

SIEMENS



Industrial Controls

Load Feeders and Motor Starters

SIRIUS MCU Motor Starters

Manual

Edition

08/2014

Answers for industry.

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MCU motor starters

Manual

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Safety notes

1.1 Information regarding safety and conformity

Before installing and commissioning this device, read the safety and warning information.

WARNING

This device must only be installed, operated, and maintained by suitably qualified personnel.

Only permanently wired mains connections are permissible. The device must be grounded (IEC 536, Class 1, NEC and other relevant standards).

Mains terminals can carry hazardous voltages even after the motor has been switched off.

When performing work on the opened device, remember that live parts are exposed. Do not touch these parts.

Under certain setting conditions, the motor may start automatically following a power failure.

Devices with a three-phase mains connection must not be connected to the network via an earth-leakage circuit breaker (see EN 50178, section 6.5).

Observe all the general and local installation and safety regulations when working on power installations. The relevant regulations regarding the correct use of tools and the use of equipment for personal protection must also be observed.

This device must not be used as an "EMERGENCY STOP" mechanism.

Note

Steps must be taken to ensure that children and unauthorized persons cannot come into contact with the device.

The operating instructions must be kept close to the device and a copy issued to all operators.

Note

This device must only be used for its intended purpose as defined by the manufacturer. Do not make any alterations to the device and only use original spare parts or spare parts recommended by the manufacturer. Non-compliance can result in fire, electric shocks, or injury.

WARNING

Observe all the general and local installation and safety regulations when working on power installations (e.g. VDE) as well as the relevant regulations regarding the correct use of tools and the use of equipment for personal protection.

Prior to commissioning, ensure the following:

- All electrical connections, fastening screws, and connecting elements have been properly fitted and tightened.
- All protective conductors have been correctly installed.
- All auxiliary devices (e.g. mechanical brakes) are fully operational.
- Protective covers for live parts have been fitted.

Note

The printed circuit boards contain highly sensitive components that are particularly sensitive to static electricity. For this reason, avoid touching components and their connections. Physical contact can only be made if appropriate ESD protective measures have been taken.



WARNING

Before switching on the device, close the cover for the device and tighten the fastening screws with the following torque values.

3RV: 2 ... 2.5 Nm

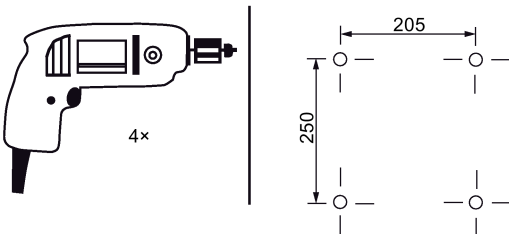
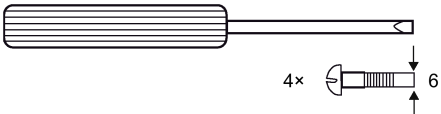
Cover: 3.4 Nm

Mechanical installation

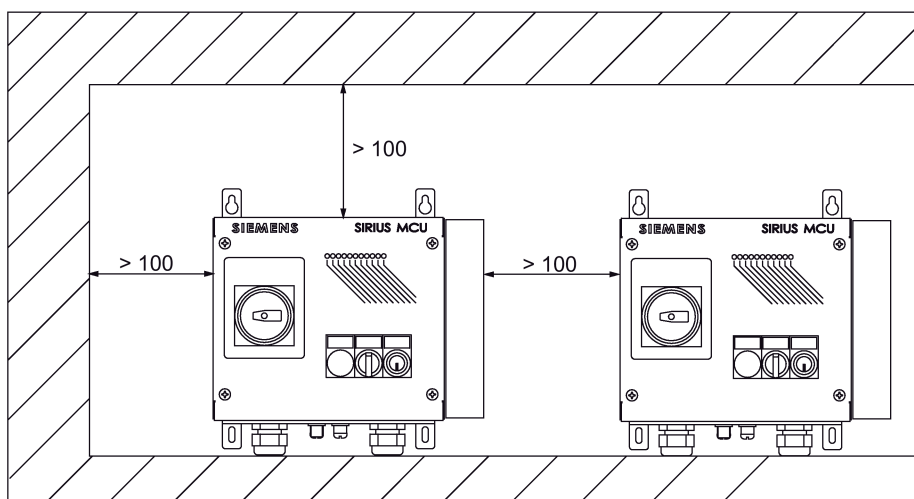
2.1 Procedure

WARNING

Hazardous voltage!
Can cause electric shock or burns. Disconnect the system and devices from the power supply before starting work.

Step	Procedure
1	Drill four holes for the screws. 
2	Secure the motor starter using the screws. 

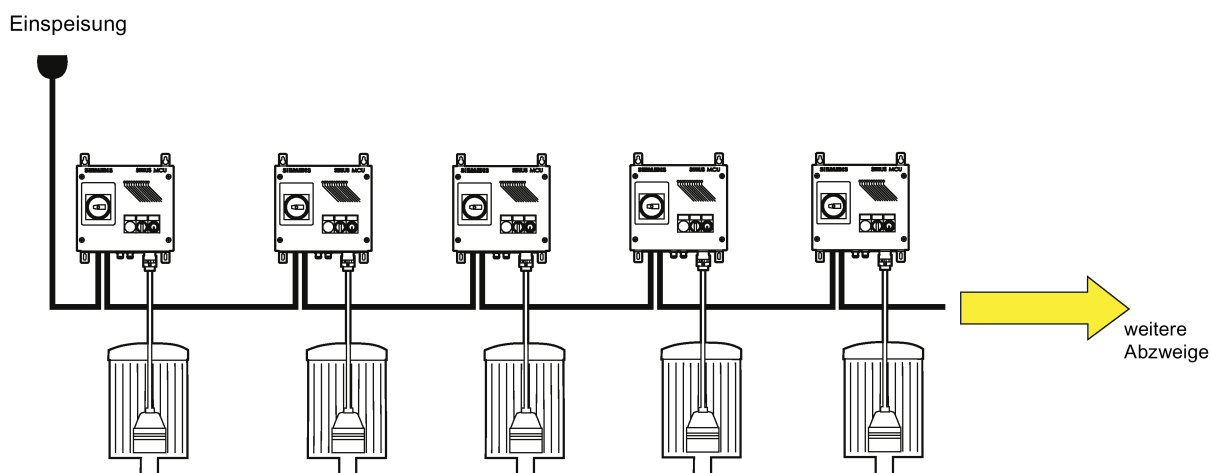
Note the specified safety clearance.



Electrical installation

3.1 System configuration

3.1.1 Version with permanent connection method



Note

This diagram illustrates the configuration and connection methods of the individual components. The size of the motors and design of the switching and control devices depend on their area of application and the associated system requirements.

3.2 Wiring rules



WARNING

Danger: hazardous voltage!

Can lead to electric shock and burns. Disconnect the system and device from the power supply before starting work.

Selecting the motor connection cables

The cross-section of the motor connection cables must be suitable for the prevailing ambient conditions. The following factors determine the cross-section:

- Operating current set on the device
- Cable installation method
- Ambient temperature
- Type of material (PVC, rubber) used for the motor connection cable
- Switching frequency of the motor
- Voltage drop on the cable

Motor starter with brake control

The 400 V power supply for the motor and the power supply for the brake are routed to the load via shared cables and connectors. Voltage transfer can occur if cables are squashed.

For this reason, loads with "extra-low voltage" type of protection must not be connected to the brake circuit.

Unused connections

Unused connections must be sealed by means of sealing caps since this is the only way to ensure degree of protection IP54.

3.3 Connection diagram

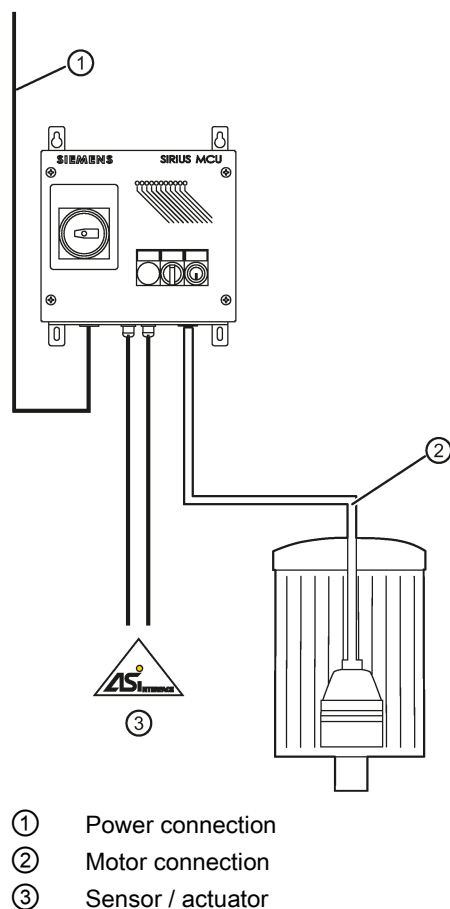


Figure 3-1 Connection diagram

3.4 Power connection

3.4.1 Version for permanent connection method

3RK432-..Q..-B...

3RK432-..Q..-D...

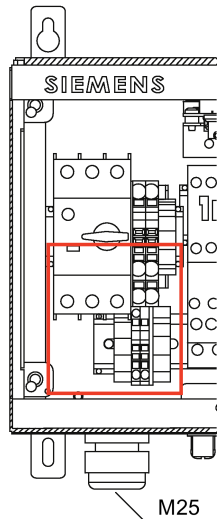


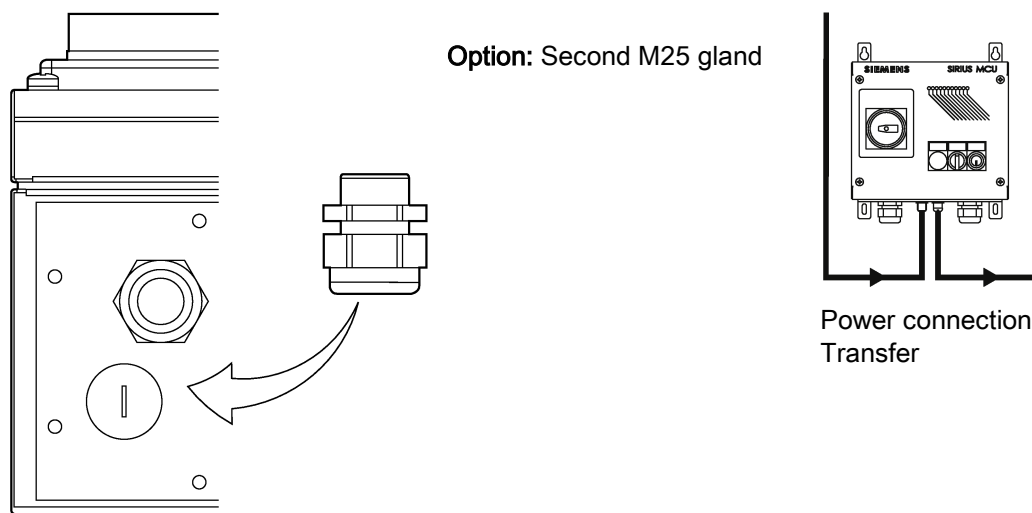
Table 3- 1 Terminal assignment: power connection

Terminal	
-Q1.2	L1
-Q1.4	L2
-Q1.6	L3
-X1.N	N
-X1.PE	PE

Note

M25 gland

Terminal area = cable diameter 9 ... 17 mm



Note

The second M25 gland is not included in the scope of supply.

3.5 Motor connection

3.5.1 Version for permanent connection method

3RK432-..Q..-B..

3RK432-..Q..-E..

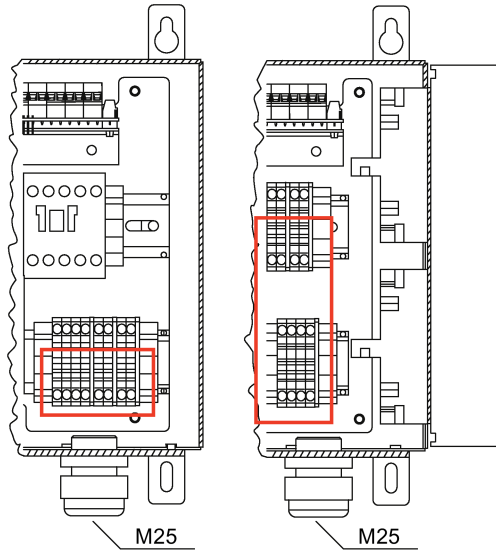


Table 3- 2 Terminal assignment: motor connection

Terminal	
-X2.U	L1 motor connection
-X2.V	L2 motor connection
-X2.W	L3 motor connection
-X2.PE	PE
-X2.B1	Brake
-X2.B2	Brake
-X2.1	Connector monitoring / thermoclick
-X2.2	Connector monitoring / thermoclick

Note

M25 gland

Terminal area = cable diameter 9 ... 17 mm

3.6 Electrical motor brake

3.6.1 Introduction

An electrical motor brake can be connected to the Sirius MCU motor starter. The brake is controlled by means of the "ON" signal from the motor starter. The motor brake can be connected using the motor cable.

3.6.2 Electromechanical MS with brake 400 V AC brake

3RK432-..Q1-...3

3RK432-..Q3-...3

3RK432-..Q5-...3

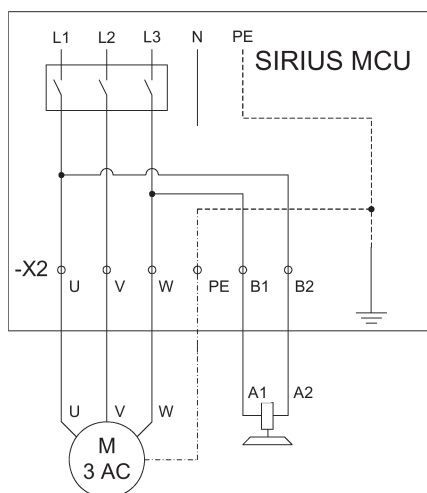


Table 3- 3 3RK432-..Q..-B.3
3RK432-..Q..-E.3

Terminal	
-X2.B1	L3
-X2.B2	L1

Table 3- 4 3RK432-..Q..-C.3
3RK432-..Q..-D.3

PIN	
-X2.4	L3
-X2.6	L1

3RK432-..Q2-...3
3RK432-..Q4-...3
3RK432-..Q6-...3

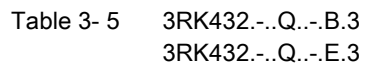


Table 3- 6 3RK432.-..Q..-.C.3
3RK432.-..Q..-.D.3

MCU motor starters
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3.6.4 Electromechanical MS with 230 V AC brake

3RK432...Q1-...2

3RK432...Q3-...2

3RK432...Q5-...2

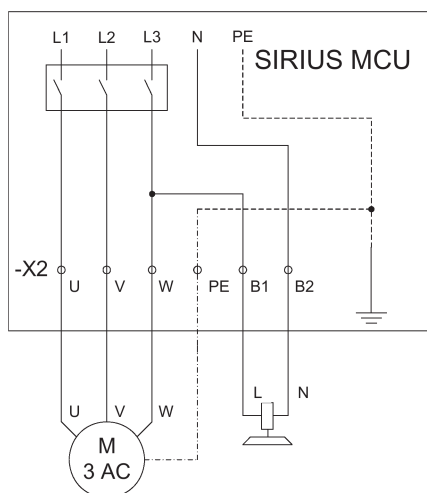


Table 3- 7 3RK432...Q...B.2
3RK432...Q...E.2

Terminal	
-X2.B1	L3
-X2.B2	N

Table 3- 8 3RK432...Q...C.2
3RK432...Q...D.2

PIN	
-X2.4	L3
-X2.6	N

3.6.5 Electronic MS with 230 V AC brake

3RK432-..Q2-...2

3RK432-..Q4-...2

3RK432-..Q6-...2

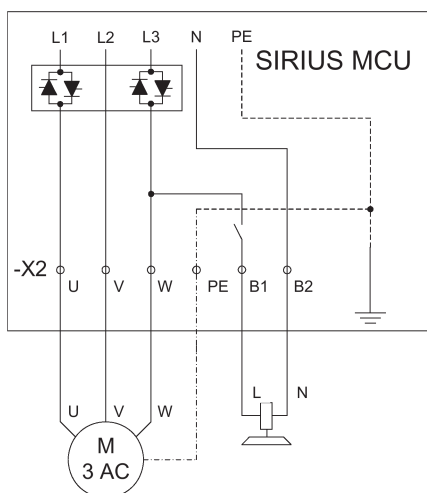


Table 3- 9 3RK432-..Q...-B.2

3RK432-..Q...-E.2

Terminal	
-X2.B1	L3
-X2.B2	N

Table 3- 10 3RK432-..Q...-C.2

3RK432-..Q...-D.2

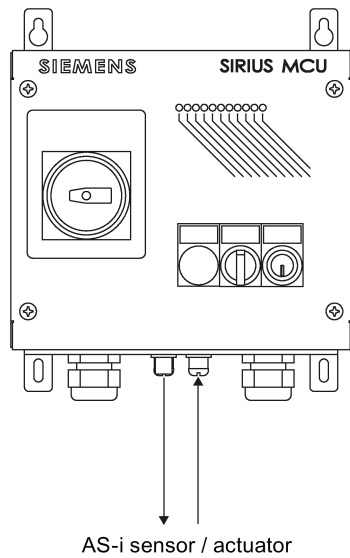
PIN	
-X2.4	L3
-X2.6	N

**DANGER****Hazardous voltage**

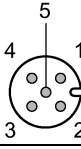
Danger of death or serious injury.

To prevent electric shocks or burns, do not touch the terminals on the motor control device when the system is connected to the power supply. Voltage is still present at the output terminals even when the motor control device is OFF.

3.7 AS-i, sensor, actuator connection



The device is equipped with an M12 connector for connecting AS-i bus / AUX PWR.
The motor starter is equipped with M12 sockets for the sensors and actuators.

				
PIN	AS-i / AUX PWR (-X31)	IN1 (-X11)	IN2 (-X12)	OUT1 (-X21)
1	AS-i +	(+)	(+)	AUX PWR +
2	AUX PWR - 0 V DC	—	—	—
3	AS-i -	(-)	(-)	AUX PWR -
4	AUX PWR + 24 V DC	IN1	IN2	OUT1
5	—	—	—	—

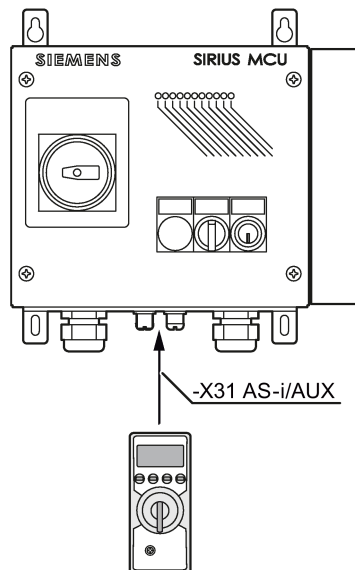
Commissioning

4.1 Addressing

Note

Addressing can be carried out before or after installation.

You can set the address by means of an addressing unit or the programming and service device.



Option: 3RK1904-2AB02

Note

Address 0 is set by default.

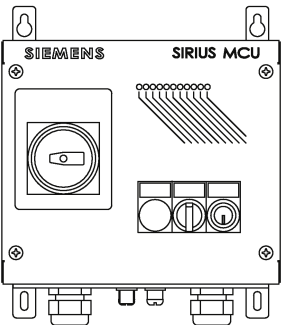
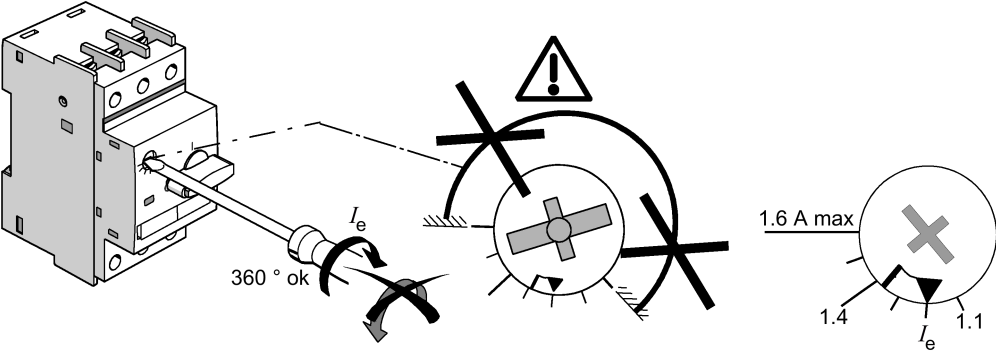
You can change the address of the motor starter as often as required.

Use each address only once within one AS-i line.

4.2 Setting the overload release

4.2.1 Circuit breaker

3RK432.-3.Q..-....

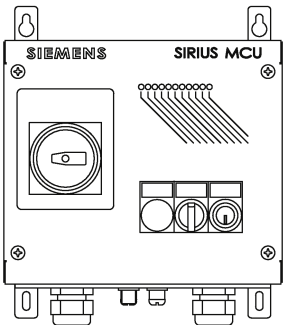
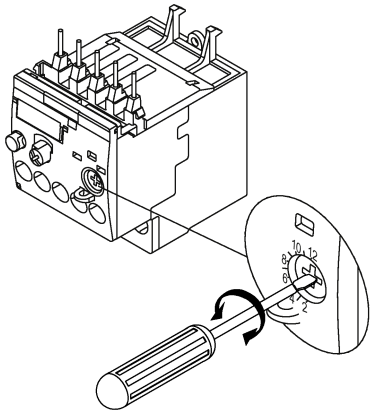
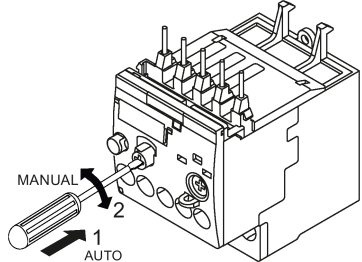
Step	Procedure
1	 Open the motor starter (remove the screws on the cover).
2	On the scale (arrow), use a screwdriver to set the operating current I_e or the r.m.s. value of the current load I_L. 
3	Close the motor starter (screw the cover back on with torque: 3.4 Nm).

The circuit breaker is designed for CLASS 10.

4.2.2 Overload relay

3RK432.-5.Q.-....

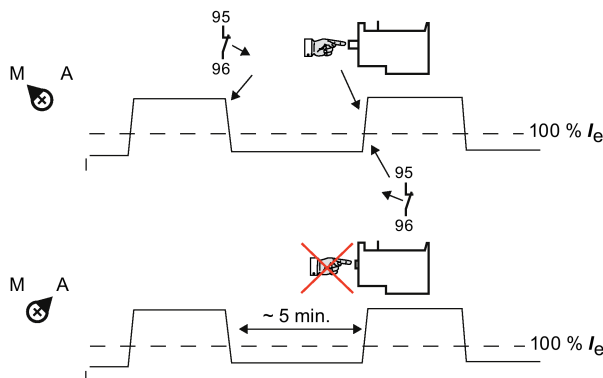
3RK432.-6.Q.-....

Step	Procedure
1	 Open the motor starter (remove the screws on the cover).
2	On the scale, use a screwdriver to set the operating current I_N or the r.m.s. value of the current load I_R. 
3	Set the automatic restart function to "Manual" or "Auto". 
4	Close the motor starter (screw the cover back on with torque: 3.4 Nm).

This overload relay is designed for CLASS 10.

Restart characteristics

The electronic overload relay can be set to restart automatically. In automatic mode, the overload relay is automatically reset approximately 5 minutes after tripping.



! WARNING

Automatic Restart

An automatic restart can result in death, serious injury, or material damage. The automatic reset function must not be used if there is a risk of the device automatically restarting unexpectedly, resulting in injury or material damage.

4.2.3

Setting the overload relay to handle increased switching frequency

If the starter is operated with increased switching frequency, duty type S4 (periodic duty), which influences the startup procedure, is used. In this case, the maximum rated motor current I_e is reduced as a function of:

- Pickup current of motor I_{an}
- Starting time of motor t_{an}
- ON duration t_{ED}
- Cycle duration t_s

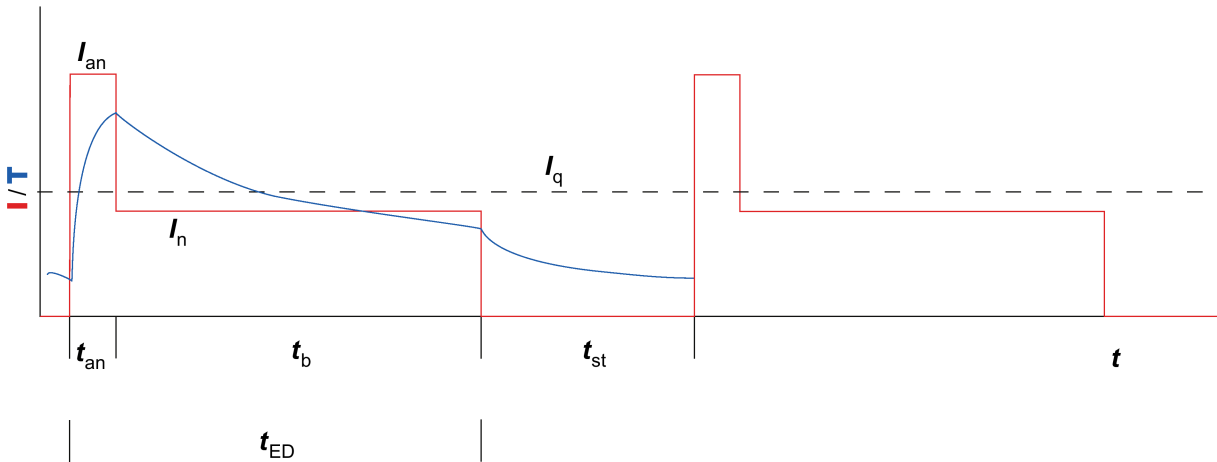
Note

Motors with a high efficiency and high motor starting currents

You may need to take higher motor starting currents into consideration when using motor starters on high-efficiency motors. The motor starters are designed for motors with a maximum 8-fold starting current in accordance with IEC 60947-4-2.

If you are operating motors with a higher starting current, please contact Technical Assistance regarding the dimensioning of the motor starters.

The current setting for overload relays in duty type S4 (series of identical duty cycles) can be calculated using the following formula:



$$I_q = \sqrt{\frac{I_{an}^2 t_{an} + I_n^2 t_b}{t_{an} + t_b + t_{st}}}$$

I_{an}	Pickup current of motor
t_{an}	Starting time of motor
t_b	Operating time of motor
t_{ED}	ON duration
t_{st}	Downtime duration
t_s	Cycle duration
I_{rated}	Rated motor current
I_q	r.m.s. value of current load = setting current for overload relay
Z	Switching frequency

Note

If the r.m.s. value of the current load is set on the electronic overload relay, the motor is only protected for the calculated switching frequencies/cycles. If the motor is operated with lower switching frequencies/cycles, **it is not protected**.

If motors are subject to frequent starting/braking operations, irregular periodic duty, or excessive switching frequencies, you are advised to use electronic overload relays in conjunction with thermoclick motor protection. To prevent the electronic overload relay from tripping prematurely under these operating conditions, it is set to a value higher than the specified operating current.

4.3 Motor protection with thermoclick

The motor windings contain thermoclick contacts (bimetallic contacts). The SIRIUS MCU motor starter allows you to evaluate these contacts. When choosing the motor, make sure that these contacts are NC contacts. The contacts are evaluated in accordance with the closed-circuit principle. If the monitoring circuit is interrupted, this causes the contactor control for the motor starter to fail and, in turn, the motor shuts down.

Once the motor has cooled down, the monitoring circuit is closed again, which can result in an automatic restart.

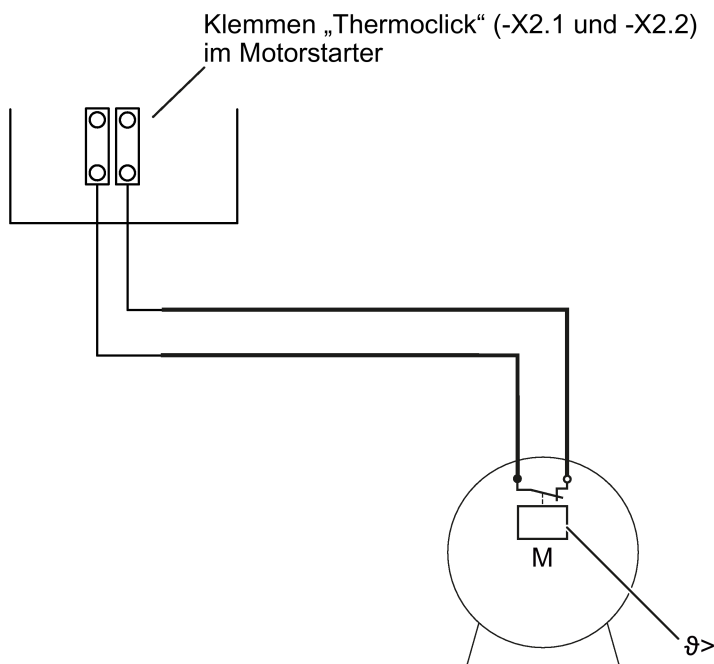
WARNING

An automatic restart can result in death, serious injury, or material damage.

The automatic reset function must not be used if there is a risk of the device automatically restarting unexpectedly resulting in injury or material damage. When a group fault is signaled, the start command (e.g. issued by the PLC) must be reset because the motor may attempt to restart again automatically if a start command is present after the fault has been acknowledged. For safety reasons, you are advised to integrate the ready-to-start signal MCU OK (DI 0) in the controller.

For information on connecting the thermoclick, see Motor connection (Page 16)

. You do not need to make additional settings on the motor starter.



Note:

If the thermoclick function is used the factory-installed jumper must be removed.

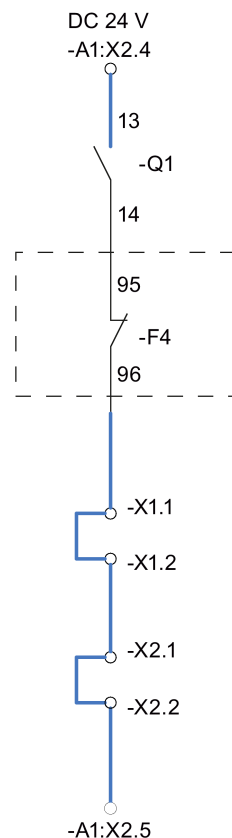
Operating the motor starter

5.1 Switch-on and shutdown conditions of the motor starter

The following signals are essential for ensuring that the motor starter can be properly controlled. If one of these signals is not present, this either prevents the motor starter from being switched on or causes it to shut down.

- Main switch -Q1 is "ON".
- Overload protection -Q1 or -F4 has not tripped.
- Short-circuit protection -Q1 has not tripped.
- Power cable is plugged in -X1.1 -X1.2 (with connector monitoring option only).
- Motor cable is plugged in -X2.1 -X2.2 (with connector monitoring option only).
- Thermoclick contact -X2.1 -X2.2 in the motor is closed (with thermoclick connection only).

When all the switch-on conditions are fulfilled, the "MCU OK" LED lights up.



If the signals above return (automatic reset) after tripping/shutdown when the "ON" command is present (manual or automatic mode), this can cause the motor to restart automatically.

! WARNING

An automatic restart can result in death, serious injury, or material damage.

The automatic reset function must not be used if there is a risk of the device automatically restarting unexpectedly resulting in injury or material damage. When a group fault is signaled, the start command (e.g. issued by the PLC) must be reset because the motor may attempt to restart again automatically if a start command is present after the fault has been acknowledged. For safety reasons, you are advised to integrate the ready-to-start signal MCU OK (DI 0) in the controller.

5.2 Main/maintenance switch

SIRIUS MCU motor starters are equipped with a main or maintenance switch, which can be used to disconnect the motor starter in three poles.

Threefold locking of the main or maintenance switch is possible in the "0" position.

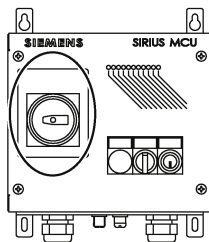


Figure 5-1 Switch

! WARNING

The terminals still carry hazardous electrical voltage even after the main or maintenance switch has been switched off. Check that the equipment is de-energized!

5.3 Mode selector switch

The motor starter can be operated in manual or automatic mode. You can select the operating mode by means of the key-operated switch (MAN – 0 – AUTO) on the cover of the housing. The key can be removed in all three positions.

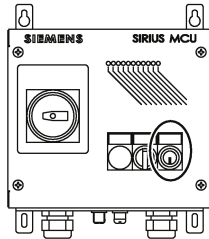


Figure 5-2 Key-operated switch MAN - 0 - AUTO

In switch position "0", neither the control signals of the AS-i master nor the commands of the local control elements are converted on the motor starter. In this position, the sensor signals are transmitted to the AS-i bus.

The "Automatic" LED does not light up.

5.4 Manual mode

Manual mode allows operation directly on the motor starter itself.

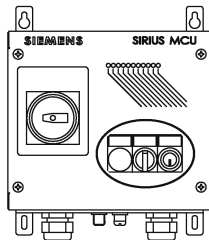


Figure 5-3 Local control elements

Step	Procedure
1	Move the key-operated switch to the "MAN" position.
2	Start the motor using the knob switch.
3	To return to automatic mode, move the key-operated switch to the "AUTO" position.

Note

In manual mode, the sensor signals are transmitted to the AS-i bus; the signals of the AS-i master are not converted.

The "Automatic" LED does not light up.

5.5 Automatic mode

When the key-operated switch is moved to the "AUTO" position, the motor starter is in automatic mode and converts the commands of the AS-i master. The sensor signals are transmitted to the AS-i master.

The "Automatic" LED lights up.

5.6 AS-i inputs (DI0 - DI3)

The following signals are transmitted to the AS-i master via the AS-i inputs DI0 – DI3. At the same time, the signal states are indicated by the LEDs in the housing cover. See also Section LED status display (Page 35)

AS-i input DI0 / MCU OK

- Main switch is "ON".
- Overload protection has not tripped.
- Short-circuit protection has not tripped.
- Power cable is plugged in (with connector monitoring option only).
- Motor cable is plugged in (with connector monitoring option only).
- Thermoclick contact in the motor is closed (with thermoclick connection only).

AS-i input DI1 / automatic mode:

- The key-operated switch is in the "Auto" position (the motor starter is in automatic mode).

AS-i input DI2 / IN1:

- A high signal is present at input IN1 (-X11.4).

AS-i input DI3 / IN2:

- A high signal is present at input IN2 (-X12.4).

AS-i input DI0 signals that the motor starter is ready to be switched on. If one of these signals is not present, this either prevents the motor starter from being switched on or causes it to shut down. If the signals above return (automatic reset) when the "ON" command is present (manual or automatic mode), this can cause the motor to restart automatically.

 WARNING

An automatic restart can result in death, serious injury, or material damage.

The automatic reset function must not be used if there is a risk of the device automatically restarting unexpectedly resulting in injury or material damage. When a group fault is signaled, the start command (e.g. issued by the PLC) must be reset because the motor may attempt to restart again automatically if a start command is present after the fault has been acknowledged. For safety reasons, you are advised to integrate the ready-to-start signal MCU OK (DI 0) in the controller.

5.7 AS-i outputs (DO0 - DO3)

The following signals are transmitted by the AS-i master and converted by the motor starter accordingly. At the same time, the signal states are indicated by the LEDs on the front panel. See also Section LED status display (Page 35).

AS-i output DO0: - Motor "ON" / forwards

AS-i output DO1: - Motor "ON" / reverse

AS-i output DO2: - A high signal is present at output OUT1 (-X21.4).

AS-i output DO3: - no function

5.8 Bit pattern

The motor is controlled by means of the AS-i outputs DO0 and DO1. The following bit patterns are supported:

Table 5- 1 Direct starter

AS-i	DO0	DO1
Stop	0	0
Motor "ON"	1	0

Table 5- 2 Reversing starter

AS-i	DO0	DO1
Stop	0	0
Motor "ON" forwards (clockwise)	1	0
Motor "ON" reverse (counter-clockwise)	0	1

The following sequence (program steps) must be observed for the reversing procedure:

Table 5- 3 Changeover: forwards → reverse

	AS-i	DO0	DO1
1	Motor forwards (clockwise)	1	0
2	Motor stop	0	0
3	Motor reverse (counter-clockwise)	0	1

Note

A pause of at least 50 ms must be included between program steps 2 and 3.

Table 5- 4 Changeover: reverse → forwards

	AS-i	DO0	DO1
1	Motor reverse (counter-clockwise)	0	1
2	Motor stop	0	0
3	Motor forwards (clockwise)	1	0

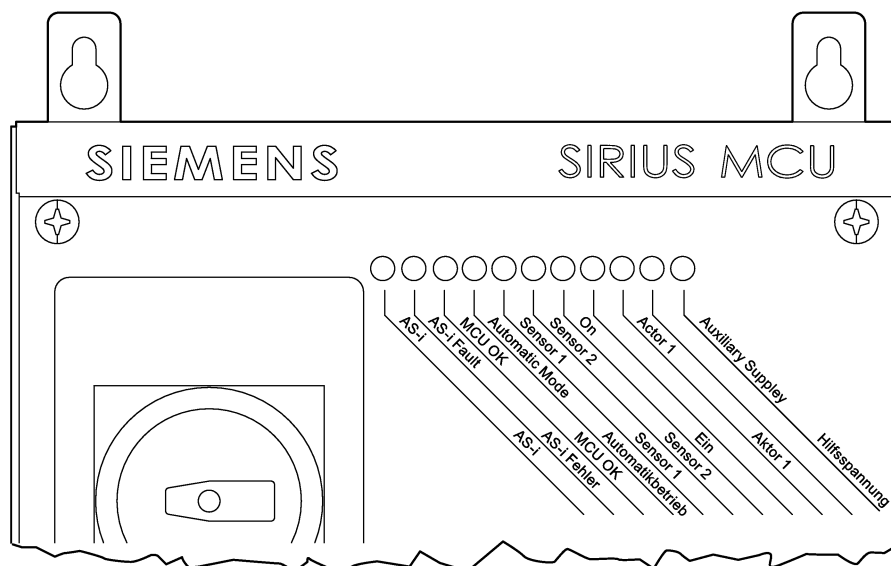
Note

A pause of at least 50 ms must be included between program steps 2 and 3.

Note

The activation of the outputs for motor clockwise and counter-clockwise shall be interlocked in the controller.

5.9 LED status display



Eleven LEDs in the housing cover indicate the status of the motor starter.

LED 1 - green		AS-i active
LED 2 - red		AS-i fault

Table 5- 5 The bus status is indicated by LED1 and LED2:

AS-i (LED1) green	Fault (LED2) red	State
ON	OFF	OK
ON	ON	No data traffic Bus fault
Flashing	ON	Address = 0
ON	Flashing	Overload (sensor)

LED 3 - yellow	DI0	MCU OK
LED 4 - yellow	DI1	Automatic mode
LED 5 - yellow	DI2	IN1
LED 6 - yellow	DI3	IN2
LED 7 - yellow	DO0	ON / forwards
LED 8 - yellow	DO1	— / reverse
LED 9 - yellow	DO2	OUT1
LED 10 - yellow	DO3	—
LED 11 - green		OK

5.10 Rating plate

3RK4324-3PR54-1BC0 E01 G/JJMMTT

DEGREE OF PROTECTION IP 55
CLASS 10

Ue (V)	400
Pmax (KW)	5,5
Ie A	12

Icu 50 kA
Ir max 12,5A

CE

Barcode

Siemens AG, Industry Sector Made in Germany

- ① Degree of protection
- ② Permissible Class value
- ③ Rated operating voltage
- ④ Max. permissible power
- ⑤ Rated motor starter current
- ⑥ Rated ultimate short-circuit breaking capacity
- ⑦ Maximum permissible setting value for overload protection (regardless of device setting range)
- ⑧ Product version

Troubleshooting

6.1 Response to faults

If the motor starter develops a fault ("MCU-OK" LED is OFF; input DI0 is low), all automatic start commands must be reset.

The fault is acknowledged automatically once it has been rectified. The "MCU-OK" LED lights up; input DI0 is high.

WARNING
--

If the start signals of the fieldbus master are not reset if a fault occurs in automatic mode, the motor starts automatically once the fault has been rectified.
--

Note

If bus communication is interrupted (master failure), the switching outputs are reset after approx. 40 ... 100 ms (watchdog).

6.2 Possible faults

Fault indication	Fault description
"AS-i" LED is OFF.	No AS-i voltage: → Check the AS-i power supply unit. → Check the AS-i connection on the motor starter.
"AS-i" LED is flashing and "FAULT" LED is ON.	The AS-i address of the motor starter has not yet been set. → Set the address (see Addressing (Page 23)).
"AS-i" LED is ON and "FAULT" LED is ON.	No data traffic: → Check communication with the fieldbus master. Possible causes of the fault: • Bus cable cut/interrupted • Fieldbus master defective
"AS-i" LED is ON and "FAULT" LED is flashing.	Sensor overload: → Check the sensor supply: $I_{out} > 150 \text{ mA}$
"MCU OK" LED is OFF (DI0).	A fault has been identified in the motor starter monitoring circuit. → Main or maintenance switch is OFF: switch on the switch. → Power cable is not plugged in or is damaged (with connector monitoring option only) Ensure that the connector is properly contacted or replace the power cable. → Motor cable is not contacted or is damaged (with connector monitoring option only). Ensure that the connector is properly contacted or replace the motor cable. → Motor thermoclick has tripped (with thermoclick connection only). Allow the motor to cool down - Check the motor design/load. → Overload relay / circuit breaker has tripped. Allow the motor to cool down - Perform reset (check the motor design/load). Check the motor cable for damage. Measure the motor winding. Check the 400 V power supply (with electronic overload relay option).
"Auxiliary voltage" LED is OFF.	No auxiliary voltage for switching the digital outputs. "MCU OK" LED is OFF: → See "MCU OK" LED "MCU OK" LED is ON: → Move the key-operated switch to the "AUTO" position. Check the auxiliary voltage supply.

Dimension drawings

7.1 Dimension drawings

3RK432-..Q1-....

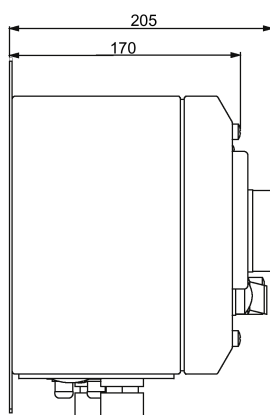
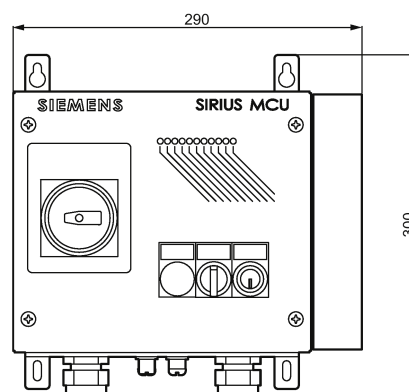
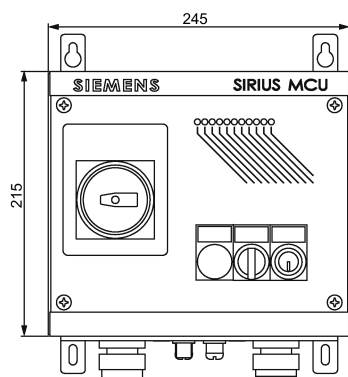
3RK432-..Q3-....

3RK432-..Q5-....

3RK432-..Q2-....

3RK432-..Q4-....

3RK432-..Q6-....



Technical data

8.1 General technical specifications for the motor starter

	3RK432-..Q1-.... 3RK432-..Q3-.... 3RK432-..Q5-....	3RK432-..Q2-.... 3RK432-..Q4-.... 3RK432-..Q6-....
Dimensions (W x H x D)	245 x 300 x 205 mm	290 x 300 x 205 mm
Degree of protection	IP54 (IEC 60529) Degree of protection IP54 is only fulfilled when the motor starter is completely closed. To ensure this, make sure that all unused terminals are sealed with covering caps.	
Degree of protection	I (IEC 60536-VDE 0106, Part 1)	
Weight	5.8 kg	6.4 kg
Max. switching frequency z	1-80 h ⁻¹	1-3600 h ⁻¹ *
Ambient temperature during operation	- 20 ... + 50 °C max. 65°C when I _e is reduced by 1% for every 1 K	
Ambient temperature during storage/transportation	- 40 ... + 80°C	
Installation altitude above sea level	< 1000 m	
Relative humidity	95 % (condensation must not be allowed to form)	
EMC	tested to EN 60439-1	
Current consumption AUX-PWR 24 V	140 mA	
Mounting position electromechanical	360° on the wall, inclination +/- 20°	
Mounting position electronic	+/- 20° on the wall, inclination +/- 20°	
Cooling	Convection	
Utilization category	AC3	
Color	RAL 7035	

* See Section Setting the overload relay to handle increased switching frequency (Page 26).

8.2 Voltages and currents

	Electromechanically switching 3RK432.-.Q1..-.... 3RK432.-.Q3.-.... 3RK432.-.Q5.-....		Electromechanically switching 3RK432.-.Q2.-.... 3RK432.-.Q4.-.... 3RK432.-.Q5.-....	
Normal output ¹ / Motor current ²				
3RK432.-.AQ.-....	0.18 kW	0.6 A	0.37 kW	1.1 A
3RK432.-.BQ.-....	0.18 kW	0.8 A		
3RK432.-.CQ.-....	0.25 kW	0.85 A		
3RK432.-.DQ.-....	0.37 kW	1.1 A		
3RK432.-.EQ.-....	0.55 kW	1.5 A		
3RK432.-.FQ.-....	0.75 kW	1.9 A		
3RK432.-.GQ.-....	0.75 kW	1.9 A	1.5 kW	3.6 A
3RK432.-.HQ.-....	1.1 kW	2.7 A		
3RK432.-.JQ.-....	1.5 kW	3.6 A		
3RK432.-.KQ.-....	1.5 kW	3.6 A		
3RK432.-.LQ.-....	2.2 kW	5.0 A		
3RK432.-.MQ.-....	3.0 kW	6.5 A		
3RK432.-.NQ.-....	4.0 kW	8.5 A	5.5 kW	11.5 A
3RK432.-.PQ.-....	5.5 kW	11.5 A		
Setting range: overload release				
3RK432.-.AQ.-....	0.45 ... 0.63 A		0.32 ... 1.25 A	
3RK432.-.BQ.-....	0.55 ... 0.80 A			
3RK432.-.CQ.-....	0.70 ... 1.0 A			
3RK432.-.DQ.-....	0.90 ... 1.25 A			
3RK432.-.EQ.-....	1.10 ... 1.60 A			
3RK432.-.FQ.-....	1.40 ... 2.00 A			
3RK432.-.GQ.-....	1.80 ... 2.50 A		1.00 ... 4.00 A	
3RK432.-.HQ.-....	2.20 ... 3.20 A			
3RK432.-.JQ.-....	2.80 ... 4.00 A			
3RK432.-.KQ.-....	3.50 ... 5.00 A			
3RK432.-.LQ.-....	4.50 ... 6.30 A			
3RK432.-.MQ.-....	5.50 ... 8.00 A			
3RK432.-.NQ.-....	7.00 ... 10.0 A		3.00 ... 12.0 A	
3RK432.-.PQ.-....	9.00 ... 12.5 A			
Rated operating voltage U _e	400 ... 500 V 3AC (±10 %)		400 ... 460 V 3AC (±10 %)	
Rated frequency f _e	50 / 60 Hz			
Trip class	Class 10			
Short-circuit current strength I _{cu}	50 kA			
Power for slave electronics	29.5 ... 31.6 V DC			
Reverse polarity protection for slave electronics	✓			
Auxiliary power (AUX PWR)	24 V DC (20.4 ... 28.8 V)			
Reverse polarity protection for auxiliary power	✓			
Brake voltage				
3RK432.-.Q.-....2	230 V AC			
3RK432.-.Q.-....3	400 V AC			

¹ Guide value for 4-pole standard motors at 400 V AC, 50 Hz. The actual startup characteristics of the connected motor as well as its rated data are important factors here.

² Guideline value

8.3 Communication

AS-Interface (with auxiliary voltage) EN 50295	✓
I / O areas	✓
Motor ON / clockwise	DO0
Motor ON / counter-clockwise*	DO1
External binary outputs (actuator) OUT1	M12 socket (-X21) DO2
Group fault (MCU - OK)	DI0
Manual / automatic	DI1
External binary inputs (sensor) IN1 IN2	M12 socket (-X11) DI2 M12 socket (-X12) DI3
Addressability	1 ... 32 A / B
Address assignment	Via AS-i connector (-X31)
Total current consumption AS-i	≤ 270 mA

* Reversing starters only

8.4 Connections

	Permanent connection
Power terminal	3RK432-..Q..-B.. 3RK432-..Q..-D.. (-Q1 and -X1)
Motor connection	3RK432-..Q..-B.. 3RK432-..Q..-E.. (-X2)
AS-i and auxiliary voltage	Pin insert M12 4-pole (-X31)
Digital inputs (IN1 / IN2)	Socket insert M12 5-pole (-X11 and -X12)
Digital outputs (OUT1)	Socket insert M12 5-pole (-X21)

8.5 Sensor inputs (IN1 and IN2)

Level	Low signal range High signal range	$\leq 5\text{ V}$ $\geq 10\text{ V}$
Sensor supply		(short-circuit and overload proof)
Protected against polarity reversal		✓
Voltage range		20 ... 30 V
Current-carrying capacity		160 mA ($T_u \leq 40\text{ °C}$) 150 mA ($T_u \leq 70\text{ °C}$)

8.6 Output (OUT 1)

Level	Low signal range High signal range	$\leq 5\text{ V}$ $\geq 10\text{ V}$
Outputs (solid state)		(solid state short-circuit proof)
Voltage (AUX PWR)		24 V DC (20.4 ... 28.8 V)
Current-carrying capacity		$I_{L\text{ min}}$ DC12 / DC13 0.7 A $I_{L\text{ Type}}$ 1 A

8.7 Brake output

Voltage at 400 V AC	as rated operating voltage U_e see Section Voltages and currents (Page 42)
Voltage at 230 V AC	as rated operating voltage $U_e / \sqrt{3}$ See Section Voltages and currents (Page 42)
Current-carrying capacity	max. 5% of rated current
Short-circuit protection	integrated

8.8 Main/maintenance switch

		3RK432-..Q.1-.... 3RK432-..Q.4-.... 3RK432-..Q.7-....	3RK432-..Q.2-.... 3RK432-..Q.5-.... 3RK432-..Q.8-....
Disconnecter feature	-Q1	✓	
Can be locked threefold (0 position)		✓	
Color of the handle		Black / grey	Red / yellow

8.9 Local control elements

		3RK432-..Q.3-.... 3RK432-..Q.4-.... 3RK432-..Q.5-....	3RK432-..Q.6-.... 3RK432-..Q.7-.... 3RK432-..Q.8-....
Mode selector switch	-S11	Key-operated switch, (manual - 0 - automatic), maintained-contact type, can be removed in all positions	
Local control element Direct starter 3RK432-..Q..0... Reversing starter 3RK432-..Q..1...	-S1	Knob, momentary-contact type 0-ON REV-0-FOR	Knob, maintained-contact type 0-ON REV-0-FOR

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