVDC	+HVDC output power	√
2	-HVDC	-HVDC output power	√

Tab. 18: Pin assignment of sockets X7 and X8

7 Control elements

7.1 Grounding capacitor switch SW1

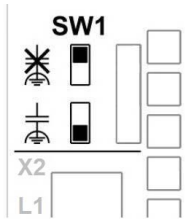


Fig. 26: Grounding capacitor switch SW1

The power supply unit has an internal noise suppression filter and is connected to ground via a capacitor.

The capacitor can be turned off using sliding switch SW1. This allows the leakage current to ground and the actual load on the capacitor to be reduced.

CAUTION



Risk of injury due to electric shock

Turning off the capacitor represents non-compliance with EMC standards.

- ▶ Therefore, always disconnect the input line before using SW1.

NOTICE! The factory set position of SW1 is the one with the capacitor connected to ground.

8 Logical states of the power supply unit

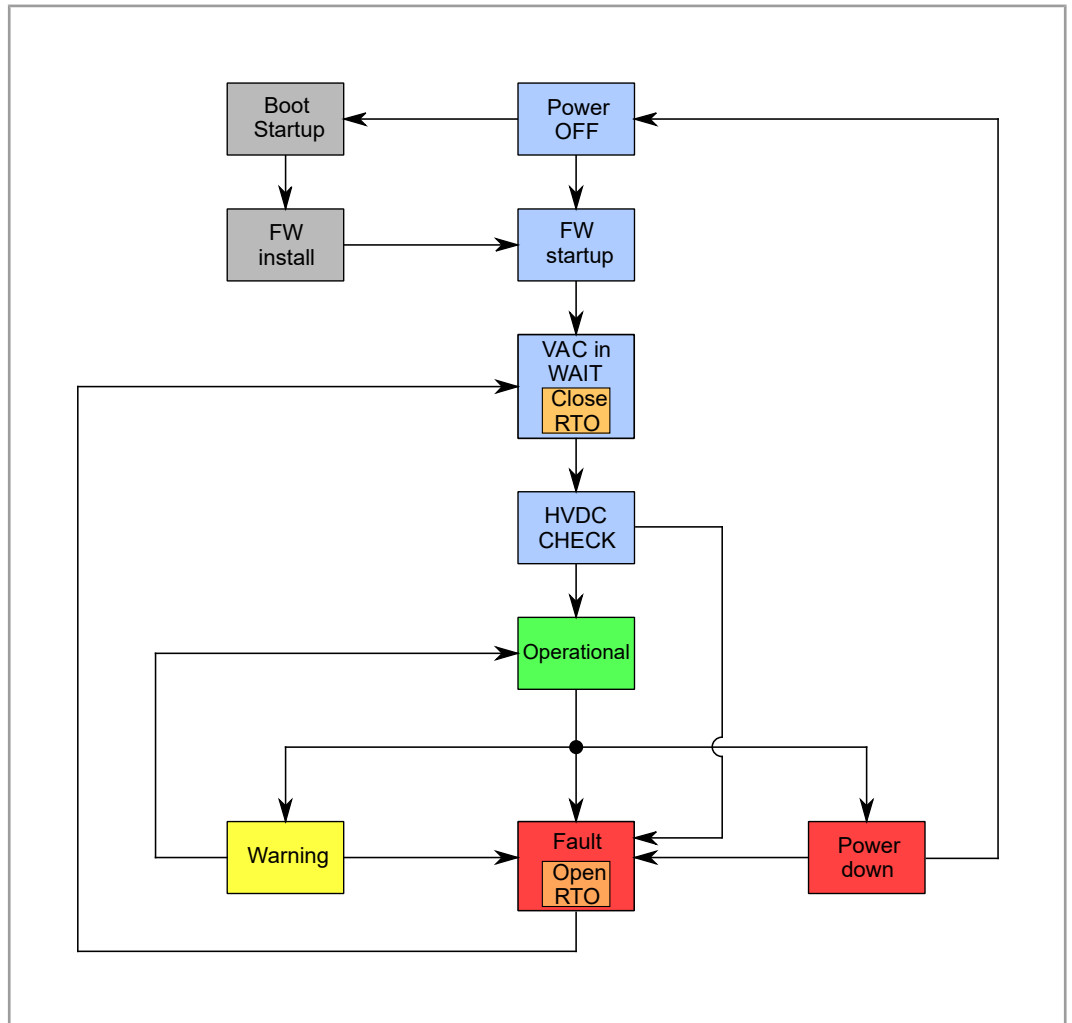


Fig. 27: Diagram of logical states

Status	Description
Power OFF	The 24 V supply of the control section is missing, the RTO contact remains blocked due to the hardware circuit.
Boot startup	24 V supply is available, boot start-up to correct a firmware anomaly (corrupted firmware or hardware and boot incompatibility).
FW install	Firmware update via the serial debug port.
FW startup	24 V supply is available, firmware start.
	24 V supply is available, system auto test, capacitor discharge.
	24 V supply is available, calibration of the measuring circuit.
VAC in WAIT	The RTO contact is closed and the VAC input voltage regulated. The next state is reached only if an input voltage is detected within the functional limits, otherwise the VAC remains in the WAIT state.

Status	Description
HVDC CHECK	Development of the output voltage is analyzed: Within the charging time of the capacitors, the voltage must rise to a value between VOUT_MIN and VOUT_MAX.
	Development of the output voltage is analyzed: The ripple must be below a safety threshold.
	If at the end of this phase all the parameters are within the limit values, the system is in a normal functional state and the device enters the operating state, otherwise it enters the error state.
Operational	The power supply functions normally, no warnings or errors are detected, the input voltage is available.
	The power supply functions normally, no warnings or errors are detected, the input voltage is not available.
Warning	The power supply unit functions normally, but one parameter has exceeded the warning threshold (voltage/current/temperature).
Fault	<p>The power supply is in this state when an error state is detected. The RTO contact is opened and the waiting time for troubleshooting commences.</p> <p>After the recovery waiting time has elapsed, the system checks whether the error has been corrected; and in this case, the power supply unit returns to the VAC in WAIT state, depending on the available recovery sources (IN0 input, automatic recovery, recovery via software with SDSetup). Otherwise the "Error" state remains in place.</p>
Power down	The power supply is in this state when the control voltage drops below the undervoltage threshold. In this case, the RTO contact is opened. When the power supply is restored, the power supply unit switches to the "NO 24V IN" state and signals the "Input voltage missing at the control section" error.

Tab. 19: Description of logical states

9 Errors and warnings

The power supply unit of the JMX-15P23-R1A0 has a few monitoring functions for its physical variables (voltage, current, temperature, etc.) to ensure correct operation and to protect the connected electronic devices. The error state signal is displayed by the **POWER LED** (see [Status display LEDs ▶ 15](#)).

9.1 Error description

Malfunctions are divided into two categories depending on their severity:

- **Warning:** Malfunction that indicates a non-serious condition of the power supply.
- **Error:** Malfunction that prevents and interrupts the power supply to the power section by opening the RTO contact (except in the absence of input voltage to the power section).

Basically, all physical variables (voltage, current, temperature, etc.) are monitored in the operating or warning state of the power supply unit.

If at least one of them exceeds the operating limits, the power supply unit enters the error state.

- All errors are **remanent**: The error remains active until the next **reset**, even if the cause of the error has been eliminated.
- **Exception:** The error *Undervoltage at the power section* is only remanent if it occurs while the power supply unit is drawing power from the supply network. Otherwise, the error is reset automatically when the input voltage reaches the correct value.

9.2 Reset error

The power supply can be restored from the error state in various ways if all the conditions listed under [Preconditions ▶ 49](#) are met.

The options are:

- **Control voltage cycle on/off:** When the control voltage is turned off and then back on, the power supply returns to the **VAC IN WAIT** state.
- **Restoration via IN0:** If a positive transition is detected at input IN0, the power supply returns to the **VAC IN WAIT** state.

9.2.1 Preconditions

The following conditions must be met to reset the errors:

- You have waited for the accumulated excess energy to be discharged.
 - Only applies to the errors listed in **Table 20**.
- You have waited for the reset time (= FaultLockTime) to elapse.
 - To avoid damage to the power supply unit, you must wait for a minimum period of time before a fault reset command can be executed.
 - Each individual malfunction is assigned a different waiting time (for details see [Error list ▶ 51](#))

NOTICE



Loss of the FaultLockTime

The FaultLockTime is lost after turning off the control voltage. The accumulated energy value is stored after turning off the control voltage only for errors whose values are stored in the remanent memory.

- ▶ In the event of an error, do not interrupt the control voltage until the storage time and the FaultLockTime have elapsed to avoid any internal damage.

Error	1 % discharge in	100 % discharge in	Remanent storage after turning off the control voltage
Brake circuit energy overload exceeds the limit value	0.5 s (CE)	50 s (CE)	√
Overloading of the charging current circuit	0.5 s (CE)	50 s (CE)	√
Cable energy overload exceeds the limit values at channel 1	24.8 s	2480 s	√
Cable energy overload exceeds the limit values at channel 2	24.8 s	2480 s	√
Device energy overload exceeds the limit value	0.15 s	15 s	-
Device energy overload exceeds the limit values at channel 1	0.17 s	17 s	-
Device energy overload exceeds the limit values at channel 2	0.17 s	17 s	-

Tab. 20: Estimation of the maximum discharge time of the accumulated energy

9.3 Error list

Type of error	FaultLockTime (s)	Error code	Warning	Error	Description
Undervoltage at the power section	5	1	-	√	<p>HVDC RMS voltage lower than the minimum limit.</p> <ul style="list-style-type: none"> ▶ Check that the input voltage (VAC_IN) is within the expected operating range and that there is no phase voltage difference or voltage drop.
Overvoltage at the power section	5	2	-	√	<p>HVDC RMS voltage higher than the maximum limit.</p> <ol style="list-style-type: none"> 1. Check that the input voltage (VAC_IN) is within the expected operating range. 2. Check that the overvoltage is due to the regenerative current of the connected drives.
The voltage ripple exceeds the limit value of the power section	10	3	-	√	<p>Voltage ripple is higher than 25 % of the rated voltage for 700 ms.</p> <ol style="list-style-type: none"> 1. Check that the input voltage (VAC_IN) is a three-phase voltage within the expected operating range and that there are no voltage drops. (If one of the three phases is missing and there is an output load available, higher ripples will be generated on the HVDC which can trigger this error). 2. Check that the overload conditions are met at the output line (HVDC).

Type of error	FaultLockTime (s)	Error code	Warning	Error	Description
Overtemperature of the control section	10	4	√	√	The temperature of the control section exceeds the maximum value. <ul style="list-style-type: none"> ▶ Check the ambient temperature of the power supply and its correct position and ventilation in the control cabinet.
Overtemperature of the power section	10	5	√	√	The temperature of the power section exceeds the maximum value. <ol style="list-style-type: none"> 1. Check the ambient temperature of the power supply and its correct position and ventilation in the control cabinet. 2. Check how frequently the braking chopper engages if the internal brake resistor is used.
Overcurrent of the power section	10	6	-	√	The current output current exceeds the maximum limit value. <ul style="list-style-type: none"> ▶ Check the output current and any peak values.
Energy overload of the device	10	7	√	√	The energy supplied by the power supply exceeds the maximum value. <ul style="list-style-type: none"> ▶ Check that the RMS output current is not higher than the max. output current (20 A for JMX-15P11; 40 A for JMX-15P23)
Energy overload of the brake circuit	10	8	√	√	The energy supplied by the overvoltage protective circuit exceeds the maximum value. <ul style="list-style-type: none"> ▶ Check how frequently the brake circuit engages.

Type of error	FaultLockTime (s)	Error code	Warning	Error	Description
Overvoltage of the HVDC output when braking	-	-	√	-	The output voltage exceeds the maximum activation threshold of the brake circuit by 15 V. <ul style="list-style-type: none"> ▶ Check the value of the braking resistor or reduce the braking dynamics of the motor (deceleration ramps).
Missing input voltage at the power section	9	-	√	√	Missing input voltage at the power section. <ul style="list-style-type: none"> ▶ Check the RTO contact and power relay activation, the upstream power relay supply and status of all the fuses and disconnecting switches.
Short circuit in the brake circuit	10	10	-	√	Short circuit detected in the braking chopper area. <ul style="list-style-type: none"> ▶ Check the braking resistor at connection X1 (connect the external resistor and check its value).
Missing input voltage at the control section	0.1	11	-	√	Missing power supply of the control section (< 18 VDC). <ul style="list-style-type: none"> ▶ Check that the 24 V supply at the X3 voltage supply is within the permissible range and that no voltage dips occur during operation.
Overloading of the charging current circuit	100	12	-	√	The energy supplied by the charging current limiting circuit of the capacitor is higher than the maximum value. <ul style="list-style-type: none"> ▶ Make sure that loads are not applied to output connections X7 and X8 during start-up (the output load must be mainly capacitive during this procedure).

Type of error	FaultLockTime (s)	Error code	Warning	Error	Description
Missing configuration parameters	-	13	-	√	<p>Configuration parameters damaged or not available.</p> <p>The power supply unit cannot be used because the parameter set that characterizes it is not valid and cannot be recovered by the user.</p> <ul style="list-style-type: none"> ▶ Return for repairs, please contact Bucher Automation AG.
Energy overload of the device exceeds the limit value at channel 1	10	16	√	√	<p>The energy supplied in channel CH1 exceeds the maximum value.</p> <ul style="list-style-type: none"> ▶ Check that the RMS output current at CH1 is within the range.
Energy overload of the device exceeds the limit value at channel 2	10	17	√	√	<p>The energy supplied in channel CH2 exceeds the maximum value.</p> <ul style="list-style-type: none"> ▶ Check that the RMS output current at CH2 is within the range.
The internal circuit ripple exceeds the limit value of the power section	10	18	-	√	<p>During start-up, the output voltage difference (ripple) between VBRIDGE (set value of HVDC) and the actual value of HVDC is greater than 50 V.</p> <ul style="list-style-type: none"> ▶ Make sure that excessive loads are not applied to output connections X7 and X8 during start-up.
The input voltage drops at the power section	5	19	-	√	<p>Input voltage drop for more than 20 ms and the HVDC output voltage value is less than 65 % of the rated voltage.</p> <ul style="list-style-type: none"> ▶ Check the VAC_IN input AC voltage, wiring and protection from the power supply.

Type of error	FaultLockTime (s)	Error code	Warning	Error	Description
Energy overload of the cable exceeds the limit value at channel 1	100	21	√	√	RMS output current of the cable connected to X8 (CH1) exceeds the maximum value. <ul style="list-style-type: none"> ▶ Check that the RMS output current at CH1 is within the limit value of 10 A for the JMX-15P11 and 20 A for the JMX-15P23.
Energy overload of the cable exceeds the limit value at channel 2	100	22	√	√	RMS output current of the cable connected to X8 (CH2) exceeds the maximum value. <ul style="list-style-type: none"> ▶ Check that the RMS output current at CH2 is within the limit value of 10 A for the JMX-15P11 and 20 A for the JMX-15P23.
Hardware configuration invalid	10	20	-	√	Hardware configuration invalid. <ul style="list-style-type: none"> ▶ Return for repairs, please contact Bucher Automation AG.
IGBT feedback error in the brake circuit	10	24	-	√	Short circuit malfunction detected in the IGBT brake circuit. <ul style="list-style-type: none"> ▶ Check the connections of braking resistor X1 or contact Bucher Automation AG.

Tab. 21: Error list

10 Service

10.1 Customer service

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

[Technical hotline | Bucher Automation - We automate your success.](#)

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

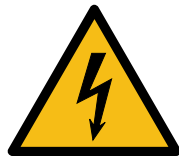
hotline@bucherautomation.com

Please supply the following information when contacting our technical hotline:

- Hardware revision and serial number
For the hardware revision and serial number of your product, please refer to the nameplate.

11 Maintenance

⚠ DANGER



Electric shock

The high electrical voltage of the device / plant can lead to serious injury.

- ▶ Only fully trained electricians may perform troubleshooting, repair or servicing work.
- ▶ Always disconnect the device / plant from the mains supply before performing any work by turning off the main switch or unplugging the mains plug.
- ▶ Secure against accidental reconnection.

Maintenance plan

Part		Maintenance interval	Maintenance work
Heat sinks		Every 6 to 12 months	<ul style="list-style-type: none"> – Temperature inspection and cleaning – Depending on the amount of dust in the environment
Capacitors		Annually, during storage	<ul style="list-style-type: none"> – Capacitor regeneration <ul style="list-style-type: none"> ▶ Please send the product for regeneration to Bucher Automation AG
Capacitors of the HVDC power range	Without power choke	After 20000 h at 40 °C	Replace
	With power choke	After 30000 h at 40 °C JMX-15P11 = inductance 1.2 mH 25 A _{eff} JMX-15P23 = inductance 0.58 mH 50 A _{eff}	
Fans	internal	Only JMX-15P23 After 90000 h	Replace
	External	After 200000 h	

Tab. 22: Maintenance plan

11.1 Repairs

Defective components could cause dangerous malfunctions and could compromise safety.

Only the manufacturer is allowed to repair the device.
It is forbidden to open the device.

Modifications to the device

Modifications and alterations to the device and its functions are not allowed. In the case of modifications to the device, any liability is excluded.

The original parts are specifically designed for the device. Parts and equipment from other manufacturers must, therefore, not be used.

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

11.2 Storage and shipment

Storage

When storing the device observe the environmental conditions given in chapter “Technical specifications”.

Shipment and packaging

The device contains electrostatically sensitive components which can be damaged if not handled properly. Damages to the device may impair its reliability.

To protect the device from impact or shock, it must be shipped in its original packaging, or in an appropriate protective ESD packaging.

In case of damaged packaging inspect the device for any visible damage, and inform your freight forwarder and the Bucher Automation AG of the damage caused during shipment. If the device is damaged or has been dropped, it is strictly forbidden to use it.

11.3 Return and disposal

How to dispose of waste equipment

Return your Bucher Automation AG product to us for proper disposal. Visit our [home-page](#) for detailed information and to download the required Returns form.

Meaning of the WEEE icon

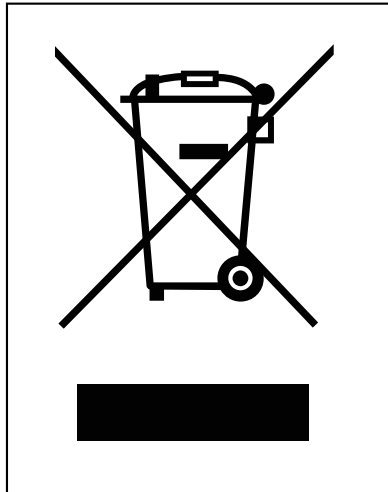


Fig. 28: WEEE icon – crossed-out trash can

Applicable local environmental directives and regulations must be complied with. The product is waste electronic equipment and must be disposed of by a certified waste management facility. Do not dispose of the product with normal household waste.

Personal data

Customers are responsible for deleting personal data from waste equipment prior to its disposal.

12 Order code

Field	Description	XXXXX	XX	-RX	AX
Series	Three-phase power supply (rectifier)	JMX-15P			
Power	Rated current that can be supplied to the 20 A output (11.3 kW @ 400 VAC input)		11		
	Rated current that can be supplied to the 40 A output (22.6 kW @ 400 VAC input)		23		
Internal braking resistor	Internal braking resistor included (120 W)			R1	
Hardware version					A0

Tab. 23: Order code

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