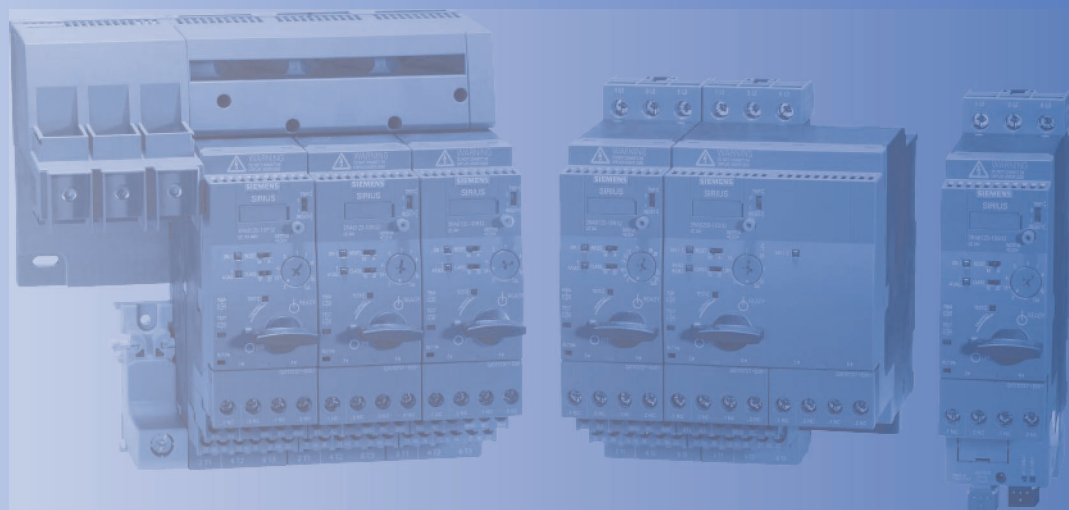




SIRIUS 3RA6 Compact Starter
SIRIUS Infeed System for 3RA6

sirius
COMPACT STARTER

SIEMENS

SIRIUS industrial switchgear

Load feeders, motor and soft starters SIRIUS 3RA6 Compact Starter

System Manual

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Safety Guidelines

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

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

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 device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

WARNING

This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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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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Introduction

Purpose of this manual

This SIRIUS 3RA6 Compact Starter Manual describes the compact starter and its functions. It contains information about configuration, commissioning and servicing.

As well as providing information about the compact starter itself, the manual also deals with compatible infeed systems. These are the SIRIUS infeed system for 3RA6, the insulated 3RV19 three-phase busbar system and the 8US busbar adapter. The options in terms of connecting to circuit breakers of other sizes and to the 3RV19 infeed system are also discussed within this context.

Furthermore, to facilitate configuration the manual contains dimension drawings and technical data of the system components.

Topics

The manual consists of instructive chapters, which are intended for reference purposes. The following table provides an overview of the topics covered:

Table 1-1 Chapter overview

Chapter	Contents
Introduction	Provides an overview of the manual's contents
Product-specific information	Provides product-specific information about the compact starter
System description	Provides an overview of the system components and their integration into the automation environment
Configuration	Provides information (e.g. environmental requirements, use in combination with other products, etc.) about using the compact starter and accessories, which need to be taken into account right from the configuration stage
Communication via AS-Interface	Provides information about communication based on an AS-Interface
Description of the hardware	Describes the compact starter's display elements and operator controls
Functions	Describes the compact starter's functions
Installation/Removal	Describes how to install and remove the compact starter
Connection	Describes how to connect the compact starter
Commissioning	Provides information about the possible settings on the compact starter and addressing of the AS-i mounting module
Diagnostics	Provides information about what defined display element states signal in terms of device states and describes diagnostics via the AS-Interface

Chapter	Contents
Accessories	Provides information about accessories (control kit, auxiliary switch block for compact starter, infeed system for 3RA6, 3-phase busbar, 8US busbar adapter, type E terminal, door-coupling rotary operating mechanism). This information includes a description of the hardware as well as the installation/removal and connection processes.
Service	Provides information about servicing or maintenance activities. This includes exchanging the entire compact starter or the individual terminal blocks. This chapter also explains the order number system used for the compact starter.
Technical data	Provides technical data for the compact starter and its accessories
Dimension drawings	Provides dimension drawings for the compact starter and its accessories
Circuit diagrams	Provides circuit diagrams for the compact starter

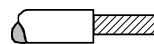
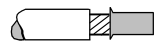
Required basic knowledge

To understand this manual, you will need to have a general knowledge of low-voltage controls and distribution and also of automation.

Symbols used in the text

The following table explains the meaning of the various symbols used within this document:

Table 1-2 Symbols

Symbol	Meaning
	LED is illuminated
	LED not illuminated
	Mechanical display is white
	No mechanical display
	Solid and stranded conductors
	Finely stranded conductor without end sleeve
	Finely stranded conductor with end sleeve

Product-specific information

2.1 Standards/Regulations/Approvals

Standards

The 3RA6 compact starter conforms to the following standards:

- IEC / EN 60947-6-2
- UL 508 Type E
- CSA C22.2 No. 14 Type E

Approvals/Test reports

UL and CSA approval was being sought at the time of going to press. Once approval has been obtained, the compact starter will be marked with the symbols  and .

Note

- Marking

Any compact starter that does not bear the  marking is not intended for the US market.

Confirmation of approvals, test certificates and characteristic curves is available via the Internet:

www.siemens.de/lowvoltage/technical-assistance

Compact starter degree of protection

The compact starter's degree of protection is IP20. In the terminal area it features IP00 degree of protection.

Infeed system degree of protection for 3RA6

The infeed system for the 3RA6 features IP20 degree of protection. In the terminal area it features IP00 degree of protection.

Isolating features

The requirements of IEC / EN 60947-3 have been met in respect of the isolating features.

Main switch and EMERGENCY STOP/EMERGENCY OFF function

The main switch and EMERGENCY STOP/EMERGENCY OFF meet the requirements of IEC / EN 60204-1.

Characteristic curves

If required, you can request the characteristic curves for all setting ranges by sending an e-mail to our Technical Assistance team: technical-assistance@siemens.com. Alternatively, you can get them by visiting the following website:

www.siemens.de/lowvoltage/technical-assistance

2.2 Use as prescribed

Compact starter

Prescribed use in accordance with IEC / EN 60947-6-2.

System description

3.1 System overview

General

The SIRIUS 3RA6 compact starter is a universal motor feeder that meets the requirements of IEC / EN 60947-6-2 (weld-free). It combines the functions of a circuit breaker, a solid-state overload relay and a contactor within a single housing and can be used in any application involving the direct starting of standard induction motors with a rating of up to 32 A (approx. 15 kW/400 V).

The compact starter is available as either a direct or a reversing starter.

As an option, an AS-i mounting module can be mounted on the compact starter with a 24 V control voltage. The AS-i mounting module enables the compact starter to communicate via an AS-Interface.

Table 3-1 Compact starter communication options

Compact starter	Communication
Compact starter without optional AS-i mounting module	No communication
Compact starter (24 V) with optional AS-i mounting module	Communication via AS-Interface

Setting ranges

The compact starter is available with five different current setting ranges and three different control voltage ranges. For details of the corresponding compact starter order numbers, please refer to " Order numbers for the SIRIUS 3RA6 compact starter (Page 140) ".

- Current setting ranges:

0.1	to	0.4	A
0.32	to	1.25	A
1	to	4	A
3	to	12	A
8	to	32	A

- Control voltage ranges (AC/DC):

24 V	
42	to 70 V
110	to 240 V

Accessories

As well as providing details of the compact starter and AS-i mounting module, this document also describes the following accessories:

Table 3-2 Accessories for the 3RA6 compact starter

Accessories	Description	Chapter
Auxiliary switch block for compact starter	Optional auxiliary switch block in the following versions: 2 NO contacts, 2 NC contacts or 1 NO contact + 1 NC contact	External auxiliary switch block (Page 91)
Control kit	Tool for closing the main contacts manually by means of the actuator	Control kit (Page 89)
Adapter for screw fastening the compact starter	The adapters for screw fastening enable you to install the compact starter on a level surface (screw fastening).	Installing the compact starter on a level surface (screw fastening) (Page 60)
Terminals for "Combination Controller Type E"	The terminals conform to the creepages and clearances stipulated by UL 508 (Type E).	Terminal for Type E combination motor controller, UL 508 (Page 127)
Infeed system for 3RA6	The infeed system for 3RA6 is a modular infeed system with an optional PE system. The permanent wiring means that compact starters can be mounted quickly and easily.	SIRIUS infeed system for 3RA6 (Page 95)
3-phase busbar	The 3-phase busbar enables several compact starters to be fed using a single infeed terminal.	3-phase busbar (Page 117)
8US busbar adapter	The 8US busbar adapter enables the compact starter to be mechanically fastened and electrically connected to a busbar system.	8US busbar adapter (Page 121)
Door-coupling rotary operating mechanism	Door-coupling rotary operating mechanisms enable compact starters to be operated with the control cabinet doors closed.	Door-coupling rotary operating mechanism (Page 129)

3.2 System configuration

Main circuit

The following supply options are available for the compact starter's main circuit:

- Parallel wiring
- Infeed system for 3RA6
(For additional information, please refer to "SIRIUS infeed system for 3RA6 (Page 95)".)
- 3-phase busbar
(For additional information, please refer to "3-phase busbar (Page 117)".)
- 8US busbar adapter
(For additional information, please refer to "8US busbar adapter (Page 121)".)

Control circuit

The control circuit can be structured as follows:

Table 3-3 Control circuit (configuration)

Compact starter	Control system
Compact starter without optional AS-i mounting module	Parallel wiring to control system (e.g. PLC)
Compact starter (24 V) with optional AS-i mounting module	AS-Interface

Examples of how the compact starter can be integrated into the automation environment

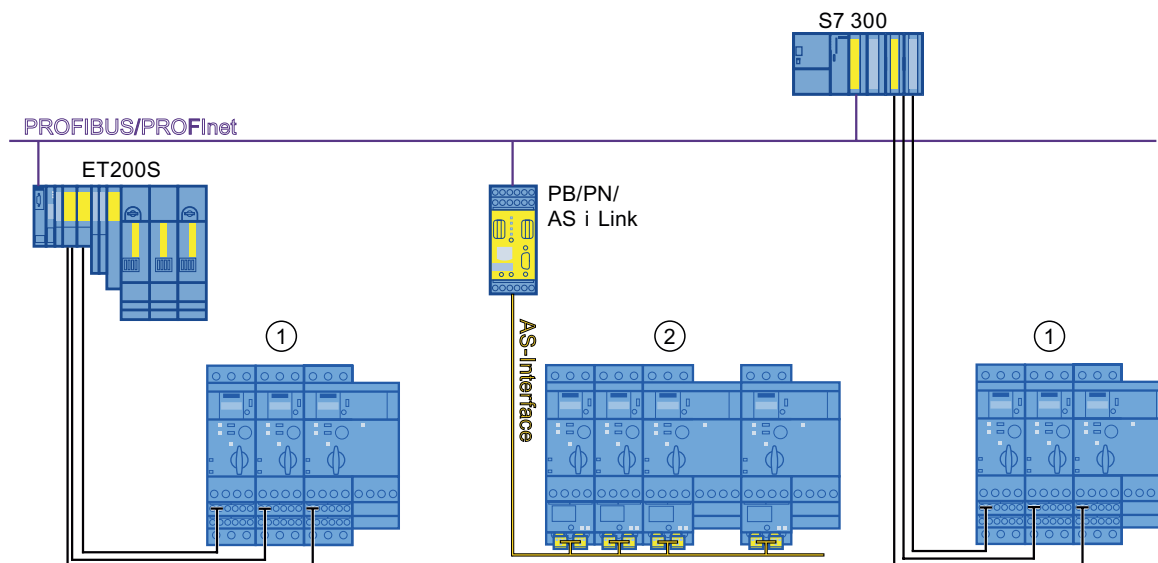


Figure 3-1 Integration into the automation environment

- (1) 3RA6 compact starter without AS-i mounting module
- (2) 3RA6 compact starter with AS-i mounting module

3.2.1 System configuration without optional AS-i mounting module

Configuration

The compact starter is connected to the control system via parallel wiring. Control takes place via the following terminals:

- Direct starter: A1+, A2-
- Reversing starter: A1+, A2/B2-, B1+

View

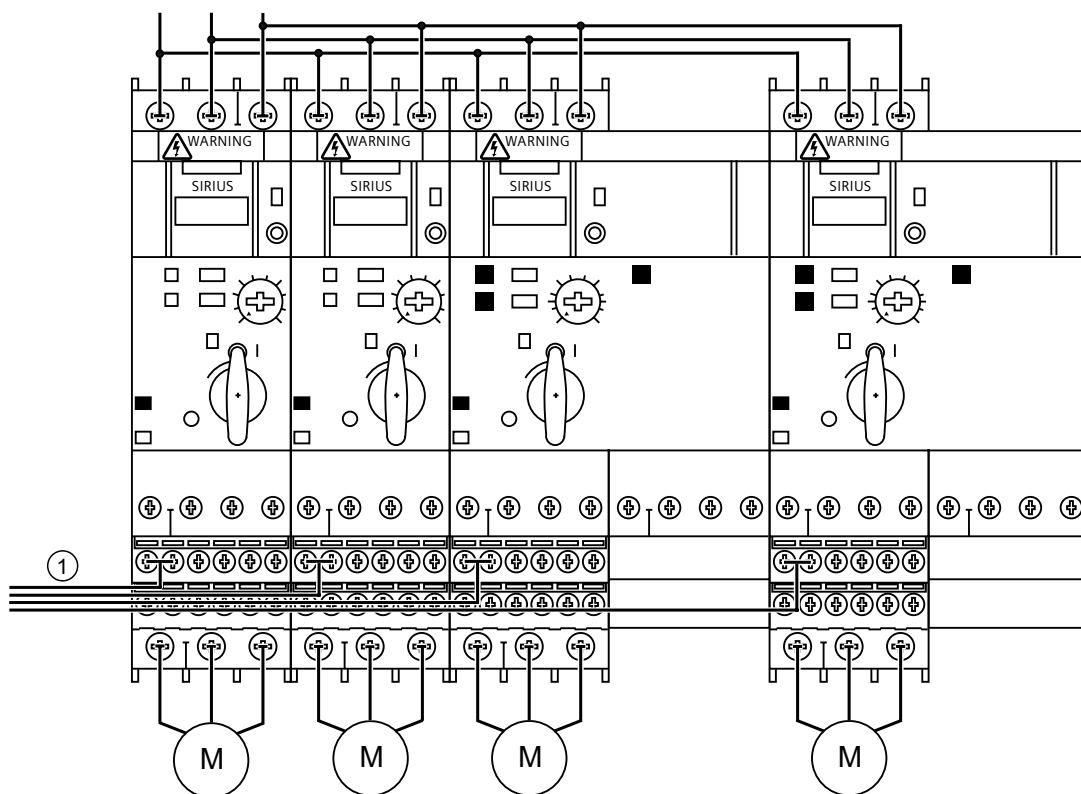


Figure 3-2 SIRIUS 3RA6 compact starter without AS-i mounting module (system configuration)

(1) Connection to control system (e.g. PLC)

3.2.2 System configuration with optional AS-i mounting module

The compact starter with 24 V control voltage can be controlled via an AS-Interface. The actuator sensor interface (AS-Interface) is a modular networking system for sensors and actuators at the lowest field level.

Configuration

If the AS-Interface is being used for control purposes, the AS-i mounting module needs to be installed on the compact starter (24 V) instead of the two auxiliary circuit terminals. The AS-i and auxiliary voltage cables are connected to the AS-i mounting module.

An AS-i power supply is used to feed the AS-i voltage into the AS-i cable, which also serves as a communication cable between the AS-i master and slave. The auxiliary voltage is supplied by a 24 VDC PELV power supply in accordance with VDE 0106 safety class III.

For additional information on the AS-Interface, please refer to the manual entitled "AS-Interface System" (order number: 3RK2703-3AB02-1AA1).

For additional information on connecting the AS-i mounting module, please refer to "Connecting the compact starter (24 V) with optional AS-i mounting module (Page 77)".

View

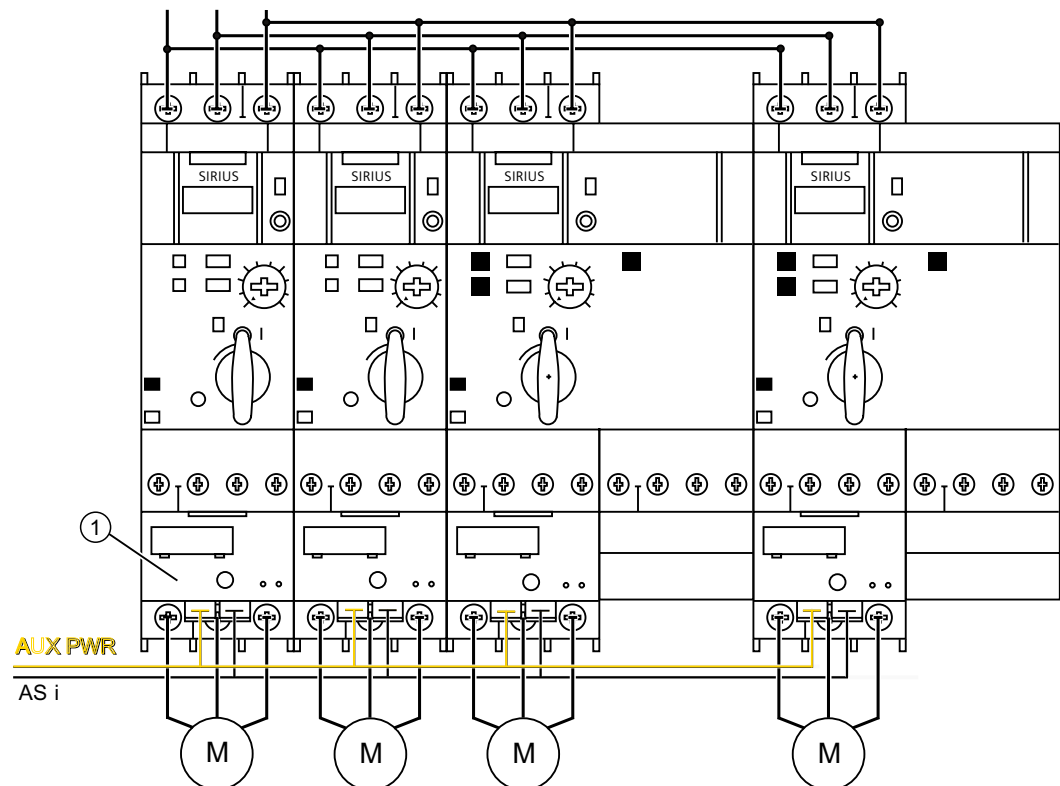
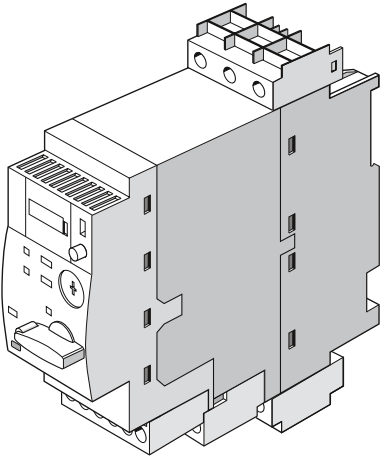
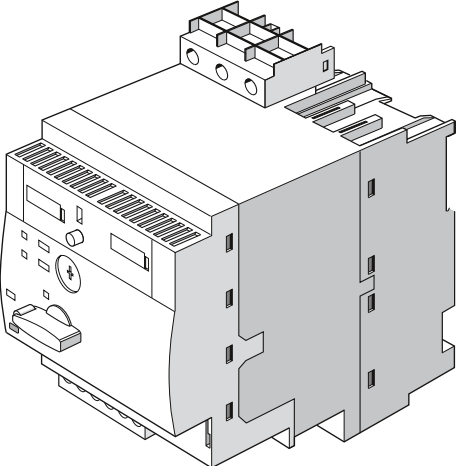
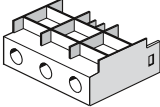
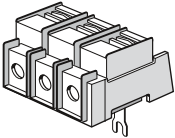


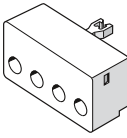
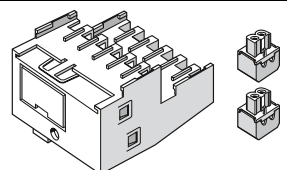
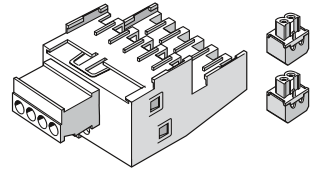
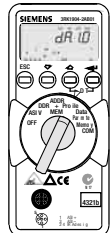
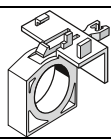
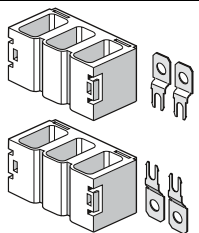
Figure 3-3 SIRIUS 3RA6 compact starter with AS-i mounting module (system configuration)

(1) AS-i mounting module

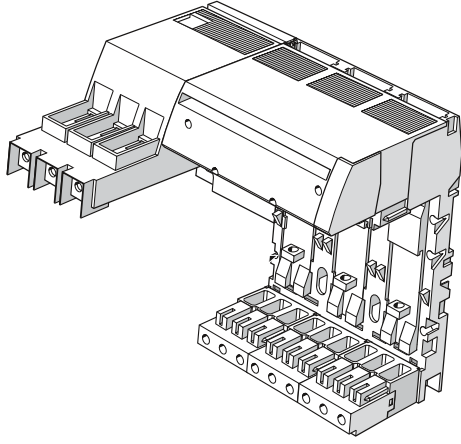
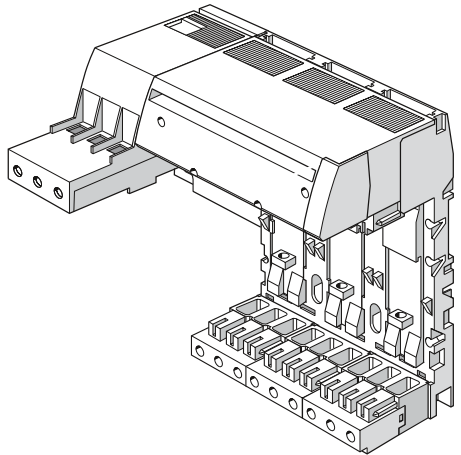
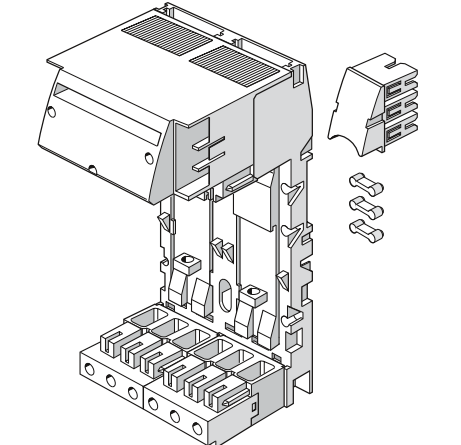
3.3 System components

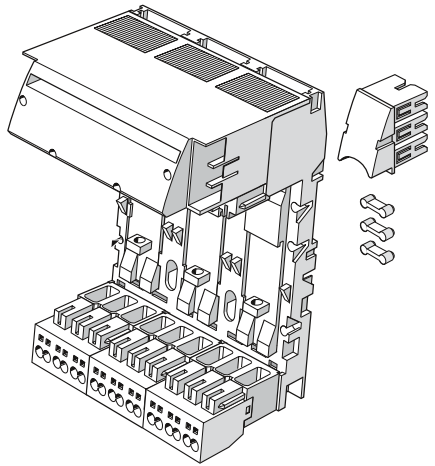
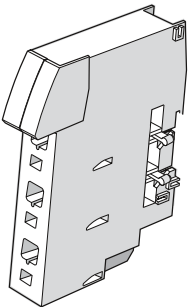
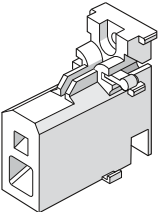
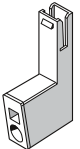
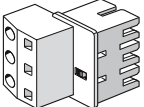
SIRIUS 3RA6 compact starter

System component	Order number	Image
3RA61 compact starter direct starter	3RA61	
3RA62 compact starter reversing starter	3RA62	
Main conductor terminal (2 terminals/package for incoming and outgoing terminals) - Screw-type connection technology - Spring-loaded connection technology	3RA6920-1A 3RA6920-2A	
Terminal for self-protected combination motor controller (Type E) to UL 508	3RV1928-1H	

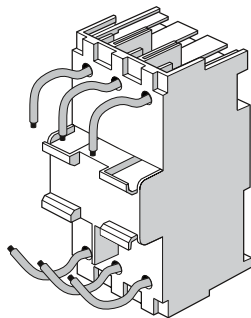
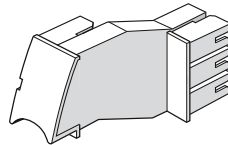
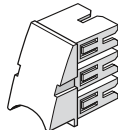
System component	Order number	Image
Auxiliary switch block for compact starter - Screw-type connection technology: 2 NO contacts 2 NC contacts 1 NO contact + 1 NC contact - Spring-loaded connection technology: 2 NO contacts 2 NC contacts 1 NO contact + 1 NC contact	3RA6911-1A 3RA6912-1A 3RA6913-1A 3RA6911-2A 3RA6912-2A 3RA6913-2A	
AS-i mounting module for compact starter	3RA6970-3A	
AS-i mounting module for compact starter with two local inputs for safe shutdown	3RA6970-3B	
AS-i mounting module addressing unit - For active AS-Interface modules, intelligent sensors and final controlling elements - Corresponds to AS-Interface version 2.1 - Includes extended addressing mode - Scope of delivery includes addressing cable (1.5 m stereo jack)	3RK1904-2AB01	
Control kit	3RA6950-0A	
Adapter for screw fastening the compact starter (you will need 2 sets for the reversing starter)	3RA6940-0A	

SIRIUS infeed system for 3RA6

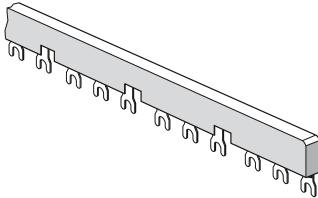
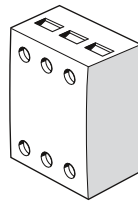
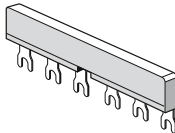
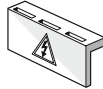
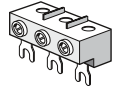
System component	Order number	Image
Left infeed, 50/70 mm² screw terminal with three slots, outgoing terminals with - Screw-type connection technology - Spring-loaded connection technology Incl. PE bar (for installing Type E starters in accordance with UL 508)	3RA6813-8AB 3RA6813-8AC	
Left infeed, 25/35 mm² screw terminal with three slots, outgoing terminals with - Screw-type connection technology - Spring-loaded connection technology Incl. PE bar	3RA6812-8AB 3RA6812-8AC	
Extension module with two slots, outgoing terminals with - Screw-type connection technology - Spring-loaded connection technology Incl. PE bar	3RA6822-0AB 3RA6822-0AC	

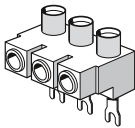
System component	Order number	Image
Extension module with three slots, outgoing terminals with - Screw-type connection technology - Spring-loaded connection technology Incl. PE bar	3RA6823-0AB 3RA6823-0AC	
Left or right infeed, 25/35 mm ² , with spring-loaded connection technology	3RA6830-5AC	
PE infeed, 25/35 mm ² , with - Screw-type connection technology - Spring-loaded connection technology	3RA6860-6AB 3RA6860-5AC	
PE tap, 6/10 mm ² , with - Screw-type connection technology - Spring-loaded connection technology	3RA6870-4AB 3RA6870-3AC	
PE extension connector	3RA6890-0EA	
Terminal block	3RV1917-5D	

3.3 System components

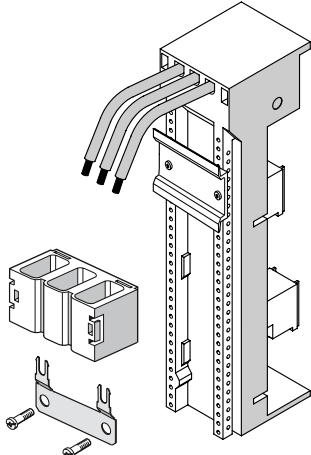
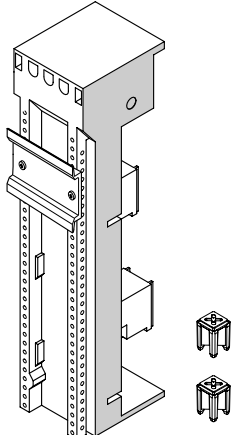
System component	Order number	Image
45 mm adapter for infeed system for 3RA6 (for mounting size S0 circuit breakers (max. 12.5 A / 400 V; $I_{CU} < 53$ kA) on the infeed system for 3RA6)	3RA6890-0BA	
Extension connector for 3RV19 (connects SIRIUS infeed system for 3RA6 to 3RV19 infeed system)	3RA6890-1AA	
Extension connector (for reordering an original part that has been lost)	3RA6890-1AB	

3-phase busbar

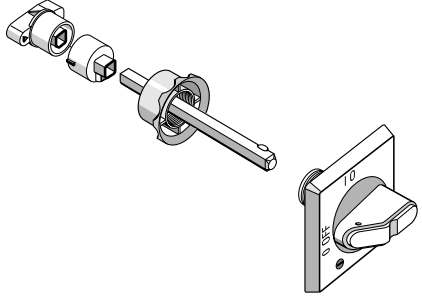
System component	Order number	Image
3-phase busbar - 2 partitions - 3 partitions - 4 partitions - 5 partitions	3RV1915-1AB 3RV1915-1BB 3RV1915-1CB 3RV1915-1DB	
3-phase infeed terminal, connection from the bottom, with screw-type connection technology	3RV1915-5B	
Connection piece for connecting compact starters to size S00 circuit breakers	3RV1915-5DB	
Cover cap for terminal lugs	3RV1915-6AB	
3-phase infeed terminal, connection from the top, with screw-type connection technology	3RV1925-5AB	

System component	Order number	Image
3-phase infeed terminal for installing Type E starters, UL 508 with screw-type connection technology	3RV1925-5EB	

8US busbar adapter

System component	Order number	Image
Busbar adapter for 60 mm system	8US1211-1NS10	
Device holder for side mounting on busbar adapter (only if installing a 3RA62 reversing starter)	8US1250-1AA10	

Door-coupling rotary operating mechanism

System component	Order number	Image
Door-coupling rotary operating mechanism - 130 mm long	3RV1926-0B	
EMERGENCY OFF door-coupling rotary operating mechanism - 130 mm long	3RV1926-0C	

Configuration

4.1 SIRIUS 3RA6 compact starter

Assembly group installation

The module can be installed horizontally (i.e. on a vertically installed DIN rail) or vertically (i.e. on a horizontally installed DIN rail).

Safe isolation

The following limit values must be observed to ensure safe isolation of the compact starters in accordance with IEC / EN 60947-1:

- Control circuit to internal auxiliary circuit: 250 V
- Internal auxiliary/control circuit to internal auxiliary/control circuit: 250 V
- Internal auxiliary/control circuit to external auxiliary circuit: 400 V
- Main circuit to internal auxiliary/control circuit: 400 V
- Main circuit to external auxiliary circuit: 400 V

In order for the "safe isolation" of circuits to be achieved, an individual fault must not be able to trigger a voltage overspill from one circuit into another. The kinds of fault to be taken into account include twisted or loose conductive parts, twisted solder pins, broken winding wire, missing screws or broken barriers within a device.

Cabinet types

The system can be installed inside a central control cabinet or a distributed control box.

Grounding measures

No grounding measures are necessary.

Required control power supply

Depending on the version, the compact starter requires the following control power supply (AC/DC):

- 24 V
- 42 to 70 V
- 110 to 240 V

Operating temperature

The compact starter has been designed for use with ambient temperatures ranging from - 20 °C to + 40 °C.

Derating

Within the temperature range + 40 °C to + 60 °C, derating of the compact starter's permissible rated current is necessary if:

- Several compact starters are installed side by side on a vertical DIN rail without any space in between.
- Several compact starters are installed side by side in a SIRIUS 3RA6 infeed system without any space in between.

Internal control cabinet temperatures	Permissible rated current $I_{r\max}$
+ 40 °C	100% of $I_{r\max}$
+ 60 °C	80% of $I_{r\max}$

Maximum rated current

Depending on the current setting range, the following maximum rated currents apply to the compact starter:

Table 4-1 Maximum rated current (3RA6 compact starter)

Current setting range	Max. rated current
0.1 to 0.4 A	0.4 A
0.32 to 1.25 A	1.25 A
1 to 4 A	4 A
3 to 12 A	12 A
8 to 32 A	32 A

Short-circuit protection

The compact starter has a rated ultimate short-circuit breaking capacity I_{cu} of 53 kA at 400 V. If the short-circuit current at the installation point exceeds the compact starter's specified rated ultimate short-circuit breaking capacity, then you will need to use a backup fuse. It is also possible to install an upstream circuit breaker with limiter function.

Combining compact starters with SIRIUS circuit breakers

The compact starter's connecting terminals are compatible with size S0 circuit breakers from the SIRIUS 3RV range.

Distance from neighboring components

When installing compact starters, the following distances from grounded or live parts and from neighboring components must be observed in accordance with IEC / EN 60947-6-2.

- Lateral distance from grounded parts: 10 mm
- Arcing space, top and bottom: 30 mm

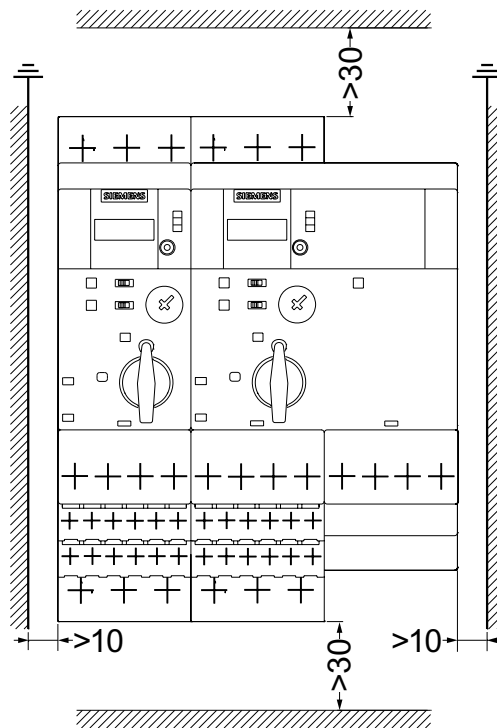


Figure 4-1 Distance of compact starter from neighboring components (dimensions in mm)

- (1) 3RA61 compact starter direct starter
- (2) 3RA62 compact starter reversing starter

4.2 Supply possibilities in main circuit

The following supply options are available for the compact starter's main circuit:

- Infeed via parallel wiring of individual compact starters
- Infeed via SIRIUS infeed system for 3RA6
- Infeed via 3-phase bus bars
- Infeed via 8US busbar adapter

If the creepages and clearances specified by UL 508 also need to be observed, then special infeed terminals are available for the relevant infeed systems.

According to UL 508, these infeed terminals are not required for MSP (Manual Starter Protector).

4.2.1 SIRIUS infeed system for 3RA6

Maximum rated current

The following maximum rated currents apply to the components of the SIRIUS infeed system for 3RA6:

Table 4-2 Maximum rated current (infeed system for 3RA6)

Components	Order number	Max rated current $I_{r\ max}$
Left infeed, 50/70 mm ² screw terminal with three slots, outgoing terminals with screw-type connection technology, incl. PE bar	3RA6813-8AB	100 A
Left infeed, 50/70 mm ² screw terminal with three slots, outgoing terminals with spring-loaded connection technology, incl. PE bar	3RA6813-8AC	100 A
Left infeed, 25/35 mm ² screw terminal with three slots, outgoing terminals with screw-type connection technology, incl. PE bar	3RA6812-8AB	63 A
Left infeed, 25/35 mm ² screw terminal with three slots, outgoing terminals with spring-loaded connection technology, incl. PE bar	3RA6812-8AC	63 A
Left or right infeed, 25/35 mm ² , with spring-loaded connection technology	3RA6830-5AC	63 A
Extension connector	3RA6890-1AB	63 A

**⚠ WARNING****Danger, high voltage!**

The maximum rated current for the extension connector is 63 A, regardless of the infeed block. If the rated current is exceeded, the extension connector will be damaged beyond repair.

Make sure that the extension connector is never subjected to more than 63 A.

Operating temperature

The infeed system for 3RA6 has been designed for use with ambient temperatures ranging from - 20 °C to + 60 °C.

Use with higher ambient temperatures

The infeed system can be operated within the temperature range - 20 °C to + 40 °C without derating. Within the temperature range + 40 °C to + 60 °C, derating of the compact starter's permissible rated current is necessary.

Internal control cabinet temperatures	Permissible rated current $I_{r\ max}$ of the compact starter
+ 40 °C	100% of $I_{r\ max}$
+ 60 °C	80% of $I_{r\ max}$

Configuration

The infeed system for 3RA6 can be installed horizontally or vertically.

The main conductors can be connected to the screw-type infeeds of the infeed system from both the top and the bottom.

Therefore, the infeed system for 3RA6 is particularly suitable for multi-tier configuration. Within this context, the bottom terminal openings of the top tier need to be connected to the top terminal openings of the bottom tier using a conductor.

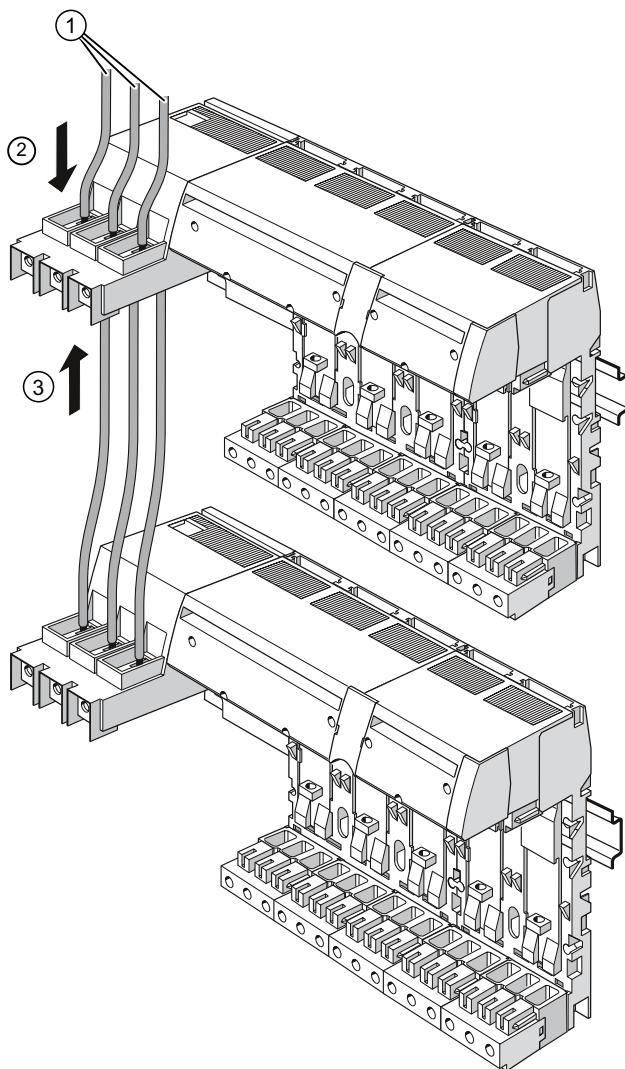


Figure 4-2 Multi-tier configuration of the infeed system for 3RA6

- (1) Main conductors (L1, L2, L3)
- (2) Connection from the top
- (3) Connection from the bottom

Distance from neighboring components

When installing the infeed system, the following distances from grounded or live parts and from neighboring components must be observed.

- Lateral distance from grounded parts: 10 mm
- Arcing space, top and bottom: 30 mm

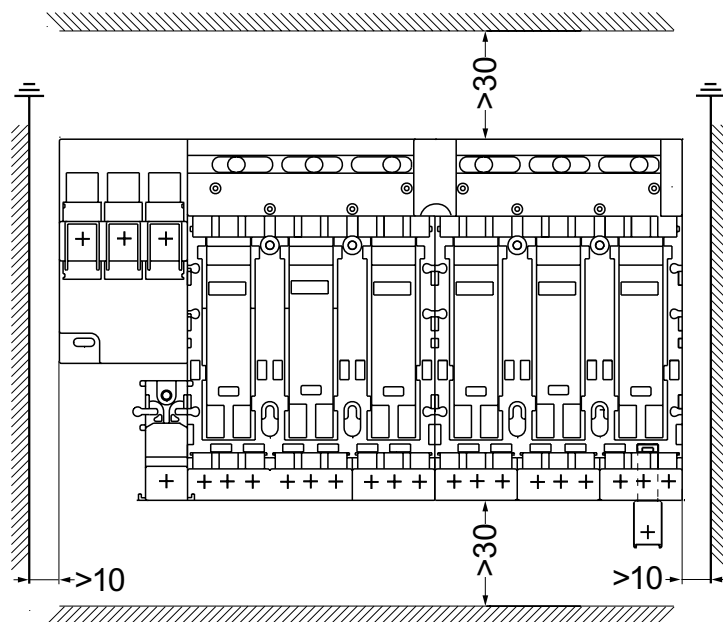


Figure 4-3 Distance of infeed system for 3RA6 from neighboring components (dimensions in mm)

The installation guidelines for compact starters and circuit breakers/fuseless load feeders must also be observed along with the associated clearances.

Short-circuit protection

The short-circuit protection device that is installed upstream of the infeed system must be designed in accordance with the table below.

Table 4-3 Short-circuit protection for SIRIUS infeed system for 3RA6

Conductor cross-sections	$I_{d,max}$	Recommendation regarding upstream short-circuit protection device (53 kA/400 VAC)
Short-circuit protection for left or right infeed, 25/35 mm ² , with spring-loaded connection technology (3RA6830-5AC)		
4 mm ²	$I_{d,max} < 9.5 \text{ kA}$, $I^2t = 85 \text{ kA}^2\text{s}$	3RV1021-4DA10
6 mm ²	$I_{d,max} < 12.5 \text{ kA}$, $I^2t = 140 \text{ kA}^2\text{s}$	3RV1031-4EA10
10 mm ²	$I_{d,max} < 15 \text{ kA}$, $I^2t = 180 \text{ kA}^2\text{s}$	3RV1031-4HA10
16 mm ² /25 mm ²	$I_{d,max} < 19 \text{ kA}$, $I^2t = 440 \text{ kA}^2\text{s}$	3RV1041-4JA10

Conductor cross-sections	$I_{d,max}$	Recommendation regarding upstream short-circuit protection device (53 kA/400 VAC)
Short-circuit protection for - Left infeed, 25/35 mm ² screw terminal with three slots, outgoing terminals with screw-type connection technology, incl. PE bar (3RA6812-8AB) - Left infeed, 50/70 mm ² screw terminal with three slots, outgoing terminals with screw-type connection technology, incl. PE bar (3RA6813-8AB) - Left infeed, 25/35 mm ² screw terminal with three slots, outgoing terminals with spring-loaded connection technology, incl. PE bar (3RA6812-8AC) - Left infeed, 50/70 mm ² screw terminal with three slots, outgoing terminals with spring-loaded connection technology, incl. PE bar (3RA6813-8AC)		
-	-	3RV1041-4MA10 NH gL/gG 3NA3; 315 A

Table 4-4 Short-circuit protection for terminal block (3RV1917-5D)

Conductor cross-sections	$I_{d,max}$ for downstream short-circuit protection device
Short-circuit protection for terminal block (3RV1917-5D)	
1.5 mm ²	$I_{d,max} < 7.5 \text{ kA}$
2.5 mm ²	$I_{d,max} < 9.5 \text{ kA}$
4 mm ²	$I_{d,max} < 9.5 \text{ kA}$
6 mm ²	$I_{d,max} < 12.5 \text{ kA}$

On the 45 mm adapter for the infeed system for 3RA6 only S0 circuit breakers with a rated ultimate short-circuit breaking capacity $I_{CU} < 53 \text{ kA}$ at 400 V ($I_{max} = 12.5 \text{ A}$) may be mounted. If the short-circuit current at the installation point exceeds the circuit breaker's specified rated ultimate short-circuit breaking capacity, then you will need to use a backup fuse.

**⚠ WARNING****Short-circuit hazard!**

Unless the cables running from the terminal block to the downstream short-circuit protection device are laid in a short-circuit proof manner, there is a risk of damage to the system.

Make sure that the cables running from the terminal block to the downstream short-circuit protection device are laid in a short-circuit proof manner (IEC / EN 60439-1 Section 7.5.5.1).

Options for combining the equipment with other products from the SIRIUS modular system

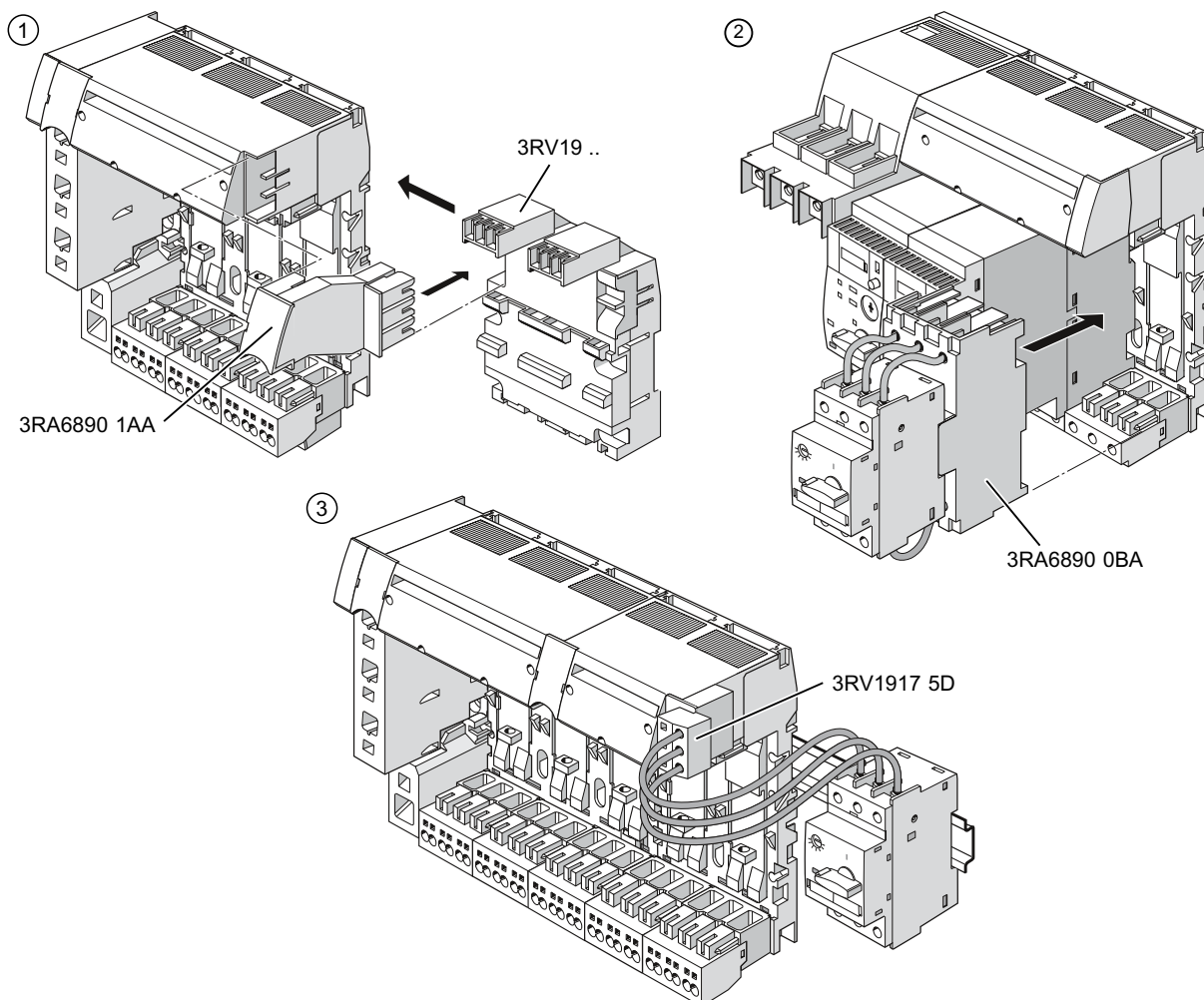


Figure 4-4 Combination with other sizes (SIRIUS infeed system for 3RA6)

The SIRIUS infeed system for 3RA6 combined with:

- (1) The 3RV19 infeed system using the extension connector for 3RV19 (3RA6890-1AA).
- (2) SIRIUS size S0 circuit breakers (max. 12.5 A / 400 V; $I_{cu} < 53$ kA) using the 45 mm adapter for the infeed system for 3RA6 (3RA6890-0BA).
- (3) Three-phase or single-phase protection devices of other sizes using the terminal block (3RV1917-5D).

4.2.2 3-phase busbar

Rated current/operating voltage

- Rated operating voltage: 690 V
- Rated current: 63 A

Combination with other sizes

The compact starters can be combined with size S0 circuit breakers using the 3-phase busbar (3RV1915-1.B) as well as with size S00 circuit breakers using the connection piece (3RV1915-5DB).

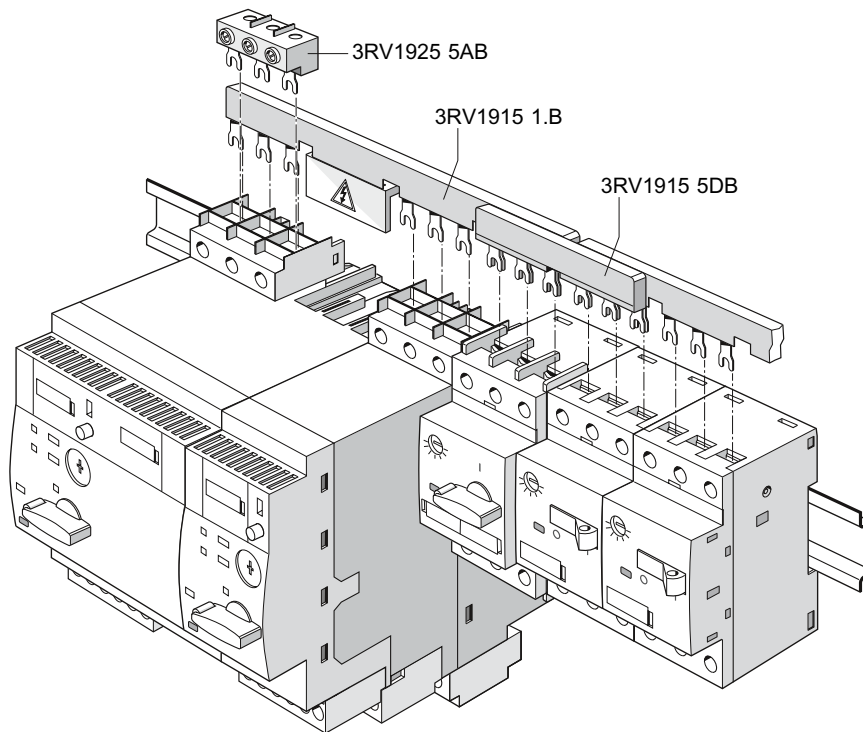


Figure 4-5 Combination with other sizes (3-phase busbar)

4.2.3 8US busbar adapter

The compact starters are mounted on the 8US busbar adapter and connected on the line side. This ready-to-use unit plugs directly onto the busbar systems, thereby taking care of mechanical fastening and electrical connection at the same time.

Installation with 8US busbar adapter

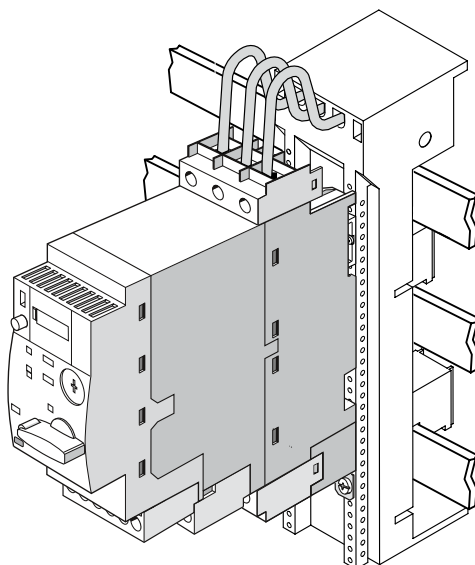


Figure 4-6 Infeed via 8US busbar adapter

Note

The 8US busbar adapter plus compact starters must be arranged side by side on the busbar system without any space in between in order to meet the specified vibratory load and shock load requirements.

4.2.4 Infeed in accordance with UL 508 (Type E)

According to UL 508 and CSA 22.2, a motor feeder is required to fulfill 4 sub-functions:

Table 4-5 Sub-functions of motor feeders according to UL 508 and CSA 22.2

Sub-function	Description
Disconnect	The feeder component has an actuator, which will only indicate the "OFF" switch position if all the main contacts are open and are isolating the disconnected circuit from the supply system up to the specified voltage U_{imp} . It is not permissible for an overvoltage in the supply system up to the specified voltage U_{imp} to flash over to the disconnected circuit via the contacts.
Branch Circuit Protection	The feeder component must protect the cable running to the motor, the contactor and the overload relay (if installed) in the event of a short circuit.
Motor Control	The feeder component turns the motor "ON" or "OFF" under normal switching duty conditions.
Motor Overload	The feeder component must protect the motor from damage in the event of an overload.

To ensure the provision of these 4 sub-functions, the motor feeder can be made up of various feeder components, e.g. circuit breaker, contactor, fuse, etc. Depending on which feeder components are used and the sub-functions that these components perform, the motor feeders are sorted into the following categories in accordance with UL 508: Type A, B, C, D, E, and Type F.

Table 4-6 Categorization of motor feeders in accordance with UL 508

Category	Motor feeder
Type A and Type B	Each sub-function is provided by a separate feeder component. ¹⁾
Type C and Type D	"The Disconnect" and "Branch Circuit Protection" sub-functions are provided by the same feeder component. All other sub-functions are provided by separate feeder components. ¹⁾
Type E	All sub-functions are provided by a single feeder component.
Type F	"Motor Control" is provided by a separate feeder component. All other sub-functions are provided by a single feeder component.
1) For more detailed information, please refer to UL 508.	

The compact starter is a circuit breaker with an integrated contactor operating mechanism. This means that it provides all 4 sub-functions and is, therefore, a member of the Type E category. It differs from the devices in the Type F category in that they switch the motors via a contactor which is connected separately.

According to UL 508 (Type E), a creepage of 1 inch and clearance of 2 inches are required on the line side for a Combination Motor Controller Type E.

The following supply possibilities are available for ensuring that the creepage and clearance requirements of UL 508 are met:

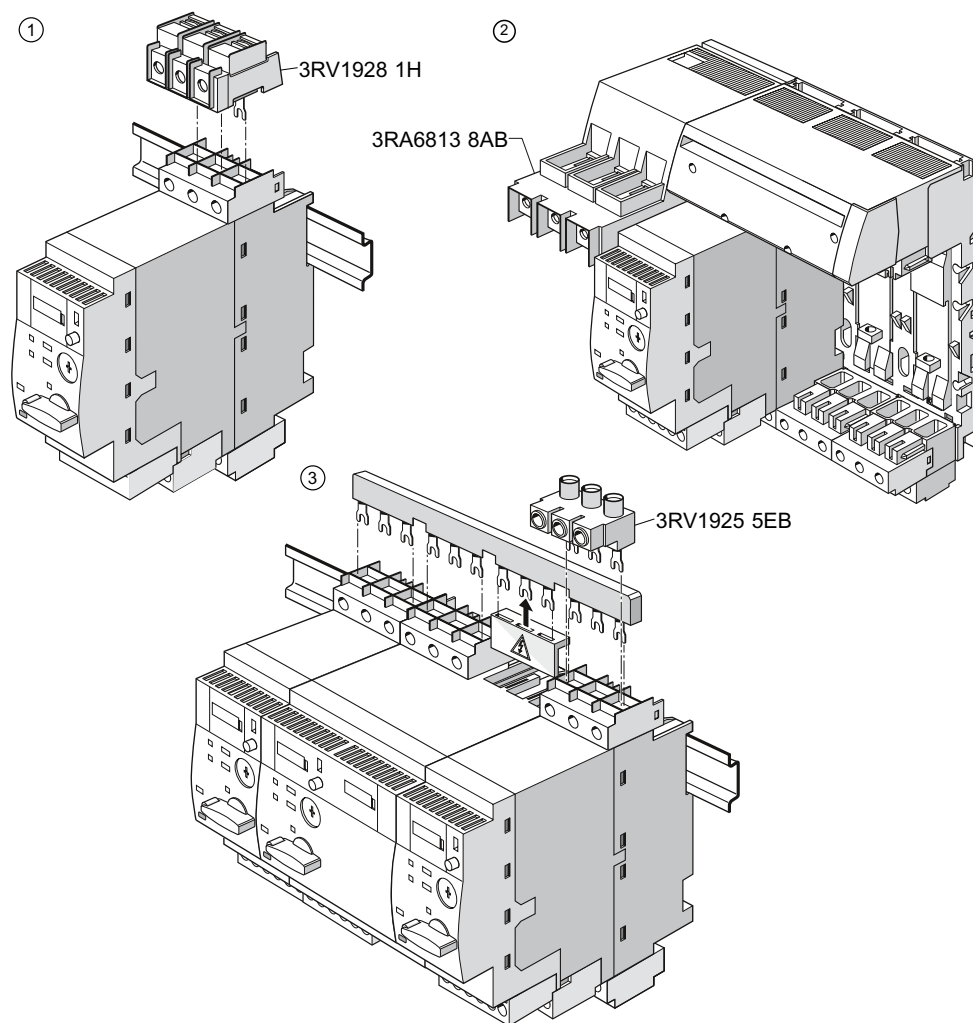


Figure 4-7 Terminals for infeed in accordance with UL 508 (Type E)

No.	Type of infeed	Infeed terminal (in accordance with UL 508, Type E)	Order number
(1)	Parallel wiring	Terminal for Self-Protected Combination Motor Controller (Type E)	3RV1928-1H
(2)	Infeed system for 3RA6	Left infeed, 50/70 mm ² screw terminal with three slots, outgoing terminal with screw-type or spring-loaded connection technology, incl. PE bar	3RA6813-8AB 3RA6813-8AC
(3)	3-phase busbar	3-phase infeed terminal for installing Type E starters, UL 508	3RV1925-5EB

Note

According to C22.2-14, terminal blocks are not required for installation in accordance with CSA requirements.

Communication via AS-Interface

The actuator sensor interface (AS-Interface) is a modular networking system for sensors and actuators at the lowest field level.

As far as the program in the control system is concerned, it makes no difference whether parallel wiring is used or whether the AS-Interface is used. As a result, it is possible to switch over to the AS-Interface even on existing systems, as you can continue to use any programs that are already installed. The entire system can be operated without additional software. You do not need to know about the internal workings of the AS-Interface.

Replacement for wire bundle

If parallel wiring is used for the compact starter, a large amount of wiring will be required for the purpose of transferring process signals to the control system. This means that each compact starter has to be connected to the control system by means of its own separate line. However, if the AS-Interface is used instead, this wire bundle can be replaced by a single two-wire line that is shared by all compact starter groups (up to a maximum of 62 compact starters).

Data and power via one two-wire line

The master communicates with the nodes via the AS-Interface lines. As well as being used for data exchange, this line also carries the supply voltage for the electronics and the check-back signals of the compact starter. The voltage is fed into the AS-Interface line by a special AS-Interface power supply unit with data decoupling circuit.

Auxiliary power

The AS-i mounting module features a separate external 24 VDC auxiliary power supply, which is intended for the outputs. This meets the requirements of EN / DIN EN 50178 in respect of safe isolation of the auxiliary voltage from the AS-i potential. Consequently, compact starter control can be safely deactivated via Y1 - Y4.

Maximum system configuration

For detailed installation and mounting guidelines, please refer to the manual entitled "AS-Interface System" (order number: 3RK2703-3AB02-1AA1).

Up to 62 nodes (e.g. compact starters) can be connected to the AS-Interface line. This is possible thanks to the use of A/B technology, whereby the 31 addresses are split into two completely separate sub-addresses (e.g. 1A and 1B).

Addressing

Before it can participate in data exchange with the master, each node must be assigned an address prior to commissioning of the AS-Interface network. To facilitate this, an addressing unit is available.

For additional information on addressing, please refer to "Addressing via AS-Interface (Page 82)".

Certification by the AS-International association

Siemens AS-Interface products are tested at an accredited test laboratory in accordance with the relevant testing regulations and certified by the AS-International association.

Description of the hardware

6.1 SIRIUS 3RA61 compact starter direct starter

Features

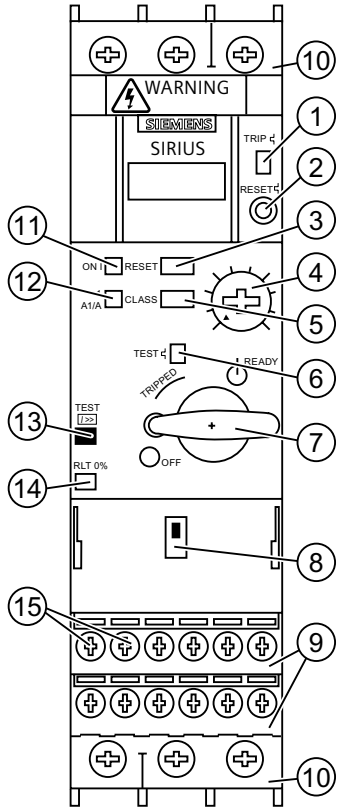
The 3RA61 compact starter direct starter is made up of the following components:

- Direct starter
- Two removable main conductor terminal blocks
- Two 6-pin removable auxiliary and control conductor terminal blocks (A1+/A2-, "overload" and "short circuit/malfunction" signaling switch and internal auxiliary switches)
- One optional external auxiliary switch block (2 NO contacts, 2 NC contacts or 1 NC contact + 1 NO contact)

Control is either via the control voltage connection at terminals "A1+" and "A2-" or via the AS-i mounting module.

For additional information on the AS-i mounting module, please refer to "AS-i mounting module for compact starter (Page 47)".

3RA61 compact starter direct starter

Front view	No.	Function
	(1)	"Overload trip" mechanical display
	(2)	"Reset overload trip" button
	(3)	"Manual/auto reset" selector switch
	(4)	"Current setting I_e " setting wheel
	(5)	"Overload trip class" selector switch
	(6)	"Overload protection" test button
	(7)	Actuator with eye for padlock
	(8)	Connection point for auxiliary switch block
	(9)	Control and auxiliary conductor terminal blocks
	(10)	Main conductor terminal blocks
	(11)	"Main contacts closed" LED display
	(12)	"Control voltage present" LED display
	(13)	"Short-circuit protection function" test button
	(14)	"Malfunction" mechanical display
	(15)	"Control voltage" connection

Display elements and operator controls on the 3RA61 compact starter direct starter

No.	Function	Marking	Description
(1)	Overload trip	TRIP ϵ	- No display: Loading on motor is within permissible range - White display: The motor has been/is being overloaded.
(2)	Reset overload trip	RESET ϵ	Press this button to reset the compact starter following an overload.
(3)	"Manual/auto reset"	RESET M/A	For selecting manual or auto reset following an overload
(4)	Current setting I_e	0.1 - 0.4 A ϵ 0.32 - 1.25 A ϵ 1 - 4 A ϵ 3 - 12 A ϵ 8 - 32 A ϵ	For selecting the current setting I_e .
(5)	Overload trip class	CLASS 10/20	For selecting the overload trip class 10 or 20
(6)	"Overload protection" test button	TEST ϵ	Press this button to test the overload protection function.

No.	Function	Marking	Description
(7)	Device status	○ OFF ◐ READY - TRIPPED	○ OFF: Compact starter is out of service ○ OFF and eye for padlock pulled out: Compact starter is out of service and secured against unauthorized closing. ◐ READY: Compact starter is ready - TRIPPED: Short circuit or malfunction
(8)	Connection point for auxiliary switch block	-	-
(9)	Control and auxiliary conductor terminal blocks	-	-
(10)	Main conductor terminal blocks	-	-
(11)	Device status	ON I	- Green: Main contacts are closed. - Off: Main contacts are open.
(12)	Control voltage	A1/A2	- Green: Control voltage is present - Off: Control voltage is not present
(13)	"Short-circuit protection function" test button	TEST I>>	Press this button to test the short-circuit protection function.
(14)	Malfunction	RLT 0%	- No display: Device is OK - White display: Malfunctions detected. Device must be replaced.
(15)	"Control voltage" connection	A1+, A2-	-

6.2 SIRIUS 3RA62 compact starter reversing starter

Features

The 3RA62 compact starter reversing starter is made up of the following components:

- Reversing starter
- Two removable main conductor terminal blocks
- Two 6-pin removable auxiliary and control conductor terminal blocks (A1+/A2 -, B2/B1, "overload" and "short circuit/malfunction" signaling switch and internal auxiliary switches)
- Two optional external auxiliary switch blocks (2 NO contacts, 2 NC contacts or 1 NO contact + 1 NC contact)

Control is either via the control voltage connection at terminals "A1+", "A2/B2-" and "B1+" or via the AS-i mounting module.

For additional information on the AS-i mounting module, please refer to "AS-i mounting module for compact starter (Page 47)".

Direction of rotation interlock

The contactors for the reversing starter's direction of rotation are interlocked. This precaution prevents the contactors for direction of rotation 1 and direction of rotation 2 from being activated simultaneously, which would result in a short circuit.

Contactors interlocking is implemented on both a mechanical level (against shock loads) and an electrical level (against incorrect activation).

- Mechanical protective interlock: A tumbler gear is used to interlock the directions of rotation mechanically. If the main contacts for direction of rotation 1 are closed, the tumbler gear will prevent the main contacts for direction of rotation 2 from closing at the same time, and vice versa.
- Electrical protective interlock: The reversing starter has an auxiliary contact (NC contact) for each direction of rotation. Each auxiliary contact blocks the control current of the other direction of rotation, i.e. if the main contacts for "direction of rotation 1 (2)" are closed, the relevant auxiliary contact will open and interrupt the control circuit for "direction of rotation 2 (1)". This ensures that the main contacts for "direction of rotation 2 (1)" cannot be switched even if the control voltage for "direction of rotation 2 (1)" is present.

Configuration of 3RA62 compact starter reversing starter

Front view	No.	Function
	(1)	"Overload trip" mechanical display
	(2)	"Reset overload trip" button
	(3)	"Manual/auto reset" selector switch
	(4)	"Current setting I_e " setting wheel
	(5)	"Overload trip class" selector switch
	(6)	"Overload protection" test button
	(7)	Actuator with eye for padlock
	(8a)	Connection point for auxiliary switch block (direction of rotation 1)
	(8b)	Connection point for auxiliary switch block (direction of rotation 2)
	(9)	Control and auxiliary conductor terminal blocks
	(10)	Main conductor terminal blocks
	(11a)	"Main contacts closed" LED display (direction of rotation 1)
	(11b)	"Main contacts closed" LED display (direction of rotation 2)
	(12)	"Control voltage present" LED display
	(13)	"Short-circuit protection function" test button
	(14)	"Malfunction" mechanical display
	(15)	"Control voltage" connection

Display elements and operator controls on the 3RA62 compact starter reversing starter

No.	Function	Marking	Description
(1)	Overload trip	TRIP 𐀀	- No display: Loading on motor is within permissible range - White display: The motor is overloaded.
(2)	Reset overload trip	RESET 𐀀	Press this button to reset the compact starter following an overload.
(3)	"Manual/auto reset"	RESET M/A	For selecting manual or auto reset following an overload
(4)	Current setting I_e	0.1 - 0.4 A 𐀀 0.32 - 1.25 A 𐀀 1 - 4 A 𐀀 3 - 12 A 𐀀 8 - 32 A 𐀀	For selecting the current setting I_e .
(5)	Overload trip class	CLASS 10/20	For selecting the overload trip class 10 or 20
(6)	"Overload protection" test button	TEST 𐀀	Press this button to test the overload protection function.

6.2 SIRIUS 3RA62 compact starter reversing starter

No.	Function	Marking	Description
(7)	Device status	○ OFF ⌚ READY - TRIPPED	○ OFF: Compact starter is out of service ○ OFF and eye for padlock pulled out: Compact starter is out of service and secured against unauthorized closing. ⌚ READY: Compact starter is ready - TRIPPED: Short circuit or malfunction
(8a)	Connection point for auxiliary switch block (direction of rotation 1)	-	-
(8b)	Connection point for auxiliary switch block (direction of rotation 2)	-	-
(9)	Control and auxiliary conductor terminal blocks	-	-
(10)	Main conductor terminal blocks	-	-
(11a)	Device status direction of rotation 1	ON I 1	- Green: Main contacts "direction of rotation 1" closed. - Off: Main contacts "direction of rotation 1" not closed.
(11b)	Device status direction of rotation 2	ON I 2	- Green: Main contacts "direction of rotation 2" closed. - Off: Main contacts "direction of rotation 2" not closed.
(12)	Control voltage	A1/A2 B1/B2	- Green: Control voltage is present - Off: Control voltage is not present
(13)	"Short-circuit protection function" test button	TEST I>>	Press this button to test the short-circuit protection function.
(14)	Malfunction	RLT 0%	- No display: Device is OK - White display: Malfunctions detected. Device must be replaced.
(15)	"Control voltage" connection	A1+, A2/B2-, B1+	-

6.3 AS-i mounting module for compact starter

Features

The AS-i mounting module is mounted on the compact starter with 24 V control voltage, thereby enabling it to be controlled via an AS-Interface. The following components are required for this purpose:

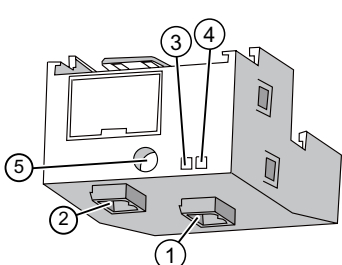
- AS-i master
- AS-i power supply unit
- 24 VDC PELV power supply unit
- Cables and connection plugs

The AS-i mounting module is available in 2 versions:

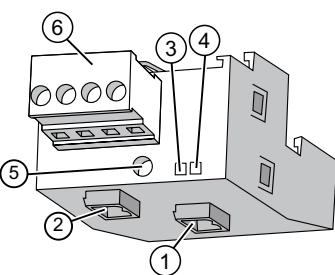
- AS-i mounting module for compact starter (order number: 3RA6970-3A)
- AS-i mounting module for compact starter with two local inputs for safe shutdown (order number: 3RA6970-3B). This version of the AS-i mounting module also allows limit switches, for example, to be connected via a screw terminal for the safe shutdown of compact starters up to category 2 in accordance with EN ISO 13849-1.

For additional information on connecting the AS-i mounting module, please refer to "Connecting the compact starter (24 V) with optional AS-i mounting module (Page 77)".

Configuration of the AS-i mounting module for compact starter (3RA6970-3A)

View	No.	Function
	(1)	24 VDC PELV power supply unit connection
	(2)	AS-i data cable connection
	(3)	AS-i/Fault LED
	(4)	AUX Power LED
	(5)	Addressing unit connection

Configuration of AS-i mounting module with 2 local inputs for safe shutdown (3RA6970-3B)

View	No.	Function
	(1)	24 VDC PELV power supply unit connection
	(2)	AS-i data cable connection
	(3)	AS-i/Fault LED
	(4)	AUX Power LED
	(5)	Addressing unit connection
	(6)	Terminal for connecting a limit switch

Display elements and operator controls on the AS-i mounting module

Element	Description
AS-i/Fault LED	- Off: No AS-i voltage on AS-Interface chip - Flashing red/yellow: The address of the AS-i mounting module is "0". - Green: Ready/communication OK - Red: Communication error
AUX Power LED	- Off: No AUX Power - Green: AUX Power present

Functions

7.1 Normal switching duty

Compact starters are mainly used for switching and protecting motors and also as main switches and disconnectors. The actuator can be used to switch the compact starter manually; together with the "ON I" LED it indicates the compact starter's current status.

The actuator has three positions:

-  READY: Compact starter is ready
-  OFF: Compact starter is out of service
- TRIPPED: Malfunction or short circuit trip

Actuator OFF

When the actuator is in the  OFF position, the main contacts are open and the active areas of the control electronics are disconnected. Only the thermal motor model and display elements remain in operation.

When the actuator is in the  OFF position, the 3RA61 compact starter direct starter can adopt the following statuses:

Table 7-1 Actuator display elements  OFF (direct starter)

Actuator	LEDs		Compact starter status
	ON I	A1/A2	
OFF	 OFF	 OFF	Compact starter is off: - The circuit breaker mechanism is off. - The main contacts are open. - The control voltage is not present.
OFF	 OFF	 GREEN	Compact starter is off: - The circuit breaker mechanism is off. - The main contacts are open. - The control voltage is present.

When the actuator is in the ○ OFF position, the 3RA62 compact starter reversing starter can adopt the following statuses:

Table 7-2 Actuator display elements ○ OFF (reversing starter)

Actuator	LEDs			Compact starter status
	ON I 1	ON I 2	A1/A2 B1/B2	
OFF	○ OFF	○ OFF	○ OFF	Compact starter is off: - The circuit breaker mechanism is off. - The main contacts are open. - The control voltage is not present.
OFF	○ OFF	○ OFF	 GREEN	Compact starter is off: - The circuit breaker mechanism is off. - The main contacts are open. - The control voltage is present.

Actuator ◐ READY

The circuit breaker mechanism (breaker latching mechanism) in the compact starter is switched on and the compact starter is ready.



DANGER

Machine start-up!

Switch the actuator on the compact starter to ◐ READY with the "A1/A2" LED illuminated. The compact starter will switch on immediately and the machine will start up.

Make sure that no-one is in the machine danger zone, when you move the actuator to the ◐ READY position.

When the actuator is in the ◐ READY position, the 3RA61 compact starter direct starter can adopt the following statuses:

Table 7-3 Actuator display elements ◐ READY (direct starter)

Actuator	LEDs		Compact starter status
	ON I	A1/A2	
READY	○ OFF	○ OFF	Compact starter is ready: - The circuit breaker mechanism is on. - The main contacts are open. - The control voltage is not present.
READY	 GREEN	 GREEN	Compact starter is on: - The circuit breaker mechanism is on. - The main contacts are closed. - The control voltage is present.
READY	○ OFF	 GREEN	Overload tripped

When the actuator is in the ϕ READY position, the 3RA62 compact starter reversing starter can adopt the following statuses:

Table 7-4 Actuator display elements ϕ READY (reversing starter)

Actuator	LEDs			Compact starter status
	ON I 1	ON I 2	A1/A2 B1/B2	
READY	 OFF	 OFF	 OFF	Compact starter is ready: - The circuit breaker mechanism is on. - The main contacts are open. - The control voltage is not present.
READY	 GREEN	 OFF	 GREEN	Compact starter is on: - The circuit breaker mechanism is on. - The main contacts for "direction of rotation 1" are closed. - The control voltage is present.
READY	 OFF	 GREEN	 GREEN	Compact starter is on: - The circuit breaker mechanism is on. - The main contacts for "direction of rotation 2" are closed. - The control voltage is present.
READY	 OFF	 OFF	 GREEN	Overload tripped

Actuator TRIPPED

The compact starter has shut down because a malfunction or short circuit has been detected.

The actual trigger event can be identified by referring to the "RLT 0%" display window.

When the actuator is in the TRIPPED position, the 3RA61 compact starter direct starter and 3RA62 compact starter reversing starter can adopt the following statuses:

Table 7-5 Actuator TRIPPED display elements (direct/reversing starter)

Actuator	Mech. display	Compact starter status
	RLT 0%	
TRIPPED	 No display	Short circuit tripped
TRIPPED	 White display	Malfunction (e.g. end of service life reached)

Note

Turning the actuator manually to the TRIPPED position

The actuator can also be moved to the TRIPPED position manually. In this case, it is not possible to say whether a short circuit has occurred or whether the actuator has been moved to the TRIPPED position manually simply by looking at the display elements. However, if the actuator has been moved to the TRIPPED position manually, the user will be able to turn it back from the TRIPPED position to the ϕ READY position straight away. This will not be possible if a short circuit trip has occurred.

For additional information on eliminating malfunctions, please refer to "Shutdown on malfunction (Page 57)".

For additional information on eliminating short circuits, please refer to "Short-circuit protection function (Page 56)".

7.2 Overload protection function

Function

The compact starter protects three-phase motors against overload. Consequently, the compact starter can shut down without the breaker latching mechanism having to open. The compact starter is also equipped with phase failure protection in order to minimize heating of the load in the event of a phase failure during single-phase operation.

For the purpose of the overload protection function, the rated current of the load is set using the "current setting I_e " setting wheel. The overload trip class can be set to CLASS 10 or CLASS 20 directly on the device.

The "RESET M/A" (manual/automatic) selector switch allows you to select manual or auto reset following an overload:

- **Manual reset:** Following an overload, the compact starter is reset manually using the blue reset button.
- **Auto reset:** Following an overload, the compact starter is reset automatically after 3 minutes. However, a manual reset can still be performed if you have selected this setting.

Display concept

The "Overload tripped" status is indicated by the following elements:

Table 7-6 Overload trip display elements (direct starter/reversing starter)

Actuator	Mech. display	Compact starter status
	TRIP 	
READY	 White display	Overload tripped

Function test

Use the "TEST " button to test the overload protection function ("overload protection function" test button). The thermal motor model/overload protection function will not be affected by this function test. Use the "Test " button to switch the compact starter back on following a shutdown.

Motor model

The electronics calculate the motor temperature continuously in accordance with the operating time and current load and store this information in a thermal motor model.

Manual/auto reset

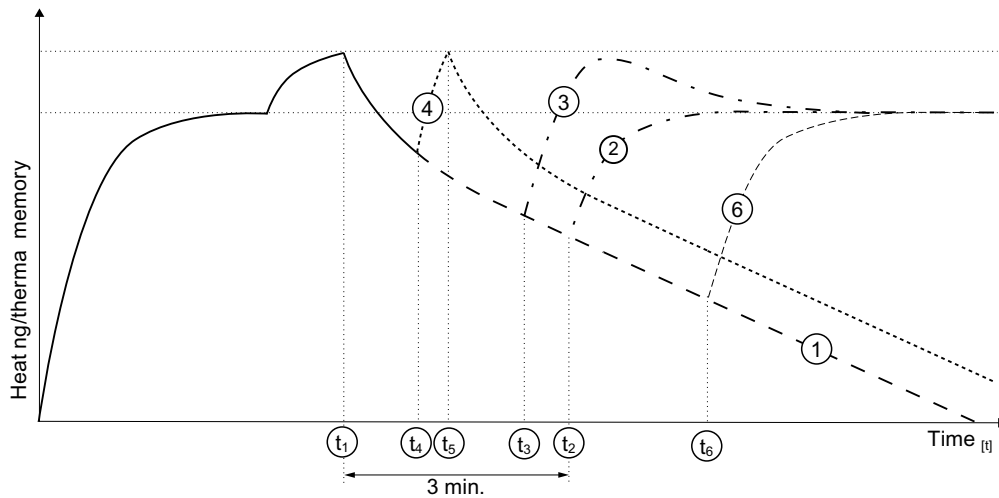


Figure 7-1 Manual/auto reset following an overload trip

- (t₁) Overload trip
- (t₂) Auto reset
- (t₃) Manual reset (t < 3 minutes following overload trip)
- (t₄) Manual reset (t < 3 minutes following overload trip)
- (t₅) Overload trip
- (t₆) Manual reset (t > 3 minutes following overload trip)

If the "Manual/auto reset" selector switch is set to auto reset, any overload trip that occurs will be reset automatically after 3 minutes and the compact starter will be switched to READY. If the control voltage is present, the compact starter will switch on and the electronics will calculate the temperature increase of the motor model in accordance with the current flow (curve (2)).

DANGER

Automatic machine restart!

If the compact starter is set to auto reset, it will be reset automatically following an overload trip. Assuming that the control voltage is present at this moment, the compact starter will switch on automatically and the machine will start up.

Make sure that the machine danger zone is kept clear of people at all times.

A manual reset can always be performed regardless of the "Manual/auto reset" selector switch position. However, if the "Manual/auto reset" selector switch is set to manual reset, the compact starter can only be reset manually.

The compact starter is set to READY again by pressing the "Reset overload trip" button. If the control voltage is present at this moment, the compact starter will switch on and the electronics will calculate the temperature increase of the motor model in accordance with the current flow (curves (3) and (6)).

NOTICE**Risk of a new overload trip!**

If a manual reset is performed within 3 minutes of the overload trip and the compact starter switches on, there is a risk of a new overload trip occurring immediately due to the fact that the motor/motor model may not yet have had a chance to cool down sufficiently (curve (4)).

Make sure that the motor has cooled down sufficiently before resetting the compact starter.

If there is no control voltage present following a manual or automatic reset, the motor model will continue to cool down as per the motor (curve (1)).

7.3 Short-circuit protection function

Function

The SIRIUS 3RA6 compact starter's short-circuit releases are designed to isolate the faulty load feeder from the supply system in the event of a short circuit in order to prevent any further damage. The short-circuit release is factory set to 14 times the maximum rated current I_n of the compact starter.

The compact starter has a short-circuit switching capacity of 53 kA at a voltage of 400 VAC.

Overload trips and short-circuit trips are signaled via two separate signaling switches so that both signals can be evaluated in their own right. For additional information on terminal assignment, please refer to "Connecting the compact starter without optional AS-i mounting module (Page 75)".

Display concept

The "Short circuit tripped" status is indicated by the following elements:

Table 7-7 Short circuit trip display elements (direct starter/reversing starter)

Actuator	Mech. display RLT 0%	Compact starter status
TRIPPED	 No display	Short circuit tripped

Resetting the short circuit trip



WARNING

Short-circuit hazard!

If the short circuit trip is reset on the compact starter before the cause of the short circuit has been eliminated, a new short circuit will occur when the compact starter commences operation.

Eliminate the cause of the short circuit before resetting the short circuit trip on the compact starter and putting the compact starter back into operation.

To reset a short circuit trip, turn the actuator to the $\circ$ OFF position.

Function test

To test the short-circuit protection function, press the "TEST I>>" button ("Short-circuit protection" test button).

7.4 Shutdown on malfunction

Type of malfunction

There is a patented mechanism for detecting malfunctions, which opens the main contacts. The following malfunctions can be detected:

- End of service life
 - Worn switching contacts.
(For additional information on electrical endurance, please refer to "Technical data (Page 145)".)
 - Worn switching mechanism.
(For additional information on mechanical service life, please refer to "Technical data (Page 145)".)
- Faults in the control electronics

Display concept

The "Malfunction" status is indicated by the following elements:

Table 7-8 Malfunction display elements (direct starter/reversing starter)

Actuator	Mech. display RLT 0%	Compact starter status
TRIPPED	 White display	Malfunction (e.g. end of service life reached)

Eliminating malfunctions

CAUTION

There is a malfunction on the compact starter.

A compact starter malfunction will cause the compact starter to shut down. Continuing to operate the compact starter is extremely risky, as it can no longer be considered reliable.

Following a shutdown caused by a malfunction, you will need to replace the compact starter.

In order to achieve a safe system status, you can continue operating the compact starter for a short time. For this purpose, you will have to set the compact starter to "ready" again by turning the actuator to the  OFF position and then to the  READY position.

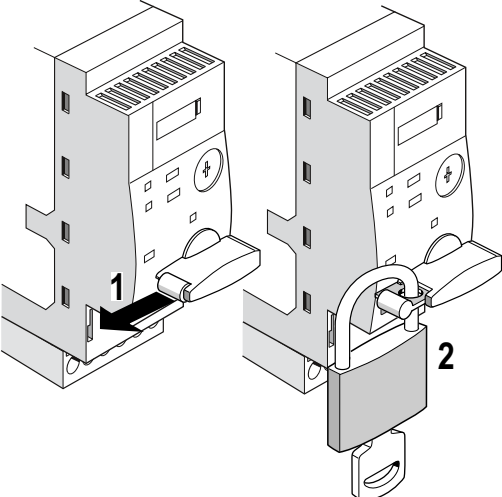
Note

Once the malfunction has been reset, the white field will continue to be displayed in the "RLT 0%" display window. The compact starter **must** be replaced.

7.5 Disabling the actuator

Disabling the actuator

You can disable the actuator to protect it against unauthorized closing by locking it with a padlock (shackle diameter 3.5 - 4.5 mm). Before you can do this, the actuator must be set to the $\circ$ OFF position and the actuator eye must be pulled out.

Step	Instructions	Image
1	Pull out the eye on the actuator.	
2	Attach the padlock to the eye.	

Installation/Removal

8.1 Installing the SIRIUS 3RA6 compact starter and AS-i mounting module

The sections below explain how to install the SIRIUS 3RA6 compact starter on:

- A DIN rail
- A level surface (screw fastening)
- The infeed system for 3RA6

The process of installing the AS-i mounting module on the compact starter (24 V) is also described.

8.1.1 Mounting the compact starter on a DIN rail

Requirements

- A 35-mm mounting rail in accordance with IEC / EN 60715 must be properly secured at the installation location.
- Please remember to observe the information on minimum distances in "Dimension drawings (Page 161)".

Procedure

Step	Instructions	Image
1	Place the back of the device onto the upper edge of the DIN rail.	
2	Press the lower half of the device against the DIN rail until you hear the device engage.	

8.1.2 Installing the compact starter on a level surface (screw fastening)

Requirements

- Look up the order numbers pertaining to the adapters for screw fastening by referring to the list in "System components (Page 18)".

Note

The adapters for screw fastening are black and must not be confused with the gray adapters for the infeed system for 3RA6.

- Drill holes with thread or plug on the level surface. For details of the distances between the drilled holes, please refer to the relevant dimension drawing in "Dimension drawings (Page 161)".
- 4 M4 screws for mounting the direct starter on the level surface.
6 M4 screws for mounting the reversing starter on the level surface.
- Please remember to observe the information on minimum distances in "Dimension drawings (Page 161)".

Procedure

Step	Instructions	Image
1	Click the adapters for screw fastening the compact starter into position behind the main conductor terminals.	
2	Push the 4 mounting lugs from the top/bottom into the adapters until they engage.	
3	Hold the device up to the surface prepared for screw fastening.	
4	Insert each screw through the relevant holes in the mounting lugs.	
5	Screw the device onto the level surface so that it is secure.	

8.1 Installing the SIRIUS 3RA6 compact starter and AS-i mounting module

Virtually the same process is used for installing the reversing starter on a level surface as for the direct starter. However, in this case 2 additional adapters just need to be snapped onto the reversing starter and a single lug is used for surface mounting.

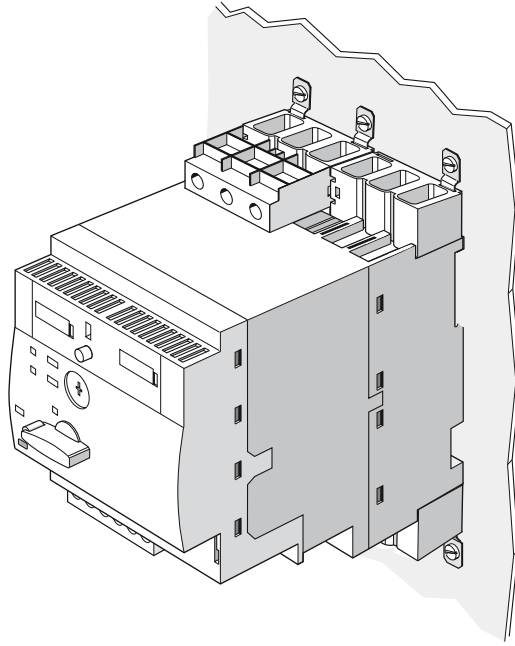


Figure 8-1 Installing a 3RA62 compact starter on a level surface (screw fastening)

8.1.3 Installing the compact starter on a SIRIUS infeed system for 3RA6

Requirements

- The SIRIUS infeed system for 3RA6 must be correctly installed. For additional information on installing the infeed system, please refer to "SIRIUS infeed system for 3RA6 (Page 95)".
- The compact starter must be switched off (actuator set to $\circ$ OFF position).

CAUTION

Compact starter material damage!

There is a risk of the compact starter getting damaged if it is switched on (i.e. actuator in ϕ READY position) when you install it on the infeed system for 3RA6.

Make sure that the compact starter's actuator is set to the $\circ$ OFF position before you install the compact starter on the infeed system for 3RA6.

Procedure

Step	Instructions	Image
1	Attach the compact starter to the front of the infeed system for 3RA6.	
2	Push the compact starter straight onto the infeed system for 3RA6 until you hear it engage.	

8.1.4 Installing the AS-i mounting module

Requirements

NOTICE

There is a risk of damage to the AS-i mounting module.

If you install the AS-i mounting module on a compact starter that has a control voltage of more than 24 V, the AS-i mounting module will be supplied with too much power. This will damage the AS-i mounting module.

Only install the AS-i mounting module on a compact starter with a control voltage of 24 V.

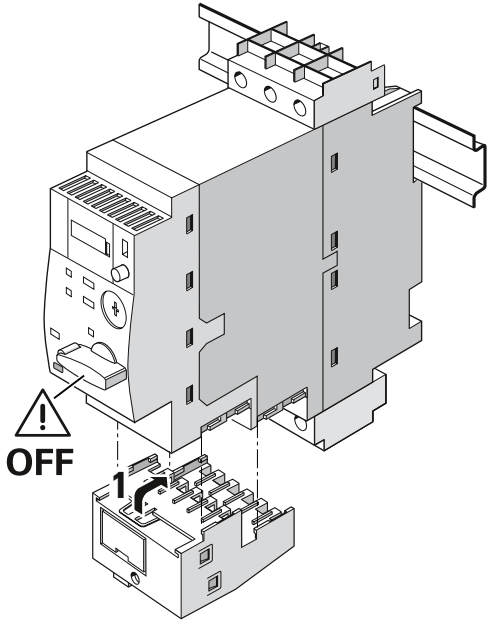
NOTICE

There is a risk of damage to the AS-i mounting module.

When installing the AS-i mounting module, please observe the ESD regulations, as electrostatic charging can damage it.

- The auxiliary and control conductor terminal blocks must be removed from the compact starter (24 V) (for information on removing the auxiliary and control conductor terminal blocks, please refer to "Installing/Removing auxiliary and control conductor terminal blocks (Page 135)").
- The compact starter must be switched off (actuator set to ○ OFF position).

Procedure

Step	Instructions	Image
1	Insert the AS-i mounting module into the mechanically coded guiderail on the device from the bottom and then push it back until you hear it engage.	

8.2 Removing the SIRIUS 3RA6 compact starter and AS-i mounting module

The sections below explain how to remove the SIRIUS 3RA6 compact starter from:

- A DIN rail
- A level surface (screw fastening)
- The infeed system for 3RA6

The process of removing the AS-i mounting module from the compact starter (24 V) is also described.

8.2.1 Removing the compact starter from a DIN rail

Requirements

- The compact starter must be switched off (actuator set to ○ OFF position).
- The AS-i cables must be removed.

Note

Disassemble the compact starter's main and control conductor terminal blocks before removing it, as this makes the process easier.

Procedure

Step	Instructions	Image
1	Pull the device down until the lower half can be pulled away from the DIN rail.	
2	Pull the lower half of the device away from the DIN rail and lift the device off its upper edge.	

8.2.2 Removing the compact starter from a level surface (screw fastening)

Requirements

- The compact starter must be switched off (actuator set to ○ OFF position).
- The control and auxiliary conductor terminals must be disconnected.



! DANGER

Danger, high voltage!

If removing the compact starter when the system is live, you must remember to set the actuator to the ○ OFF position first, otherwise the compact starter could get damaged and you could get an electric shock.

Procedure

Note

The compact starter can be removed from the wall with the wiring still in place (permanent wiring), i.e. there is no need to disconnect the main conductor terminal blocks.

Step	Instructions	Image
1	Use a screwdriver to release the top main conductor terminal block.	
2	Tilt the compact starter forwards so that there is no risk of it snapping back into the main conductor terminal block.	
3	Use a screwdriver to release the bottom main conductor terminal block.	
4	Tilt the compact starter upwards and pull it forwards in order to remove it from the main conductor terminal blocks.	

8.2.3 Removing the compact starter from a SIRIUS infeed system for 3RA6

Requirements

- Screwdriver with max. diameter of 7.5 mm and minimum shaft length of 100 mm for releasing the compact starter
- The compact starter must be switched off (actuator set to ○ OFF position).



⚠ CAUTION

Danger, high voltage!

There is a risk of the compact starter getting damaged if it is switched on (i.e. actuator in ○ READY position) when you remove it from the infeed system for 3RA6.

Make sure that the compact starter's actuator is set to the ○ OFF position before you remove the compact starter from the infeed system for 3RA6.

Procedure

For servicing purposes, the compact starter can be removed from the infeed system while the system is live but at zero current.

Note

The fact that the SIRIUS infeed system for 3RA6 features permanent wiring means that there is no need to disconnect the main conductor terminals.

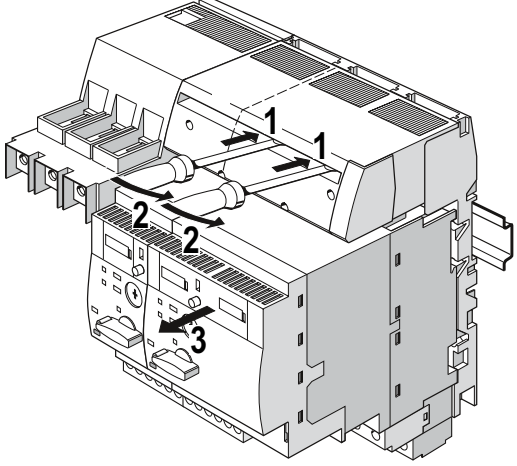
Step	Instructions	Image
1	Insert a screwdriver into the opening.	
2	Tilt the screwdriver to the right and then down (see arrow on enclosure lid) so that you can push the compact starter forwards by approx. 5 mm.	
3	Move the compact starter forwards to remove it from the screw-type infeed or extension block.	

Note

The 45 mm adapter for the infeed system for 3RA6 can be removed in the same way.

8.2 Removing the SIRIUS 3RA6 compact starter and AS-i mounting module

When removing a reversing starter, you will need to insert two screwdrivers into the neighboring openings at the same time.

Step	Instructions	Image
1	Insert 2 screwdrivers into the opening above the reversing starter.	
2	Tilt the screwdrivers to the right and then down (see arrow on enclosure lid) so that you can push the reversing starter forwards by approx. 5 mm.	
3	Move the reversing starter forwards to remove it from the screw-type infeed or extension block.	

8.2.4 Removing the AS-i mounting module

Requirements

NOTICE

There is a risk of damage to the AS-i mounting module.

When removing the AS-i mounting module, please observe the ESD regulations, as electrostatic charging can damage it.

- The AS-i cables must be disconnected from the AS-i mounting module.
- AUX PWR 24 VDC must be disconnected from the AS-i mounting module.
- The compact starter must be switched off (actuator set to ○ OFF position).

Procedure

Step	Instructions	Image
1	Push the release clip down.	
2	Take hold of the recessed grip on the lower side of the AS-i mounting module and pull the AS-i mounting module forwards.	
3	Move the AS-i mounting module down and out through the mechanically coded guiderail on the device.	

Connecting

9.1 General connection information

The SIRIUS 3RA6 compact starter is universally available with screw-type and spring-loaded connection technology.

Stripping lengths

A stripping length of 10 mm applies in respect of the main, auxiliary and control conductor connections.

The terminals are marked to make it easier to determine the stripping length. The correct stripping length can be achieved by lining the conductor up with this marking.

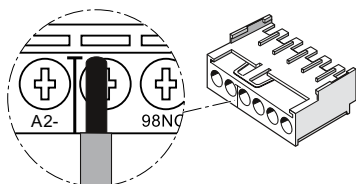


Figure 9-1 Representation of stripping lengths on terminals

Openings for test probes

On the compact starter with screw-type connection technology, the test probes are attached to the terminal screws.

On the compact starter with spring-loaded connection technology, all terminals are equipped with special test probe openings.

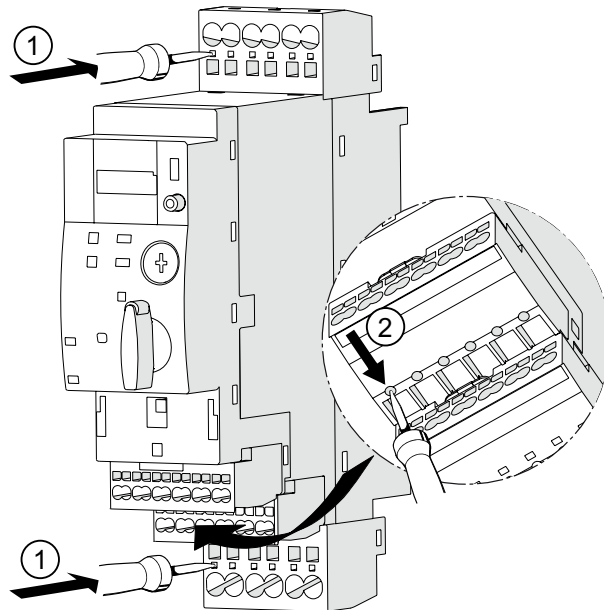


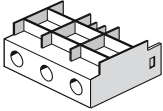
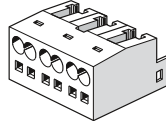
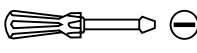
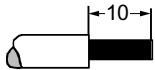
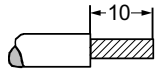
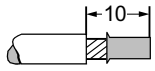
Figure 9-2 Test probe openings on the 3RA6 compact starter

Openings for test probes on

- (1) The main conductor terminals
- (2) The auxiliary and control conductor terminals

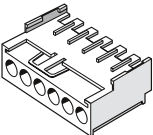
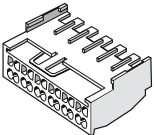
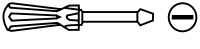
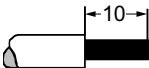
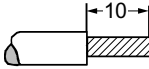
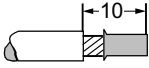
Conductor cross-sections of main conductor terminals

Table 9-1 Conductor cross-sections of main conductor terminals

				
Compact starter	... 12 A	8 ... 32 A	... 12 A	8 ... 32 A
	 Ø 6 mm/PZ 2		 8WA2 803 (3.5 x 0.5) mm	
	2 ... 2.5 Nm (18 to 22 lb·in)		-	
	2 x (1.5 ... 2.5) mm ² 2 x (2.5 ... 6) mm ² max. 1 x 10 mm ²	2 x (2.5 ... 6) mm ² max. 1 x 10 mm ²	2 x (1.5 ... 6) mm ² max. 1 x 10 mm ²	2 x (2.5 ... 6) mm ² max. 1 x 10 mm ²
	-	-	2 x (1.5 ... 6) mm ²	2 x (2.5 ... 6) mm ²
	2 x (1.5 ... 2.5) mm ² 2 x (2.5 ... 6) mm ²	2 x (2.5 ... 6) mm ²	2 x (1.5 ... 6) mm ²	2 x (2.5 ... 6) mm ²
AWG	2 x (16 to 14) 2 x (14 to 10) 1 x 8	2 x (14 to 10) 1 x 8	2 x (16 to 10) 1 x 8	2 x (14 to 10) 1 x 8

Conductor cross-sections of auxiliary and control conductor terminals

Table 9-2 Conductor cross-sections of auxiliary conductor terminals

		
	 Ø 6 mm/PZ 2	 (0.5 x 3.0) mm DIN ISO 2380-1A
	0.8 ... 1.2 Nm (7 to 10.3 lb·in)	-
	1 x (0.5 ... 4) mm ² 2 x (0.5 ... 2.5) mm ²	2 x (0.25 ... 1.5) mm ²
	-	2 x (0.25 ... 1.5) mm ²
	1 x (0.5 ... 2.5) mm ² 2 x (0.5 ... 1.5) mm ²	2 x (0.25 ... 1.5) mm ²
AWG	2 x (20 to 14)	2 x (24 to 16)

Note

A cross-section (2 x 1.5) mm² with end sleeve to DIN 46228-4 is not possible (plastic collar).

9.2 Connecting terminal blocks



DANGER

Danger, high voltage!

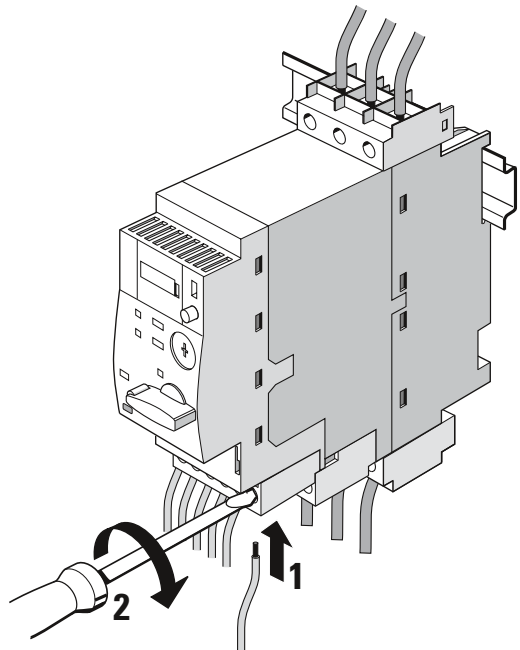
Electrical voltage can result in electric shocks or burns.

Before starting work, disconnect the system and devices from the power supply.

Requirements for screw terminals

- The connection cables must have been bared correctly.
- Pozidriv 2 (Ø 6 mm).

Procedure for screw terminals

Step	Instructions	Image
1	Insert the relevant cable as far as it will go into the screw terminal opening and hold it in place.	
2	Tighten the relevant screw. Pull on the cable to ensure it is completely secure.	

Requirements for spring-loaded terminals

- Main conductor terminals: Flat-head screwdriver with (3.5 x 0.5 mm) blade (8WA2 803)
- Auxiliary conductor terminals: Flat-head screwdriver with (3.0 x 0.5 mm) blade (DIN ISO 2380-1A)

Procedure for spring-loaded terminal block

Step	Instructions	Image
1	To open the clamping springs of the spring-loaded terminal, insert the flat-head screwdriver into the square opening as far as it will go. Please observe a 10° horizontal angular deviation of the screwdriver to the oval opening.	
2	Insert the cable as far as it will go into the oval opening and hold it in place.	
3	Remove the screwdriver and pull on the cable to ensure it is completely secure.	

9.3 Connecting the compact starter without optional AS-i mounting module

Connection method

All auxiliary and control conductor connections on the compact starter converge at the same central point: the outgoing terminal.

The terminals are universally available with screw-type or spring-loaded connection technology. (For additional information on the connection systems, please refer to "Connecting terminal blocks (Page 73)".)

Pin assignments

Table 9-3 Pin assignments for 3RA61 compact starter direct starter

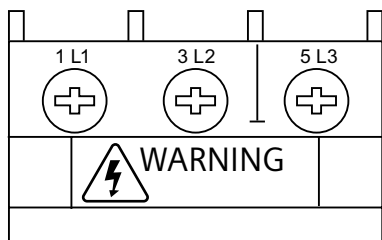
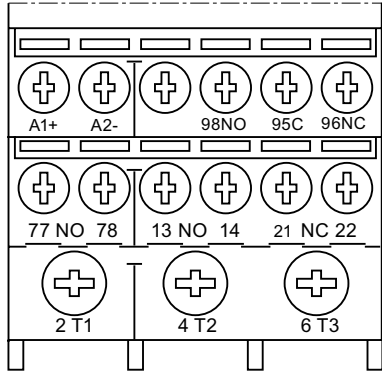
Terminal	Description	Image
1L1, 3L2, 5L3	Main conductor terminals (line side)	
A1+, A2-	Control voltage connection (AC/DC 24 V, 42 - 70 V or 110 - 240 V)	
Unlabeled	Not used	
95, 96, 98	"Overload" signaling switch (CO contact)	
77, 78	"Fault" signaling switch, e.g. "Short circuit" → actuator set to O OFF/TRIPPED (NO contact)	
13, 14	Auxiliary NO contact for querying the position of the main contacts	
21, 22	Auxiliary NC contact for querying the position of the main contacts - mirror contacts to main contacts	
2T1, 4T2, 6T3	Main conductor terminals (outgoing side)	

Table 9-4 Pin assignments for 3RA62 compact starter reversing starter

Terminal	Description	Image
1L1, 3L2, 5L3	Main conductor terminals (line side)	
A1+, A2/B2-, B1+	Control voltage connection (AC/DC 24 V, 42 - 70 V or 110 - 240 V) A: Direction of rotation 1 B: Direction of rotation 2	
95, 96, 98	"Overload" signaling switch (CO contact)	
77, 78	"Fault" signaling switch, e.g. "Short circuit" → actuator set to ○ OFF/TRIPPED (NO contact)	
13, 14	Auxiliary NO contact for querying the position of the main contacts (direction of rotation 1)	
43, 44	Auxiliary NO contact for querying the position of the main contacts (direction of rotation 2)	
2T1, 4T2, 6T3	Main conductor terminals (outgoing side)	

Note

If a mirror contact is required in conjunction with a reversing starter, the external auxiliary switch block (optional) must be used for this purpose.

9.4 Connecting the compact starter (24 V) with optional AS-i mounting module

To enable communication via an AS-Interface, the AS-i mounting module must first be installed on the compact starter (24 V). Then the AS-i mounting module can be connected to the AS-Interface using the AS-i cables.

9.4.1 Connecting the AS-Interface

Connection method

The following cables are required:

- Cables for connecting an AS-Interface
- 24 VDC AUX PWR cable for supplying the final controlling element

In order for the cables to be secured within the connectors, they must have a conductor cross-section of $2 \times (0.5 \dots 0.75) \text{ mm}^2$.

Contact

NOTICE

There is a risk of damage to the AS-i mounting module.

When working on the AS-i mounting module, please observe the ESD regulations, as electrostatic charging can damage it.

The insulation displacement terminals make contact with the cables automatically when the connector cover is attached.

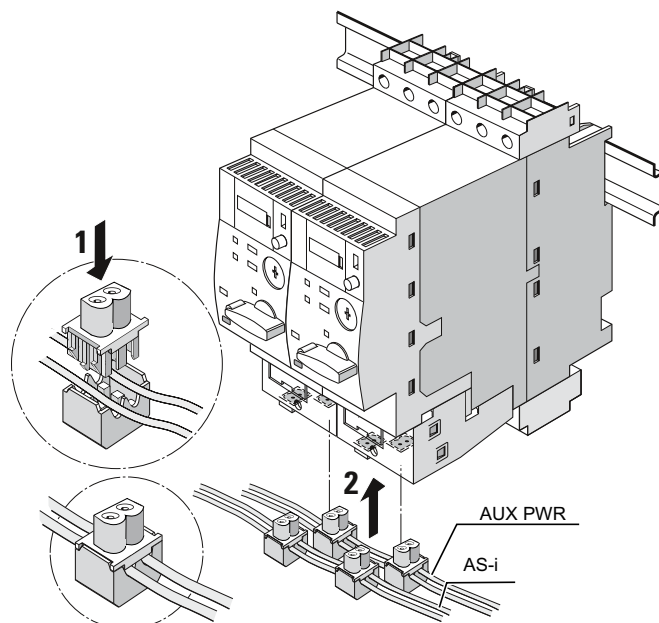


Figure 9-3 Contact with cables

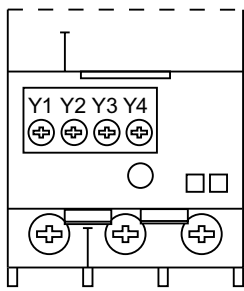
9.4.2 Connecting limit switches

The AS-i mounting module for compact starters with two local inputs for safe shutdown (3RA6970-3B) can have equipment such as a limit switch connected to it. Consequently, safe shutdown up to category 2 in accordance with EN ISO 13849-1 is supported.

When the contacts open, the limit switch function immediately shuts down the compact starter. The direct starter is shut down via Y1 - Y2. In the case of the reversing starter, shutdown is direction-specific and takes place via Y1 - Y2 for direction of rotation 1 and via Y3 - Y4 for direction of rotation 2.

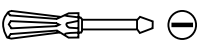
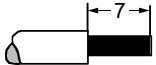
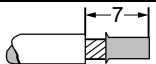
Pin assignment of limit switch terminal

Table 9-5 Limit switch terminal

Interface	Meaning	Image
Y1, Y2	Connecting terminals for limit switch 1 for safe shutdown of "direction of rotation 1"	
Y3, Y4	Connecting terminals for limit switch 2 for safe shutdown of "direction of rotation 2" (only if mounting a reversing starter)	

Conductor cross-sections of limit switch terminal

Table 9-6 Conductor cross-sections of limit switch terminal

	Limit switch terminal
 (0.5 x 3.0) mm DIN ISO 2380-A	0,5 ... 0.6 Nm (4.5 to 5.3 lb-in)
	1 x (0.5 ... 2.5) mm ² 2 x (0.5 ... 1) mm ²
	1 x (0.5 ... 2.5) mm ² 2 x (0.5 ... 1) mm ²
AWG	1 x (20 to 12)

Note

If no limit switch is connected to the limit switch terminals, terminals Y1 - Y2 will need to be jumpered on the direct starter and terminals Y1 - Y2 and Y3 - Y4 will need to be jumpered on the reversing starter.

9.5 Disconnecting terminal blocks

Requirements

- The compact starter must be switched off (actuator set to ○ OFF position).



! DANGER

Danger, high voltage!

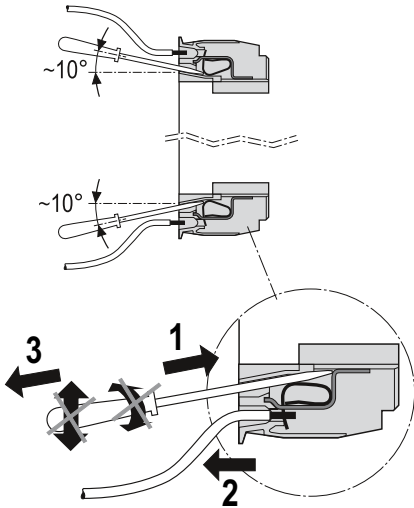
Electrical voltage can result in electric shocks or burns.

Before starting work, disconnect the system and devices from the power supply.

Procedure for screw terminals

Step	Instructions	Image
1	Undo the screw of the screw terminal.	
2	Remove the cable from the unscrewed screw terminal.	

Procedure for spring-loaded terminals

Step	Instructions	Image
1	Insert the flat-head screwdriver into the square opening of the spring-loaded terminal as far as it will go. Please observe a 10° horizontal angular deviation of the screwdriver to the oval opening.	
2	Remove the cable from the oval opening.	
3	Remove the screwdriver.	

Commissioning

10.1 Settings on the compact starter

All settings are made on the device itself.

CLASS 10/20

The CLASS (overload trip class) indicates the tripping time t_A of the compact starter (from cold) at 7.2 times the current setting I_e . As the compact starter features a solid-state overload relay, the trip class corresponds to the narrow tolerance band E (IEC / EN 60947-6-2):

- CLASS 10: $5\text{ s} < t_A < 10\text{ s}$
- CLASS 20: $10\text{ s} < t_A < 20\text{ s}$ (for heavy starting)

The trip class can be set to CLASS 10 or CLASS 20 using a slide switch.

Current setting I_e

The rated operating current of the motor requiring protection is set on the setting scale.

RESET M/A

The "RESET M/A" (manual/automatic) selector switch allows you to select manual or auto reset following an overload trip:

- **Manual reset:** Following an overload trip, the compact starter is reset manually using the blue reset button.
- **Auto reset:** Following an overload trip, the compact starter is reset automatically after 3 minutes. However, a manual reset can still be performed if you have selected this setting.

For additional information on the manual and auto reset functions, please refer to "Overload protection function (Page 53)".

10.2 AS-Interface

10.2.1 Addressing via AS-Interface

Before it can participate in data exchange with the master, each module must be assigned an individual address on the AS-Interface. Each address can only be used once on each AS-i network.

On the AS-i mounting module, an extended master can be used to access the extended address mode (A/B technology). The 31 addresses that are supported by an AS-Interface network can be split into two completely separate sub-addresses, e.g. 1A and 1B. If you do decide to use this facility for all 31 slaves, there will be a maximum of 62 nodes on one AS-Interface network.

AS-i profile

Table 10-1 AS-i profile (AS-i mounting module)

I/O configuration (Hex)	ID code (Hex)	ID1 code (Hex)	ID2 code (Hex)
7	A	1 ... 7 *) Factory setting: 7	E

*) User-adjustable

Requirements



WARNING

Danger, high voltage!

Electrical voltage can result in electric shocks or burns.

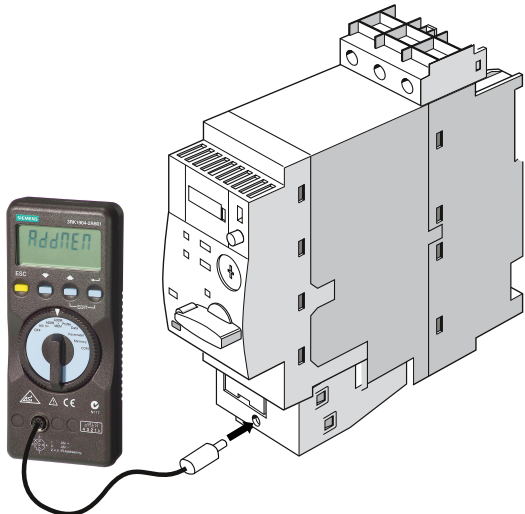
Disconnect the AS-i voltage before you start the addressing process.

To carry out the AS-i mounting module addressing, you will need the following:

- An AS-i addressing unit (3RK1904-2AB01)
or
programming and service unit plus connected AS-i power supply
or
GOSSEN GMC Metratest 36 AS-i
- A connecting cable for connecting the AS-Interface addressing unit to the AS-i mounting module.

Procedure

The AS-i mounting module is addressed via an addressing socket, e.g. using the AS-Interface addressing unit. The connecting cable is used to connect this unit to the addressing socket.

Step	Instructions	Image
1	If the AS-i mounting module on the compact starter is to be addressed via the addressing socket, remember to switch off the AS-i voltage. This is necessary for reasons of plant safety.	
2	Connect the AS-Interface addressing unit to the addressing socket.	
3	Set the required address.	

For more detailed information on the AS-Interface and addressing AS-i slaves, please refer to the operating instructions titled "Addressing and Diagnosis Instrument for AS-i Modules" (3RK1703-2WB02-1CA1).

Note

The module address can be changed as often as required.

10.2.2 Process data and process images

Process image

The process image is used for buffering input and output data. When the control system starts cyclic program execution, the signal states of the compact starter are transferred to the process input image of the higher-level control system. At the end of the cyclic program, the process output image is transferred to the compact starter as the signal state.

Logical assignment

The following table contains details of the process data and process images:

Table 10-2 Logical assignment

Compact starter status	Inputs				Outputs	
	D0	D1	D2	D3	D0	D1
	Compact starter ready	Motor ON	Group error	Group warning	Motor "direction of rotation 1"	Motor "direction of rotation 2"
Normal operation	X					
AUX Power OFF, undervoltage, overvoltage			X			
Output 1 (Motor ON) set via master	X	X			X	
Output 2 (Motor ON) set via master	X	X				X
Overload	X		X	X		
Limit switch open	X		X			

Diagnostics

11.1 Compact starter diagnostics

Direct starter display concept

Table 11-1 Display concept of the 3RA61 compact starter direct starter

Compact starter status	Actuator	LED display		Mechanical display	
		ON I	A1/A2	RLT 0%	TRIP 𐀀
Switched off (delivery condition)	○ OFF	○	○	▢	▢
Control voltage present with actuator set to OFF	○ OFF	○	☀	▢	▢
Ready	◐ READY	○	○	▢	▢
Switched on	◐ READY	☀	☀	▢	▢
Switched on following malfunction	◐ READY	☀	☀	▢	▢
Overload protection function					
Overload tripped	◐ READY	○	☀ OR ○ ¹⁾	▢	▢
Short-circuit protection function					
Short circuit tripped	TRIPPED	○	☀ OR ○ ¹⁾	▢	▢
Malfunction (e.g. end of service life reached)					
Malfunction tripped	TRIPPED	○	☀ OR ○ ¹⁾	▢	▢
Ready following malfunction	◐ READY	○	○	▢	▢
Switched on following malfunction	◐ READY	☀	☀	▢	▢
¹⁾ Depends on whether control voltage is present at the same time ☀ or whether no control voltage is present ○					



LED: Not illuminated



LED: Illuminated green



Mechanical display: No display



Mechanical display: White display

Reversing starter display concept

Table 11-2 Display concept of the 3RA62 compact starter reversing starter

Compact starter status	Actuator	LED display			Mechanical display	
		ON I 1	ON I 2	A1/A2 B1/B2	RLT 0%	TRIP 4
Switched off (delivery condition)	○ OFF	○	○	○		
Attempt to switch on (direction of rotation 1 or 2) with actuator set to OFF	○ OFF	○	○			
Ready	◐ READY	○	○	○		
Switched on (direction of rotation 1)	◐ READY		○			
Switched on (direction of rotation 2)	◐ READY	○				
Switched on following malfunction	◐ READY	OR ○	○ OR			
Overload protection function						
Overload tripped	◐ READY	○	○	OR ○ ¹⁾		
Short-circuit protection function						
Short circuit tripped	TRIPPED	○	○	OR ○ ¹⁾		
Malfunction (e.g. end of service life reached)						
Malfunction tripped	TRIPPED	○	○	OR ○ ¹⁾		
Ready following malfunction	◐ READY	○	○	○		
Switched on following malfunction	◐ READY					
1) Depends on whether control voltage is present at the same time or whether no control voltage is present ○						

○ LED: Not illuminated

LED: Illuminated green

Mechanical display: No display

Mechanical display: White display

11.2 AS-i mounting module diagnostics

The status of the AS-i mounting module is indicated by means of two LEDs, which will either light up continuously or flash. Making straightforward diagnostics available directly on the AS-i mounting module in this way enables the user to troubleshoot quickly and efficiently.

Display concept on the AS-i mounting module

Table 11-3 Display concept of the "AS-i/FAULT" LED

	AS-i/FAULT LED			
	 Green	 OFF	 Red	 Red/yellow
Operating status	Communication OK	No voltage on AS-Interface chip	Communication failure	Slave has the address "0"

Table 11-4 Display concept of the "AUX PWR" LED

	AUX PWR LED	
	 Green	 OFF
AUX PWR	Voltage present	No voltage

Accessories

12.1 Control kit

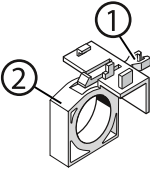
12.1.1 Description of the hardware

Features

The control kit is a tool for checking the wiring of the main and auxiliary circuits as well as the motor direction.

The control kit is installed on the compact starter and bypasses the electromechanical operating mechanism so that electrical control can be simulated for the compact starter. Then the main contacts can be closed using the actuator and the motor will start up.

Configuration

View	No.	Meaning
	(1)	Mechanical connection point
	(2)	Handle

12.1.2 Using the control kit



! DANGER

Danger, high voltage!

When the control kit is in use, the compact starter's overload protection function is deactivated. Only the short-circuit protection function is active.

Only use the control kit briefly for testing purposes (e.g. checking the direction of rotation or the auxiliary switch wiring).

Requirements

- The compact starter must be switched off (actuator set to ○ OFF position).

Procedure

Step	Instructions	Image
1	Turn the actuator to the ○ OFF position.	
2	Plug the control kit into the connection point (2a), inserting it from the bottom at an angle. Tilt the control kit up (2b) until it makes contact with the compact starter. Then pull the control kit forwards and away from the compact starter until it locks into position (2c).	
3	Checking the main and auxiliary circuit wiring: Use the actuator to switch the compact starter on (ⓘ READY) or off (○ OFF) and check the main and auxiliary circuit wiring.	
4	Turn the actuator to the ○ OFF position.	
5	Release the latch mechanism (5a). Push the control kit backwards and then tilt it down (5b). Remove the control kit from the compact starter by pulling it down at an angle (5c).	

12.2 External auxiliary switch block

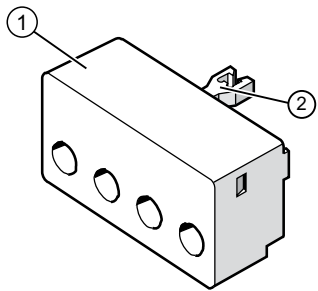
12.2.1 Description of the hardware

An auxiliary switch block can be mounted on the 3RA61 compact starter direct starter. Two auxiliary switch blocks can be mounted on the 3RA62 compact starter reversing starter. The contacts of the auxiliary switch open and close along with the main contacts.

The external auxiliary switch block is available with screw-type or spring-loaded connection technology in the following versions:

- 2 NO contacts
- 2 NC contacts
- 1 NO contact + 1 NC contact

Configuration

View	No.	Meaning
	(1)	Auxiliary switch block for compact starter
	(2)	Mechanical connection point

12.2.2 Installing and removing the auxiliary switch block for the compact starter

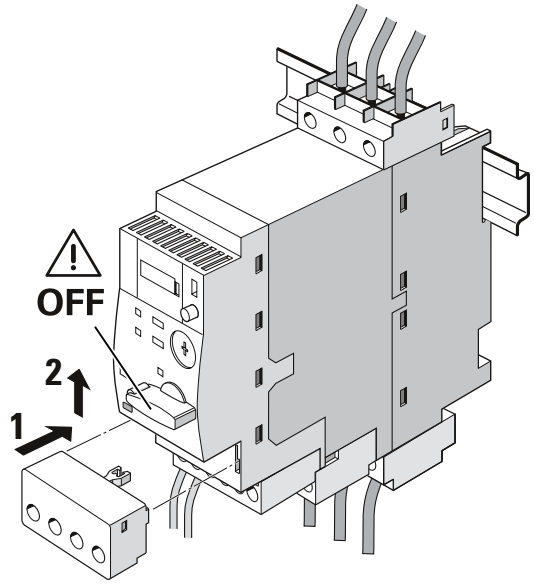
Requirements

- The compact starter must be switched off (actuator set to ○ OFF position).

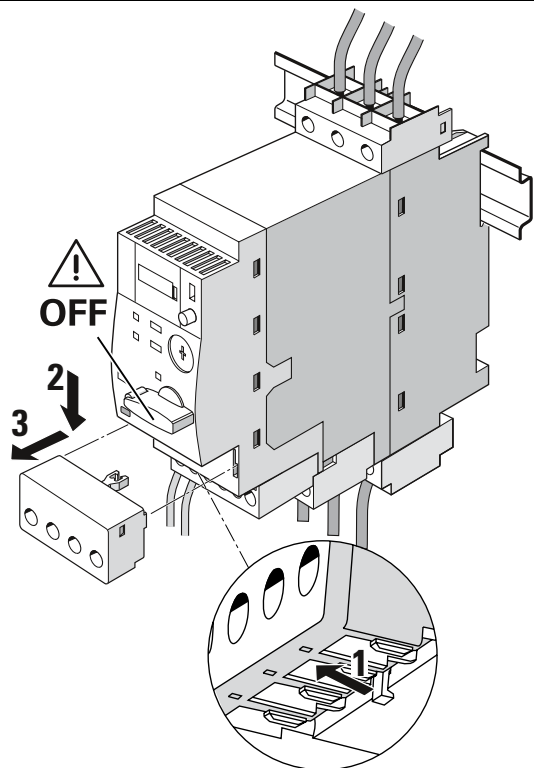
Note

If an external auxiliary switch block is installed on the compact starter, it will not be possible to use the control kit.

Installing the auxiliary switch block

Step	Instructions	Image
1	Insert the auxiliary switch block into the location holes on the compact starter.	
2	Push the auxiliary switch block up until it engages.	

Removing the auxiliary switch block

Step	Instructions	Image
1	Release the locking latch on the lower side of the auxiliary switch block.	
2	Push the auxiliary switch block downwards.	
3	Remove the auxiliary switch block from the compact starter by pulling it forwards and off.	

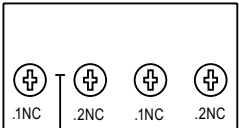
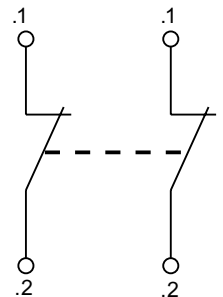
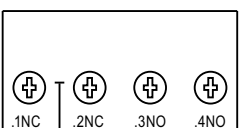
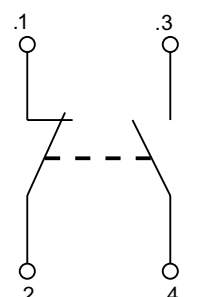
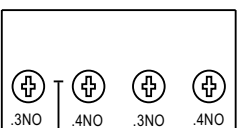
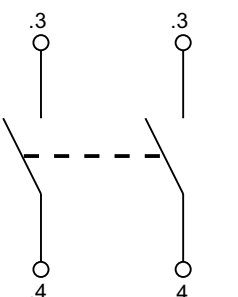
12.2.3 Connecting the auxiliary switch block for compact starter

The terminals on the auxiliary switch block are available with screw-type or spring-loaded connection technology.

For additional information on the connection systems, please refer to "Connecting terminal blocks (Page 73)".

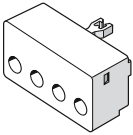
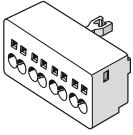
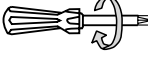
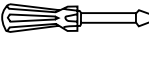
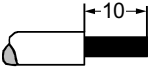
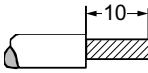
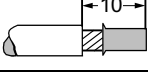
Pin assignments

Table 12-1 Pin assignments on the auxiliary switch block for compact starter

Auxiliary switch block	View	Meaning
2 NC contacts		
1 NO contact + 1 NC contact		
2 NO contacts		

Conductor cross-sections

Table 12-2 Conductor cross-section of the terminals on the auxiliary switch block for compact starter

	3RA691.-1A	3RA691.-2A
		
	 Ø 6 mm/PZ 2	 8WA2 807 (2.5 x 0.4) mm
	0.8 ... 1.2 Nm (7 to 10.3 lb·in)	-
	2 x (0.5 ... 1.5) mm ² 2 x (0.75 ... 2.5) mm ² max. 2 x (1 ... 4) mm ²	2 x (0.25 ... 2.5) mm ²
	-	2 x (0.25 ... 2.5) mm ²
	2 x (0.5 ... 1.5) mm ² 2 x (0.75 ... 2.5) mm ²	2 x (0.25 ... 1.5) mm ²
AWG	2 x (20 to 16) 2 x (18 to 14)	2 x (24 to 14)

12.3 SIRIUS infeed system for 3RA6

12.3.1 Description of the hardware

Features

The SIRIUS infeed system for 3RA6 is a pre-wired infeed system for the compact starter.

The infeed system for 3RA6 is characterized by the permanent wiring of the main circuit, the PE infeed and PE tap. Compact starters can be removed from the infeed system and reinstalled without having to go to all the trouble of disconnecting and reconnecting the wiring.

Configuration

The infeed system for 3RA6 offers 3 supply possibilities. The following table presents these 3 supply possibilities and lists the short designations used to refer to them in this section.

Table 12-3 Short designations for the infeed system for 3RA6

Infeed	Order number	Short designation
Left infeed, 50/70 mm ² screw terminal with three slots, outgoing terminal with screw-type or spring-loaded connection technology, incl. PE bar	3RA6813-8AB 3RA6813-8AC	Screw-type infeed (50/70 mm ²)
Left infeed, 25/35 mm ² screw terminal with three slots, outgoing terminal with screw-type or spring-loaded connection technology, incl. PE bar	3RA6812-8AB 3RA6812-8AC	Screw-type infeed (25/35 mm ²)
Left or right infeed, 25/35 mm ² , with spring-loaded connection technology	3RA6830-5AC	Spring-loaded infeed

Note

Short designations

For clarity's sake, this manual employs the short designations for the various infeed types that are associated with the infeed system for 3RA6. For a list of all the abbreviations used in the manual, please refer to the appendix "List of abbreviations (Page 174)".

Thanks to the modular design, the infeed blocks can be extended to a total maximum width of 1.20 m using extension modules. For this purpose, the infeed blocks and extension modules are arranged side by side and connected up electrically using an extension connector and an optional PE extension connector.

12.3 SIRIUS infeed system for 3RA6

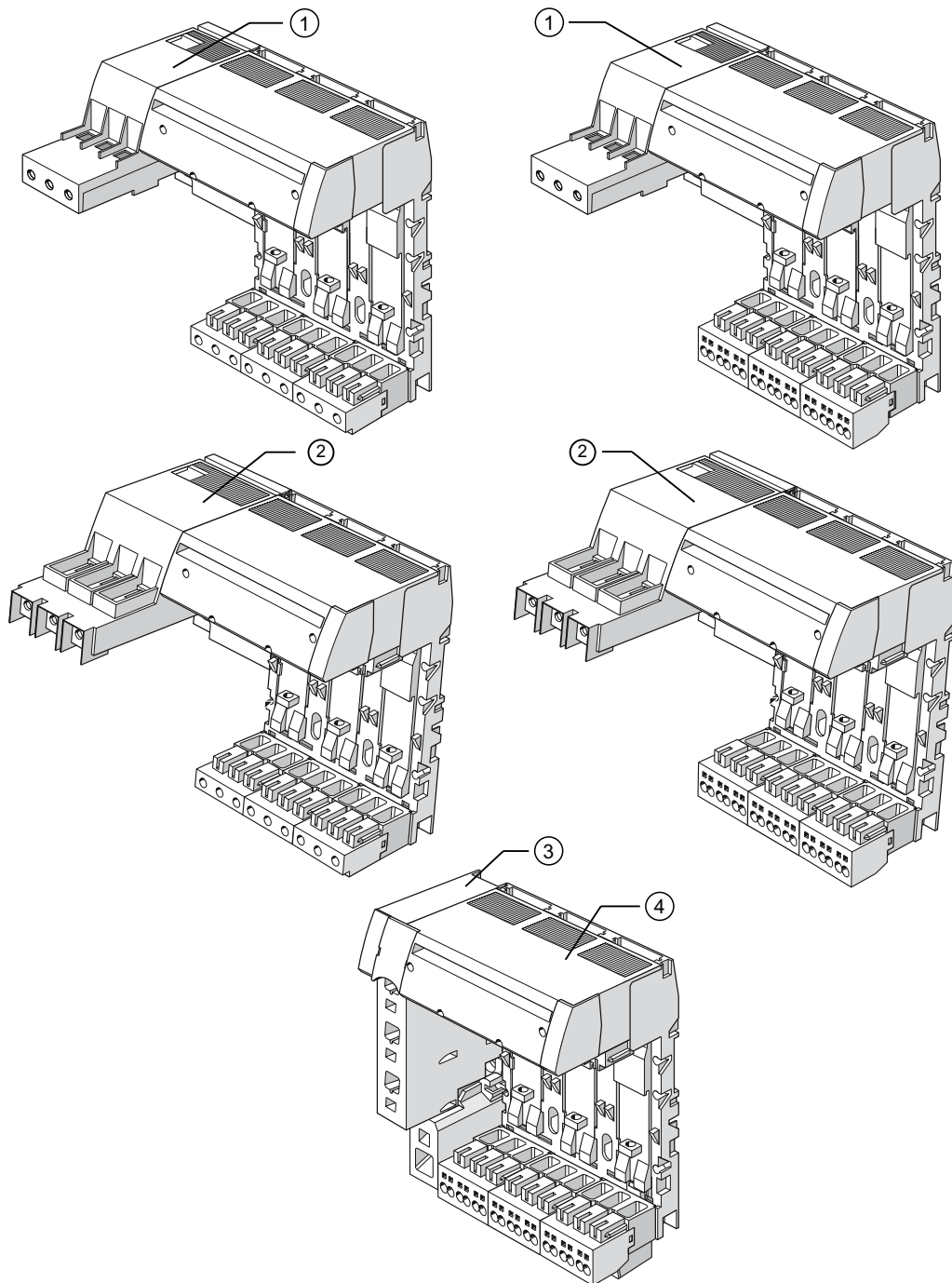


Figure 12-1 Infeed system for 3RA6

- (1) Screw-type infeed (25/35 mm²)
- (2) Screw-type infeed (50/70 mm²)
- (3) Spring-loaded infeed
- (4) Extension block

Combination with other sizes

The infeed system for 3RA6 can be connected to the SIRIUS 3RV19 infeed system using the extension connector for 3RV19 (3RA6890-1AA). SIRIUS size S0 circuit breakers (max. 12.5 A / 400 V; $I_{CU} < 53 \text{ kA}$) can be installed on the infeed system for 3RA6 using the 45 mm adapter for the infeed system for 3RA6 (3RA6890-0BA).

For additional information on combining the equipment with other sizes, please refer to "Configuration (Page 25)".

12.3.2 Coding the SIRIUS infeed system for 3RA6

The infeed system for compact starters can be locked by disabling the slots with a padlock (shackle diameter 3.5 - 4.5 mm). Simply attach a padlock to the fixture on the infeed system.

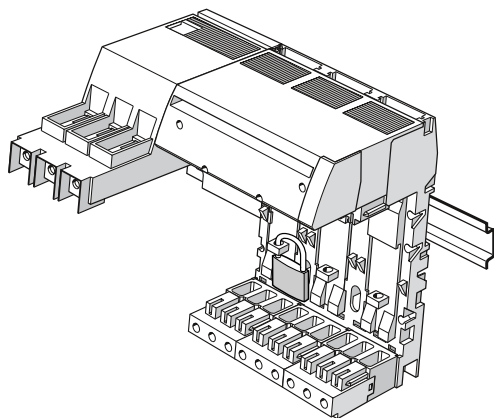


Figure 12-2 Locking the SIRIUS infeed system for 3RA6 for compact starters

Alternatively, the infeed system for 3RA6 can be coded to only allow installation of compact starters with a defined maximum rated current. This function prevents compact starters being installed on the infeed system if their current setting range is too high, thereby eliminating the problem of infeed system current overload, for example.

The infeed system for 3RA6 can be locked against compact starters with the following current setting ranges:

- 3 to 12 A
- 8 to 32 A
- 3 to 12 A and 8 to 32 A

Procedure

Coding is achieved by means of cylindrical pins (DIN EN ISO 8734-2x8). The cylindrical pins are inserted into special holes in the infeed system's base carrier. The cylindrical pins are used as spacers and prevent compact starters from being snapped onto certain slots of the infeed system.

Each slot is individually coded for compact starters with a particular current setting range.

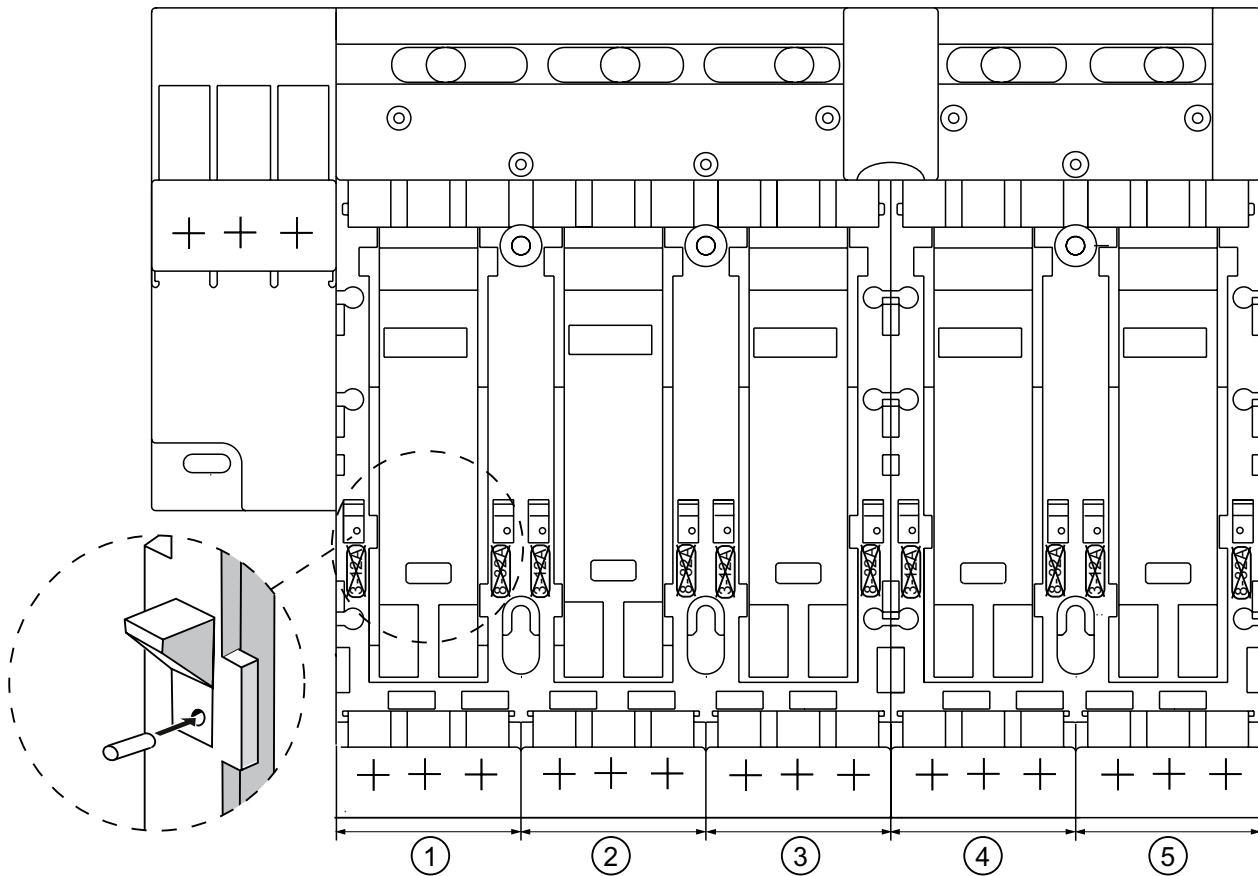


Figure 12-3 Coding the SIRIUS infeed system for 3RA6

- | | | | |
|-----|---------------|-----|---------------|
| (1) | Slot 1 coding | (4) | Slot 4 coding |
| (2) | Slot 2 coding | (5) | Slot 5 coding |
| (3) | Slot 3 coding | | |

The following options are available for coding the infeed system slots:

Coding	Procedure
No locking. i.e. all types of compact starter can be installed	No measures required, i.e. no cylindrical pin needs to be inserted into the infeed system slot
Compact starters for the current setting range 3 - 12 A must not be used.	Insert the cylindrical pin into the hole (3-12A) .
Compact starters for the current setting range 8 - 32 A must not be used.	Insert the cylindrical pin into the hole (8-32A) .
Compact starters for the current setting range 3 - 12 A and 8 - 32 A must not be used.	Insert the cylindrical pins into the holes (3-12A) and (8-32A) .

12.3.3 Installing the SIRIUS infeed system for 3RA6 on a DIN rail

Requirements

- A 35-mm mounting rail in accordance with IEC / EN 60715 must be properly secured at the installation location.

Mounting the screw-type infeed on the DIN rail

The procedure for installing the 25/35 mm² and 50/70 mm² screw-type infeeds is the same in both cases.

Step	Instructions	Image
1	Place the back of the screw-type infeed onto the upper edge of the DIN rail	
2	Press the lower half of the screw-type infeed against the DIN rail until you hear it engage.	

Installing a spring-loaded infeed with 2-slot or 3-slot extension module on a DIN rail

The spring-loaded infeed and extension module are 2 separate components.

The 2-slot and 3-slot extension modules can be mounted to the right or left or to the right and left of the spring-loaded infeed.

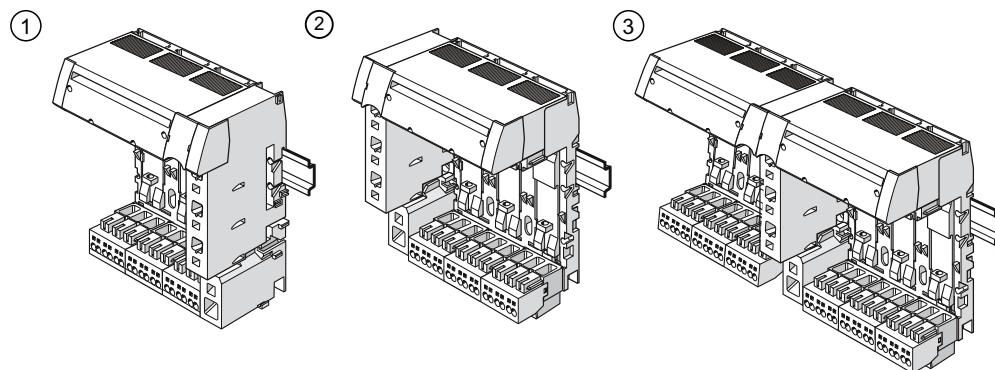


Figure 12-4 Installation scenarios involving the spring-loaded infeed

Extension modules installed

- ① To the left of the spring-loaded infeed
- ② To the right of the spring-loaded infeed
- ③ To the right and left of the spring-loaded infeed



⚠ WARNING

Danger, high voltage!

The maximum rated current for the extension connector is 63 A, regardless of the infeed block. If the maximum rated current is exceeded, the extension connector will be damaged beyond repair.

Make sure that the extension connector is never subjected to more than 63 A.



⚠ WARNING

Danger, high voltage!

Installing the extension connector on the infeed system for 3RA6 while the system is live can damage both the extension connector and infeed system and can also result in an electric shock.

Remember to disconnect the system from the power supply before installing the extension connector.

Step	Instructions	Image
1	Snap the spring-loaded infeed onto the DIN rail.	
2	Snap the extension module onto the DIN rail.	
3	Remove the right or left end cover from the spring-loaded infeed.	
4	Push together the extension module and spring-loaded infeed.	
5	Establish a mechanical connection between the spring-loaded infeed and extension module by pressing the 2 link wedges on the spring-loaded infeed down and into the extension module.	
6	Use an extension connector to establish an electrical connection between the extension module and spring-loaded infeed.	
7	Attach the end cover to the right or left of the extension module.	

Expanding the SIRIUS infeed system for 3RA6 by means of additional extension modules

Screw-type infeeds and extension blocks can be expanded by adding additional 3-slot and 2-slot extension modules.

The screw-type infeeds can only be expanded by adding modules to the right.

With spring-loaded connection technology, the extension module can be added to the right or left, depending on which side the spring-loaded infeed has been installed.



! WARNING

Danger, high voltage!

The maximum rated current for the extension connector is 63 A, regardless of the infeed block. If the maximum rated current is exceeded, the extension connector will be damaged beyond repair.

Make sure that the extension connector is never subjected to more than 63 A.



! WARNING

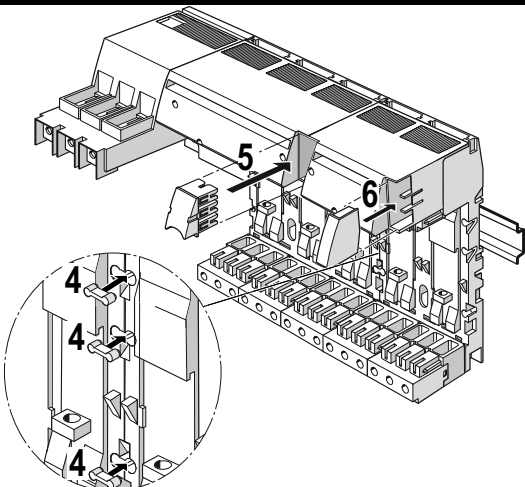
Danger, high voltage!

Installing the extension connector on the infeed system for 3RA6 while the system is live can damage both the extension connector and infeed system and can also result in an electric shock.

Remember to disconnect the system from the power supply before installing the extension connector.

Step	Instructions	Image
1	Remove the end cover.	
2	Snap the extension module onto the DIN rail until you hear it engage.	
3	Push together the extension module and the module that has already been installed.	

12.3 SIRIUS infeed system for 3RA6

Step	Instructions	Image
4	Use the 3 link wedges to establish a mechanical connection between the 2 modules.	
5	Use an extension connector to establish an electrical connection between the 2 modules.	
6	Attach the end cover to the additional extension module.	

Note

If the infeed system is being mounted on a vertical DIN rail, a suitable stopper must be installed underneath the infeed system to keep it in place.

12.3.4 Installing the SIRIUS infeed system for 3RA6 on a level surface (screw fastening)

Requirements

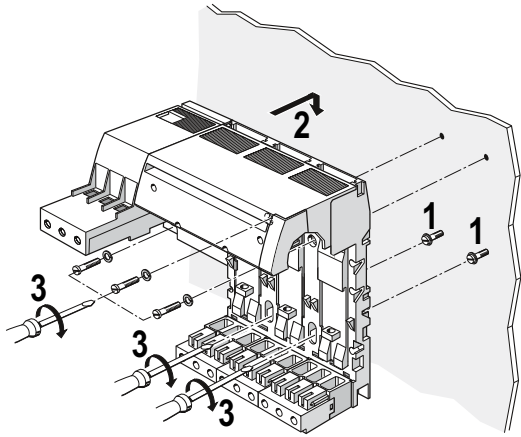
- Drill holes with thread or plug on the level surface. For details of the distances between the drilled holes, please refer to the relevant dimension drawing in "Dimension drawings (Page 161)".
- Screws:
 - Screw-type infeed (25/35 mm²) or screw-type infeed (50/70 mm²): Five M4x16 screws incl. washers
 - 3-slot extension module: Four M4 x16 screws incl. washers
 - 2-slot extension module: Two M4 x16 screws incl. washers
 - PE infeed: One M4 x 16 screw incl. washer

Procedure

Not only can the infeed system for 3RA6 be attached to a DIN rail, but it can also be installed on a level surface using screws.

Note

Slots make the screw-type infeeds and extension modules easier to install. The slots allow the screw-type infeeds and extension modules to be mounted on pre-assembled screws and installed.

Step	Instructions	Image
1	Screw the 2 screws for the 2 slots into the level surface.	
2	Mount the screw-type infeed/extension module on the pre-assembled screws.	
3	Insert each of the remaining screws through the relevant holes in the screw-type infeed/extension module and screw the device onto the level surface.	

12.3.5 Installing the accessories for a SIRIUS infeed system for 3RA6

Installing PE accessories

The PE infeeds and taps are available with screw-type or spring-loaded connection technology. The PE infeed can be mounted to the right or left of the screw-type infeeds and extension modules. The PE tap is inserted into the relevant slots from the bottom. The modules offer the following slot options:

- Screw-type infeed (25/35 mm²), screw-type infeed (50/70 mm²), 3-slot extension module: 4 slots
- 2-slot extension module: 2 slots

The figure below provides an overview of the mounting options available for the PE infeed and PE tap.

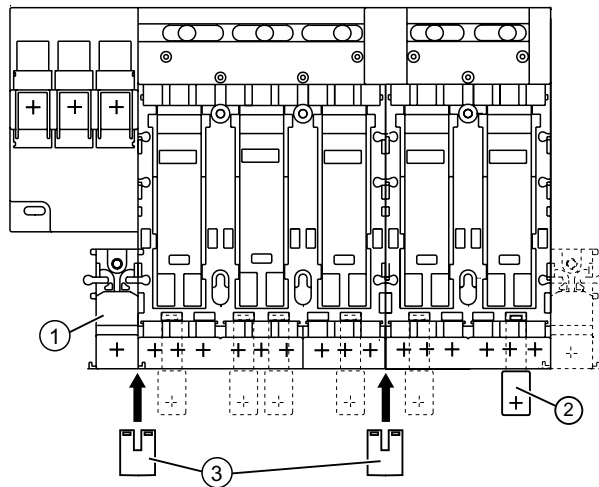


Figure 12-5 Mounting options for PE infeed and PE tap

- (1) PE infeed, 25/35 mm², with screw-type or spring-loaded connection technology
- (2) PE tap, 6/10 mm², with screw-type or spring-loaded connection technology
- (3) PE extension connector

Step	Instructions	Image
1	Push the PE infeed against the right-hand/left-hand side of the screw-type infeed or extension module and then push it upwards.	
2	Press the link wedge down.	
3	Use the PE extension connector to connect the PE infeed and screw-type infeed/extension module.	
4	Use the PE extension connector to connect each additional extension module to its predecessor.	
5	Working from the bottom, push the PE tap into the relevant slot on the infeed or extension module until you hear it engage.	



DANGER

Danger, high voltage!

Unless the extension modules are connected using a PE extension connector, the infeed system will **NOT** be grounded.

If you are using the PE infeed and PE tap and decide to expand the infeed system for 3RA6 by adding extension modules, you will need to use a PE extension connector for the purpose of connecting each additional extension module to its predecessor.

Note

If you are installing the PE infeed on a level surface (screw fastening), it will also need to be fixed to the surface using an M4 x 16 screw.

Installing the terminal block

The terminal block is available with spring-loaded connection technology. It can be installed on the right or left-hand side of the extension module.

Step	Instructions	Image
1	Remove the end cover from the extension module.	
2	Mount the terminal block on the extension module.	
3	Lock the terminal block.	

Connecting the SIRIUS infeed system for 3RA6 and SIRIUS 3RV19 infeed system

The 3RV19 infeed system can be mounted on the right-hand side of the infeed system for 3RA6 using the extension connector for 3RV19 (3RA6890-1AA).

Step	Instructions	Image
1	Remove the end cover from the infeed system for 3RA6.	
2	Push together the infeed system for 3RA6 and the 3RV19 infeed system.	
3	Use the extension connector for 3RV19 to connect the infeed systems.	

Installing the 45 mm adapter for infeed system for 3RA6

Step	Instructions	Image
1	Snap the back of the circuit breaker onto the upper edge of the DIN rail, connecting it to the 45 mm adapter for 3RA6 infeed systems.	
2	Connect the circuit breaker to the adapter cables.	
3	Working from the front, mount the adapter on the screw-type infeed/extension module and push the adapter backwards until you hear it engage.	

**! DANGER****Danger, high voltage!**

If a circuit breaker that is not permitted is mounted on the 45 mm adapter for the infeed system for 3RA6 this may result in damage to the circuit breaker and to the infeed system for 3RA6 and may cause an electric shock.

Only mount size S0 circuit breakers with a rated ultimate short-circuit breaking capacity $I_{CU} < 53 \text{ kA at } 400 \text{ V (} I_{max} = 12.5 \text{ A)}$ on the 45 mm adapter for the infeed system for 3RA6.

12.3.6 Removing the accessories for a SIRIUS infeed system for 3RA6

Requirements



! DANGER

Danger, high voltage!

Electrical voltage can result in electric shocks or burns.

Before starting work, disconnect the system and devices from the power supply.

- The compact starters and circuit breakers must have been removed from the infeed system for 3RA6. For additional information on this topic, please refer to "Removing the compact starter from a SIRIUS infeed system for 3RA6 (Page 66)".
- Flat-head screwdriver with max. blade width of 3 mm and total max. length of 120 mm for levering out the link wedges and releasing the PE tap and PE extension connectors.

Removing PE accessories

The PE infeed is mounted on the right or left of the base carrier.

Step	Instructions	Image
1	Use a screwdriver to lever out the link wedge.	
2	Push the PE infeed downwards.	
3	Pull the PE extension connector down and out and then remove the PE infeed sideways.	
4	Press the clip on the PE tap backwards and then pull the PE tap down and out of the infeed or extension module.	

12.3.7 Removing the SIRIUS infeed system for 3RA6 from a DIN rail

The infeed system for 3RA6 is either installed on a DIN rail or on a level surface (screw fastening). The removal process is basically the same for both mounting types. The only difference between the two is how the extension modules are fastened. As the infeed system for 3RA6 is meant to be mounted on a DIN rail as standard, the information below describes removal from a DIN rail.

Requirements



! DANGER

Danger, high voltage!

Electrical voltage can result in electric shocks or burns.

Before starting work, disconnect the system and devices from the power supply.

- The terminal blocks must have been disconnected.
- The compact starters and circuit breakers must have been removed.
- The PE infeed and PE tap must have been removed.

Removing screw-type infeed (25/35 mm²) or screw-type infeed (50/70 mm²) from a DIN rail

Step	Instructions	Image
1	Pull the screw-type infeed down until it can be pulled away from the DIN rail.	
2	Pull the screw-type infeed away from the DIN rail and lift it off the DIN rail's upper edge.	

Removing a spring-loaded infeed with extension module from a DIN rail

The spring-loaded infeed is mounted on the right or left of a 3-slot or 2-slot extension module.



⚠ WARNING

Danger, high voltage!

Removing the extension connector from the infeed system for 3RA6 while the system is live can damage both the extension connector and infeed system and can also result in an electric shock.

Remember to disconnect the system from the power supply before removing the extension connector.

Step	Instructions	Image
1	Remove the extension connector that has been used to connect the extension module to the spring-loaded infeed.	
2	Use a screwdriver to lever out the 2 link wedges that have been used for the mechanical connection between the extension module and the spring-loaded infeed.	
3	Pull the extension module down until it can be pulled away from the DIN rail.	
4	Pull the extension module away from the DIN rail and lift it off the DIN rail's upper edge.	
5	Pull the spring-loaded infeed down until it can be pulled away from the DIN rail.	
6	Pull the spring-loaded infeed away from the DIN rail and lift it off the DIN rail's upper edge.	

Removing additional extension modules

Screw-type and spring-loaded infeeds can be expanded by means of additional 3-slot and 2-slot extension modules. Screw-type infeeds can only be expanded by adding modules to the right. Spring-loaded infeeds can be expanded by adding modules to the right or left, depending on which side the spring-loaded infeed has been installed.



! WARNING

Danger, high voltage!

Removing the extension connector from the infeed system for 3RA6 while the system is live can damage both the extension connector and infeed system and can also result in an electric shock.

Remember to disconnect the system from the power supply before removing the extension connector.

Step	Instructions	Image
1	Remove the extension connector that has been used for the electrical connection between the extension modules.	
2	Use a screwdriver to lever out the 3 link wedges that have been used for the mechanical connection between the extension modules.	
3	Pull the extension module down until it can be pulled away from the DIN rail.	
4	Pull the extension module away from the DIN rail and lift it off the DIN rail's upper edge.	

12.3.8 Connecting the SIRIUS infeed system for 3RA6

The SIRIUS infeed system for 3RA6 is available with screw-type and spring-loaded connection technology.

The main conductors (L1, L2, L3) can be connected to the screw-type infeed (25/35 mm²) and screw-type infeed (50/70 mm²) from both the top and the bottom.

Stripping lengths

The following stripping lengths apply to the SIRIUS infeed system for 3RA6:

Table 12-4 Stripping lengths (infeed system for 3RA6)

Connecting terminal	Order number	Stripping length
Screw-type infeed (25/35 mm ²)	3RA6812-8AB 3RA6812-8AC	Line side: 13 mm and outgoing side: 10 mm
Screw-type infeed (50/70 mm ²)	3RA6813-8AB 3RA6813-8AC	Line side: 17 mm and outgoing side: 10 mm
Extension modules with screw-type and spring-loaded connection technology	3RA6822-0AB 3RA6822-0AC 3RA6823-0AB 3RA6823-0AC	10 mm
Spring-loaded infeed	3RA6830-5AC	23 mm
PE infeed, 25/35 mm ² , screw-type connection technology	3RA6860-6AB	13 mm
PE infeed, 25/35 mm ² , spring-loaded connection technology	3RA6860-5AC	23 mm
PE tap	3RA6870-4AB 3RA6870-3AC	10 mm
Terminal block	3RV1917-5D	12 mm

Openings for test probes

On the infeed system with screw-type connection technology, the test probes are attached to the terminal screws.

On the infeed system with spring-loaded connection technology, all terminals are equipped with special test probe openings.

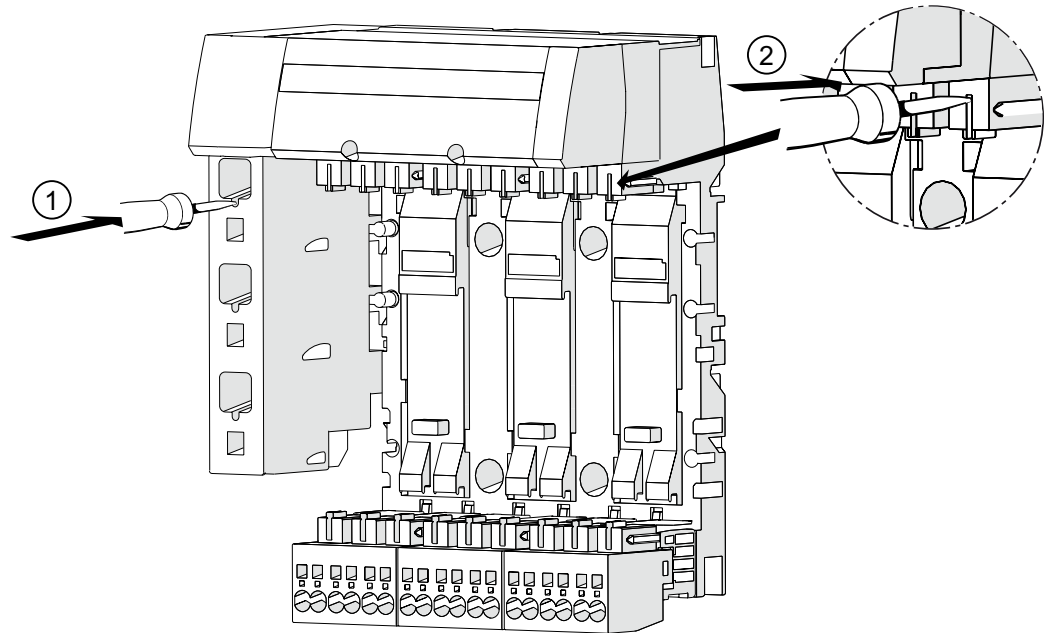


Figure 12-6 Test probe openings on the infeed system

Openings for test probes on

- (1) The spring-loaded infeed
- (2) The extension blocks

Conductor cross-sections

Table 12-5 Screw-type infeed (25/35 mm²) (L1, L2, L3) and PE infeed, 25/35 mm², with screw-type connection technology

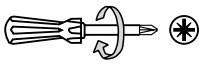
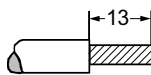
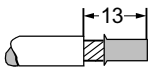
	3RA6812-8AB (L1, L2, L3) 3RA6812-8AC (L1, L2, L3) 3RA6860-6AB		
			
 Ø 6 mm/PZ 2	3 ... 4.5 Nm (27 ... 40 lb·in)		
	2.5 ... 35 mm ²	2.5 ... 35 mm ²	Max. (2 x 25) mm ²
	2.5 ... 25 mm ²	2.5 ... 25 mm ²	Max. (2 x 16) mm ²
	2.5 ... 25 mm ²	2.5 ... 25 mm ²	Max. (2 x 16) mm ²
AWG	12 to 2	12 to 2	Max. 2 x (16 to 2)

Table 12-6 Screw-type infeed (50/70 mm²) (L1, L2, L3)

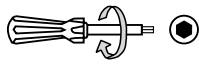
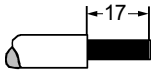
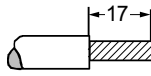
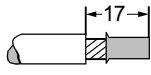
	3RA6813-8AB (L1, L2, L3) 3RA6813-8AC (L1, L2, L3)		
			
 SW4	6 ... 8 Nm (53 ... 71 lb·in)		
	2.5 ... 70 mm ²	2.5 ... 70 mm ²	Max. (2 x 50) mm ²
	4 ... 50 mm ²	10 ... 50 mm ²	Max. (2 x 35) mm ²
	2.5 ... 35 mm ²	2.5 ... 50 mm ²	Max. (2 x 35) mm ²
AWG	10 to 2/0	10 to 2/0	Max. 2 x (10 to 1/0)

Table 12-7 Spring-loaded infeed (L1, L2, L3) and PE infeed, 25/35 mm², with spring-loaded connection technology

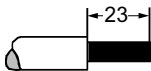
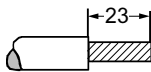
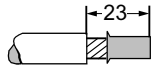
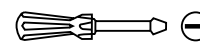
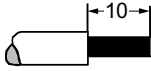
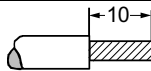
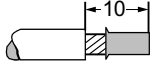
	3RA6830-5AC 3RA6860-5AC
	 8WA2 806 (5.5 x 0.8 mm)
	4 ... 35 mm ²
	6 ... 25 mm ²
	4 ... 25 mm ²
AWG	10 to 3

Table 12-8 Screw-type infeed (25/35 mm²) (T1, T2, T3), screw-type infeed (50/70 mm²) (T1, T2, T3), 2-slot/3-slot extension modules (T1, T2, T3) and PE tap, 6/10 mm², with screw-type connection technology

	3RA6813-8AB (T1, T2, T3) 3RA6812-8AB (T1, T2, T3) 3RA6822-0AB (T1, T2, T3) 3RA6823-0AB (T1, T2, T3) 3RA6870-4AB		3RA6822-0AC (T1, T2, T3) 3RA6823-0AC (T1, T2, T3) 3RA6813-8AC (T1, T2, T3) 3RA6812-8AC (T1, T2, T3)	
Compact starter	... 12 A	8 ... 32 A	... 12 A	8 ... 32 A
	 Ø 6 mm/PZ 2 2 ... 2.5 Nm (18 to 22 lb-in)		 8WA2 803 (3.5 x 0.5) mm -	
	2 x (1.5 ... 2.5) mm ² 2 x (2.5 ... 6) mm ² max. 1 x 10 mm ²	2 x (2.5 ... 6) mm ² max. 1 x 10 mm ²	2 x (1.5 ... 6) mm ² max. 1 x 10 mm ²	2 x (2.5 ... 6) mm ² max. 1 x 10 mm ²
	-	-	2 x (1.5 ... 6) mm ²	2 x (2.5 ... 6) mm ²
	2 x (1.5 ... 2.5) mm ² 2 x (2.5 ... 6) mm ²	2 x (2.5 ... 6) mm ²	2 x (1.5 ... 6) mm ²	2 x (2.5 ... 6) mm ²
AWG	2 x (16 to 14) 2 x (14 to 10) 1 x 8	2 x (14 to 10) 1 x 8	2 x (16 to 10) 1 x 8	2 x (14 to 10) 1 x 8

12.3 SIRIUS infeed system for 3RA6

Table 12-9 PE tap, 6/10 mm², with spring-loaded connection technology

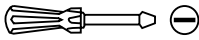
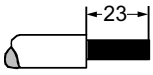
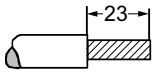
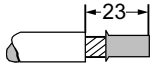
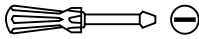
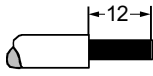
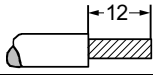
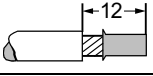
	3RA6870-3AC
	 8WA2 803 (3.5 x 0.5 mm)
	1.5 ... 10 mm ²
	1.5 ... 6 mm ²
	1.5 ... 6 mm ²
AWG	16 to 10 1 x 8

Table 12-10 Terminal block

	3RV1917-5D
	 8WA2 803 8WA2 804 (3.5 x 0.5 mm)
	1.5 ... 6 mm ²
	1.5 ... 6 mm ²
	1.5 ... 4 mm ²
AWG	15 to 10

12.4 3-phase busbar

12.4.1 Description of the hardware

3-phase busbars enable several compact starters to be fed using a single infeed terminal. The 3-phase busbars are finger-safe in terms of touch protection. They have been dimensioned to withstand the level of short-circuit stress that can occur on the output side of the connected compact starters.

Rated operating voltage/current

- Rated operating voltage: 690 V
- Rated current: 63 A

Versions

Depending on the version selected, the 3-phase busbars can be used to connect between 2 and 5 compact starters.

Combining compact starters with SIRIUS circuit breakers

You can combine compact starters with size S0 circuit breakers.

If you wish to combine compact starters with size S00 circuit breakers you will need to use a connection piece (3RV1915-5DB). This connection piece is required, because the compact starters and size S00 circuit breakers have different depths.

For additional information on combining the compact starter with SIRIUS size S00 circuit breakers, please refer to "3-phase busbar (Page 34)".

Extending 3-phase busbars

The 3-phase busbar can be extended by adding another busbar (rotated by 180°) and pushing the terminal lugs of this new busbar underneath the terminals of the last compact starter (see **Configuration**).

CAUTION
Material damage to the busbar and connecting terminals!
Thermal overloads can damage the busbar and connecting terminals.
When extending the 3-phase busbar, please remember to observe its current carrying capacity.

Accessories

- Connection piece (3RV1915-5DB): A connection piece is used to connect two 3-phase busbars with 45 mm modular spacing if you are using compact starters together with size S00 circuit breakers.
- Cover cap for terminal lugs (3RV1915-6AB): Cover caps provide touch protection for reserved slots as well as any that are not in use (e.g. for reversing starters). These cover caps need to be removed before extending the busbars.

Configuration

Configuration involving 3-phase busbar and infeed terminal from the top/bottom

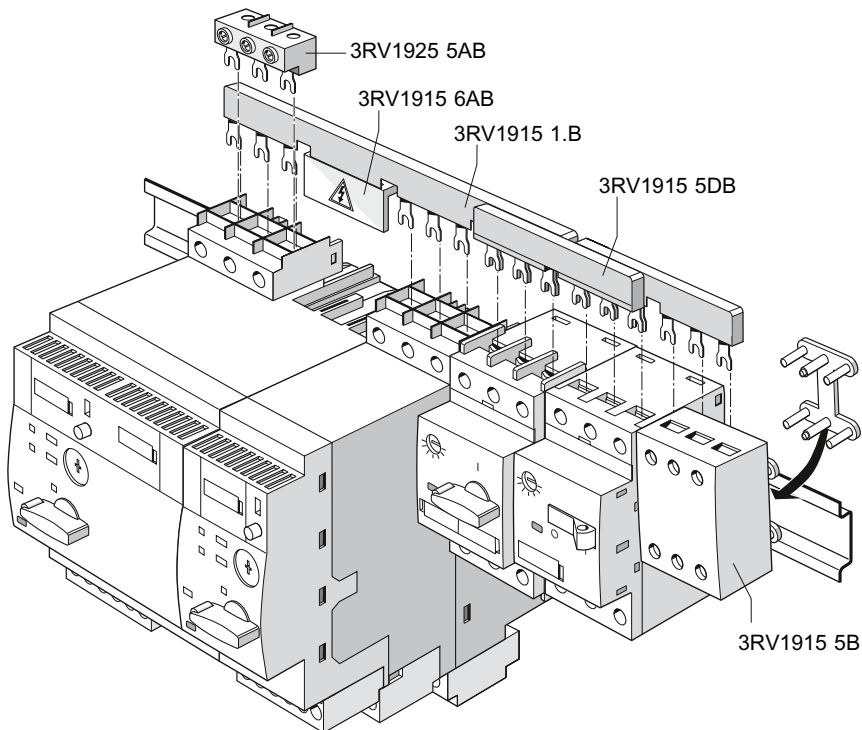


Figure 12-7 Configuration involving 3-phase busbar

**Configuration involving 3-phase busbar and 3-phase infeed terminal for installing
Type E starters, UL 508**

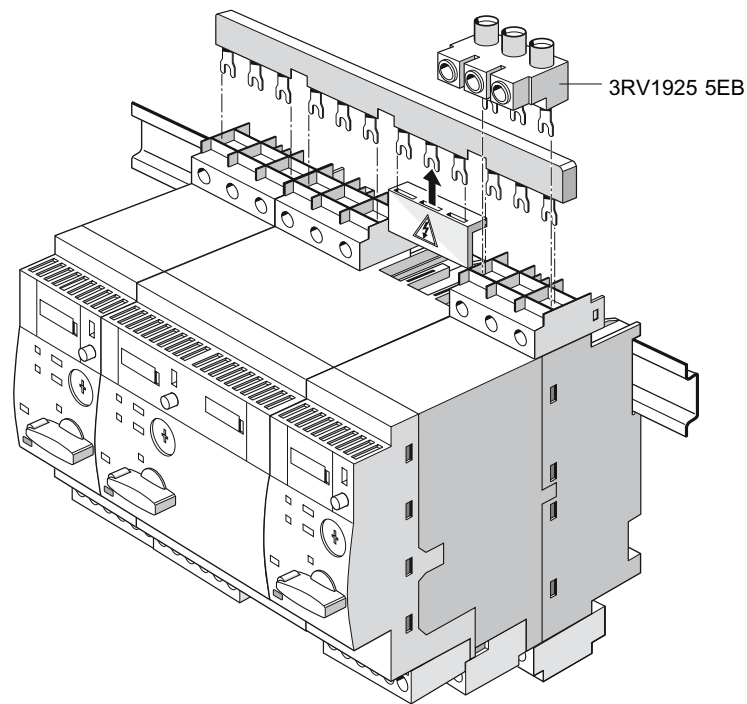


Figure 12-8 Configuration involving 3-phase busbar to UL 508 (Type E)

12.4.2 Connecting the 3-phase busbar

The 3-phase infeed terminals are available with screw-type connection technology.

3-phase infeed terminals

There are 3 supply possibilities available for the 3-phase busbar:

- 3-phase infeed terminal, connection from the top, with screw-type connection technology (3RV1925-5AB)
- 3-phase infeed terminal, connection from the bottom, with screw-type connection technology (3RV1915-5B)
- 3-phase infeed terminal for installing Type E starters, UL 508, with screw-type connection technology (3RV1925-5EB)

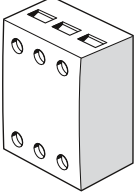
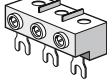
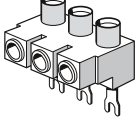
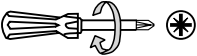
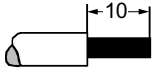
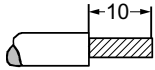
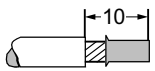
3-phase infeed terminal – connection from the bottom

Note

The 3-phase infeed terminal with connection from the bottom is connected instead of a compact starter. You will therefore need to take the space requirements into account when configuring the 3-phase busbar.

Conductor cross-sections of 3-phase infeed terminals

Table 12-11 3-phase infeed terminal

	3RV1915-5B	3RV1925-5AB	3RV1925-5EB
			
 Ø 5 ... 6 mm/PZ 2	2 ... 4 Nm (17.6 ... 35.2 lb-in)		
	(6 ... 25) mm ²	(2.5 ... 25) mm ²	(2.5 ... 25) mm ²
	(6 ... 25) mm ²	(2.5 ... 25) mm ²	(2.5 ... 25) mm ²
	(4 ... 16) mm ²	(2.5 ... 16) mm ²	(2.5 ... 16) mm ²
AWG	10 to 4	12 to 4	12 to 4

12.5 8US busbar adapter

12.5.1 Description of the hardware

To save space when installing compact starters and to save time as far as the infeed is concerned, busbar adapters are used to mount the compact starters directly onto busbar systems.

The compact starter is mounted on the 8US busbar adapter and connected on the line side. This ready-to-use unit plugs directly onto the busbar systems, thereby taking care of mechanical fastening and electrical connection at the same time.

Busbar systems

The 8US busbar adapter has been designed for use with the following system:

Table 12-12 Bus bar system

Busbar system with center-to-center clearance	For copper busbar in accordance with DIN EN/EN 13601	
	Width	Thickness
60 mm systems	12 mm to 30 mm	5 mm and 10 mm

Accessories

The following accessory is available for the 8US busbar adapter:

- Device holder for lateral mounting on busbar adapter (8US1250-1AA10).
You only need the device holder when installing a 3RA62 compact starter reversing starter.

12.5.2 Installing the 8US busbar adapter plus SIRIUS 3RA6 compact starter

Requirements

- The compact starter must be switched off (actuator set to ○ OFF position).
- The busbars must be disconnected from the power supply when the 8US busbar adapter is mounted on the busbars.

Adjusting the 8US busbar adapter for the busbar system

The busbar adapter can be adjusted to suit the following busbar thicknesses:

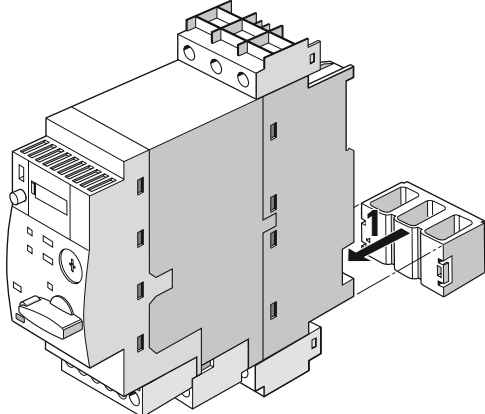
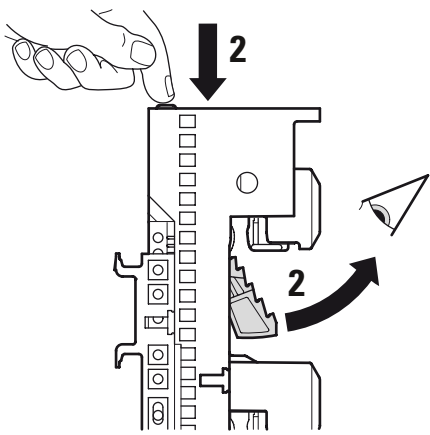
- 5 mm (delivery condition)
- 10 mm

Step	Instructions	Image
1	Push the 3 fastening blocks down.	The image contains four sub-diagrams illustrating the adjustment process. The top-left diagram shows the adapter with three fastening blocks. The top-right diagram, labeled '1', shows a hand pushing the blocks down. The bottom-left diagram, labeled '2', shows a hand adjusting a block for a 5 mm busbar. The bottom-right diagram, labeled '3', shows a hand pushing a block up until it engages with a 10 mm busbar, indicated by a starburst symbol.
2	Adjust the fastening blocks in accordance with the busbar thickness (5 mm/10 mm).	
3	Push the fastening blocks up until they engage.	

Procedure for 3RA61 compact starter direct starter

Note

The 8US busbar adapter plus compact starters must be arranged side by side on the busbar system without any space in between in order to meet the specified vibratory load and shock load requirements.

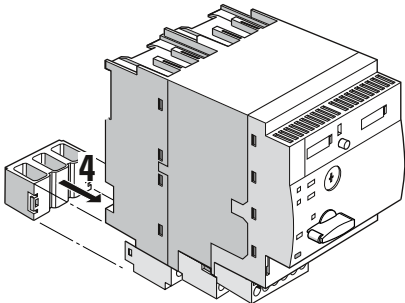
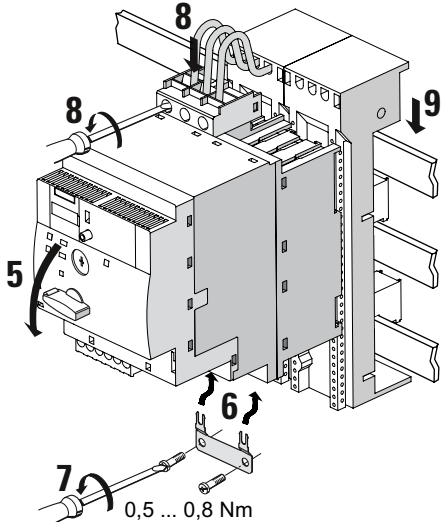
Step	Instructions	Image
1	Click the adapter for screw fastening the compact starter into position behind the lower main conductor terminal.	
2	Press the button on the top side of the busbar adapter to release the holder. The holder should flip out from the front of the busbar adapter.	

Step	Instructions	Image
3	Push the mounting lug into the adapter from the bottom.	
4	Snap the compact starter onto the DIN rail, connecting it to the busbar adapter.	
5	Insert each of the screws through the relevant holes in the mounting lug and screw the compact starter onto the busbar adapter.	
6	Connect the wiring from the busbar adapter to the compact starter's main conductor terminal block.	
7	Mount the busbar adapter on the busbars from the top.	

Procedure for 3RA62 compact starter reversing starter

If you are mounting a reversing starter on the 8US busbar adapter, the reversing starter's width means that it will need to be mounted on a device holder (8US1250-1AA10) as well.

Step	Instructions	Image
1	Position the device holder next to the 8US busbar adapter.	
2	Press the 2 connecting plugs into the relevant openings from behind to connect the device holder to the 8US busbar adapter.	
3	Press the button on the top side of the busbar adapter and device holder to release the holders. The holders should flip out from the front of the busbar adapter and device holder.	

Step	Instructions	Image
4	Click the adapter for screw fastening the reversing starter into position behind the lower main conductor terminal.	
5	Snap the reversing starter onto the DIN rail, connecting it to the busbar adapter and device holder.	
6	Push the mounting lug into the adapter from the bottom.	
7	Insert each of the screws through the relevant holes in the mounting lug and screw the reversing starter onto the busbar adapter.	
8	Connect the wiring from the busbar adapter to the reversing starter's main conductor terminal block.	
9	Mount the busbar adapter plus device holder on the busbars from the top.	

12.5.3 Removing the 8US busbar adapter plus SIRIUS 3RA6 compact starter

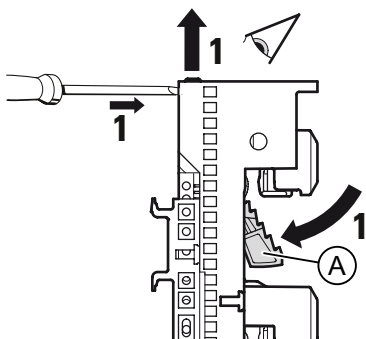
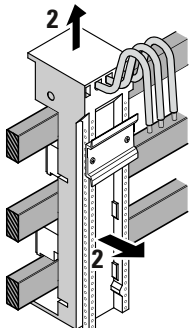
Requirements

- The compact starter must be switched off (actuator set to ○ OFF position).
- The busbars must be disconnected from the power supply when the 8US busbar adapter is removed from the busbars.

Procedure

Note

The compact starter can be detached from the 8US busbar adapter either before or after the 8US busbar adapter has been removed from the busbars.

Step	Instructions	Image
1	From the front, insert a screwdriver into the right-hand opening on the busbar adapter and release the holder (A). The button on the top side of the busbar adapter should spring up.	
2	Remove the busbar adapter from the busbars. To do this, you will first need to push it up slightly so that you can remove it by pulling it off towards you.	

Note

Removing the busbar adapter plus mounted device holder

When removing the busbar adapter along with a mounted device holder, you will need to release both holder (A) on the busbar adapter and the one on the device holder.

12.6 Terminal for Type E combination motor controller, UL 508

12.6.1 Installing the terminal for a Type E self-protected combination motor controller (UL 508)

According to UL 508 (Type E), line-side clearances of 1 and 2 inches are required for Type E combination motor controllers. If parallel wiring is used for the compact starter, the terminal for the self-protected combination motor controller (Type E) (3RV1928-1H) should be used.

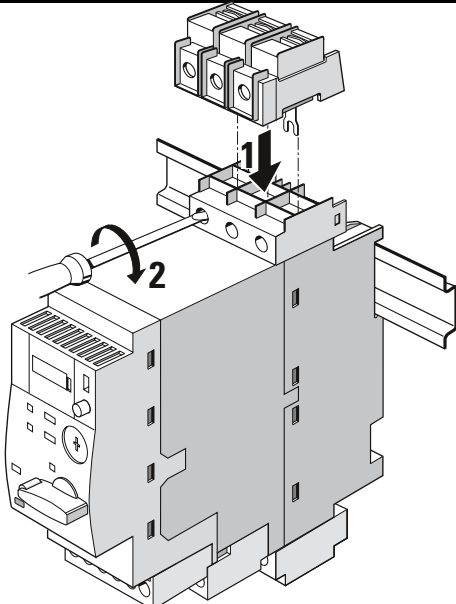
Note

According to C22.2-14, terminal blocks are not required for installation in accordance with CSA requirements.

Note

Supply possibilities in accordance with UL 508 (Type E) are still available when compact starters are installed with a 3-phase busbar and the infeed system for 3RA6. For additional information, please refer to "Infeed in accordance with UL 508 (Type E) (Page 36)".

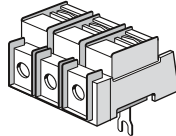
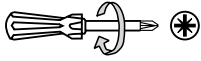
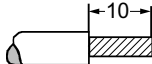
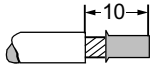
Procedure

Step	Instructions	Image
1	Attach the terminal to the compact starter's main conductor terminal from the top.	
2	Screw the screw terminals tight.	

12.6.2 Connecting the terminal for a Type E self-protected combination motor controller (UL 508)

Conductor cross-sections

Table 12-13 Conductor cross-sections of the terminal for a self-protected combination motor controller (Type E) to UL 508

	3RV1928-1H		
			
			
 $\varnothing$ 5 ... 6 mm/PZ 2	2.5 ... 3 Nm (22 to 26.5 lb·in)		
	(1 ... 10) mm ²	(1 ... 10) mm ²	Max. 10 + max. 10 mm ²
	(2.5 ... 25) mm ²	(1.5 ... 25) mm ²	Max. 10 + max. 25 mm ²
	(1 ... 16) mm ²	(1 ... 16) mm ²	Max. 10 + max. 10 mm ² Max. 6 + max. 16 mm ²
AWG	14 to 3	16 to 3	Max. 6 + max. 3

12.7 Door-coupling rotary operating mechanism

12.7.1 Description of the hardware

Door-coupling rotary operating mechanisms consist of a lockable rotary operating mechanism with a removable door coupling, an extension shaft and a connection piece that joins onto the switch mechanism. There are two basic versions available:

- Door-coupling rotary operating mechanism for standard applications (order number: 3RV1926-0B)
- Door-coupling rotary operating mechanism for EMERGENCY OFF applications (black/red actuator) (order number: 3RV1926-0C)

Both versions have been designed to provide IP65 degree of protection and can be locked in the ○ OFF position using up to 3 padlocks.

12.7.2 Installing the door-coupling rotary operating mechanism

Installing the door-coupling rotary operating mechanism

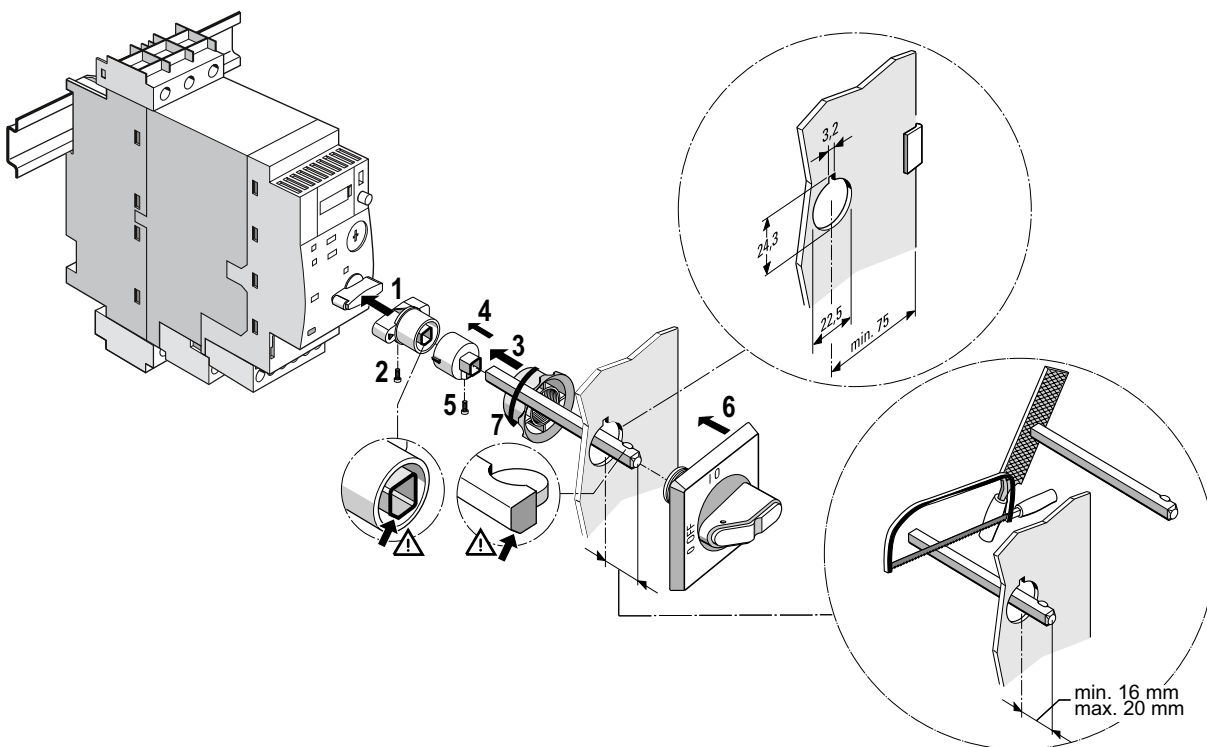


Figure 12-9 Installing the door-coupling rotary operating mechanism

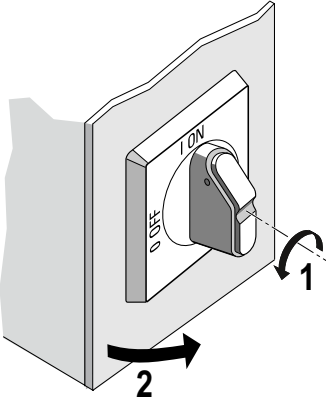
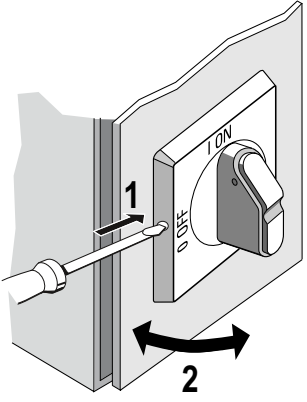


Remember to observe the mechanical coding of the connecting rod!

12.7.3 Commissioning the door-coupling rotary operating mechanism

Opening the door

The following table explains how to open the control cabinet door with the door-coupling rotary operating mechanism.

Instructions	Image
To open the control cabinet door, set the compact starter to the $\circ$ OFF position. This will release the extension shaft from the rotary operating mechanism so that you can open the door.	
If you want to open the control cabinet door during operation, press the button to the side of the bypass finger-grip knob (step 1). To close the door during operation press the button again so that the extension shaft reengages.	

Note

When the compact starter is in ϕ the READY position and the door is opened with a force of $> 150 \dots 200 \text{ N}$, the extension shaft cap will separate from the compact starter's rotary switch to prevent major damage to the compact starter. The compact starter will remain in the ϕ READY position.

12.7 Door-coupling rotary operating mechanism

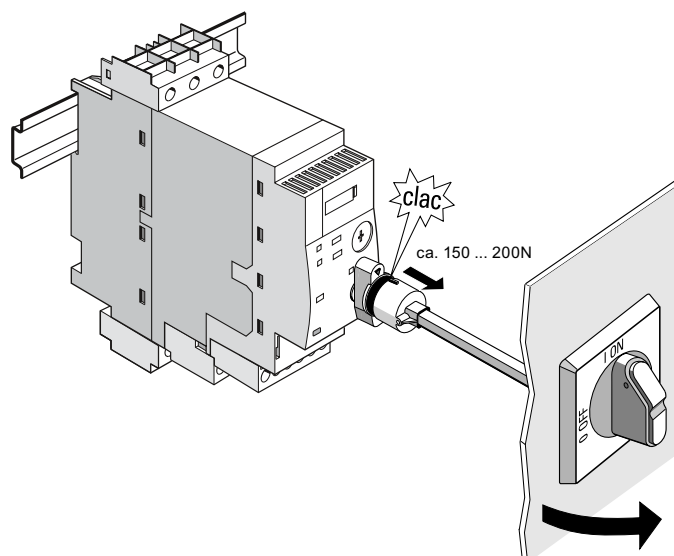


Figure 12-10 Door-coupling rotary operating mechanism; operating information

The extension shaft then needs to be attached to the compact starter and door-coupling rotary operating mechanism as described below:

Step	Instructions	Image
1	Switch off the compact starter (O OFF) and turn the rotary switch of the door-coupling rotary operating mechanism to O OFF.	
2	Attach the extension shaft cap to the rotary switch and then insert the extension shaft into the cap.	
3	Close the control cabinet door.	

Locking

In the ○ OFF position, the rotary operating mechanism can be secured using up to 3 locks, e.g. while maintenance work is carried out on the system.

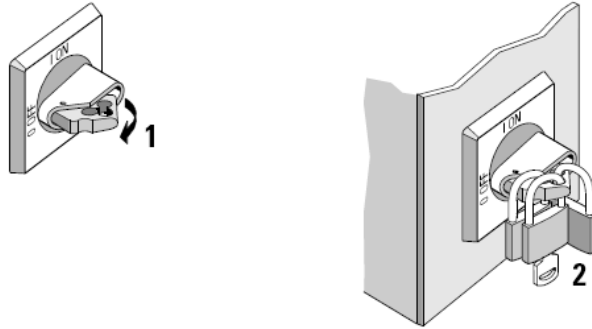


Figure 12-11 Door-coupling rotary operating mechanism, securing

The SIRIUS 3RA6 compact starter and SIRIUS infeed system for 3RA6 have been designed to be maintenance-free.

13.1 Installing/Removing main conductor terminal blocks

Requirements



! DANGER

Danger, high voltage!

Electrical voltage can result in electric shocks or burns.

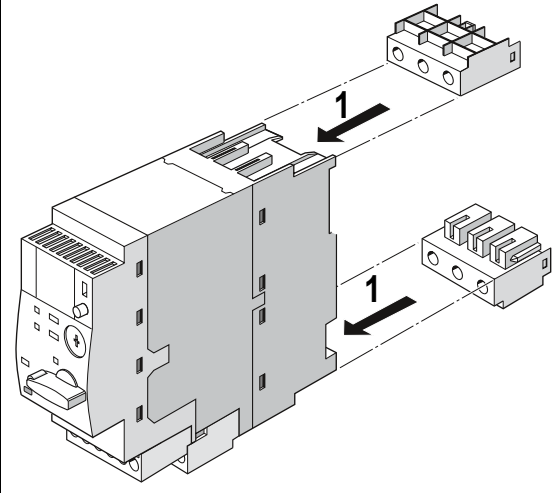
Before starting work, disconnect the systems and devices from the power supply.

- The main conductor terminals must have been disconnected.

Removing the main conductor terminal blocks

Step	Instructions	Image
1	Use a screwdriver to release the latching mechanism on the main conductor terminal block.	
2	Pull the main conductor terminal block back so that it comes off the compact starter, then lift it away from the device's mechanically coded guiderail.	

Installing main conductor terminal blocks

Step	Instructions	Image
1	Insert the removable main conductor terminal block into the device's mechanically coded guiderail from the back. Then push it forwards until you hear it engage.	

13.2 Installing/Removing auxiliary and control conductor terminal blocks

Installing auxiliary and control conductor terminal blocks on the compact starter

The auxiliary and control conductor terminals are mechanically coded to prevent mix-ups. The terminals are marked as follows:

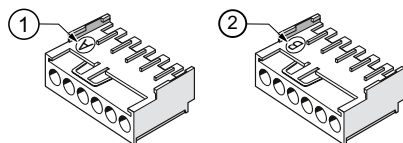


Figure 13-1 Coding of auxiliary and control conductor terminals

- ① A: Top/front mounting position on compact starter
- ② B: Bottom/rear mounting position on compact starter

Note

The auxiliary and control conductor terminal blocks can only be installed in the following order because of how they are arranged:

1. Lower/rear auxiliary circuit terminal (B)
 2. Top/front control circuit terminal (A)
-

Requirements



! DANGER

Danger, high voltage!

Electrical voltage can result in electric shocks or burns.

Before starting work, disconnect the systems and devices from the power supply.

- The compact starter must be switched off (actuator set to ○ OFF position).

Installing auxiliary and control conductor terminal blocks on the compact starter

Step	Instructions	Image
1	Insert the removable terminal block into the device's mechanically coded guiderail from the bottom.	
2	Push the terminal block up and then back until you hear it engage. Make sure that you install the two terminal blocks in the correct order.	

Removing auxiliary and control conductor terminal blocks from the compact starter

Step	Instructions	Image
1	Push the terminal block's release clip down.	
2	Pull the terminal block out to the front.	
3	Move the terminal block down and out from the compact starter's mechanically coded guiderail.	

13.3 Malfunction (e.g. end of service life reached)

The SIRIUS 3RA6 compact starter features a patented mechanism for detecting malfunctions. If a malfunction is detected, it could mean, for example, that the compact starter has reached the end of its service life.

For additional information, please refer to " Shutdown on malfunction (Page 57) ".

Instructions for dealing with malfunctions, e.g. end of service life reached

CAUTION
There is a malfunction on the compact starter. A compact starter malfunction will cause the compact starter to shut down. Continuing to operate the compact starter is extremely risky, as it can no longer be considered reliable. Replace the compact starter.

If the SIRIUS 3RA6 compact starter shuts down following a malfunction (e.g. end of service life), you will need to replace it.

In order to achieve a safe system status for the purpose of replacing the compact starter, you can continue operating the compact starter for a short time. For this purpose, you will have to set the compact starter to "ready" again by turning the actuator to the $\circ$ OFF position and then to the ϕ READY position.

Note

Following a malfunction (e.g. end of service life), the white display will be retained in the "RLT 0%" display window and you will not be able to reset it. The compact starter must be replaced.

For additional information on replacing the SIRIUS 3RA6 compact starter, please refer to " Replacing the SIRIUS 3RA6 compact starter (Page 138) ".

13.4 Replacing the SIRIUS 3RA6 compact starter

When service work becomes necessary or there is a malfunction (e.g. end of service life reached), the SIRIUS 3RA6 compact starter will need to be replaced.

The permanent wiring means that the main conductor terminals will be disconnected automatically when the compact starter is removed.

The procedure for removing the compact starter differs according to the mounting type. The method you should use to remove it depends on whether it has been installed on a DIN rail, a level surface (screw fastening) or the infeed system for 3RA6. The relevant requirements will need to be met in each case.

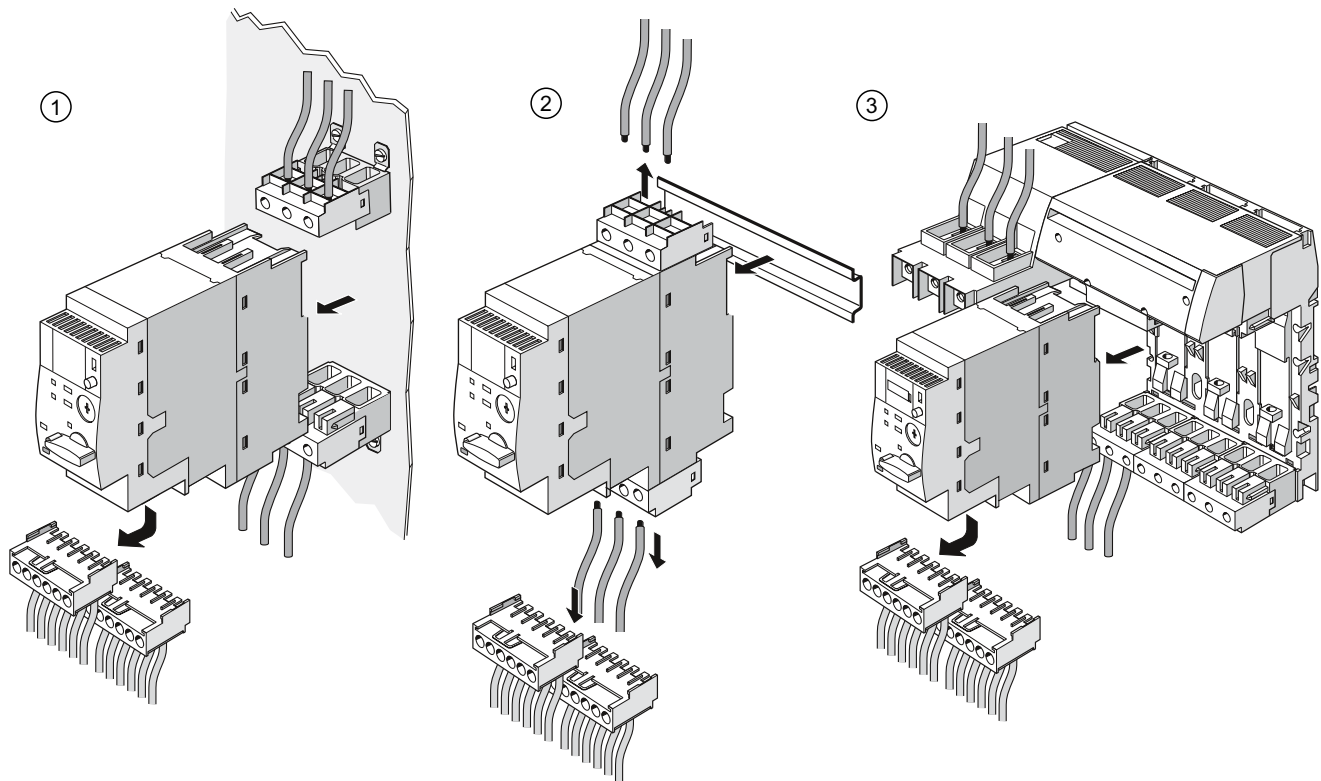


Figure 13-2 Replacing the compact starter

- (1) Replacement when installed on a level surface (screw fastening)
- (2) Replacement when installed on a DIN rail
- (3) Replacement when installed on the infeed system for 3RA6

Requirements when the compact starter is installed on a DIN rail or level surface (screw fastening)**! DANGER****Danger, high voltage!**

Electrical voltage can result in electric shocks or burns.

Before starting work, disconnect the system and devices from the power supply.

- The compact starter must be switched off (actuator set to $\circ$ OFF position).

Requirements when the compact starter is installed on the infeed system for 3RA6

The good thing about removing the compact starter from the infeed system for 3RA6 is that you do not need to disconnect the entire system from the power supply. The compact starter can be removed from the infeed system while the system is live, but the starter must be switched off.

**! DANGER****Danger, high voltage!**

Installing/removing the compact starter on/from the infeed system for 3RA6 while the starter is live can damage the compact starter and also result in an electric shock.

Make sure that the compact starter's actuator is set to the $\circ$ OFF position before you install the compact starter on the infeed system for 3RA6 or remove it.

- The compact starter must be switched off (actuator set to $\circ$ OFF position).

For additional information on removing the individual components, please refer to " Removing the compact starter from a DIN rail (Page 64) ", " Removing the compact starter from a level surface (screw fastening) (Page 65) ", " Removing the compact starter from a SIRIUS infeed system for 3RA6 (Page 66) ", " Installing/Removing auxiliary and control conductor terminal blocks (Page 135) " and " Disconnecting terminal blocks (Page 79) ".

13.5 Order numbers

13.5.1 Order numbers for the SIRIUS 3RA6 compact starter

Overview of order numbers

The SIRIUS 3RA6 compact starter order number is made up of a fixed series of characters plus a number of variables (①, ②, ③, ④ and ⑤):

3RA6 ① 0 - ② ③ ④ ⑤

The variables can be selected from the following table, depending on the required compact starter options:

Variable	Options SIRIUS 3RA6 compact starter	Character string
①	Compact starter - 3RA61 direct starter - 3RA62 reversing starter	12 25
②	Terminal connection type - No terminals - Screw-type connection technology - Spring-loaded connection technology	0 1 2
③	Current setting range - 0.1 to 0.4 A - 0.32 to 1.25 A - 1 to 4 A - 3 to 12 A - 8 to 32 A	A B C D E
④	Control voltage range (AC/DC) - 24 V - 42 to 70 V - 110 to 240 A	B3 E3 P3
⑤	Terminal configuration - No terminals - With main conductor terminals and control conductor terminals for attachment to a DIN rail - Without main conductor terminals but with control conductor terminals for installation on the SIRIUS infeed system for 3RA6 - With main conductor terminals but without control conductor terminals for attachment to a DIN rail and the AS-i mounting module	0 2 3 4

Example

Options SIRIUS 3RA6 compact starter	3RA6 ① 0 - ② ③ ④ ⑤
Compact starter: Direct starter version	① → 12
Terminal connection type All terminals with screw-type connection technology	② → 1
Current setting range 1 to 4 A	③ → C
Control voltage range (AC/DC) 24 V	④ → B3
Terminal configuration With main conductor terminals and control conductor terminals for attachment to a DIN rail	⑤ → 2
Order number:	→ 3RA6 12 0 - 1 C B3 2

13.5.2 Order numbers for accessories

SIRIUS 3RA6 compact starter

System component	Order number
Main conductor terminal (2 units per pack) - Screw-type connection technology - Spring-loaded connection technology	3RA6920-1A 3RA6920-2A
Terminal for self-protected combination motor controller (Type E) to UL 508	3RV1928-1H
Auxiliary switch block for compact starter - Screw-type connection technology: 2 NO contacts 2 NC contacts 1 NO contact + 1 NC contact - Spring-loaded connection technology: 2 NO contacts 2 NC contacts 1 NO contact + 1 NC contact	3RA6911-1A 3RA6912-1A 3RA6913-1A 3RA6911-2A 3RA6912-2A 3RA6913-2A
AS-i mounting module for compact starter	3RA6970-3A
AS-i mounting module for compact starter with two local inputs for safe shutdown	3RA6970-3B
Addressing unit	3RK1904-2AB01
Control kit	3RA6950-0A
Adapter for screw fastening the compact starter	3RA6940-0A

SIRIUS infeed system for 3RA6

System component	Order number
Left infeed, 50/70 mm ² screw terminal with three slots, outgoing terminals with - Screw-type connection technology - Spring-loaded connection technology Incl. PE bar (for installing Type E starters in accordance with UL 508)	3RA6813-8AB 3RA6813-8AC
Left infeed, 25/35 mm ² screw terminal with three slots, outgoing terminals with - Screw-type connection technology - Spring-loaded connection technology Incl. PE bar	3RA6812-8AB 3RA6812-8AC
Extension module with two slots, outgoing terminals with - Screw-type connection technology - Spring-loaded connection technology Incl. PE bar	3RA6822-0AB 3RA6822-0AC
Extension module with three slots, outgoing terminals with - Screw-type connection technology - Spring-loaded connection technology Incl. PE bar	3RA6823-0AB 3RA6823-0AC
Left or right infeed, 25/35 mm ² , with spring-loaded connection technology	3RA6830-5AC
PE infeed, 25/35 mm ² , with - Screw-type connection technology - Spring-loaded connection technology	3RA6860-6AB 3RA6860-5AC
PE tap, 6/10 mm ² , with - Screw-type connection technology - Spring-loaded connection technology	3RA6870-4AB 3RA6870-3AC
PE extension connector	3RA6890-0EA
Terminal block	3RV1917-5D
45 mm adapter for infeed system for 3RA6 (for mounting size S0 circuit breakers (max. 12.5 A / 400 V; I _{CU} < 53 kA) on the infeed system for 3RA6)	3RA6890-0BA
Extension connector for 3RV19 (connects SIRIUS infeed system for 3RA6 to 3RV19 infeed system)	3RA6890-1AA
Extension connector (for reordering an original part that has been lost)	3RA6890-1AB

3-phase busbar

System component	Order number
3-phase busbar	
- 2 partitions	3RV1915-1AB
- 3 partitions	3RV1915-1BB
- 4 partitions	3RV1915-1CB
- 5 partitions	3RV1915-1DB
3-phase infeed terminal, connection from the bottom, with screw-type connection technology	3RV1915-5B
Connection piece for connecting compact starters to size S00 circuit breakers	3RV1915-5DB
Cover cap for terminal lugs	3RV1915-6AB
3-phase infeed terminal, connection from the top, with screw-type connection technology	3RV1925-5AB
3-phase infeed terminal for installing Type E starters, UL 508 with screw-type connection technology	3RV1925-5EB

8US busbar adapter

System component	Order number
Busbar adapter for 60 mm system	8US1211-1NS10
Device holder for side mounting on busbar adapter	8US1250-1AA10

Door-coupling rotary operating mechanism

System component	Order number
Door-coupling rotary operating mechanism	
- 130 mm long	3RV1926-0B
EMERGENCY OFF door-coupling rotary operating mechanism	
- 130 mm long	3RV1926-0C

Technical data

14.1 SIRIUS 3RA6 compact starter

General technical data

Order number	3RA61 3RA62		
Device standard	IEC / EN 60947-6-2		
Number of poles	3		
Permissible ambient temperature			
Storage	According to IEC / EN 60721-3-1	°C	-55 to +80
Shipping	According to IEC / EN 60721-3-2	°C	-55 to +80
Operation	According to IEC / EN 60721-3-3	°C	-20 to +60 ¹⁾
Permissible rated current of compact starter if			
- Several compact starters are installed side by side on a vertical DIN rail			
- Several compact starters are installed side by side on a SIRIUS 3RA6 infeed system			
Internal control cabinet temperature: + 40 °C		%	100
Internal control cabinet temperature: + 60 °C		%	80
Relative atmospheric humidity		%	10 to 90
Max. installation altitude		m	2000 m above sea level without any restrictions
Max. rated current $I_{r \max}$	0.1 ... 0.4 A	A	0.4
(= max. rated operating current I_e)	0.32 ... 1.25 A	A	1.25
for the relevant setting range	1 ... 4 A	A	4
	3 ... 12 A	A	12
	8 ... 32 A	A	32
Rated frequency		Hz	50/60
Rated insulation voltage U_i		V	690
Rated impulse voltage U_{imp}		kV	6
Trip class (CLASS)	According to IEC / EN 60947-6-2		10/20
(the trip class corresponds to tolerance band E)			
1) At over 40 °C compact starter current reduction if			
- Several compact starters are installed side by side on a vertical DIN rail			
- Several compact starters are installed side by side on a SIRIUS 3RA6 infeed system			

14.1 SIRIUS 3RA6 compact starter

Order number		3RA61 3RA62	
Power loss $P_{v \max}$ of all main current paths in accordance with rated current I_r (top setting range)	0.1 ... 0.4 A	mW	2
	0.32 ... 1.25 A	mW	19.1
	1 ... 4 A	W	0.2
	3 ... 12 A	W	0.7
	8 ... 32 A	W	2.3
Operating mechanism losses			
24 V			
- Up to 12 A	Active power	W	2.7
- 8 to 32 A	Active power	W	2.95
42 to 70 V			
- Up to 12 A	Active power	W	2.5
- 8 to 32 A	Active power	W	3.0
110 to 240 V			
- Up to 12 A	Active power	W	3.4
- 8 to 32 A	Active power	W	3.8
Overload function			
Ratio of lower to upper current mark		1:4	
Degree of protection	According to IEC / EN 60947-1	IP20 (connection compartment IP 00)	
Touch protection	According to DIN EN 50274	Finger-safe	
Vibratory load		f = 1 to 6 Hz; d = 15 mm 10 cycles f = 150 Hz; a = 2g	
Shock		a = 60 m/s ² (6g) with 10 ms every 3 All axes subjected to shock	
Cooling		None	
EMC interference immunity	According to IEC / EN 60947-1	Corresponds to degree of severity 3	
Conducted interference	BURST according to IEC / EN 61000-4-4	kV	4
Conducted interference	SURGE according to IEC / EN 61000-4-5		
- Conductor-ground		kV	4
- Conductor-conductor		kV	1
Electrostatic discharge, ESD	According to IEC / EN 61000-4-2	kV	8
		kV	6
Field-based interference suppression	According to IEC / EN 61000-4-3	V/m	10
Integrated auxiliary and signaling switches			
- Direct starter	Auxiliary switch	1 NO contact, 1 NC contact	
	Overload signaling switch	1 CO contact	
	Short circuit signaling switch	1 NO contact	
- Reversing starter	Auxiliary switch	2 NO contacts	
	Overload signaling switch	1 CO contact	
	Short circuit signaling switch	1 NO contact	
Extendable auxiliary switch block			
Direct starter: 1 x auxiliary switch block		2 NO contacts, 2 NC contacts, 1 NO	
Reversing starter: 1 x auxiliary switch block per direction of rotation		contact, and 1 NC contact	

14.1 SIRIUS 3RA6 compact starter

Order number	3RA61 3RA62		
Surge suppressor	Varistor (ready-integrated)		
Degree of pollution	3		
Safe isolation	According to IEC / EN 60947-1		
Control circuit to internal auxiliary circuit	V	250	
Internal auxiliary/control circuit to internal auxiliary/control circuit	V	250	
Internal auxiliary/control circuit to external auxiliary circuit	V	400	
Main circuit to internal auxiliary circuit	V	400	
Main circuit to external auxiliary circuit	V	400	
Max. dimensions of direct starter			
Screw-type connection technology	W x H x D	mm	45 x 170 x 165
Spring-loaded connection technology	W x H x D	mm	45 x 191 x 165
Max. dimensions of reversing starter			
Screw-type connection technology	W x H x D	mm	90 x 170 x 165
Spring-loaded connection technology	W x H x D	mm	90 x 191 x 165
Depth starting from DIN rail		mm	160

Electromagnetic operating mechanism

Order number	3RA61 3RA62		
Frequency range	DC and 50/60 Hz (+/- 5%)		
Control voltage ranges	V	24 (AC/DC)	
	V	42 to 70 (AC/DC)	
	V	110 to 240 (AC/DC)	
Working range	Where U_s = control voltage		0.7 to 1.25 x U_s
No-load operating frequency	1/hour	3600	
OFF-delay time	ms	Max. 70	
ON-delay time	ms	Max. 120	
Max. breakaway starting current at 24 VDC			
- Up to 12 A	mA	250	
- 8 to 32 A	mA	350	
Holding current and holding power valid for working range 24 V			
24 V, AC operation			
- Up to 12 A	Holding current	mA	132
	Active power	W	2.7
	Apparent power	VA	3.15
	cos φ		0.86
- 8 to 32 A	Holding current	mA	144
	Active power	W	3.0
	Apparent power	VA	3.45
	cos φ		0.86

14.1 SIRIUS 3RA6 compact starter

Order number			3RA61
			3RA62
24 V, DC operation			
- Up to 12 A	Holding current	mA	100
	Active power	W	2.45
	Apparent power	VA	2.75
	cos φ		0.88
- 8 to 32 A	Holding current	mA	116
	Active power	W	2.8
	Apparent power	VA	3.3
	cos φ		0.85
Holding current and holding power valid for working range 42 V to 70 V			
42 V, AC operation			
- Up to 12 A	Holding current	mA	75
	Active power	W	2.35
	Apparent power	VA	3.2
	cos φ		0.734
- 8 to 32 A	Holding current	mA	84
	Active power	W	2.7
	Apparent power	VA	3.6
	cos φ		0.73
42 V, DC operation			
- Up to 12 A	Holding current	mA	55
	Active power	W	2.3
	Apparent power	VA	2.7
	cos φ		0.853
- 8 to 32 A	Holding current	mA	63
	Active power	W	2.7
	Apparent power	VA	3.35
	cos φ		0.85
70 V, AC operation			
- Up to 12 A	Holding current	mA	54
	Active power	W	2.5
	Apparent power	VA	3.8
	cos φ		0.654
- 8 to 32 A	Holding current	mA	58.5
	Active power	W	2.7
	Apparent power	VA	4
	cos φ		0.65
70 V, DC operation			
- Up to 12 A	Holding current	mA	33
	Active power	W	2.35
	Apparent power	VA	2.9
	cos φ		0.813
- 8 to 32 A	Holding current	mA	37
	Active power	W	2.6
	Apparent power	VA	3.0
	cos φ		0.81

Order number	3RA61		
	3RA62		
Holding current and holding power valid for working range 110 V to 240 V			
110 V, AC operation			
- Up to 12 A	Holding current	mA	38
	Active power	W	2.8
	Apparent power	VA	4.2
	cos φ		0.67
- 8 to 32 A	Holding current	mA	42.5
	Active power	W	3.2
	Apparent power	VA	4.7
	cos φ		0.68
110 V, DC operation			
- Up to 12 A	Holding current	mA	22.5
	Active power	W	2.5
	Apparent power	VA	3.75
	cos φ		0.67
- 8 to 32 A	Holding current	mA	25.5
	Active power	W	2.9
	Apparent power	VA	4.65
	cos φ		0.62
240 V, AC operation			
- Up to 12 A	Holding current	mA	36
	Active power	W	3.6
	Apparent power	VA	8.8
	cos φ		0.41
- 8 to 32 A	Holding current	mA	39
	Active power	W	3.9
	Apparent power	VA	9.3
	cos φ		0.42
240 V, DC operation			
- Up to 12 A	Holding current	mA	12.5
	Active power	W	3.0
	Apparent power	VA	6.35
	cos φ		0.47
- 8 to 32 A	Holding current	mA	14
	Active power	W	3.35
	Apparent power	VA	6.55
	cos φ		0.51
Max. holding current at 24 VDC			
- Up to 12 A		mA	100
- 8 to 32 A		mA	150
Rated operating short-circuit breaking capacity Ics			
- At 400 V		kA	53
- At 690 V		kA	3
Conductor protection			
- At Ir = 10 kA		mm²	2.5
- At Ir = 50 kA		mm²	4

Main circuit

Order number			3RA61 3RA62
Switching frequency	At AC-41	1/h	750
	At AC-43	1/h	250
Making capacity			12 x I _r
Breaking capacity			10 x I _r
Service life			
- Mechanical endurance	Switching cycles		10 million
- Electrical endurance	Switching cycles		1.52 million (I _e = 0.9 I _r)

Auxiliary circuit

Order number				3RA61 3RA62 3RA691.-.A
Rated operating voltage				
External auxiliary switch block			V	400/690
Internal auxiliary switch			V	400/690
Short circuit signaling switch			V	400
Overload signaling switch			V	400
Switching capacity				
External auxiliary switch block	At AC-15	At U _e = 230 V	A	6
		At U _e = 400 V	A	3
		At U _e = 289/500 V	A	2
		At U _e = 400/690 V	A	1
	At DC-13	At U _e = 24 V	A	6
		At U _e = 60 V	A	0.9
		At U _e = 125 V	A	0.55
		At U _e = 250 V	A	0.27
Internal auxiliary switch	At AC-15	At U _e = 230 V	A	6
		At U _e = 400 V	A	3
		At U _e = 289/500 V	A	2
		At U _e = 400/690 V	A	1
	At DC-13	At U _e = 24 V	A	10
		At U _e = 60 V	A	2
		At U _e = 125 V	A	1
		At U _e = 250 V	A	0.27
Signaling switch	At AC-15	At U _e = 230 V	A	3
		At U _e = 400 V	A	1
	At DC-13	At U _e = 24 V	A	2
		At U _e = 250 V	A	0.11

Order number			3RA61
			3RA62
			3RA691.-.A
Service life			
External auxiliary switch block, internal auxiliary switch			
- Mechanical endurance		Switching cycles	10 million
- Electrical endurance			
AC-15, 230 V	At 6 A	Switching cycles	200,000
	At 3 A	Switching cycles	500,000
	At 1 A	Switching cycles	2,000,000
	At 0.3 A	Switching cycles	10,000,000
DC-13, 24 V	At 6 A	Switching cycles	30,000
	At 3 A	Switching cycles	100,000
	At 0.5 A	Switching cycles	2,000,000
	At 0.2 A	Switching cycles	10,000,000
DC-13, 110 V	At 1 A	Switching cycles	40,000
	At 0.55	Switching cycles	100,000
	At 0.3 A	Switching cycles	300,000
	At 0.1 A	Switching cycles	2,000,000
	At 0.04 A	Switching cycles	10,000,000
DC-13, 220 V	At 0.3 A	Switching cycles	110,000
	At 0.1 A	Switching cycles	650,000
	At 0.05 A	Switching cycles	2,000,000
	At 0.018 A	Switching cycles	10,000,000
Short circuit and overload signaling switches			
- Mechanical endurance		Switching cycles	20,000
- Electrical endurance AC15		Switching cycles	6,050 (230 V; 3 A)
Contact reliability	At 17 V, 5 mA	Switching cycles	1 faulty switching operation per 100 million
Short-circuit protection			
External auxiliary switch block			
Fuse links gL/gG NEOZED 5SE, DIAZED 5SB, NH 3NA (I _k ≤ 1.1 kA)		A	10
Miniature circuit breakers up to 230 V with C characteristic Short-circuit current I _k < 400 A		A	10
Internal auxiliary switch			
Fuse links gL/gG NEOZED 5SE, DIAZED 5SB, NH 3NA (I _k ≤ 1.1 kA)		A	10
Miniature circuit breakers up to 230 V with C characteristic Short-circuit current I _k < 400 A		A	10

14.1 SIRIUS 3RA6 compact starter

Order number		3RA61 3RA62 3RA691.-.A
Short-circuit protection		
Short circuit signaling switch		
Fuse links gL/gG NEOZED 5SE, DIAZED 5SB, NH 3NA ($I_k \leq 1.1 \text{ kA}$)	A	6
Miniature circuit breakers up to 230 V with C characteristic Short-circuit current $I_k < 400 \text{ A}$	A	6
Overload signaling switch		
Fuse links gL/gG NEOZED 5SE, DIAZED 5SB, NH 3NA ($I_k \leq 1.1 \text{ kA}$)	A	4

Conductor cross-sections of main conductor terminals

Order number		3RA6920-1A		3RA6920-2A	
Type of connection		Screw connection		Spring-loaded connection	
Rated current I _{max}		... 12 A	8 ... 32 A	... 12 A	8 ... 32 A
Tool		Pozidriv, size 2	Pozidriv, size 2	8WA2 803 (3.5 x 0.5) mm	8WA2 803 (3.5 x 0.5) mm
Specified tightening torque		Nm	2 ... 2.5	2 ... 2.5	-
Conductor cross-sections					
Solid	mm ²	2 x (1.5 ... 2.5)	2 x (2.5 ... 6)	2 x (1.5 ... 6)	2 x (2.5 ... 6)
	mm ²	2 x (2.5 ... 6)	max. 1 x 10	max. 1 x 10	max. 1 x 10
	mm ²	max. 1 x 10			
Finely stranded without end sleeve	mm ²	-	-	2 x (1.5 ... 6)	2 x (2.5 ... 6)
Finely stranded with end sleeve	mm ²	2 x (1.5 ... 2.5)	2 x (2.5 ... 6)	2 x (1.5 ... 6)	2 x (2.5 ... 6)
	mm ²	2 x (2.5 ... 6)			
AWG cables	AWG	2 x (16 to 14)	2 x (14 to 10)	2 x (16 to 10)	2 x (14 to 10)
	AWG	2 x (14 to 10)	1 x 8	1 x 8	1 x 8
	AWG	1 x 8			

Conductor cross-sections of auxiliary conductor terminals

Order number	3RA61		3RA62
Type of connection	Screw connection		
Tool	Pozidriv, size 2		(0.5 x 3.0) mm DIN ISO 2380-1A
Specified tightening torque	Nm	0.8 ... 1.2	-
Conductor cross-sections			
Solid	mm²	1 x (0.5 ... 4)	2 x (0.25 ... 1.5)
	mm²	2 x (0.5 ... 2.5)	
Finely stranded without end sleeve	mm²	-	2 x (0.25 ... 1.5)
Finely stranded with end sleeve	mm²	1 x (0.5 ... 2.5)	2 x (0.25 ... 1.5)
	mm²	2 x (0.5 ... 1.5)	
AWG cables	AWG	2 x (20 to 14)	2 x (24 to 16)

Conductor cross-sections of external auxiliary switch block for compact starter

Order number		3RA691.-1A	3RA691.-1A
Type of connection		Screw connection	Spring-loaded connection
Tool		Pozidriv, size 2	8WA2 807 (2.5 x 0.4) mm
Specified tightening torque		Nm 0.8 ... 1.2	-
Conductor cross-sections			
Solid	mm ²	2 x (0.5 ... 1.5)	2 x (0.25 ... 2.5)
	mm ²	2 x (0.75 ... 2.5)	
	mm ²	max. 2 x (1 ... 4)	
Finely stranded without end sleeve	mm ²	-	2 x (0.25 ... 2.5)
Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5)	2 x (0.25 ... 1.5)
	mm ²	2 x (0.75 ... 2.5)	
AWG cables	AWG	2 x (20 to 16)	2 x (24 to 14)
	AWG	2 x (18 to 14)	

14.2 AS-i mounting module

General technical data

Order number	3RA6970-3A 3RA6970-3B		
Permissible ambient temperature			
Storage/shipping	According to IEC / EN 60721-3-1 (storage), IEC / EN 60721-3-2 (shipping)	°C	-25 to +70
Degree of protection	According to IEC / EN 60947-1	IP20	
EMC interference immunity	According to EN 50295		
Conducted interference	BURST according to IEC / EN 61000-4-4	kV	½
Electrostatic discharge	According to IEC / EN 61000-4-2	kV	6/8
Field-based interference suppression	According to IEC / EN 61000-4-3	V/m	10 (80 MHz ... 2.7 GHz)

Conductor cross-sections of AS-i mounting module 3RA6970-3B

Order number		3RA6970-3B
Type of connection		Screw connection
Tool		Pozidriv, size 1
Specified tightening torque	Nm	0.5 ... 0.6 Nm
Conductor cross-sections		
Solid	mm²	1 x (0.5 ... 2.5)
	mm²	2 x (0.5 ... 1.0)
Finely stranded with end sleeve	mm²	1 x (0.5 ... 2.5)
	mm²	2 x (0.5 ... 1.0)
AWG cables	AWG	1 x (20 to 12)

14.3 SIRIUS infeed system for 3RA6

General data

Order number		3RA68.	
Frequency		50/60 Hz	
Permissible ambient temperature			
Storage / transport		°C	-55 ... +80
operation		°C	-20 ... +60 ¹⁾
Permissible rated current of compact starter at the following internal control cabinet temperatures:			
+ 40 °C		%	100
+ 60 °C		%	80
Max. rated current I _{r max}	Order number		
Left infeed, 50/70 mm ² screw terminal with three slots, outgoing terminals with screw-type and spring-loaded connection technology, incl. PE bar	3RA6813-8AB	A	100
	3RA6813-8AC		
Left infeed, 25/35 mm ² screw terminal with three slots, outgoing terminals with screw-type and spring-loaded connection technology, incl. PE bar	3RA6812-8AB	A	63
	3RA6812-8AC		
Left or right infeed, 25/35 mm ² , with spring-loaded connection technology	3RA6830-5AC	A	63
Extension connector	3RA6890-1AB	A	63
Installation altitude		m	2000 m above sea level without any restrictions
Vibratory load		f = 1 to 6 Hz; d = 15 mm 10 cycles f = 150 Hz; a = 2g	
Shock		a = 60 m/s ² (6g) with 10 ms every 3 All axes subjected to shock	
Degree of protection		According to IEC / EN 60947-1	IP20 (connection compartment IP 00)
Touch protection		According to DIN EN 50274	Finger-safe
Rated operating voltage U _e		V	690 AC
Degree of pollution		3	
Short-circuit protection for spring-loaded infeed			
4 mm ²	I _{d,max} < 9.5 kA, I ² t = 85 kA ² s	3RV1021-4DA10 ²⁾	
6 mm ²	I _{d,max} < 12.5 kA, I ² t = 140 kA ² s	3RV1031-4EA10 ²⁾	
10 mm ²	I _{d,max} < 15 kA, I ² t = 180 kA ² s	3RV1031-4HA10 ²⁾	
16 mm ² /25 mm ²	I _{d,max} < 19 kA, I ² t = 440 kA ² s	3RV1041-4JA10 ²⁾	

Order number	3RA68.
Short-circuit protection for screw-type infeed (25/35 mm ²) and screw-type infeed (50/70 mm ²)	3RV1041-3MA10 NH gL/gG 3NA3, 315 A
Short-circuit protection for terminal block	
1.5 mm ²	$I_{d,max} < 7.5 \text{ kA}^{3)}$
2.5 mm ²	$I_{d,max} < 9.5 \text{ kA}^{3)}$
4 mm ²	$I_{d,max} < 9.5 \text{ kA}^{3)}$
6 mm ²	$I_{d,max} < 12.5 \text{ kA}^{3)}$

1) At over 40 °C compact starter current reduction is necessary

2) Recommendation regarding upstream short-circuit protection device

3) Recommendation regarding downstream short-circuit protection device

Conductor cross-sections of screw-type infeed (25/35 mm²) (L1, L2, L3) and PE infeed, 25/35 mm², with screw-type connection technology

Order number	3RA6812-8AB, 3RA6812-8AC, 3RA6860-6AB			
				
Type of connection	Screw connection			
Tool	Pozidriv, size 2			
Specified tightening torque	Nm	3 ... 4,5		
Conductor cross-sections				
Solid, stranded	mm ²	2,5 ... 35	2,5 ... 35	Max. (2 x 25)
Finely stranded without end sleeve	mm ²	2,5 ... 25	2,5 ... 25	Max. (2 x 16)
Finely stranded with end sleeve	mm ²	2,5 ... 25	2,5 ... 25	Max. (2 x 16)
AWG cables	AWG	12 to 2	12 to 2	Max. 2 x (16 to 2)

Conductor cross-sections of screw-type infeed (50/70 mm²) (L1, L2, L3)

Order number	3RA6813-8AB, 3RA6813-8AC			
				
Type of connection	Screw connection			
Tool	SW4 Allen key			
Specified tightening torque	Nm	6 ... 8		
Conductor cross-sections				
Solid, stranded	mm ²	2,5 ... 70	2,5 ... 70	Max. (2 x 50)
Finely stranded without end sleeve	mm ²	4 ... 50	10 ... 50	Max. (2 x 35)
Finely stranded with end sleeve	mm ²	2,5 ... 35	2,5 ... 50	Max. (2 x 35)
AWG cables	AWG	10 to 2/0	10 to 2/0	Max. 2 x (10 to 1/0)

Conductor cross-sections of spring-loaded infeed (L1, L2, L3) and PE infeed, 25/35 mm², with spring-loaded connection technology

Order number	3RA6830-5AC, 3RA6860-5AC		
Type of connection	Spring-loaded connection		
Tool	8WA2 806 (5.5 x 0.8 mm)		
Conductor cross-sections			
Solid, stranded	mm²	4 ...	35
Finely stranded without end sleeve	mm²	6 ...	25
Finely stranded with end sleeve	mm²	4 ...	25
AWG cables	AWG	10 to	3

Conductor cross-sections of screw-type infeed (25/35 mm²) (T1, T2, T3), screw-type infeed (50/70 mm²) (T1, T2, T3), of 2-slot and 3-slot extension modules (T1, T2, T3) and of PE tap, 6/10 mm², with screw-type connection technology

Order number	3RA6812-8AB, 3RA6813-8AB, 3RA6812-8AC, 3RA6813-8AC 3RA6822-0A., 3RA6823-0A, 3RA6870-4AB				
Type of connection	Screw connection		Spring-loaded connection		
Max. rated current	A	... 12	8 ... 32	... 12	8 ... 32
Tool		Pozidriv, size 2	Pozidriv, size 2	8WA2 803 (3.5 x 0.5) mm	8WA2 803 (3.5 x 0.5) mm
Specified tightening torque	Nm	2 ... 2,5	2 ... 2,5	-	-
Conductor cross-sections					
Solid	mm ²	2 x (1.5 to 2.5)	2 x (2.5 ... 6)	2 x (1.5 ... 6)	2 x (2.5 ... 6)
	mm ²	2 x (2.5 to 6)	max. 1 x 10	max. 1 x 10	max. 1 x 10
	mm ²	max. 1 x 10			
Finely stranded without end sleeve	mm ²	-	-	2 x (1.5 ... 6)	2 x (2.5 ... 6)
Finely stranded with end sleeve	mm ²	2 x (1.5 ... 2.5)	2 x (2.5 ... 6)	2 x (1.5 ... 6)	2 x (2.5 ... 6)
	mm ²	2 x (2.5 ... 6)			
AWG cables	AWG	2 x (16 to 14)	2 x (14 to 10)	2 x (16 to 10)	2 x (14 to 10)
	AWG	2 x (14 to 10)	1 x 8	1 x 8	1 x 8
	AWG	1 x 8			

Conductor cross-sections of PE tap, 6/10 mm², with spring-loaded connection technology

Order number	3RA6870-3AC	
Type of connection	Spring-loaded connection	
Tool	8WA2 803 (3.5 x 0.5) mm	
Conductor cross-sections		
Solid	mm²	1,5 ... 10
Finely stranded without end sleeve	mm²	1,5 ... 6
Finely stranded with end sleeve	mm²	1,5 ... 6
AWG cables	AWG	16 to 10
	AWG	1 x 8

Terminal block

Order number	3RV1917-5D		
Type of connection	Spring-loaded connection		
Tool	8WA2 803 8WA2 804 (3.5 x 0.5) mm		
Conductor cross-sections			
Solid	mm ²	1,5 ... 6	
Finely stranded without end sleeve	mm ²	1,5 ... 6	
Finely stranded with end sleeve	mm ²	1,5 ... 4	
AWG cables	AWG	15 to 10	

Dimension drawings

15.1 SIRIUS 3RA6 compact starter

15.1.1 Dimensions (in mm)

3RA6 compact starter (screw-type connection technology)

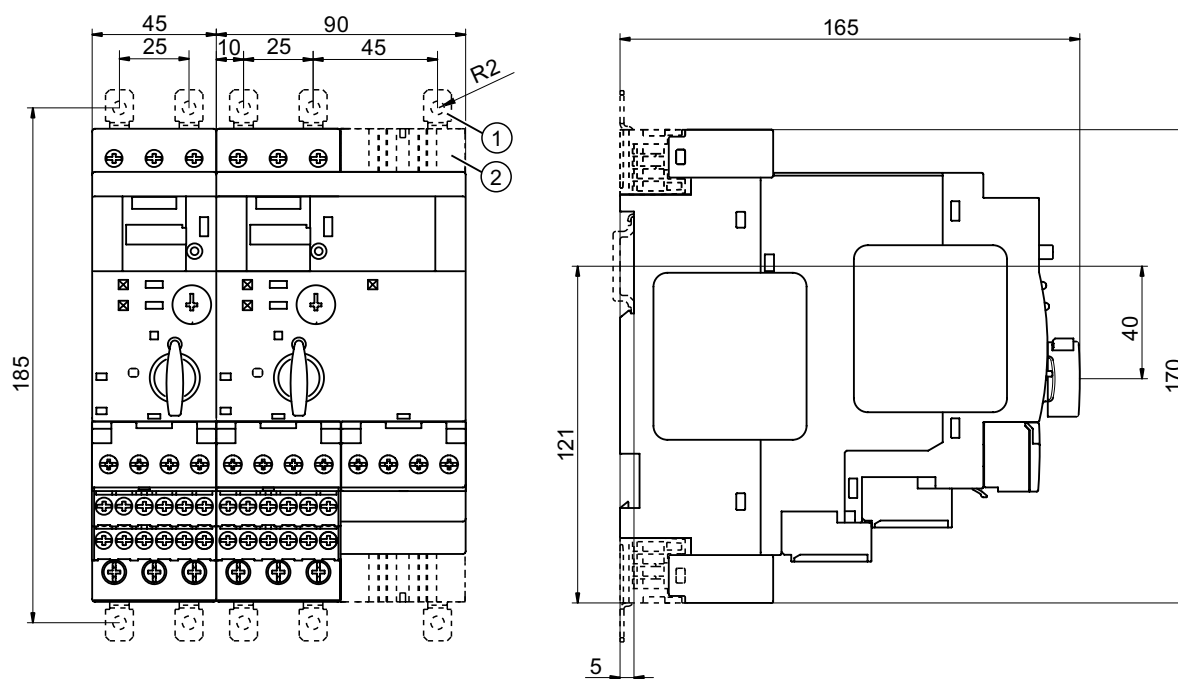


Figure 15-1 Side view of the 3RA6 compact starter (screw-type connection technology)

- (1) Push-in lug for screw fastening
- (2) Adapter for screw fastening

3RA6 compact starter (spring-loaded connection technology)

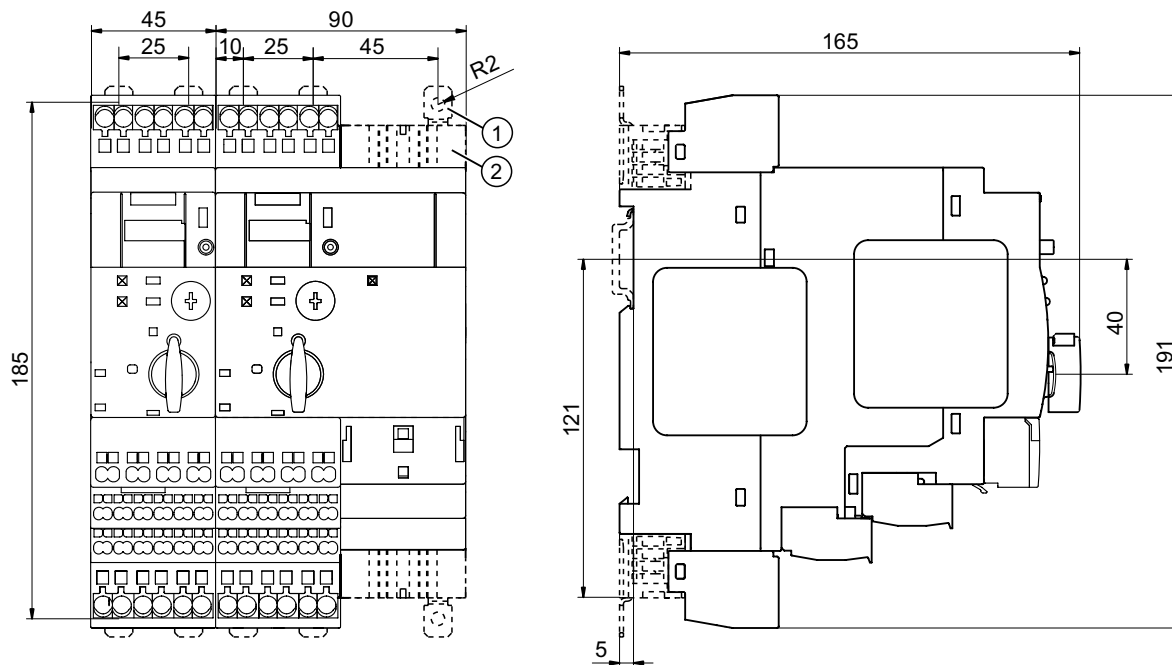


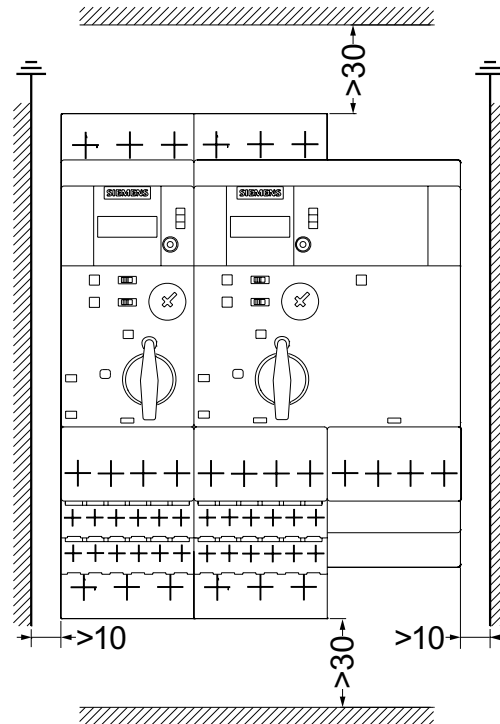
Figure 15-2 Side view of the 3RA6 compact starter (spring-loaded connection technology)

- (1) Push-in lug for screw fastening
- (2) Adapter for screw fastening

15.1.2 Minimum distances from neighboring components (dimensions in mm)

Distance from neighboring components

When installing compact starters, the following distances from grounded or live parts and from neighboring components must be observed in accordance with IEC / EN 60947-6-2.



Note

The lateral distances are minimum distances from grounded components.

The distances at the top and bottom are required in order to provide an arcing space!

15.2 SIRIUS infeed system for 3RA6

15.2.1 Dimensions (in mm)

3RA6813-8AB

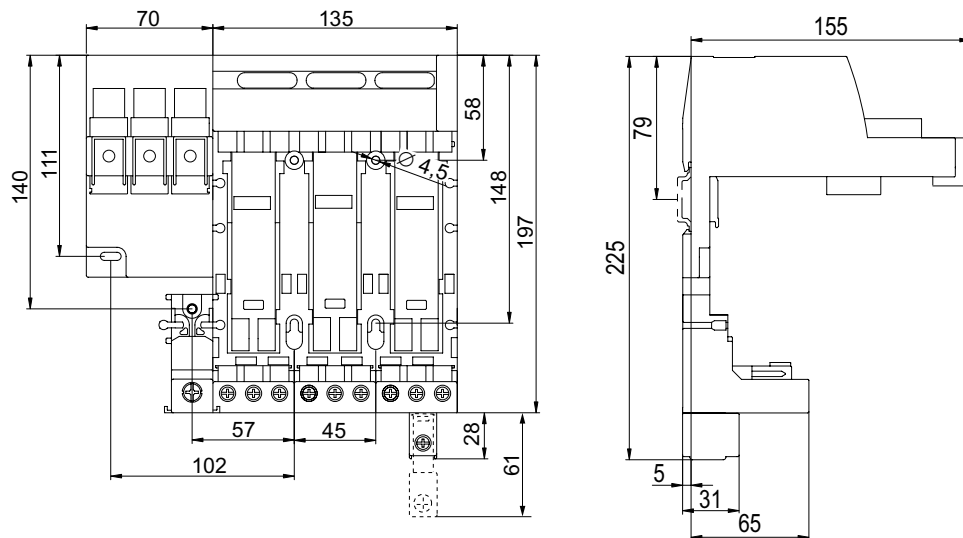


Figure 15-3 Dimension drawing of screw-type infeed (50/70 mm²) featuring outgoing terminals with screw-type connection technology

3RA6812-8AB

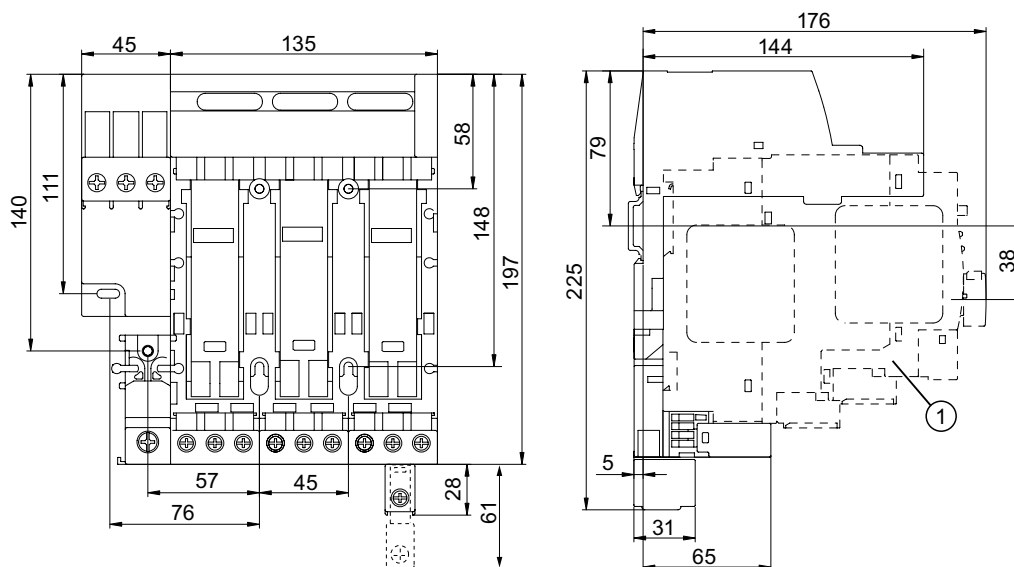


Figure 15-4 Dimension drawing of screw-type infeed (25/35 mm²) featuring outgoing terminals with screw-type connection technology

(1) 3RA6 compact starter

3RA6813-8AC

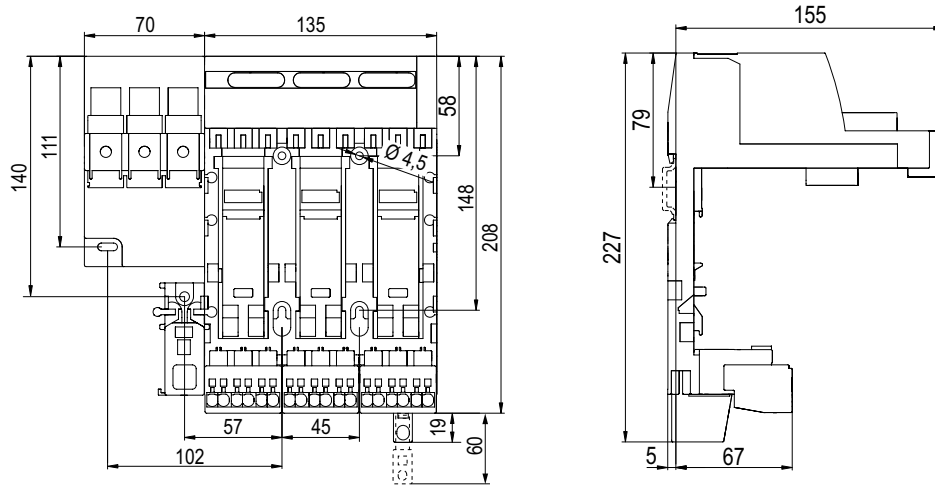


Figure 15-5 Dimension drawing of screw-type infeed (50/70 mm²) featuring outgoing terminals with spring-loaded connection technology

3RA6812-8AC

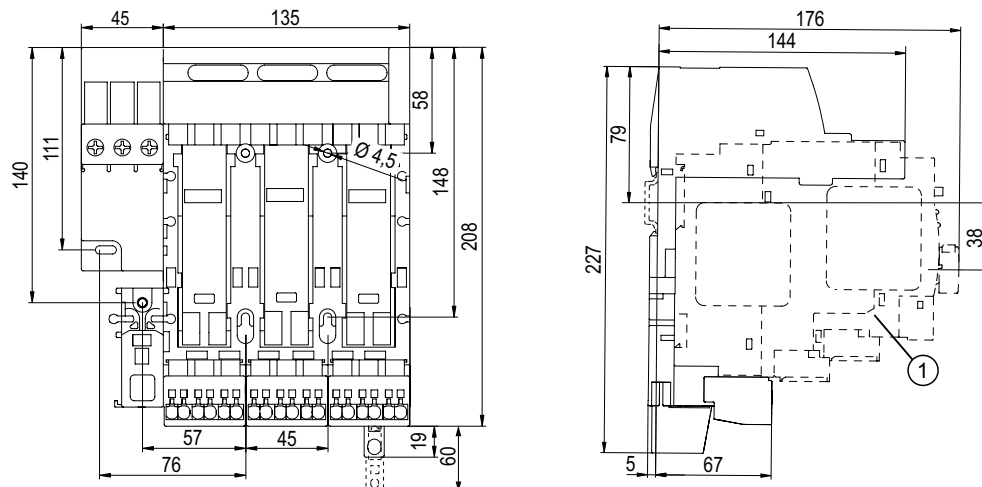


Figure 15-6 Dimension drawing of screw-type infeed (25/35 mm²) featuring outgoing terminals with spring-loaded connection technology

(1) 3RA6 compact starter

3RA6830-5AC

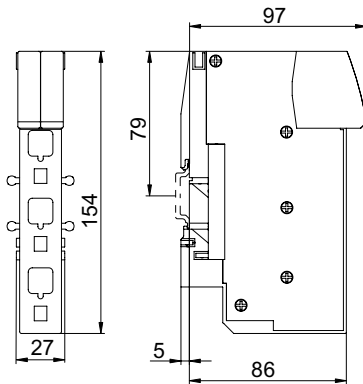


Figure 15-7 Dimension drawing of spring-loaded infeed

3RA6823-0AC, 3RA6822-0AC

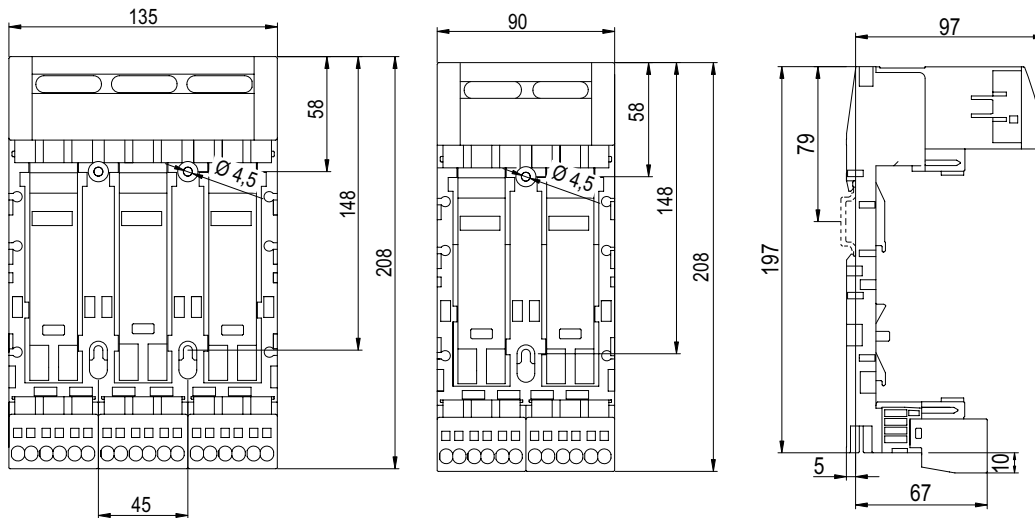


Figure 15-8 Dimension drawing of extension blocks featuring outgoing terminals with spring-loaded connection technology

3RA6823-0AB, 3RA6822-0AB

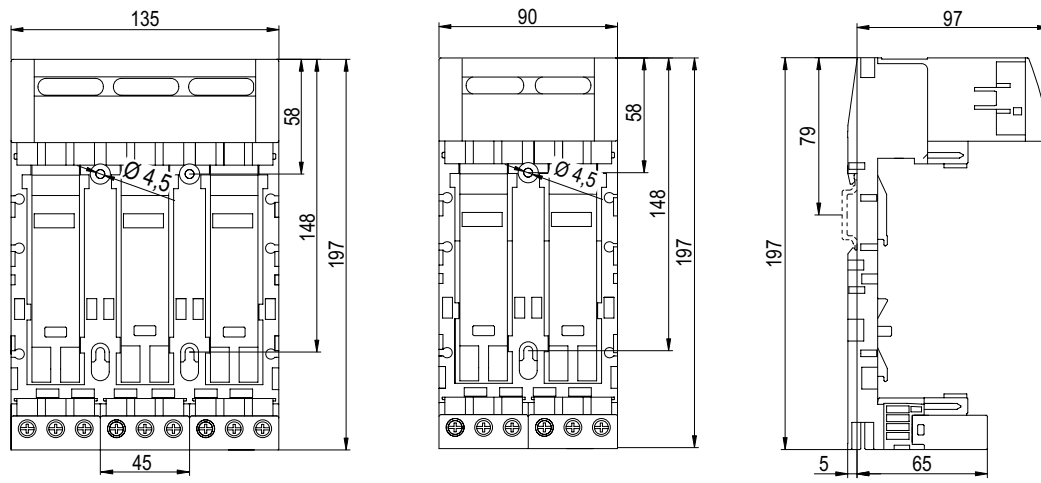


Figure 15-9 Dimension drawing of extension blocks featuring outgoing terminals with screw-type connection technology

15.2.2 Minimum distances from neighboring components (dimensions in mm)

Distance from neighboring components

When installing the infeed system for 3RA6, the following distances from neighboring parts must be observed.

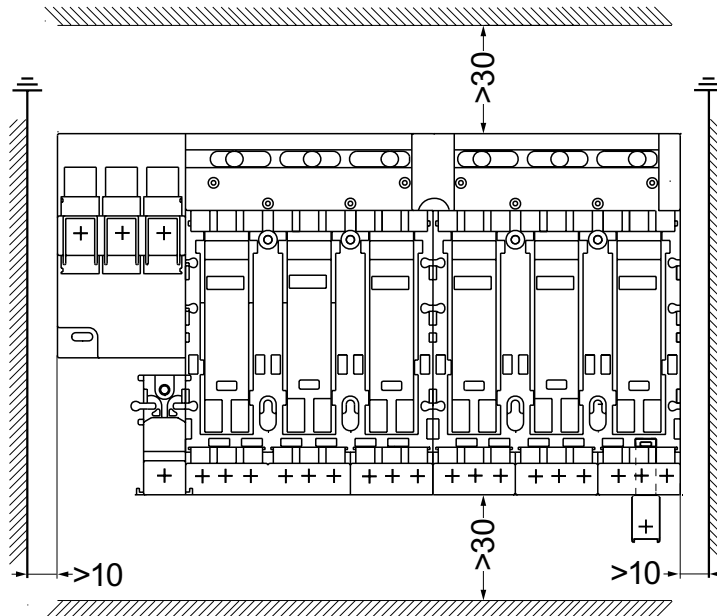


Figure 15-10 Distances from neighboring components (infeed system for 3RA6)

Note

The lateral distances are minimum distances from grounded components.

The distances at the top and bottom are required in order to provide an arcing space!

Circuit diagrams

16.1 Main circuit of 3RA6 compact starter

3RA61 compact starter direct starter

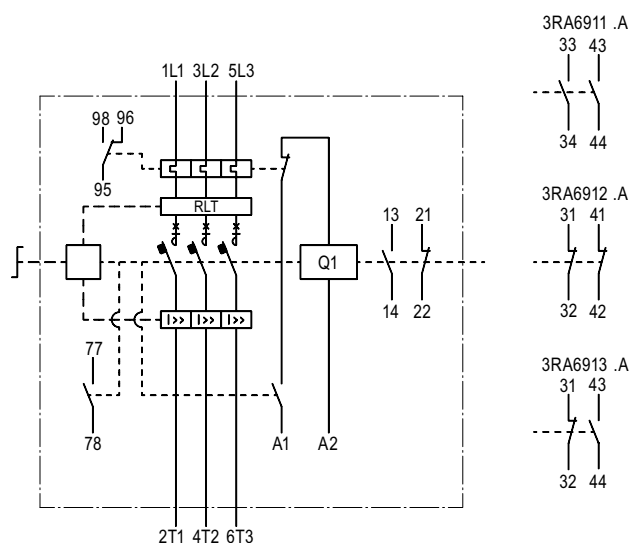


Figure 16-1 Main circuit of 3RA61 compact starter direct starter

3RA62 compact starter reversing starter

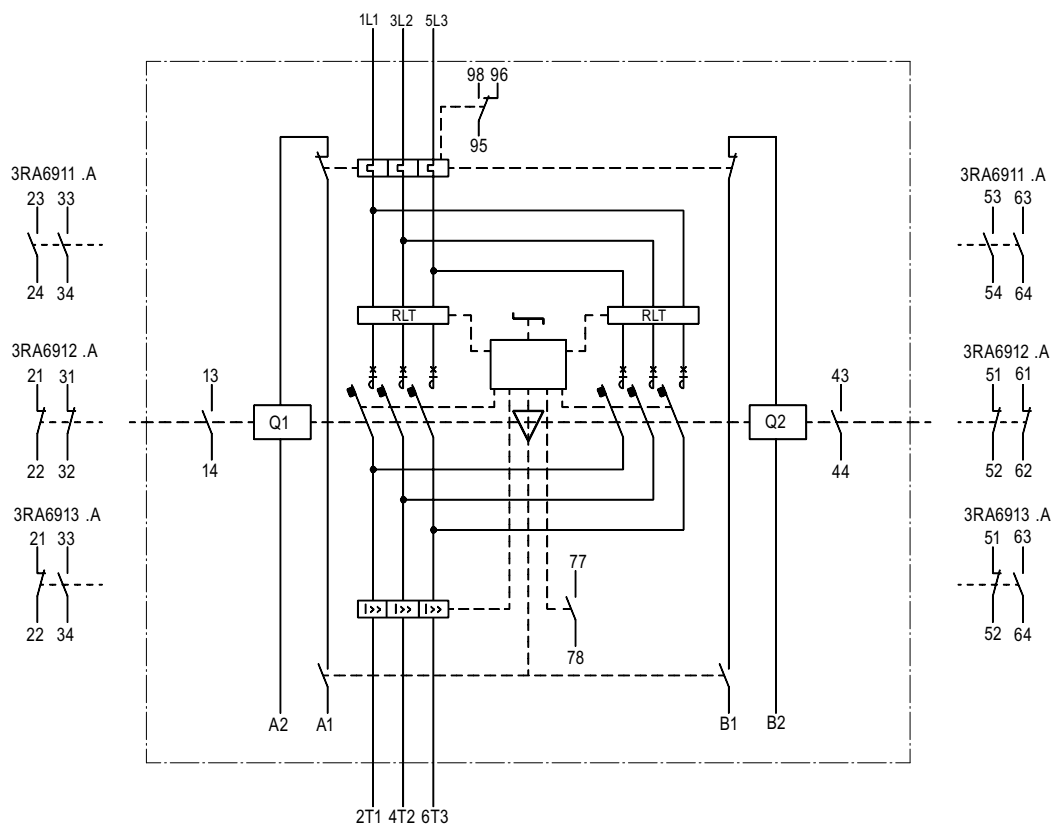


Figure 16-2 Main circuit of 3RA62 compact starter reversing starter

16.2 Control circuit for 3RA6 compact starter

3RA61 compact starter direct starter

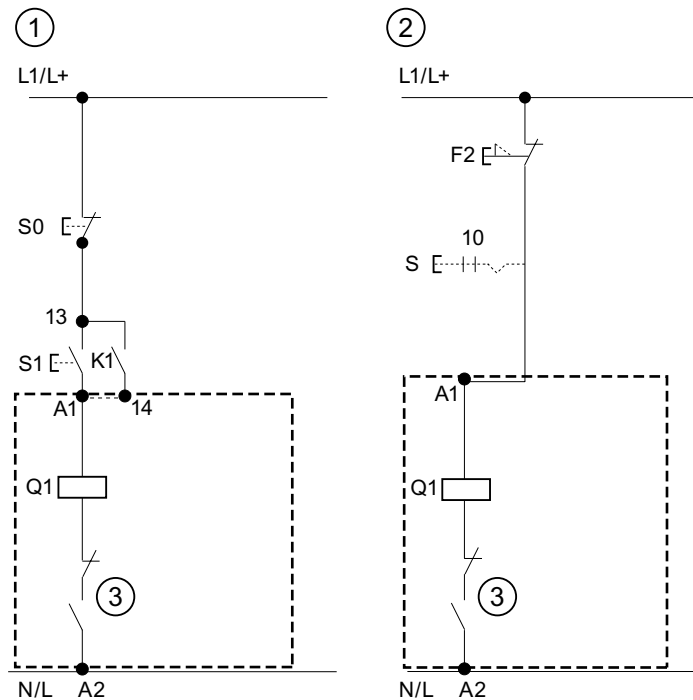


Figure 16-3 Control circuit of 3RA61 compact starter direct starter

- (1) Pushbutton switch control
- (2) Maintained-contact operation
- (3) Overload release, breaker latching mechanism

3RA62 compact starter reversing starter

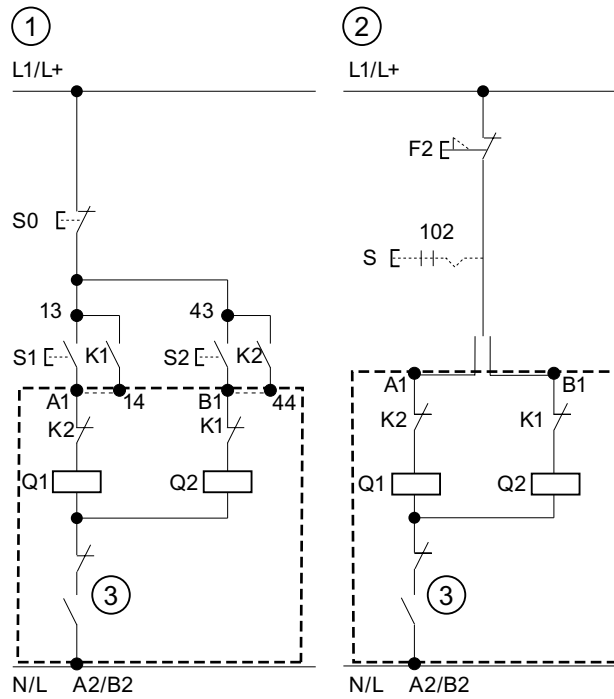


Figure 16-4 Control circuit of 3RA62 compact starter reversing starter

- (1) Pushbutton switch control
- (2) Maintained-contact operation
- (3) Overload release, breaker latching mechanism

Appendix

A.1 References

For additional information on the compact starter, please visit:

- www.siemens.de/kompaktabzweig (German)
- www.siemens.com/compactstarter (English)

Further references

In addition to this manual, please refer to the operating instructions and manuals for any accessories. You can download the relevant documentation from the Internet (www.siemens.de/automation/csi/manual). Simply enter the order number of the relevant item into the search field.

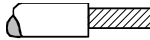
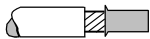
Operating instructions

Title	Order number
SIRIUS infeed system for 3RA6	3ZX1012-0RA68-1AA1
SIRIUS 3RV infeed system	3ZX1012-0RV10-2BA1
AS-i mounting module	3ZX1012-0RA60-3AA1
Addressing and Diagnosis Instrument for AS-i Modules	3RK1703-2WB02-1CA1
Busbar adapter	8ZX1012-0US12-1NA1
Door-coupling rotary operating mechanism	3ZX1012-0RV10-6AA1

Manuals

Title	Order number
AS-Interface system	3RK2703-3AB02-1AA1

A.2 List of abbreviations

Abbreviation/Symbol	Term
	Conductor, solid and stranded
	Conductor, finely stranded without end sleeve
	Conductor, finely stranded with end sleeve
	LED not illuminated
	LED illuminated green
	No mechanical display
	Mechanical display is white
Screw-type infeed (50/70 mm ²)	Left infeed, 50/70 mm ² screw terminal with three slots, outgoing terminals with screw-type or spring-loaded connection technology, incl. PE bar
Screw-type infeed (25/35 mm ²)	Left infeed, 25/35 mm ² screw terminal with three slots, outgoing terminals with screw-type or spring-loaded connection technology, incl. PE bar
Spring-loaded infeed	Left or right infeed, 25/35 mm ² , with spring-loaded connection technology
2-slot extension module	Extension module with two slots, outgoing terminals with screw-type or spring-loaded connection technology, incl. PE bar
3-slot extension module	Extension module with three slots, outgoing terminals with screw-type or spring-loaded connection technology, incl. PE bar
PZ	Pozidriv
SW	Width across flats

Glossary

3-phase busbar

The 3-phase busbar enables several compact starters to be fed using a single infeed terminal.

8US busbar adapter

The 8US busbar adapter enables the compact starter to be mechanically fastened and electrically connected to a busbar system.

Adapter for screw fastening

The adapters for screw fastening enable you to install the compact starter on a level surface.

AS-Interface

The actuator sensor interface (AS-Interface) is a modular networking system for sensors and actuators at the lowest field level.

Auxiliary switch block for compact starter

Optional auxiliary switch block in the following versions: 2 NO contacts, 2 NC contacts or 1 NO contact + 1 NC contact

Control kit

Tool for closing the main contacts manually by means of the actuator

Door-coupling rotary operating mechanism

Door-coupling rotary operating mechanisms enable compact starters to be operated with the control cabinet doors closed.

Infeed system for 3RA6

The infeed system for 3RA6 enables several compact starters to be fed using a modular infeed system with permanent wiring.

Motor model

The electronics calculate the motor temperature continuously in accordance with the operating time and current load and store this information in a thermal motor model.

Process image

The process image is used for buffering input and output data. When the control system starts cyclic program execution, the signal states of the compact starter are transferred to the process input image of the higher-level control system. At the end of the cyclic program, the process output image is transferred to the compact starter as the signal state.

Terminals for Type E combination controller

The terminals conform to the creepages and clearances stipulated by UL 508 (Type E).

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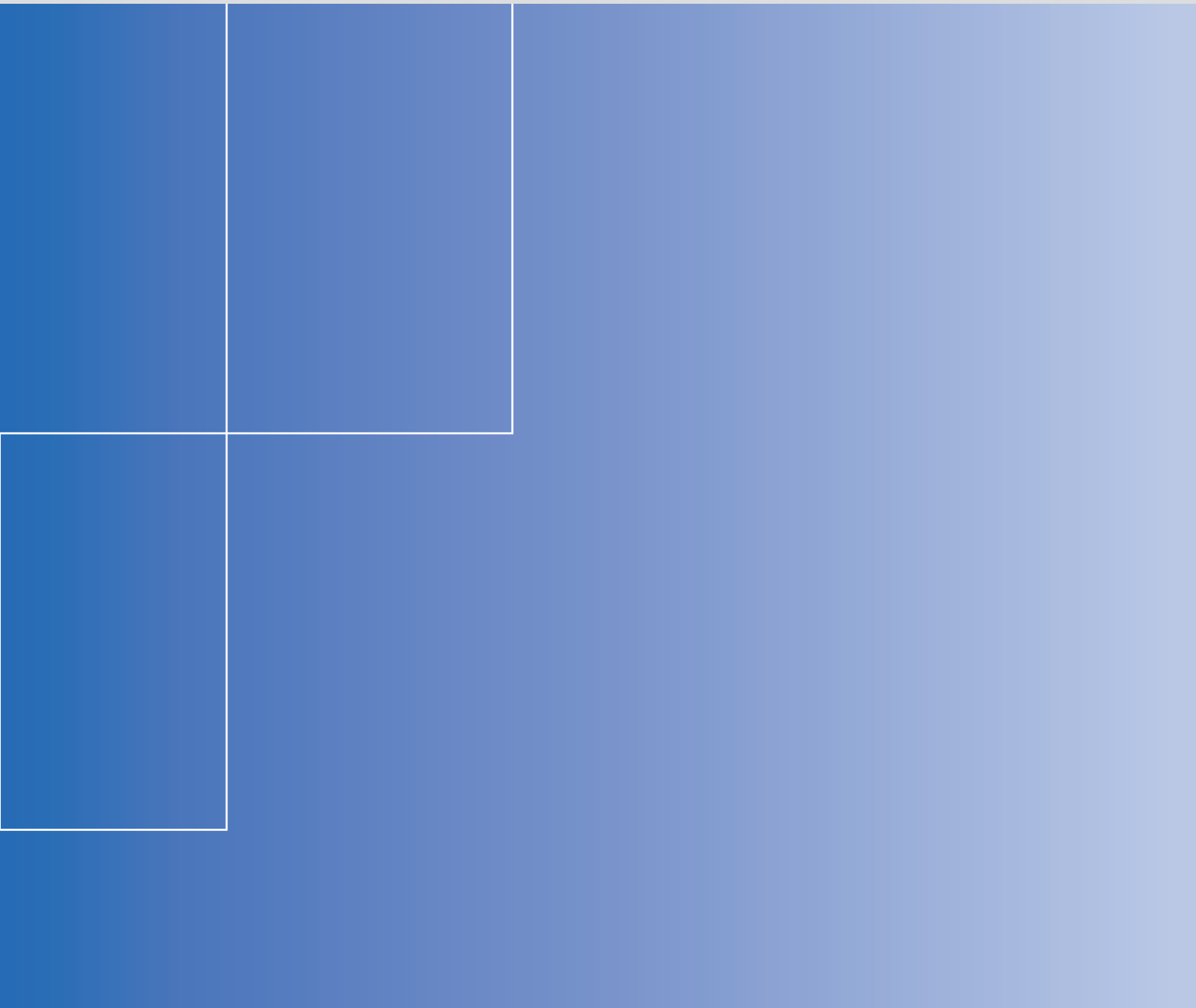
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