SIEMENS

Industrial Controls

Protection Devices

SIRIUS Innovations - Thermal Overload Relays SIRIUS 3RU2 / Solid-State Overload Relays SIRIUS 3RB3

Manual

Edition 09/2014

Answers for industry.

SIEMENS

Industrial Controls

Protection devices SIRIUS Innovations - SIRIUS 3RU2 thermal overload relays / SIRIUS 3RB3 solid-state overload relays

Manual

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Legal information

Warning notice system

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

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

Qualified Personnel

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

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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.

Siemens AG
Industry Sector
Postfach 48 48
90026 NÜRNBERG
GERMANY

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Table of contents

Introduction 1

1.1 Responsibility of the user for system configuration and functionality

3RU21 thermal overload relays have been designed to provide current-dependent protection for loads with normal starting against impermissibly high temperature rises due to overload, phase asymmetry or phase failure.

3RB30 / 3RB31 solid-state overload relays with internal power supply have been designed to provide current-dependent protection for loads with normal starting and heavy starting against impermissibly high temperature rises due to overload, phase asymmetry or phase failure.

Siemens AG, its regional offices, and associated companies (hereinafter referred to as "Siemens") cannot guarantee all the properties of an overall installation or machine that has not been designed by Siemens.

Nor can Siemens assume liability for recommendations that appear or are implied in the following description. No new guarantee, warranty, or liability claims beyond the scope of the Siemens general terms of supply are to be derived or inferred from the following description.

Purpose of the manual

This manual describes the 3RU2/3RB3 overload relays and provides the following information:

- Information for integrating the overload relays into the system environment.
- Information on necessary hardware components.
- Information on installing, connecting and operating the overload relays.
- Technical information such as dimension drawings and unit wiring diagrams.

The information in this manual enables you to configure and commission the overload relays.

Advantages through energy efficiency

Siemens offers you a unique portfolio for efficient energy management in industry – a process that serves to optimally shape your energy requirement. Operational energy management is subdivided into three phases:

- Identifying
- Evaluating
- Realizing

Siemens supports you with suitable hardware and software solutions in every phase of a project.

More information can be found on the Internet (http://www.automation.siemens.com/mcms/industrial-controls/en/energy-efficiency).

The 3RB30/3RB31 electronic overload relays make the following contribution to energy efficiency in an overall installation:

- Reduced intrinsic power loss
- Reduced control cabinet heat development
- Smaller control cabinet air conditioning units required

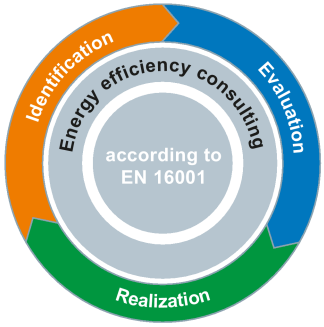


Figure 1-1 Overview of the energy management process

Required basic knowledge

To understand these operating instructions you should have a general knowledge of automation engineering and low-voltage switchgear.

Scope of the manual

The manual is valid for these overload relays. It contains a description of the devices that is valid at the time of publication.

1.2 Service&Support

Online Support

The Online Support in the Service&Support portal is an extensive information system for all questions relating to Siemens products and solutions. This service enables direct and central access to in-depth information concerning the products, systems and applications for industry and to a large number of programming, configuration and application examples. Its content is available via a mobile app.

The Technical Forum of the Online Support provides the opportunity for users to swap information. Support Request allows contact to be established with Siemens experts in Technical Support.

Siemens Industry Online Support ensures that users in industry are always kept up-to-date with news, software updates and announcements by means of newsletters and Twitter.

Links: Service&Support Portal (http://support.automation.siemens.com), Online Support (http://support.automation.siemens.com/WW/view/en/16605022)

Product Support

Are you looking for product information such as technical data, updates or FAQs? Here, the "Product Support" section of the Service & Support Portal offers an extensive collection of all information about the Siemens Industry Automation and Drive Technologies products and solutions:

- Answers to frequently asked questions (FAQs)
- Updates/upgrades, service packs and support tools for downloading
- Manuals and operating instructions
- Technical data/CAx data
- Approvals and certificates
- Test certificates and characteristic curves

All Product Support information is at your disposal free of charge and around the clock, and you always get the current version.

Link: Product Support (http://support.automation.siemens.com/WW/view/en/4000024)

CAx data

The CAx Download Manager provides you with a simple means of gaining access to up-to-date product data for your CAx or CAe system.

You configure your own download package with just a few clicks. You can choose from the following information for products

- Product images
- 2D dimensional drawings
- 3D models
- Internal circuit diagrams
- EPLAN macro files
- Manuals
- Characteristics
- Operating instructions
- Certificates
- Product master data

Link: CAx Download Manager (http://support.automation.siemens.com/WW/view/en/42455541)

Applications & Tools

Applications & Tools supports you with various tools and examples when it comes to solving your automation tasks. Solutions are presented in interaction with several components in the system, without focusing on individual products.

- Application examples
- Function blocks & tools
- Background and system descriptions
- Performance statements
- Demonstration systems/videos

Link: Applications & Tools (http://support.automation.siemens.com/WW/view/en/20208582)

My Documentation Manager

My Documentation Manager enables you to compile your own documentation from our standard documents (manuals), which are located in the Product Support section. Under mySupport, you have the opportunity to create and manage you own compilations in a structure of their own.

Link:

MyDocumentationManager (http://support.automation.siemens.com/WW/view/en/38715968)

Reference

You can find further information on structure and navigation in Online Support here (http://support.automation.siemens.com/WW/view/en/11774658).

Further documentation

To install and connect the overload relays, you require the operating instructions of the overload relays used.

You can find a list of operating instructions and an overview of the manuals pertaining to SIRIUS Innovations in the appendix "References (Page 147)".

1.3 DataMatrix code

A DataMatrix code has been lasered onto 3RB3 solid-state overload relay devices under the label (size S2 only).

The DataMatrix codes are standardized in ISO/IEC 16022. The DataMatrix codes on Siemens devices use ECC200 coding for powerful error correction.

The following device information is encoded in the DataMatrix codes as a bit stream:

- Article number
- Serial number
- If applicable, MAC address

This information is stored in the following format in the DataMatrix code:

1P	Article number	+	S	Location	/	Date	Serial number
Data identifier	User content	Separator	User content		Separator	User content	User content

Note

The information content is displayed without spaces.

This machine-readable information simplifies and accelerates handling of the respective devices.
As well as fast access to the serial numbers of the respective devices for unique identification, the DataMatrix codes simplify communication with Siemens Technical Support.

SIEMENS Industry Support App

DataMatrix codes primarily enable extremely fast and convenient access to all device-specific information relating to an article number in the SIEMENS Service&Support Portal, such as operating instructions, manuals, data sheets, FAQs, etc.
We provide the SIEMENS Industry Support app free for this purpose and it can be used on most commercially available smartphones and tablets.
The SIEMENS Industry Support app is available for iOS and Android-based devices and can be accessed via the following links:

Link for Android

Link for iOS

Recycling and disposal

These devices can be recycled thanks to their low pollutant content. For environmentally-friendly recycling and disposal of your electronic waste, please contact a company certified for the disposal of electronic waste.

Up-to-the-minute information

You can obtain further assistance by calling the following numbers:

Technical Assistance:

Telephone: +49 (911) 895-5900 (8 a.m. to 5 p.m. CET)

Fax: +49 (911) 895-5907

or on the Internet at:

E-mail: (mailto:technical-assistance@siemens.com)

Internet: (http://www.siemens.com/sirius/technical-assistance)

Correction sheet

A correction sheet is included at the end of the manual. Please use it to record your suggestions for improvements, additions and corrections, and return the sheet to us. This will help us to improve the next edition of the manual.

Standards

2

2.1 Standards

Applicable standards

3RU21 thermal overload relays and 3RB30/3RB31 solid-state overload relays meet the requirements of the following standards:

Table 2- 1 Standards

Device standards	• IEC/EN 60947-1 • IEC/EN 60947-4-1 • IEC/EN 60947-5-1 • UL 508 • UL 60947-4-1 • CSA C 22.2
EMC standard	3RB30°/ 3RB31 electronic overload relays additionally fulfill the EMC standards specified in IEC 60947-4-1.
Resistance to extreme climates	The overload relays are climate-proof according to IEC 60721-3.
Touch protection	Degree of protection according to IEC 60529: IP20

You can find more information about the touch protection of 3RU21 thermal overload relays and 3RB3 solid-state relays in the Chapter "Connection (Page 65)".

Reference

Other standards that the 3RU21 and 3RB30 / 3RB31 overload relays conform to are listed in the Chapter "Technical data (Page 101)". SIRIUS components have been approved by a whole range of bodies for various sectors (shipbuilding, etc.). An up-to-date list of approvals is provided in Chapter 16 of the Siemens catalog IC 10 - "SIRIUS Industrial Controls". You will find more information and an option to download certificates on the internet (http://www.siemens.com/automation/service&support).

Product description

3

3.1 Introduction

3RU21 thermal overload relays

3RU21 thermal overload relays up to 80 A have been designed to provide current-dependent protection for loads with normal starting against impermissibly high temperature rises due to overload, phase asymmetry or phase failure.

An overload or phase failure results in an increase of the motor current beyond the set rated motor current. Via heating elements, this current rise increasingly heats up the bimetal strips located inside the device. The deflection of these bimetal strips eventually activates the auxiliary contacts via a release mechanism. The contacts then disconnect the load via a contactor. (The contactor function is not an integral component of the overload relay).

3RB30/3RB31 solid-state overload relays

3RB30 / 3RB31 solid-state overload relays up to 80 A with internal power supply have been designed to provide current-dependent protection for loads with normal starting and heavy starting against impermissibly high temperature rises due to overload, phase asymmetry or phase failure.

An overload, phase asymmetry or a phase failure results in an increase of the motor current beyond the set rated motor current.

This current rise is detected by the current transformers integrated in the devices and evaluated by corresponding solid-state circuits which then supply a pulse to the auxiliary contacts. The contacts then disconnect the load via a contactor. (The contactor function is not an integral component of the overload relay).

In addition to current-dependent protection for loads against impermissibly high temperature rise caused by overload, phase asymmetry, and phase failure, 3RB31 solid-state overload relays feature internal ground-fault detection (not possible in conjunction with contactor assemblies for star-delta (wye-delta) start). This provides protection of loads against high-impedance faults to ground caused by damaged insulation, moisture, condensation, etc.

System integration

The overload relays have been matched to the contactors in the 3RT2 series both electrically and mechanically and can be integrated in the feeder by means of direct mounting.
3RU2 thermal overload relays and 3RB30 and 3RB31 solid-state overload relays are available in three sizes, S00, S0 and S2.

Connection systems

The overload relays are available with the following connection system options:

- Screw-type connection system
- Spring-loaded connection system (size S2 auxiliary circuit only)
- Ring cable lug connection technology (3RU21 only, in size S00 and S0)

3RB3 solid-state overload relays are available in size S2 also in through-hole technology with straight-through transformer.

Accessories

The accessories have been tailored to the overload relays; they can be mounted easily and without the need for tools.

3.2 Versions

Sizes, setting ranges, and device versions

The table below provides an overview of the various sizes in which 3RU21 thermal overload relays and 3RB30/3RB31 solid-state overload relays are available. The maximum rated currents, the minimum and maximum setting ranges, and the available tripping classes are listed for each individual size.

Table 3- 1 3RU21 thermal overload relays

Size	Width	Current range	Rated operating power for three-phase motors at 400 V AC	Rated operating voltage U_e	Rated frequency	Trip class
S00	45 mm	0.11 to 16 A	0.04 to 7.5 kW	690 V AC	50/60 Hz	CLASS 10
S0	45 mm	1.8 to 40 A	0.75 to 18.5 kW			
S2	55 mm	11 to 80 A	5.5 to 37 kW			CLASS 10 or CLASS 10A

Table 3- 2 3RB30 solid-state overload relays

Size	Width	Current range	Rated operating power for three-phase motors at 400 V AC	Rated operating voltage U_e	Rated frequency	Trip class
S00	45 mm	0.1 to 16 A	0.04 to 7.5 kW	690 V AC	50/60 Hz	CLASS 10E or 20E (fixed)
S0	45 mm	0.1 to 40 A	0.04 to 18.5 kW			
S2	55 mm	12.5 to 80 A	5.5 to 37 kW			

Table 3- 3 3RB31 solid-state overload relays

Size	Width	Current range	Rated operating power for three-phase motors at 400 V AC	Rated operating voltage U_e	Rated frequency	Trip class
S00	45 mm	0.1 to 16 A	0.04 to 7.5 kW	690 V AC	50/60 Hz	CLASS 5E, 10E, 20E, 30E (adjustable)
S0	45 mm	0.1 to 40 A	0.04 to 18.5 kW			
S2	55 mm	12.5 to 80 A	5.5 to 37 kW			

3RB30 / 3RB31 solid-state overload relays have approximately the same dimensions as 3RU21 thermal overload relays. As a result, the thermal overload relays can be replaced easily with the electronic variant 3RB30/3RB31. This is necessary, for example, when lower demands are placed on overload protection (wide setting ranges (1:4), for example, or even reduced power loss and, as a result, minimized energy consumption).

3.3 Applications

Table 3- 4 Overview of applications

Applications	3RU21	3RB30/3RB31
System protection	✓[1)]	✓[1)]
Motor protection	✓	✓
Alternating current, 3-phase	✓	✓
Alternating current, 1-phase	✓	-
DC current	✓	-

[1)] In the main circuit, the devices provide overload protection for the assigned electrical loads (e.g. motors), feeder cable, and other switching and protection devices in the respective load feeder. The 3 phases have to be under symmetrical load.

3RU21 thermal overload relays

3RU21 thermal overload relays have been designed to protect three-phase loads, DC loads, and single-phase AC loads.

Note

Protection of DC loads/single-phase AC loads

If a 3RU21 thermal overload relay is to be used to protect DC loads or single-phase AC loads, all the bimetal strips have to be heated. Therefore, all of the relay's main current paths have to be connected in series.

3RB30 / 3RB31 solid-state overload relays

3RB30/3RB31 solid-state overload relays are designed to protect three-phase loads in sinusoidal 50/60 Hz voltage supplies.

Note

DC loads/Single-phase AC loads

The relay is not suitable for protecting DC loads or single-phase AC loads. On single-pole loads, the 3RU21 thermal overload relay or the 3RB22, 3RB23 and 3RB24 solid-state overload relays for higher applications (no protection for DC loads) must be used for IO-Link.

Reference

More information ...	Can be found in the chapter titled ...
About overload relay applications	Configuration (Page 49)

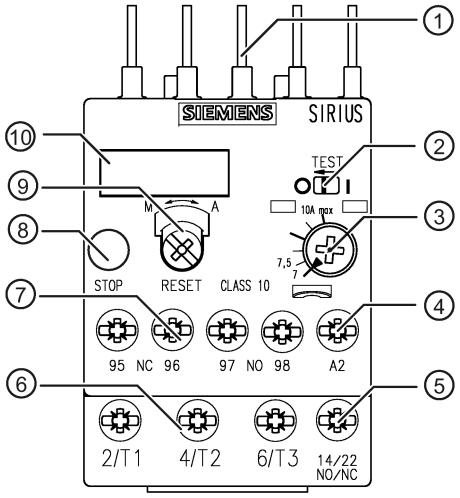
The advantages of load feeders with overload relays

Installing load feeders with overload relays (fuses + contactor + overload relay or MSP for starter combinations/circuit breaker (acc. to UL) + contactor + overload relay) has the following advantages over configurations without overload relays (motor starter protector + contactor):

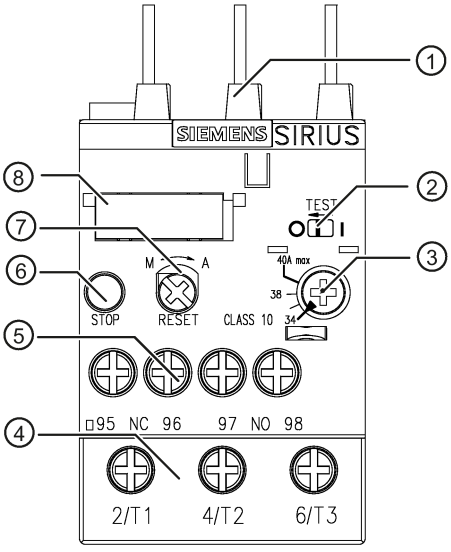
- Overload release and short-circuit release are signaled separately. In the event of a short circuit the fuses or the MSP for starter combinations/circuit breaker (acc. to UL) limit the short-circuit current and in the event of an overload the overload relay disconnects the contactor (and thus the load).
- The overload relays are especially suitable for use in fused switchgear assemblies. The devices are also used in applications in line networks with operating voltages pf more than 400 V. Compared with fuseless design, the fuses still have an extremely high short-circuit breaking capacity in excess of 100 kA, even in these voltage ranges.
- Automatic RESET is easy to implement with the overload relays. Following an overload trip, the load feeder need not be switched on again on-site.
- Attachable electrical or mechanical RESET modules compatible for use with all sizes enable 3RU21 thermal overload relays to be RESET remotely. Mechanical RESET modules which are compatible for use with all sizes can also be attached to 3RB30/3RB31 solid-state overload relays. An electrical remote RESET is an integral component of the 3RB31.
- Applications with lengthy start times can be implemented thanks to the different trip classes of the 3RB30 / 3RB31 solid-state overload relays.
- 3RB30/3RB31 solid-state overload relays reduce variation and simplify configuring and inventory management thanks to their wide 1:4 setting range.
- MSP for starter combinations/circuit breaker (acc. to UL) + contactor + overload relay combinations have the advantage that the load feeder can be isolated easily and all three poles can be disconnected in the event of a short circuit.

3.4 3RU21 thermal overload relays

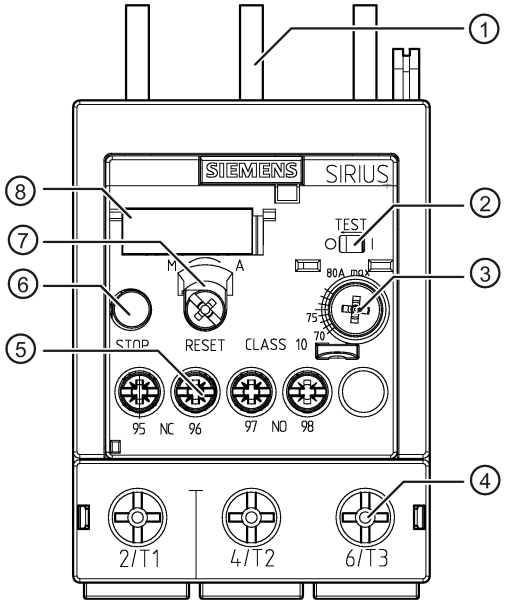
3RU2116 thermal overload relay, size S00, 45 mm width

Front view	Description	
 3RU2116 overload relay equipment	**Position digits**	
	①	Connection for contactor mounting: In terms of their electrical and mechanical features and their design, these pins are perfectly compatible with the 3RT2 contactors for the direct mounting of overload relays. Stand-alone assembly is also an option (in conjunction with a stand-alone assembly module).
	②	Switch position indicator and TEST function for wiring: Indicates a trip and facilitates testing of the wiring.
	③	Motor current setting: The large rotary button provides an easy means of setting the device to the rated motor current.
	④	Feed-through: Contactor coil terminal
	⑤	Feed-through: Contactor auxiliary switch
	⑥	Main circuit terminals: A screw-type, spring-loaded or ring cable lug connection system can be used to connect the main circuit terminal.
	⑦	Control circuit terminals: A screw-type, spring-loaded or ring cable lug connection system can be used to connect the control circuit terminal.
	⑧	STOP button: Pressing the button opens the NC contact, thereby disconnecting the downstream contactor. The NC contact closes again when the button is released.
	⑨	Selector switch for manual/automatic RESET and RESET button: This switch is used to choose between manual and automatic RESET. A device set to manual RESET can be reset locally by pressing the RESET button. The device can be reset remotely using the RESET modules (accessories) which are compatible for use with all sizes.
	⑩	Label
	Terminal labels	
	2/T1	Main circuit terminals
	4/T2	
	6/T3	
	95	NC contact (NC 95-96)
	96	
	97	NO contact (NO 97-98)
	98	
	14/22	Feed-through contactor auxiliary switch
	A2	Feed-through contactor coil terminal

3RU2126 thermal overload relay, size S0, 45 mm width

Front view	Description	
 3RU2126 overload relay equipment	**Position digits**	
	①	Connection for contactor mounting: In terms of their electrical and mechanical features and their design, these pins are perfectly compatible with the 3RT2 contactors for the direct mounting of overload relays. Stand-alone assembly is also an option (in conjunction with a stand-alone assembly module).
	②	Switch position indicator and TEST function for wiring: Indicates a trip and facilitates testing of the wiring.
	③	Motor current setting: The large rotary button provides an easy means of setting the device to the rated motor current.
	④	Main circuit terminals: A screw-type, spring-loaded or ring cable lug connection system can be used to connect the main circuit terminal.
	⑤	Control circuit terminals: A screw-type, spring-loaded or ring cable lug connection system can be used to connect the control circuit terminal.
	⑥	STOP button: Pressing the button opens the NC contact, thereby disconnecting the downstream contactor. The NC contact closes again when the button is released.
	⑦	Selector switch for manual/automatic RESET and RESET button: This switch is used to choose between manual and automatic RESET. A device set to manual RESET can be reset locally by pressing the RESET button. The device can be reset remotely using the RESET modules (accessories) which are compatible for use with all sizes.
	⑧	Label
	Terminal labels	
	2/T1	Main circuit terminals
	4/T2	
	6/T3	
	95	NC contact (NC 95-96)
	96	
	97	NO contact (NO 97-98)
	98	

3RU2136 thermal overload relay, size S2, 55 mm width

Front view	Description	
 3RU2136 overload relay equipment	**Position digits**	
	①	Connection for contactor mounting: In terms of their electrical and mechanical features and their design, these pins are perfectly compatible with the 3RT2 contactors for the direct mounting of overload relays. Stand-alone assembly is also an option (in conjunction with a stand-alone assembly module).
	②	Switch position indicator and TEST function for wiring: Indicates a trip and facilitates testing of the wiring.
	③	Motor current setting: The large rotary button provides an easy means of setting the device to the rated motor current.
	④	Main circuit terminals: A screw-type connection system can be used to connect the main circuit terminal.
	⑤	Control circuit terminals: A screw-type or spring-loaded connection system can be used to connect the control circuit terminal.
	⑥	STOP button: Pressing the button opens the NC contact, thereby disconnecting the downstream contactor. The NC contact closes again when the button is released.
	⑦	Selector switch for manual/automatic RESET and RESET button: This switch is used to choose between manual and automatic RESET. A device set to manual RESET can be reset locally by pressing the RESET button. The device can be reset remotely using the RESET modules (accessories) which are compatible for use with all sizes.
	⑧	Label
	Terminal labels	
	2/T1	Main circuit terminals
	4/T2	
	6/T3	
	95	NC contact (NC 95-96)
	96	
	97	NO contact (NO 97-98)
	98	

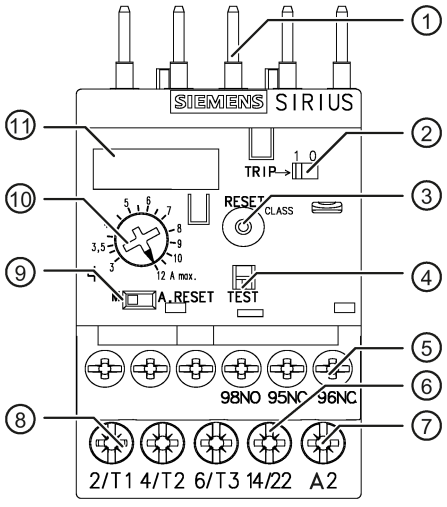
A sealable transparent cover can be optionally mounted on the thermal overload relays in the sizes S00, S0 and S2 (Accessories (Page 83)). It stops the motor setting being tampered with.

Auxiliary contacts

3RU21 thermal overload relays are equipped with an NO contact for the "tripped" message and an NC contact for disconnecting the contactor.

3.5 3RB30 solid-state overload relays

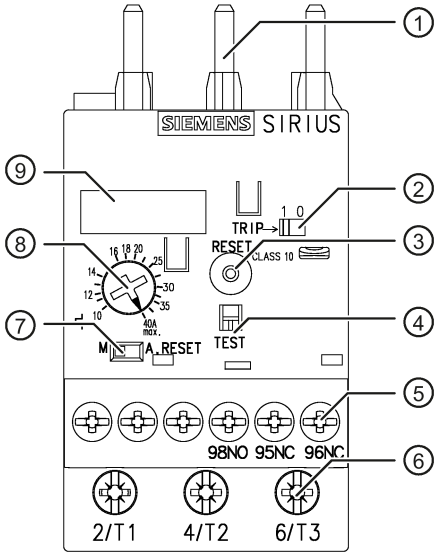
3RB3016 solid-state overload relay, size S00, 45 mm width



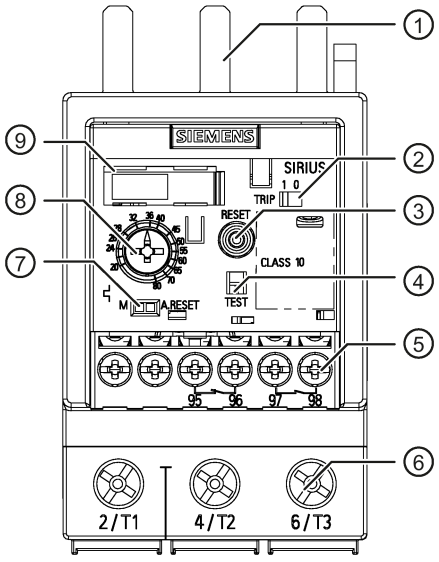
3RB3016 overload relay equipment

Front view	Description	
	Position digits	
	①	Connection for contactor mounting: In terms of their electrical and mechanical features and their design, these pins are perfectly compatible with the 3RT2 contactors for the direct mounting of overload relays. Stand-alone assembly is also an option (in some cases in conjunction with a stand-alone assembly module).
	②	Switch position indicator and TEST function for wiring: Indicates a trip and facilitates testing of the wiring.
	③	RESET button A device set to manual RESET can be reset locally by pressing the RESET button.
	④	Electronics test (device test): Enables a test of all major device components and functions.
	⑤	Control circuit terminals (removable): A screw-type or spring-loaded system can be used to connect the control circuit terminal.
	⑥	Feed-through: Contactor auxiliary switch
	⑦	Feed-through: Contactor coil terminal
	⑧	Main circuit terminals: A screw-type or spring-loaded system can be used to connect the main circuit terminal.
	⑨	Selector switch for manual/automatic RESET and RESET button: The slide switch is used to choose between manual and automatic RESET.
	⑩	Motor current setting: The large rotary button provides an easy means of setting the device to the rated motor current.
	⑪	Label
	Terminal labels	
	2/T1	Main circuit terminals
	4/T2	
	6/T3	
	95	NC contact (NC 95-96)
	96	
	97	NO contact (NO 97-98)
	98	
	14/22	Feed-through contactor auxiliary switch
	A2	Feed-through contactor coil terminal

3RB3026 thermal overload relay, size S0, 45 mm width

Front view	Description		
 3RB3026 overload relay equipment	**Position digits**		
	①	Connection for contactor mounting: In terms of their electrical and mechanical features and their design, these pins are perfectly compatible with the 3RT2 contactors for the direct mounting of overload relays. Stand-alone assembly is also an option (in some cases in conjunction with a stand-alone assembly module).	
	②	Switch position indicator and TEST function for wiring: Indicates a trip and facilitates testing of the wiring.	
	③	RESET button A device set to manual RESET can be reset locally by pressing the RESET button.	
	④	Electronics test (device test): Enables a test of all major device components and functions.	
	⑤	Control circuit terminals (removable): A screw-type or spring-loaded system can be used to connect the control circuit terminal.	
	⑥	Main circuit terminals: A screw-type or spring-loaded system can be used to connect the main circuit terminal.	
	⑦	Selector switch for manual/automatic RESET and RESET button: The slide switch is used to choose between manual and automatic RESET.	
	⑧	Motor current setting: The large rotary button provides an easy means of setting the device to the rated motor current.	
	⑨	Label	
	Terminal labels		
	2/T1	Main circuit terminals	
	4/T2		
	6/T3		
	95	NC contact (NC 95-96)	
	96		
	97	NO contact (NO 97-98)	
	98		

3RB3036 solid-state overload relays, size S2, 55 mm width

Front view	Description		
 3RB3036 overload relay equipment	**Position digits**		
	①	Connection for contactor mounting: In terms of their electrical and mechanical features and their design, these pins are perfectly compatible with the 3RT2 contactors for the direct mounting of overload relays. Stand-alone assembly is also an option (in some cases in conjunction with a stand-alone assembly module).	
	②	Switch position indicator and TEST function for wiring: Indicates a trip and facilitates testing of the wiring.	
	③	RESET button A device set to manual RESET can be reset locally by pressing the RESET button. On the 3RB31 an electronic remote RESET is integrated.	
	④	Electronics test (device test): Enables a test of all major device components and functions.	
	⑤	Control circuit terminal (removable): A screw-type or spring-loaded system can be used to connect the control circuit terminal.	
	⑥	Main circuit terminal: The main circuit can be connected using either the screw-type connection system or through-hole technology with straight-through transformer.	
	⑦	Selector switch for manual/automatic RESET and RESET button: The slide switch is used to choose between manual and automatic RESET.	
	⑧	Motor current setting: The large rotary button provides an easy means of setting the device to the rated motor current.	
	⑨	Label / DataMatrix code (behind the label)	
	Terminal labels		
	2/T1	Main circuit terminals	
	4/T2		
	6/T3		
	95	NC contact (NC 95-96)	
	96		
	97	NO contact (NO 97-98)	
	98		

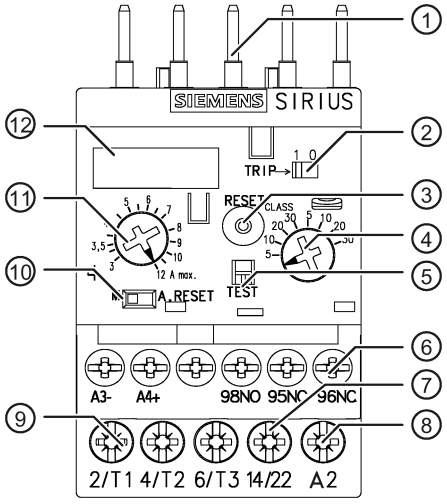
A sealable transparent cover can be optionally mounted on the solid-state overload relays in the sizes S00, S0 and S2 (Accessories (Page 83)). It stops the motor setting being tampered with.

Auxiliary contacts

3RB30 solid-state overload relays are equipped with an NO contact for the "tripped" message and an NC contact for disconnecting the contactor.

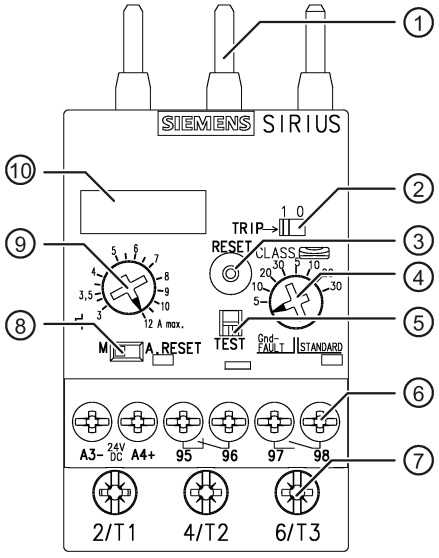
3.6 3RB31 solid-state overload relays

3RB3113 solid-state overload relays, size S00, 45 mm width

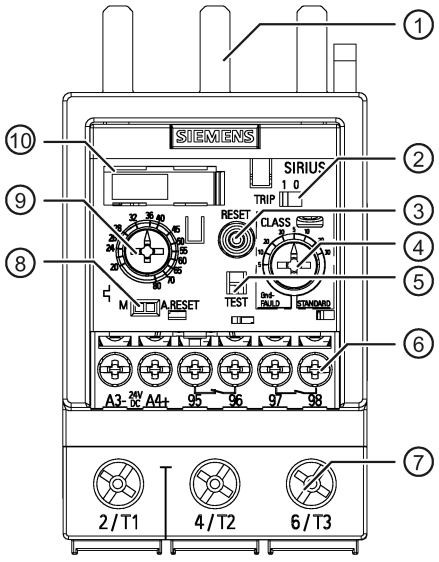
Front view	Description	
 3RB3113 solid-state overload relay equipment	**Position digits**	
	①	Connection for contactor mounting: In terms of their electrical and mechanical features and their design, these pins are perfectly compatible with the 3RT2 contactors for the direct mounting of overload relays. Stand-alone assembly is also an option (in some cases in conjunction with a stand-alone assembly module).
	②	Switch position indicator and TEST function for wiring: Indicates a trip and facilitates testing of the wiring.
	③	RESET button A device set to manual RESET can be reset locally by pressing the RESET button. In addition, an electronic remote RESET is integrated into the 3RB31.
	④	Tripping class setting/internal ground-fault detection: This rotary switch is used to set the required tripping class dependent upon the starting conditions and activate internal ground-fault detection.
	⑤	Electronics test (device test): Enables a test of all major device components and functions.
	⑥	Control circuit terminal (removable): A screw-type or spring-loaded system can be used to connect the control circuit terminal.
	⑦	Feed-through: Contactor auxiliary switch
	⑧	Feed-through: Contactor coil terminal
	⑨	Main circuit terminal: A screw-type or spring-loaded system can be used to connect the main circuit terminal.
	⑩	Selector switch for manual/automatic RESET and RESET button: The slide switch is used to choose between manual and automatic RESET.
	⑪	Motor current setting: The large rotary button provides an easy means of setting the device to the rated motor current.
	⑫	Label

Front view	Description	
	Terminal labels	
	2/T1	Main circuit terminals
	4/T2	
	6/T3	
	95	NC contact (NC 95-96)
	96	
	97	NO contact (NO 97-98)
	98	
	14/22	Feed-through contactor auxiliary switch
	A2	Feed-through contactor coil terminal

3RB3123 solid-state overload relays, size S0, 45 mm width

Front view	Description	
 3RB3123 overload relay equipment	**Position digits**	
	①	Connection for contactor mounting: In terms of their electrical and mechanical features and their design, these pins are perfectly compatible with the 3RT2 contactors for the direct mounting of overload relays. Stand-alone assembly is also an option (in some cases in conjunction with a stand-alone assembly module).
	②	Switch position indicator and TEST function for wiring: Indicates a trip and facilitates testing of the wiring.
	③	RESET button A device set to manual RESET can be reset locally by pressing the RESET button. In addition, an electronic remote RESET is integrated into the 3RB31.
	④	Tripping class setting/internal ground-fault detection: This rotary switch is used to set the required tripping class dependent upon the starting conditions and activate internal ground-fault detection.
	⑤	Electronics test (device test): Enables a test of all major device components and functions.
	⑥	Control circuit terminal (removable): A screw-type or spring-loaded system can be used to connect the control circuit terminal.
	⑦	Main circuit terminal: A screw-type or spring-loaded system can be used to connect the main circuit terminal.
	⑧	Selector switch for manual/automatic RESET and RESET button: The slide switch is used to choose between manual and automatic RESET.
	⑨	Motor current setting: The large rotary button provides an easy means of setting the device to the rated motor current.
	⑩	Label
	Terminal labels	
	2/T1	Main circuit terminals
	4/T2	
	6/T3	
	95	NC contact (NC 95-96)
	96	
	97	NO contact (NO 97-98)
	98	

3RB3133 solid-state overload relays, size S2, 55 mm width

Front view	Description	
 3RB3133 overload relay equipment	**Position digits**	
	①	Connection for contactor mounting: In terms of their electrical and mechanical features and their design, these pins are perfectly compatible with the 3RT2 contactors for the direct mounting of overload relays. Stand-alone assembly is also an option (in some cases in conjunction with a stand-alone assembly module).
	②	Switch position indicator and TEST function for wiring: Indicates a trip and facilitates testing of the wiring.
	③	RESET button A device set to manual RESET can be reset locally by pressing the RESET button. In addition, an electronic remote RESET is integrated into the 3RB31.
	④	Tripping class setting/internal ground-fault detection (3RB313 only): This rotary switch is used to set the required tripping class dependent upon the starting conditions and activate internal ground-fault detection.
	⑤	Electronics test (device test): Enables a test of all major device components and functions.
	⑥	Control circuit terminal (removable): A screw-type or spring-loaded system can be used to connect the control circuit terminal.
	⑦	Main circuit terminal: The main circuit can be connected using either the screw-type connection system or through-hole technology with straight-through transformer.
	⑧	Selector switch for manual/automatic RESET and RESET button: The slide switch is used to choose between manual and automatic RESET.
	⑨	Motor current setting: The large rotary button provides an easy means of setting the device to the rated motor current.
	⑩	Label / DataMatrix code (behind the label)
	Terminal labels	
	2/T1	Main circuit terminals
	4/T2	
	6/T3	
	95	NC contact (NC 95-96)
	96	
	97	NO contact (NO 97-98)
	98	

A sealable transparent cover can be optionally mounted on the thermal overload relays in the sizes S00, S0 and S2 (Accessories (Page 83)). It stops the motor setting being tampered with.

Auxiliary contacts

3RB31 solid-state overload relays are equipped with an NO contact for the "tripped" message and an NC contact for disconnecting the contactor.

Product combinations

4

Since the products from the innovative SIRIUS modular system are matched to one another both electrically and mechanically, they can be combined quickly and easily.

Reference

More information ...	Is available in the appendix ...
About the possible combinations of standard products from the SIRIUS modular system	"References" under "SIRIUS Innovations manuals (Page 148)"

More information ...	can be found in the Chapter ...
on the overload relay and contactor combination options	"Overview of combinable 3RT2 contactors (Page 51)"

Functions

5

5.1 Protection against overload, phase failure, and phase asymmetry

5.1.1 Functional principle

Overload relays are used for the current-dependent protection of electrical consumers (such as motors) against excessive temperature rises, which may be caused by overloading, asymmetrical power consumption, a phase failure in the line supply conductor or a locked rotor.

In the event of an overload, phase asymmetry or a phase failure, or if a rotor locks, the motor current will rise beyond the set rated motor current. This increased current - which, if sustained over a long period, may damage or even destroy the load - is detected by the overload relay and evaluated with the assistance of a thermal motor model.

The overload relays operate according to two different operating principles:

- Thermally with bimetals: 3RU21
- Electronically with current transformers and evaluation electronics: 3RB30 and 3RB31

Functional principle of 3RU21 thermal overload relays

The current rise caused by the overload causes increased heat rise affecting the heating elements. The bimetals respond by deflecting, and actuate the auxiliary contacts via the release mechanism.

Functional principle of 3RB30/3RB31 solid-state overload relays

The current rise is detected by the integrated current transformers and evaluated by corresponding solid-state circuits which then supply a pulse to the auxiliary contacts. The contactor and the load are disconnected via the auxiliary contacts.

Note

Protection of DC loads and single-phase AC loads

Only 3RU21 thermal overload relays can provide an assurance of protecting DC loads and single-phase AC loads against overload.

If a 3RU21 thermal overload relay is to be used to protect DC loads or single-phase AC loads, all the bimetal strips have to be heated. Therefore, all of the relay's main current paths have to be connected in series.

Phase-failure protection

3RU21 thermal overload relays and 3RB30/3RB31 solid-state overload relays feature phase loss sensitivity (see the chapter titled Tripping characteristics (Page 39)) to minimize load temperature rise in two-phase operation.

5.1.2 Inverse-time delayed overload release

The inverse-time-delayed overload release is based on a thermal motor model and will trigger a release dependent upon the extent of the overload.

3RU21 thermal overload relays and 3RB30/3RB31 solid-state overload relays compensate temperatures from -40 °C to 60 °C (3RU21) and -25 °C to 60 °C (3RB30/3RB31) according to IEC 60947-4-1.

5.1.3 Tripping classes

The tripping classes describe time intervals within which the overload relays have to trip in the case of a symmetrical, 3-pole load from the cold state with 7.2 times the current setting.

3RU21 thermal overload relays

3RU21 thermal overload relays are available for normal starting conditions in the tripping classes CLASS 10 or CLASS 10A. 3RB30 solid-state relays in CLASS 10E or CLASS 20E, or 3RB31 solid-state relays (adjustable in CLASS 5E, CLASS 10E, CLASS 20E or CLASS 30E) are available for heavy-duty starting conditions.

The tripping times according to IEC/EN 60947-4-1 are as follows:

Table 5- 1 Tripping times dependent upon tripping classes according to standard IEC/EN 60947-4-1

Trip class	Tripping time t_A in s at 7.2 x I_e from cold
CLASS 10A	$2 < t_A \leq 10$
CLASS 10	$4 < t_A \leq 10$
CLASS 20	$6 < t_A \leq 20$
CLASS 30	$9 < t_A \leq 30$

3RB30 / 3RB31 solid-state overload relays

3RB30 solid-state overload relays are available for normal starting conditions in tripping class CLASS 10E or for heavy-duty starting conditions in tripping class CLASS 20E (all fixed settings).

3RB31 solid-state relays are suitable for normal and heavy-duty starting conditions. A rotary switch is used to set the required tripping class (CLASS 5E, 10E, 20E or 30E) dependent upon the prevailing starting conditions.

The tripping times according to IEC/EN 60947-4-1, tolerance band E, are as follows:

Table 5- 2 Tripping times dependent upon tripping classes according to standard IEC/EN 60947-4-1, tolerance band E

Trip class	Tripping time t_A in s at 7.2 x I_e from cold
CLASS 5E	$3 < t_A \leq 5$
CLASS 10E	$5 < t_A \leq 10$
CLASS 20E	$10 < t_A \leq 20$
CLASS 30E	$20 < t_A \leq 30$

5.1.4 Tripping characteristics

Introduction

The tripping characteristic curves map the relationship between tripping time and tripping current as a multiple of the current setting I_e ; they are specified for symmetrical 3-pole and for 2-pole loading from cold.

The lowest current at which tripping will occur is known as the minimum tripping current. This must lie within specific defined limits in accordance with IEC / EN 60947-4-1.

The limits for the tripping current in the case of the overload relays with symmetrical three-pole loading are between 105 and 120 % of the current setting.

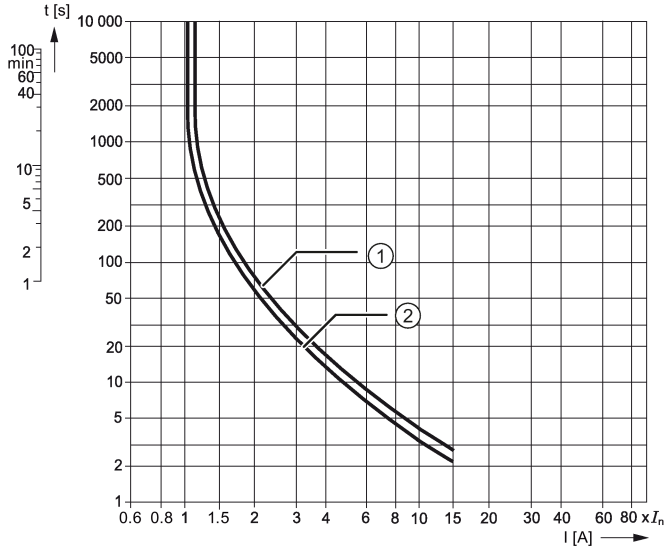
Tripping characteristics

The limit tripping current determines the progression of the tripping characteristic curve up to higher tripping currents based on the characteristics of the tripping classes (CLASS 10, CLASS 20, etc., see the Chapter Tripping classes (Page 38)).

Tripping characteristic curves for the 3RU21 thermal overload relay

The tripping characteristic curve for the 3RU21 thermal overload relay loaded at 3 poles (see figure below) applies provided all three bimetal strips are loaded symmetrically. If only two bimetal strips are heated following a phase failure, these two strips alone have to generate the force required to trigger the release mechanism and would need a longer tripping time or a higher current if no additional action was taken. If these higher currents are applied over a longer period of time, they usually cause damage to the load. To avoid damage, 3RU21 overload relays feature phase loss sensitivity, which uses a corresponding mechanism to induce accelerated tripping in accordance with the characteristic curve for 2-pole loading from the cold state.

Compared with a cold load, a load at operating temperature obviously has a lower temerature reserve. 3RU21 thermal relays take this into account by reducing the tripping time to approximately a quarter following prolonged loading with the setting current I_e.



t [s] Tripping time

I [A] Current

1 3-pole load

2 2-pole load

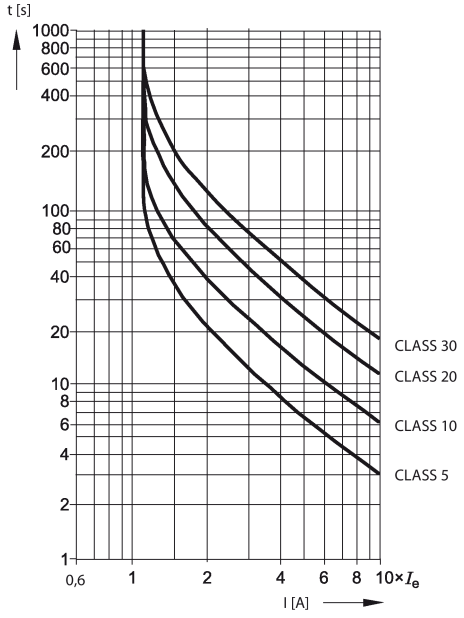
Figure 5-1 Time-current characteristic curve, schematic diagram - 3RU21

Tripping characteristic curves for 3RB30/3RB31 solid-state overload relays

The tripping characteristic curve for an overload relay loaded at 3 poles from cold (see Figure 1) applies subject to the prerequisite that all three phases are loaded symmetrically. In the event of a phase failure, the 3RB30/3RB31 solid-state overload relays disconnect the contactor more quickly to minimize the load's temperature rise in accordance with the tripping characteristic curve for two-pole loading from the cold state (see Figure 2). In the event of phase asymmetry, the devices disconnect dependent upon the extent of the asymmetry between the two characteristic curves.

Compared with a cold load, a load at operating temperature obviously has a lower temerature reserve. It is for this reason that the tripping time of 3RB30/3RB31 solid-state overload relays is reduced to approximately 30 % following prolonged loading with the current setting I_e.

Figure 1

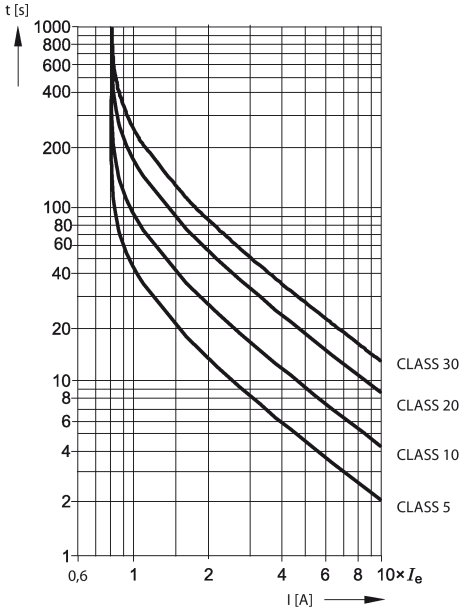


t [s] Tripping time

I [A] Current

Figure 5-2 3-pole load - 3RB30/3RB31

Figure 2



t [s] Tripping time

I [A] Current

Figure 5-3 2-pole load - 3RB30/3RB31

Reference

The figures are schematic representations of the characteristic curves. The characteristic curves for the individual overload relays can be downloaded from the Internet (http://www.siemens.com/automation/service&support).

5.2 Ground fault protection in the case of the 3RB31

Introduction

In addition to the current-dependent protection of loads against impermissibly high temperature rise resulting from overload, 3RB31 solid-state overload relays offer ground-fault protection.

Ground-fault protection

A ground fault can arise as a result of insulation damage or ingress of moisture or condensate. This results in displacement of the neutral point voltage of the power network, and in an unbalance. The neutral point voltage is simulated virtually in the device and when a neutral point displacement voltage arises, the overload relay switches the contactor off instantaneously. This prevents thermal follow-on damage and a resulting, and significantly more critical, double ground fault.

Note

Contactor assembly for star-delta (wye-delta) start

Internal ground-fault detection is not possible with contactor assemblies star-delta (wye-delta) start.

Table 5- 3 Ground-fault detection

Type of ground-fault detection	Application
Internal ground-fault detection	For motors with three-wire connection for the detection of fault currents ≥ 75 % of the current setting I_e in operation

Reference

More information ...	can be found in the Chapter ...
about ground-fault protection of the solid-state overload relays in conjunction with star-delta (wye-delta) assemblies	Contactor assembly for star-delta (wye-delta) start (Page 53)

5.3 Auxiliary contacts

Function

The auxiliary contacts control the contactor and signal overloads.

Auxiliary contact	Response to overload
NC contact (NC 95-96)	Disconnects the contactor, thereby protecting: • The contactor • The cables • The load
NO contact (NO 97-98)	Sends a signal, e.g. to the: • Control system • Lamp • Other actuators

Note

Contact rating

The contact rating of the auxiliary switches to be taken into account is specified in the Technical data (Page 101).

Reference

More information ...	Can be found in the chapter titled ...
About the response of auxiliary contacts	Response of the auxiliary contacts (Page 82)

5.4 Indication of the operating state

The prevailing operating state of the 3RU21/3RB30/3RB31 relays is indicated by the position of the marker on the "TEST function/Switch position indicator" slide.

If the relays are operating without errors, the slide marker will be set to "I". When a device trips, the slide marker moves to "0". An overload relay can trip for the following reasons:

- Overload,
- Phase asymmetry,
- Phase failure, or
- Ground fault (3RB31)
- Internal error (3RB30/3RB31)

Resetting

The relay is reset manually or automatically after a recovery time has elapsed.

Reference

Additional information...	Can be found in the chapter titled...
About resetting	RESET after release (Page 77)

5.5 Self-monitoring (3RB30/3RB31 only)

3RB30/3RB31 solid-state overload relays constantly monitor their ability to operate (self-monitoring) and trip in the event of an internal error.

In such cases you need to contact Technical Assistance on the Internet (http://www.siemens.com/automation/service&support)

5.6 Additional functions

RESET function

There are various ways to reset the device following an overload release.

Table 5- 4 RESET options for for overload relays

Overload relay	Auto RESET	Manual RESET	Mech. remote RESET (accessory)		Elect. remote RESET
			Release slide	Cable release	
3RU21	✓	✓	✓	✓	✓ (Accessories)
3RB30	✓	✓	✓	✓	-
3RB31	✓	✓	✓	✓	✓ (built-in)

The relay cannot be reset until after the recovery time has elapsed.

Reference

More information ...	can be found in the Chapter ...
about optional mechanical and electrical RESET modules	Accessories (Page 83).

Stop function (3RU21 only)

Pressing the STOP button on the 3RU21 thermal overload relay opens the NC contact, thereby disconnecting the downstream contactor and thus the load. In the case of maintained-contact operation in the auxiliary circuit, the load is switched back on via the contactor when the red STOP button is released.

Test function for the 3RU21 thermal overload relay

The TEST slide can be used to check whether the operational 3RU21 thermal overload relay is working properly. The tripping of the relay can be simulated by moving the slide. This simulation process opens the NC contact (95-96) and closes the NO contact (97-98), thereby checking that the auxiliary circuit has been wired to the overload relay correctly.

Test function for the 3RB30/3RB31 solid-state overload relay

The correct function of the relay when ready for operation can be checked by pressing the TEST button with the motor current flowing (device/electronics test). Current sensing, the motor model, and the tripping unit are tested.

The switch position indicator slide can be used to test the auxiliary contacts and the control current wiring. The tripping of the relay can be simulated by moving the slide, thereby providing a means of checking that the auxiliary circuit has been wired correctly.

Reference

More information ...	Can be found in the Chapter ...
About the RESET function	RESET after release (Page 77).
About the test function	TEST function (Page 80).

Configuration

6

6.1 SIRIUS Innovations system configurator

Reference

To assist you with configuration, the "SIRIUS Innovations system configurator" is at your disposal on the Internet. Here, you can gather together all necessary products before the actual configuration process and you can realize complete projects virtually.

You can find the "SIRIUS Innovations system configurator" on the Internet (http://www.siemens.com/sirius/configurators).

6.2 Overload relays in motor feeders

6.2.1 Motor protection with overload relay

The individual overload relay families protect the following loads against the consequences of an overload, a phase failure, and phase asymmetry.

Table 6- 1 Overload relays in motor feeders

For the protection of	3RU21	3RB30/3RB31
Three-phase current loads	✓	✓
DC loads	✓	-
Single-phase AC loads	✓	-

Note

In the case of three-phase current loads, only 3-pole circuits (3 phases) are permitted. 4-pole circuits (3 phases + neutral conductor) are not permitted.

Note

Design of motor feeders

An overload relay alone cannot generally protect a load against **overcurrents**. The tripping characteristic curve is too inert for a short-circuit and also the contactor actuated by the relay in the event of tripping is not suitable for reliable breaking in the event of a short-circuit.

A protective device such as a 3RV2 motor starter protector or a fuse must be installed upstream of the load to provide **protection against short-circuits**.

Appropriate contactors are required to protect loads. Chapter Overview of combinable 3RT2 contactors (Page 51) provides an overview of the coordination between overload relays and contactors, along with their power ratings.

6.2.2 Overview of combinable 3RT2 contactors

Overload relay with contactor assemblies

Table 6- 2 Thermal overload relay with contactor assemblies

			Contactors			
			Type	3RT201	3RT202	3RT203
Thermal overload relay [1]			Size	S00	S0	S2
Type	Size	Current range [A]	Power [kW]	3 / 4 / 5,5 / 7,5	5,5 / 7,5 / 11 / 15 / 18,5	15 / 18,5 / 22 / 30 / 37
3RU211	S00	0,11 … 16		✓	-	-
3RU212	S0	1,8 … 40		-	✓	-
3RU213	S2	11 … 80		-	-	✓

[1] You can find more information on using the overload relays in feeders in the Chapter "Technical data (Page 101)".

Table 6- 3 Solid-state overload relay with contactor assemblies

			Contactors			
			Type	3RT201	3RT202	3RT203
Solid-state overload relay [1]			Size	S00	S0	S2
Type	Size	Current range [A]	Power [kW]	3 / 4 / 5,5 / 7,5	5,5 / 7,5 / 11 / 15 / 18,5	15 / 18,5 / 22 / 30 / 37
3RB3.1	S00	0,1 … 16		✓	-	-
3RB3.2	S0	0,1 … 40		-	✓	-
3RB3.3	S2	12,5 … 80		-	-	✓

[1] You can find more information on using the overload relays in feeders in the Chapter "Technical data (Page 101)".

The configuration guide titled "Configuring SIRIUS Innovations - Selection data for load feeders in fuseless and fused designs" (article no. 3ZX1012-0RA21-1AB0) provides information about the assembly of type-tested motor feeders according to IEC / EN 60947-4-1 with type of coordination 1 or 2.

6.2.3 Normal and heavy-duty starting

Normal starting

Selecting the right overload relay means considering the start time as well as the rated motor current. The start time refers to the time required by the motor between switching on and reaching its rated speed.

Table 6- 4 Normal starting

Designation	Start time
Normal starting	< 10 s
Heavy-duty starting	> 10 s

Heavy-duty starting

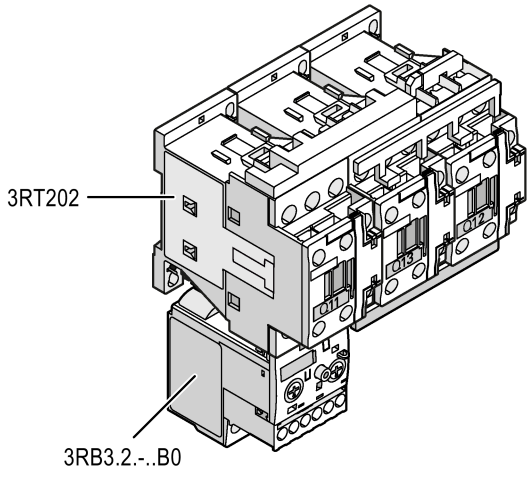
Note

Overload relays with corresponding tripping classes are required to protect heavy-duty-starting motors (for the acceleration of large centrifuges, for example). In the case of heavy-duty starting, the cables and contactors also have to be dimensioned specifically on account of the increasing thermal load.

6.2.4 Contactor assembly for star-delta (wye-delta) start

Overload relays in contactor assemblies for star-delta (wye-delta) start

When using overload relays in conjunction with contactor assemblies for star-delta (wye-delta) start, you need to bear in mind that only 1/√3 times the motor current flows through the line contactor. An overload relay mounted onto a line contactor has to be set to this 0.58-times motor current.



Note

Internal ground-fault detection on the 3RB31

If you are using the 3RB31 solid-state overload relay in conjunction with contactor assemblies for star-delta (wye-delta) start, internal ground-fault detection must not be activated due to the occurrence of transient current peaks when switching over from star (wye) to delta operation. These current peaks can cause an unintentional response of the ground-fault monitoring.

6.2.5 Operation with frequency converters

3RU21 thermal overload relays

3RU21 thermal overload relays are suitable for operation with frequency converters. Depending on the frequency of the converter, eddy current and skin effects that occur mean that in some cases, a current higher than the rated motor current has to be set.

3RB30/3RB31 solid-state overload relays

3RB30/3RB31 solid-state overload relays are suitable for frequencies of 50 / 60 Hz and their associated harmonics. This makes it possible to use a 3RB30/3RB31 on the input side of the frequency converter. If motor protection is required on the secondary side of the frequency converter, we recommend 3RN thermistor motor protection devices or 3RU21 thermal overload relays.

Reference

More information ...	can be found on the Internet at
about setting corrections and other factors when using circuit breakers and overload relays on the secondary side of frequency converters	Circuit breakers and overload relays on the secondary side of frequency converters - influences and criteria (http://support.automation.siemens.com/WW/view/en/24232798)
about the influence of frequency converters on thermal motor protection devices in the case of pulsed voltage	about the influence of frequency converters/inverters on thermal motor protection devices in the case of pulsed voltage (http://support.automation.siemens.com/WW/view/de/24153083)

Reference

More information ...	Is available in the appendix ...
About the currents to be set	"References" under SIRIUS Innovations manuals (Page 148) in the "SIRIUS Innovations - SIRIUS 3RV2 motor starter protectors" manual

6.3 Short-circuit protection

Either fuses (fused design) or motor starter protectors/circuit breakers (acc. to UL) (fuseless design) must be used for short-circuit protection. The types of coordination must also be considered when selecting load feeders from the tables.

References

More information	Can be found
About coordination of corresponding short-circuit protective devices with overload relays	in the configuration guide titled "Configuring SIRIUS Innovations - Selection data for load feeders in fuseless and fused designs" (http://support.automation.siemens.com/WW/view/en/50250592) (article no.: 3ZX1012-0RA21-1AC0)

6.4 Protecting explosion-protected motors

SIRIUS components meet a wide range of requirements for operation in hazardous areas and for switching and protecting components used in hazardous areas.

Explosion protection types in accordance with ATEX Directive 94/9/EC

3RB30/3RB31 solid-state overload relays and 3RU21 thermal overload relays are suitable for the overload protection of explosion-proof motors with protection type "increased safety" Ex e.
The relays correspond to the requirements of EN 60079.

3RB30/3RB31 solid-state overload relays and 3RU21 thermal overload relays are approved under Device Group II, Category (2) for overload protection of motors operated in Area "G" (areas in which potentially explosive gas, vapor, mist, and air mixes are present) and additionally in Area "D" (areas containing combustible dust).
3RB30/3RB31 solid-state overload relays and 3RU21 thermal overload relays are not intended for installation in hazardous areas.
When installed in hazardous areas, 3RB30/3RB31 solid-state overload relays and 3RU21 thermal overload relays must be adapted to the corresponding explosion protection type.

For 3RB30 and 3RB31 solid-state overload relays in sizes S00 and S0 (size S2 on request), the EC type examination certificate is available for Group II,
Category (2) G [Ex e] [Ex d] [Ex px] and D [Ex t] [Ex p].
The number is PTB 09 ATEX 3001.

For 3RU21 thermal overload relays in sizes S00 and S0 (size S2 on request), the EC type test certificate is available for Group II, Category (2) GD.
The number is DMT 98 ATEX G001.

More information and certificates for download are available on the internet (http://www.siemens.com/automation/service&support).

More information on explosion protection (ATEX) can be found online (http://www.siemens.com/sirius/atex).

6.5 Application environment

The following information must be taken into account when planning applications involving overload relays.

Installation altitude

The overload relays are approved for installation altitudes up to 2,000 m. The reduced air density at altitudes higher than 2,000 meters affects the overload relays' electrical characteristics. The reduction factors which have to be taken into account when using overload relays at altitudes higher than 2,000 m can be obtained on request from our Technical Assistance on the Internet (http://www.siemens.com/automation/service&support).

Operating conditions and resistance to extreme climates

The overload relays are climate-proof.

The overload relays are not sensitive to external influences such as shocks, corrosive ambient conditions, ageing, and temperature fluctuations.

Ambient temperatures for 3RU21 overload relays

3RU21 thermal overload relays compensate temperature within the temperature range –40 °C to +60 °C in accordance with IEC/EN 60947-4-1. At temperatures between +60 °C and +70 °C, the maximum permissible operating current related to the rated operating current must be reduced by a specific factor f in accordance with the table below ($I_{max} = I_e \times f$).

Table 6- 5 Ambient temperatures for 3RU21 overload relays (size S00/S0)

Ambient temperature in °C	Reduction factor applies for ...	
	Rated current 0.16 ... 20 A	Rated current 22 ... 40 A
+60	1,0	1,0
+65	0,94	0,97
+70	0,87	0,94

Table 6- 6 Ambient temperatures for 3RU2136 overload relays (size S2)

Ambient temperature in °C	Reduction factor applies for ...	
	Rated current 8 ... 45 A	Rated current 50 ... 80 A
+60	1,0	1,0
+65	0,94	0,97
+70	0,87	0,94

Ambient temperatures for 3RB30/3RB31 overload relays

3RB30/3RB31 solid-state overload relays compensate temperature in the temperature range from –25 °C to +60 °C in accordance with IEC/EN 60947-4-1.

The reduction factors which have to be taken into account when using solid-state overload relays at an ambient temperature higher than 60°C can be obtained on request from our Technical Assistance on the Internet (http://www.siemens.com/automation/service&support).

Current derating during heavy-duty starting for 3RB30/3RB31 overload relays

No reduction in the maximum permissible rated operating current is required for size S00 (to 16 A).

The following maximum rated operating currents are permissible for device versions with the setting range 10 to 40 A for size S0:

Table 6- 7 Derating during heavy-duty starting, 3RB30/3RB31 overload relays (size S0)

Trip class	Rated operating current
CLASS 20E	$I_{e\ max}$ = 32 A
CLASS 30E	$I_{e\ max}$ = 25 A

The following maximum rated operating currents are permissible for device versions with the setting range 20 to 80 A for size S2:

Table 6- 8 Derating during heavy-duty starting, 3RB30/3RB31 overload relays (size S2)

Trip class	Rated operating current
CLASS 5E CLASS 10E	$I_{e\ max}$ = 80 A
CLASS 20E	$I_{e\ max}$ = 60 A
CLASS 30E	$I_{e\ max}$ = 50 A

Special application environments

SIRIUS components have been approved by a whole range of bodies for various sectors (shipbuilding, etc.). The current list of approvals is provided in Chapter 16 of the SIRIUS IC 10 catalog. You can find more information and an option to download certificates on the internet (http://www.siemens.com/automation/service&support).

Mounting

7

7.1 Mounting options

Mounting options for the 3RU21, 3RB30 and 3RB31

The 3RU2 thermal overload relays and the 3RB3 solid-state overload relays are matched electrically and mechanically to 3RT2 contactors. As a result, direct mounting can be achieved easily. Alternatively, the devices are suitable for stand-alone assembly.

7.2 Minimum clearances and mounting position

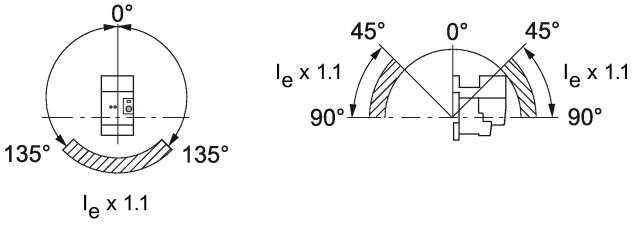
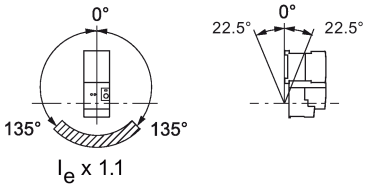
Minimum clearance

A minimum lateral clearance of > 6 mm must be maintained from live and grounded parts.

Mounting position for 3RU21 thermal overload relay

The diagrams below illustrate the permissible mounting positions for contactor mounting and stand-alone assembly for 3RU21 thermal overload relays.

Table 7- 1 Permissible mounting positions for the 3RU21

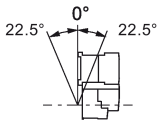
Overload relay, stand-alone assembly	Contactor + overload relay
	

The set value is 1.1 times the motor current for a mounting position in the hatched area.

Mounting position for 3RB30/3RB31 solid-state overload relay

The following diagram shows the permissible mounting position for contactor mounting for 3RB30/3RB31 solid-state overload relays.

Table 7- 2 Permissible mounting positions for 3RB30/3RB31

Overload relay, stand-alone assembly	Contactor + overload relay
3RB30/3RB31 solid-state overload relays can be mounted in any position in stand-alone assembly.	

7.3 Mounting/Disassembly

Direct mounting on 3RT contactor

The diagram below shows an example mounting scenario based on mounting the 3RU21 thermal overload relay, size S0, on the 3RT2 contactor. The contactor/overload relay combinations can be snapped onto 35 mm DIN rails according to EN 60715.

Table 7- 3 Mounting the 3RU21 overload relay with a screw-type connection system

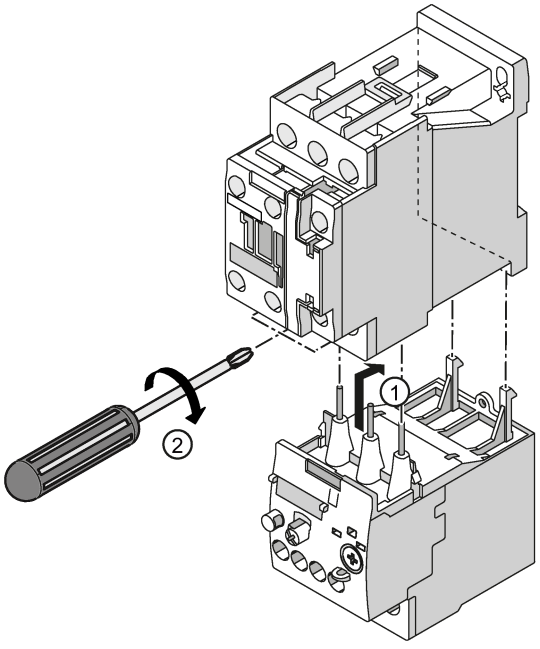
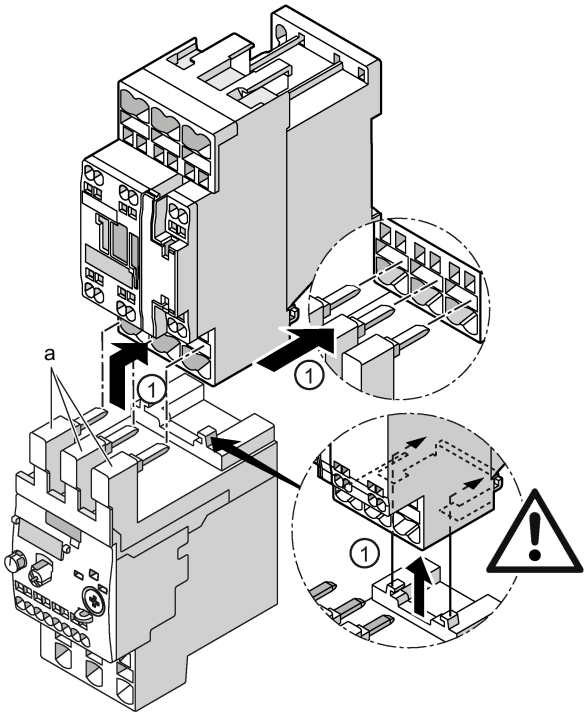
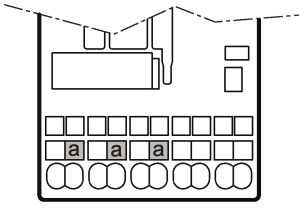
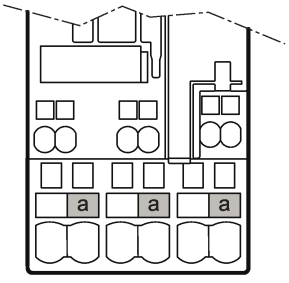
Step	Instructions	Figure
1	Push the overload relay into the contactor from below. Attach the two hooks on the overload relay to the two openings on the rear of the contactor. This pushes the main current contacts into the corresponding socket contacts on the contactor.	
2	Screw the contacts tight. Check that the cable is clamped tight.	

Table 7- 4 Mounting the 3RU21 overload relay with a spring-loaded connection system

Step	Instructions	Figure
1	Insert the contacts (a) into the central opening of the main conductor terminals on the contactor (see below, a), with the contacts flush to the right. Make sure that the guide tabs are inserted into the designated slots on the contactor. The overload relay will sit flush with the contactor on the left- and right-hand sides.	

The table below shows the openings of the main conductor terminals on the contactor into which the overload relay contacts have to be inserted.

Main conductor terminals on the contactor (a) (S00):	Main conductor terminals on the contactor (a) (S0):
	

Note

Ring cable lug connection system

The procedure for mounting the overload relays with ring cable lug connection system is similar to that for mounting with screw-type connection system.

Mounting on mounting plate

Screw mounting on a mounting plate is an alternative option to DIN rail mounting. For screw mounting, the contactor first has to be fastened with screws and then the overload relay mounted on the top of the contactor as shown in the figures.

Disassembly

To disassemble the contactor/relay combination from the DIN rail, press the contactor down and pull it toward you.

Table 7- 5 Overload relay disassembly, screw-type connection system

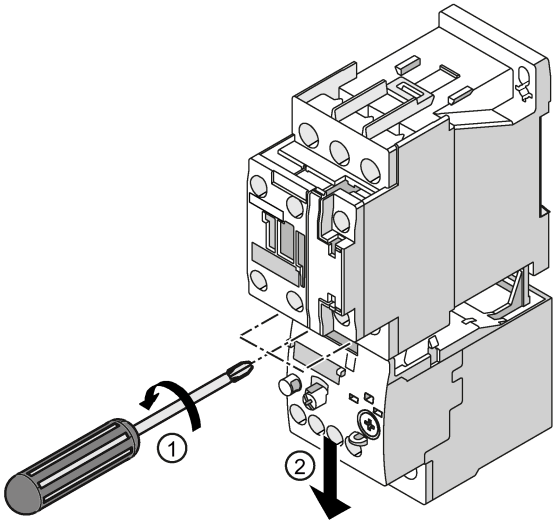
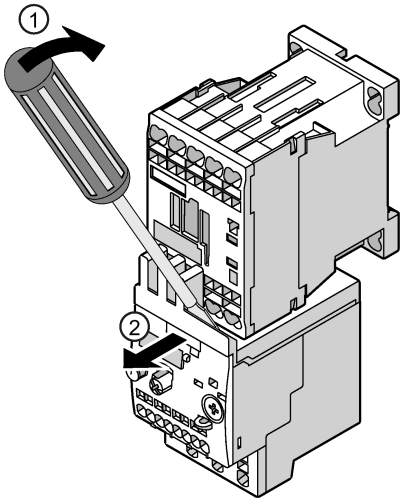
Step	Instructions	Figure
1	Undo the screw on the main conductor terminals.	
2	Pull the overload relay down and away from the contactor.	

Table 7- 6 Overload relay disassembly, spring-loaded connection system

Step	Instructions	Figure
1	Position the screwdriver on the overload relay as shown in the figure. Carefully dislodge the overload relay from the contactor.	
2	Pull the overload relay toward you and away from the contactor.	

Note

Ring cable lug connection system

The procedure for disassembling the overload relays with ring cable lug connection system is similar to that for disassembly with screw-type connection system.

Connection

8

8.1 Connection

Connection types

The overload relays are available with the following connection types for the main and auxiliary current paths:

- Screw-type connection system
- Spring-loaded connection system (size S2 auxiliary circuit only)
- Ring cable lug connection system (3RU21 only for size S00 and S0) with optional terminal covers (accessories)

3RB3 solid-state overload relays are available in size S2 also in through-hole technology with straight-through transformer.

Conductor cross-sections

The conductor cross-sections of the devices in the SIRIUS modular system are matched to one another on a size-specific basis.

Coil repeat and auxiliary switch repeat terminal

In the case of size S00 3RU21 thermal overload relays and 3RB30/3RB31 solid-state overload relays, direct contactor mounting involves feed-through of the auxiliary switch and coil terminals A2 on the contactor. This makes wiring much easier.

Touch protection

Please observe the information in the chapter titled "Technical specifications (Page 101)" with regard to touch protection for 3RU21 thermal overload relays and 3RB30/3RB31 solid-state overload relays (according to IEC 61140). Devices with screw-type and spring-loaded connection systems are finger-safe. The addition of terminal covers (accessories) is required to achieve finger-safety in the case of ring cable lug connection systems.

Note

Size S2 devices have degree of protection IP00 in the area of the main circuit connecting terminals.

8.2 Connection of 3RU21 overload relay

Control circuit

An additional power supply is not required for the operation of 3RU21 thermal overload relays.

Connection of terminals

The terminal labels and a description of the operator controls of the 3RU21 thermal overload relays can be found in the chapter "3RU21 thermal overload relays (Page 24)".

Reference

More information ...	can be found ...
about connecting the SIRIUS modular system	in the appendix "References" under SIRIUS Innovations manuals (Page 148) in the "SIRIUS Innovations - System Overview" manual.
about conductor cross-sections and tightening torques	In the chapter "Technical data (Page 101)".

8.3 Connection of 3RB30/3RB31 overload relays

Control circuit

The 3RB30 and 3RB31 solid-state overload relays do not need an additional supply voltage because they power themselves via the integrated current transformers.

Connection of terminals

The terminal labels and a description of the operator controls of 3RB3 solid-state overload relays can be found in chapters "3RB30 solid-state overload relays (Page 27)" and "3RB31 solid-state overload relays (Page 30)".

Reference

More information ...	can be found ...
about connecting the SIRIUS modular system	in the appendix "References" under SIRIUS Innovations manuals (Page 148) in the "SIRIUS Innovations - System Overview" manual.
about conductor cross-sections and tightening torques	In the chapter "Technical data (Page 101)".

8.4 Connection cross-sections

8.4.1 Conductor cross-sections for screw-type connection systems

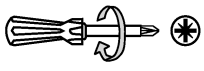
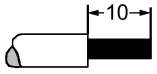
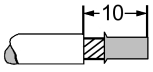
Conductor cross-sections for screw-type connection systems

The following tables define the permissible conductor cross-sections for main terminals and auxiliary conductor connections in sizes S00, S0 and S2 for screw-type connection systems.

Note

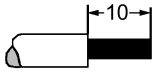
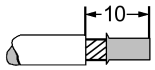
If two different conductor cross-sections are connected to one clamping point, both cross-sections must be located in the range specified.

Table 8- 1 Main conductors of size S00

		Overload relay [1]
Tool		Pozidriv size PZ 2, Ø 5 to 6 mm
Tightening torque		0.8 to 1.2 Nm
Solid and stranded		2 x (0.5 to 1.5) mm²
		2 x (0.75 to 2.5) mm²
		Max. 2 x 4 mm²
Finely stranded with end sleeve		2 x (0.5 to 1.5) mm²
		2 x (0.75 to 2.5) mm²
AWG		2 x (20 to 16)
		2 x (18 to 14)
		2 x 12

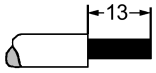
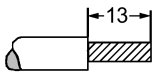
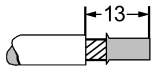
[1] Only 1 conductor can be clamped on the stand-alone assembly support.

Table 8- 2 Main conductors of size S0

		Overload relay [1]
Tool		Pozidriv size PZ 2, Ø 5 to 6 mm
Tightening torque		2.0 to 2.5 Nm
Solid and stranded		2 x (1.0 to 2.5) mm²
		2 x (2.5 to 10) mm²
Finely stranded with end sleeve		2 x (1 to 2.5) mm²
		2 x (2.5 to 6) mm²
		Max. 1 x 10 mm²
AWG		2 x (16 to 12)
		2 x (14 to 8)

[1] Only 1 conductor can be clamped on the stand-alone assembly support.

Table 8- 3 Main conductors of size S2 with box terminal

		Overload relay [1]
Tool		Pozidriv size PZ 2, Ø 5 to 6 mm
Tightening torque		3.0 to 4.5 Nm
Solid and stranded		2 x (1 to 35) mm²
		1 x (1 to 50) mm²
Finely stranded without end sleeve		–
Finely stranded with end sleeve		2 x (1 to 25) mm²
		1 x (1 to 35) mm²
AWG		2 x (18 to 2)
		1 x (18 to 1)

[1] Only 1 conductor can be clamped on the stand-alone assembly support.

Table 8- 4 Main conductor connection of size S2 with through-hole technology

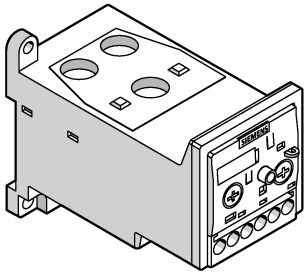
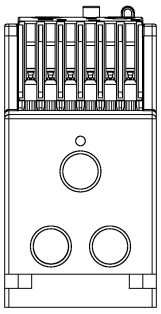
		Solid-state overload relay
		The maximum diameter of the opening is 12.7 mm.

Table 8- 5 Auxiliary conductors of sizes S00, S0 and S2 on the 3RU2 thermal overload relay

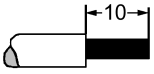
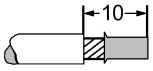
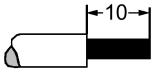
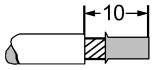
		Overload relay
Tool		Pozidriv size PZ 2, Ø 5 to 6 mm
Tightening torque		0.8 to 1.2 Nm
Solid and stranded		2 x (0.5 to 1.5) mm² 2 x (0.75 to 2.5) mm²
Finely stranded with end sleeve		2 x (0.5 to 1.5) mm² 2 x (0.75 to 2.5) mm²
AWG		2 x (20 to 16) 2 x (18 to 14)

Table 8- 6 Removable terminal on the 3RB3 solid-state overload relay

		Removable terminal
Tool		Pozidriv size PZ 2, Ø 6 mm
Tightening torque		0.8 to 1.2 Nm
Solid and stranded		1 x (0.5 to 4) mm² 2 x (0.5 to 2.5) mm²
Finely stranded with end sleeve		1 x (0.5 to 2.5) mm² 2 x (0.5 to 1.5) mm²
AWG		2 x (20 to 14)

8.4.2 Conductor cross-sections for spring-loaded connection systems

Conductor cross-sections for spring-loaded connection systems

The following tables define the permissible conductor cross-sections for main terminals in sizes S00 and S0, and auxiliary conductor connections in sizes S00, S0 and S2 for spring-loaded connection systems.

Table 8- 7 Main conductors of size S00

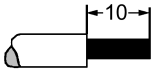
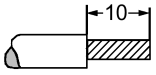
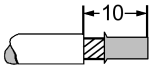
		Overload relay
Tool		Ø3.0 x 0.5 (3RA2908-1A)
Solid and stranded		1 x (0.5 to 4.0) mm²
Finely stranded without end sleeve		1 x (0.5 to 2.5) mm²
Finely stranded with end sleeve		1 x (0.5 to 2.5) mm²
AWG		1 x (20 to 12)

Table 8- 8 Main conductors of size S0

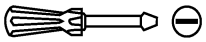
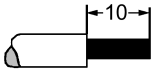
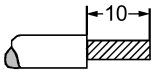
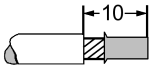
		Overload relay
Tool		Ø3.0 x 0.5 (3RA2908-1A)
Solid and stranded		1 x (1.0 to 10) mm²
Finely stranded without end sleeve		1 x (1.0 to 6.0) mm²
Finely stranded with end sleeve		1 x (1.0 to 6.0) mm²
AWG		1 x (18 to 8)

Table 8- 9 Auxiliary conductors of sizes S00, S0 and S2 on the 3RU2 thermal overload relay

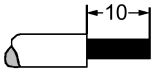
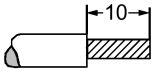
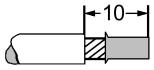
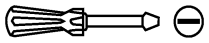
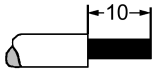
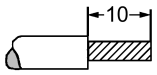
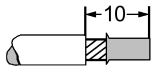
		Overload relay
Tool		Ø3.0 x 0.5 (3RA2908-1A)
Solid and stranded		2 x (0.5 to 2.5) mm²
Finely stranded without end sleeve		2 x (0.5 to 2.5) mm²
Finely stranded with end sleeve		2 x (0.5 to 1.5) mm²
AWG		2 x (20 to 14)

Table 8- 10 Removable terminal on the 3RB3 solid-state overload relay

		Removable terminal
Tool		Ø3.0 x 0.5 (3RA2908-1A)
Solid and stranded		2 x (0.25 to 1.5) mm²
Finely stranded without end sleeve		2 x (0.25 to 1.5) mm²
Finely stranded with end sleeve		2 x (0.25 to 1.5) mm²
AWG		2 x (24 to 16)

8.4.3 Conductor cross-sections for ring cable lug connection system

Conductor cross-sections for ring cable lug connection system

The tables below define the permissible conductor cross-sections for main terminals and auxiliary conductor connections in sizes S00 and S0 for ring cable lug connection systems.

Table 8- 11 Main conductors and auxiliary conductors of size S00 with M3 combination screws

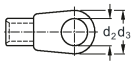
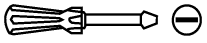
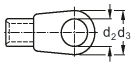
		SIRIUS devices
Tool		Pozidriv size 2, Ø 5 to 6 mm
Tightening torque		0.8 to 1.2 Nm
Ring cable lug [1]		d_2 = min. 3.2 mm
		d_3 = max. 7.5 mm

Table 8- 12 Main conductors and auxiliary conductors of size S0 with M4 combination screws

		SIRIUS devices
Tool		Pozidriv size 2, Ø 5 to 6 mm
Tightening torque		2.0 to 2.5 Nm
Ring cable lug [1]		d_2 = min. 4.3 mm
		d_3 = max. 12.2 mm

[1] The following ring cable lugs are approved for achieving the required clearances and creepage distances:

- For applications according to IEC 60947-1:
  - DIN 46237 (with insulating sleeve)
  - JIS CS805 type RAV (with insulating sleeve)
  - JIS CS805 type RAP (with insulating sleeve)
- For applications according to UL 508:
  - DIN 46 234 (without insulating sleeve)
  - DIN 46225 (without insulating sleeve)
  - JIS CS805 (without insulating sleeve)

A shrink-on sleeve must be used to insulate ring cable lugs without an insulating sleeve. The following conditions must be met:

- Application temperature: -55 °C to +155 °C
- UL 224 approved
- Flame-protected

DANGER

Hazardous voltage.

Will cause death or serious injury.

Only use approved ring cable lugs to meet the required clearances and creepage distances.

Operation

9

9.1 Setting the current

Setting the rated motor current on 3RU21/3RB30/3RB31 overload relays

3RU21 thermal overload relays and 3RB30/3RB31 solid-state overload relays are set to the rated motor current with a rotary knob.

Note

The overload relays may only be set between the upper and lower setting marks on the scale. A setting below or above the setting scale is not permissible.

The figure below shows how to set the rated motor current based on the example of the 3RU21 thermal overload relay, size S0.

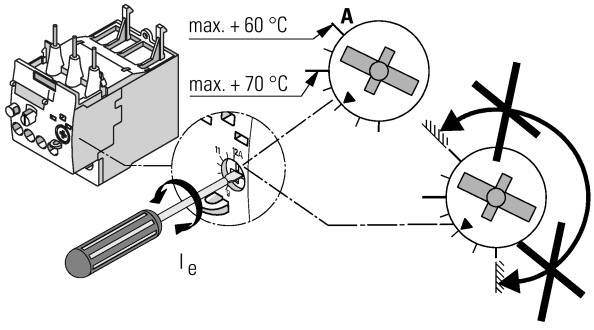


Figure 9-1 Setting the current I_e

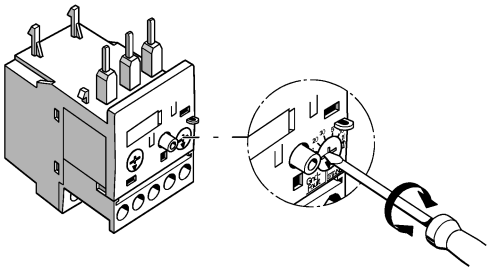
9.2 Setting the tripping class/ground-fault detection (3RB31)

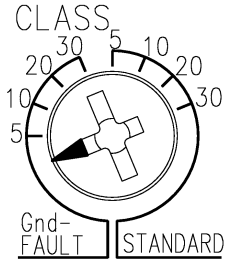
Key statement

In the case of 3RB31 solid-state overload relays, it is also possible to select the tripping class (CLASS 5E, 10E, 20E or 30E) via a second rotary knob using a screwdriver and activate or deactivate internal ground-fault monitoring.

There are 8 possible settings:

- CLASS 5E, 10E, 20E and 30E without ground-fault detection (STANDARD)
- CLASS 5E, 10E, 20E and 30E without ground-fault detection (Gnd-FAULT)

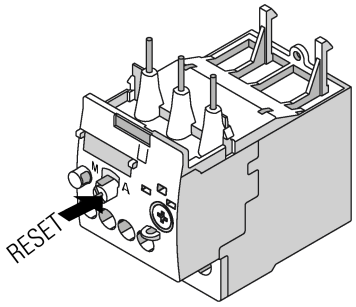




9.3 RESET after release

Manual and automatic reset

If manual reset is selected, resetting can be carried out directly on the device by pressing the RESET button.



A remote reset (remote RESET) is possible in conjunction with the mechanical and electrical RESET modules, which are available as accessories. If automatic RESET is set on the overload relay, the relay will be reset automatically.

⚠ WARNING

Automatic machine restart!

Can result in death, serious injury, or property damage.

If a switch-on command is present after an overload trip and a manual reset or automatic reset is performed, the machine will start up immediately. People may be injured if they stay in the danger area of the machine.

Make sure that the motor does not start up again following an overload trip until a new switch-on command has been issued (e.g. via an additional ON button) and that no one is in the machine danger zone at the time of restarting.

Recovery time following overload release

This time gives the load a chance to cool down.

- 3RU21 thermal overload relays

  The device cannot be reset until the bimetal strips have cooled down. The recovery time is dependent upon the tripping characteristic curve and the extent of the tripping current.

- 3RB30/3RB31 solid-state overload relays

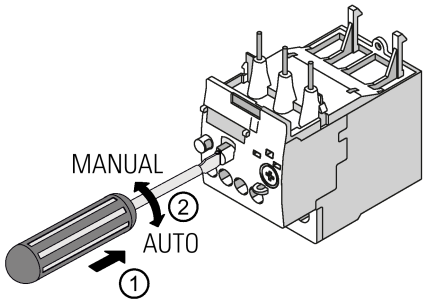
  In the case of the 3RB30/3RB31 solid-state overload relays, the recovery time is stored as a fixed value and is 3 minutes following a current-dependent release with automatic RESET selected.

  Following a trip, the 3RB30/3RB31 overload relays can be immediately reset locally on the device.

Setting the RESET function on the 3RU21 thermal overload relay

On the 3RU21 thermal overload relays, automatic and manual resetting is selected by pressing and turning the blue button (RESET button). The figure below shows how to switch between automatic and manual reset on the 3RU21 thermal overload relay, size S0.

Table 9- 1 Switching between manual and automatic on the 3RU21 thermal overload relay

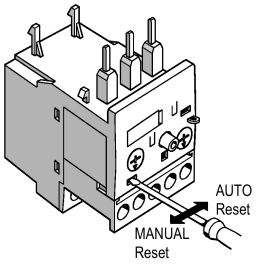
Step	Instructions	Figure
1	Press the blue RESET button down with a screwdriver.	
2	Turn the blue RESET button to M (manual reset) or A (automatic reset).	

Setting the RESET function on the 3RB30/3RB31 solid-state overload relay

In the case of the 3RB30/3RB31 solid-state overload relays, a slide switch can be used to choose between automatic and manual reset.

As an alternative to the local reset options, an electrical remote RESET (manual / automatic) can be implemented on 3RB31 solid-state overload relays by applying a 24 V DC voltage at terminals A3 and A4, which actuates an internal relay. To ensure that the internal relay will reliably switch, the voltage needs to be applied for at least 200 ms. During switching, the relay's current consumption amounts to as much as 200 mA for up to 20 ms, after which it drops to below 10 mA.

Table 9- 2 Switching between manual and automatic on 3RB30/3RB31 solid-state overload relays

Step	Instructions	Figure
1	Using a screwdriver, slide the switch to the required position.	

Reference

More information ...	Can be found in the Chapter ...
about optional mechanical and electrical RESET modules	Accessories (Page 83)

9.4 TEST function

Test function for the 3RU21 thermal overload relay

Correct functioning of the operational 3RU21 thermal overload relay can only be checked with the TEST slide. The tripping of the relay can be simulated by moving the slide with a screwdriver. This simulation process opens the NC contact and closes the NO contact, thereby checking that the auxiliary circuit has been wired to the overload relay correctly.

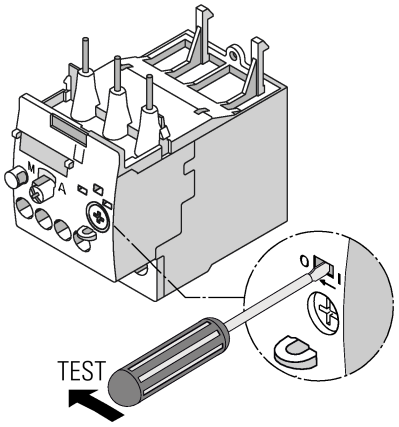


Figure 9-2 Executing a device test

Resetting

If the overload relay has been set to automatic RESET, the overload relay is automatically reset when the TEST slide is released. The relay must be reset with the RESET button if it has been set to manual RESET.

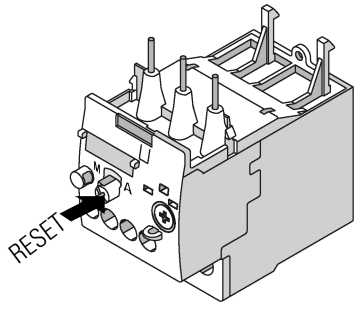


Figure 9-3 Resetting following device test

Test function for the 3RB30/3RB31 solid-state overload relay

Correct functioning of the relay when ready for operation can only be checked by pressing the TEST button with the motor current flowing (device/electronics test). Current sensing, the motor model, and the tripping unit are tested. If these components are OK, the device is tripped in accordance with the table below. In the event of an error, the device is not tripped.

Trip class	Required loading with the rated current prior to pressing the TEST button	Tripping within
CLASS 5E	3 min	30 s
CLASS 10E	5 min	1 min
CLASS 20E	10 mins	2 mins
CLASS 30E	15 mins	3 min

Note

The TEST button must be held down throughout the test. In this case the motor current must be > 80% of the current setting I_e and equal to at least the value of the lower current setting.

The switch position indicator slide can be used to test the auxiliary contacts and the control current wiring. The tripping of the relay can be simulated by moving the slide. This simulation process opens the NC contact and closes the NO contact, thereby checking that the auxiliary circuit has been wired correctly. The relay is reset after a test trip by pressing the RESET button.

The user test has been completed successfully if:

- The device trips within the maximum permissible time and
- Contact 95-96 is open (test for welding)

9.5 Response of the auxiliary contacts

Auxiliary contacts

The overload relay is equipped with an NO contact (NO 97-98) for the "tripped" signal and an NC contact (NC 95-96) for disconnecting the contactor. The auxiliary contacts have high contact reliability; this makes them suitable for PLCs. Furthermore, the high switching capacity facilitates direct switching of the contactor coil.

The table below shows how the auxiliary contacts respond when the TEST, STOP (3RU21 only), and RESET buttons are pressed.

	READY	TEST	STOP	RESET
NC 95/96				
NO 97/98				
Switch position indicator 3RB3			--	
Switch position indicator 3RU21				

Accessories

10

10.1 Accessories

For maximum flexibility, accessories can be added to the overload relays as required, easily, and without the need for tools.

Accessories	3RU21	3RB30	3RB31
Terminal support for stand-alone assembly	✓	✓	✓
Release slide (mechanical remote RESET), compatible for use with all sizes	✓	✓	✓
Cable release (mechanical remote RESET), compatible for use with all sizes	✓	✓	✓
Module for electrical remote RESET, compatible for use with all sizes	✓	--	--
Integrated electrical remote RESET 24 V DC	--	--	✓
Terminal cover for ring cable lug connections, compatible for use with all sizes	✓	--	--
Sealable cover	✓	✓	✓

10.2 Terminal support for stand-alone assembly

10.2.1 Description

3RU21 thermal overload relays and 3RB30/3RB31 solid-state overload relays can also be installed individually with the terminal supports for stand-alone assembly.

The terminal supports for stand-alone assembly are available for the sizes S00 and S0 in screw-type and spring-loaded connection systems. In size S2, the terminal support for stand-alone assembly is available in screw-type connection technology. A terminal support can be mounted on the thermal overload relay as well as on the solid-state overload relay.

10.2.2 Mounting/Disassembly

The terminal supports can be snapped onto 35 mm DIN rails according to DIN EN 60715. They can also be screw-mounted.

The figures below show how the terminal support for stand-alone assembly is mounted and removed, based on the example of a 3RU21 thermal overload relay (size S0 and S2).

Table 10- 1 Mounting the terminal support (screw-type connection system) size S0

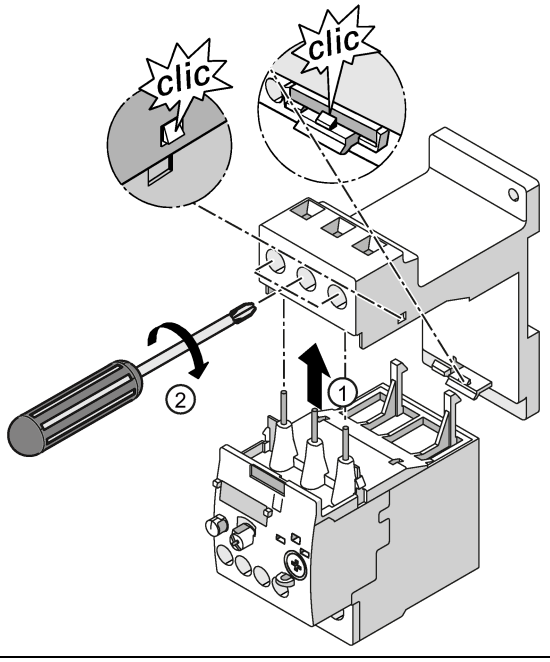
Step	Instructions	Figure
1	Guide the overload relay into the terminal support from below.	
2	Screw the contacts tight. Check that the cables are clamped tight.	

Table 10- 2 Mounting the terminal support (spring-loaded connection system) size S0

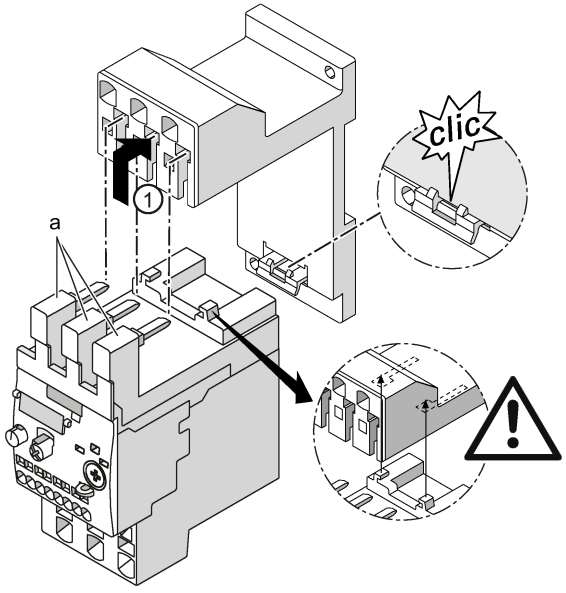
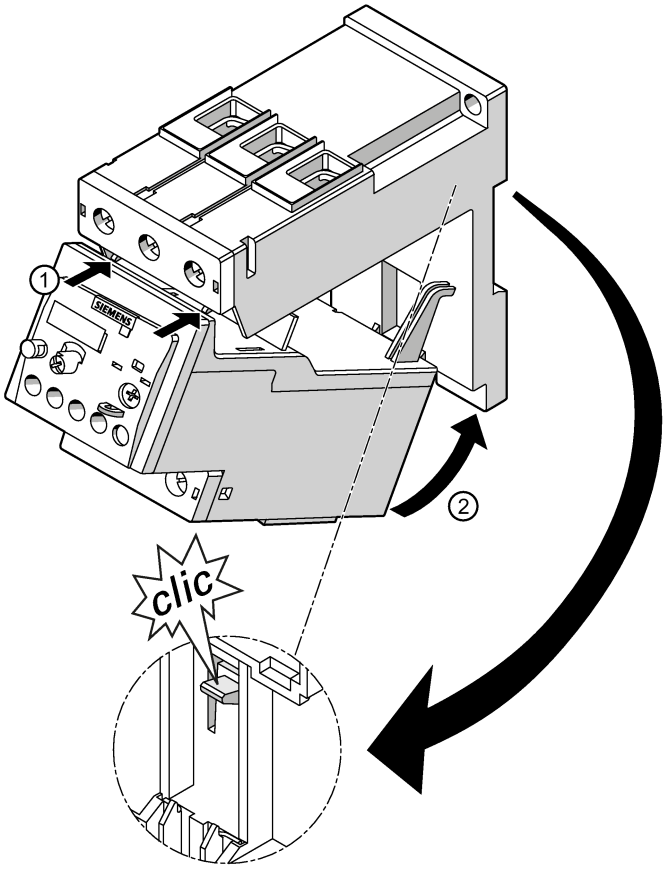
Step	Instructions	Figure
1	Insert the contacts (a) into the central opening of the main conductor terminals on the terminal support, with the contacts flush to the right. Make sure that the guide tabs are inserted into the designated slots on the terminal support.	

Table 10- 3 Mounting the terminal support (screw-type connection system) size S2

Step	Instructions	Figure
1 / 2	Guide the overload relay into the terminal support from below with a swivel movement.	

Disassembly

Table 10- 4 Removing the terminal support (screw-type connection system) size S0

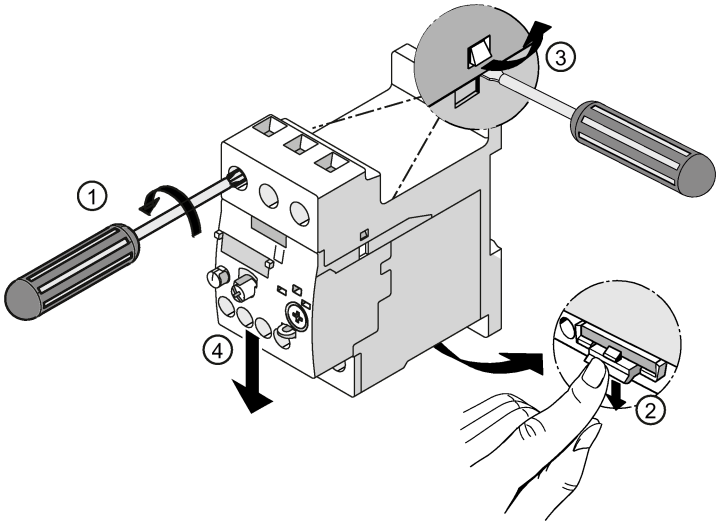
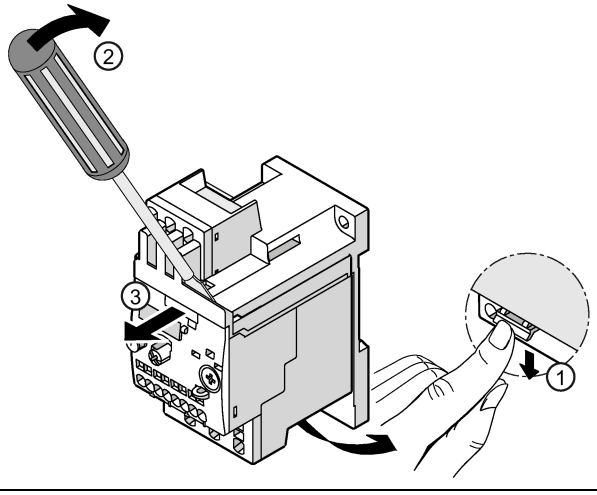
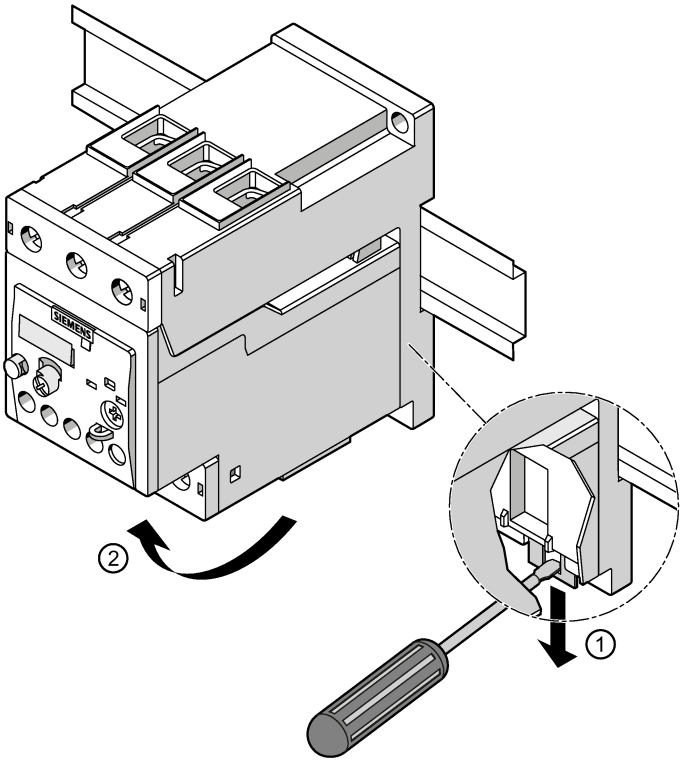
Step	Instructions	Figure
1	Undo the screws on the main conductor terminals.	
2	Release the overload relay by pushing down the clip on the underside of the terminal support.	
3	Release the terminal support from the overload relay with a screwdriver (only on size S00 and S0 devices).	
4	Pull the overload relay down and away from the terminal support.	

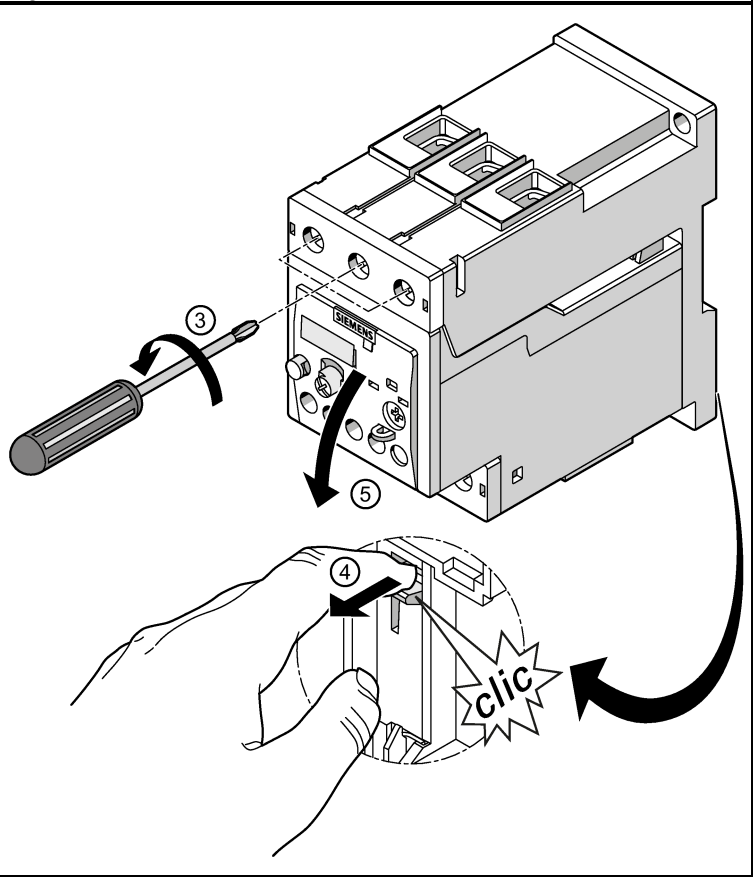
Table 10- 5 Removing the terminal support (spring-loaded connection system) size S0

Step	Instructions	Figure
1	Release the overload relay by pushing down the clip on the underside of the terminal support.	
2	Position the screwdriver on the terminal support as shown in the figure. Carefully dislodge the overload relay from the contactor.	
3	Pull the overload relay forward and away from the terminal support.	

The figure below shows how the terminal support for stand-alone assembly is removed, based on the example of a 3RU2136 thermal overload relay (size S2).

Table 10- 6 Removing the terminal support (screw-type connection system) size S2

Step	Instructions	Figure
1	Release the terminal support by pushing down the clip on the underside of the terminal support using a screwdriver.	
2	Remove the terminal support with the mounted overload relay from the mounting rail with a swivel movement to the front.	

Step	Instructions	Figure
3	Undo the screws on the main conductor terminals using a screwdriver.	
4	Release the overload relay by pushing down the clip on the rear of the terminal support.	
5	Pull the overload relay forward and away from the terminal support with a swivel movement.	

10.3 Mechanical remote RESET

Available versions

A mechanical remote reset option is also available for thermal overload relays and solid-state overload relays. There are two options for mechanical remote RESET:

- Release slide (Page 90)
- Cable release with holder for built-in overload relays which are hard to reach (Page 92)

10.3.1 Release slide

10.3.1.1 Description

Release slide

There is one release slide for thermal overload relays and one for solid-state overload relays; both are compatible for use with all sizes. The release slide with holder and former is used to activate the RESET from the control cabinet door; it is shortened to the required length. A pushbutton with extended travel and an extension plunger for compensation of the distance between the pushbutton and the relay's unlocking button are available for the release slide.

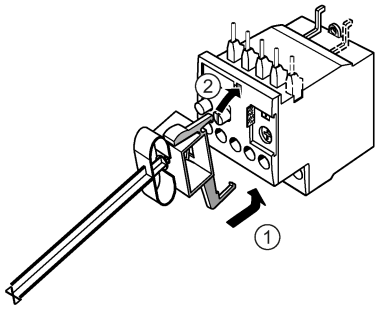
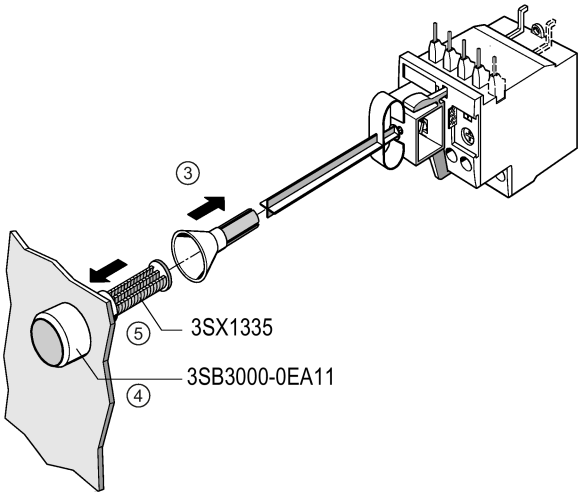
10.3.1.2 Mounting/Disassembly

The figure below shows how the release slide, the holder, the former, and the pushbutton are mounted based on the example of a size S00 3RU21 thermal overload relay:

Prerequisite

Before the release slide can be mounted, the release slide and the optional extension plunger have to be shortened to the required length.

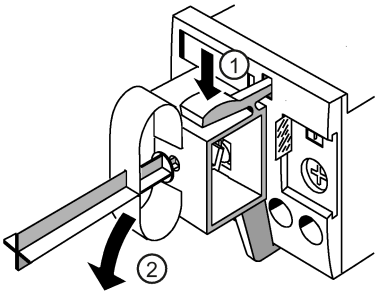
Table 10- 7 Mounting the release slide

Step	Instructions	Figure
1	Attach the hook on the release slide to the designated opening on the overload relay.	
2	Fold the module up so that the locking latch snaps into the overload relay.	
3	Attach the former to the release slide.	
4	Fit the pushbutton (3SB3000-0EA11) in the front cover.	
5	(Optional) Attach the pushbutton to the extension plunger (3SX1335).	

Disassembly

The figure below shows how to disassemble the holder based on the example of the 3RU21 thermal overload relay:

Table 10- 8 Disassembling the release slide

Step	Instructions	Figure
1	Press the locking latch down.	
2	Tilt the module toward you and take it off the overload relay.	

10.3.2 Cable release

10.3.2.1 Description

Cable release (compatible for use with all sizes)

There is one cable release with holder for built-in overload relays which are hard to reach for thermal overload relays and another for solid-state relays; both are compatible for use with all sizes.

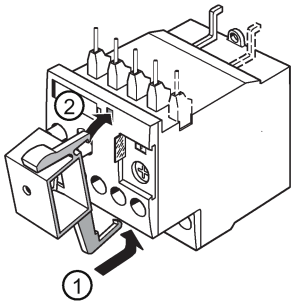
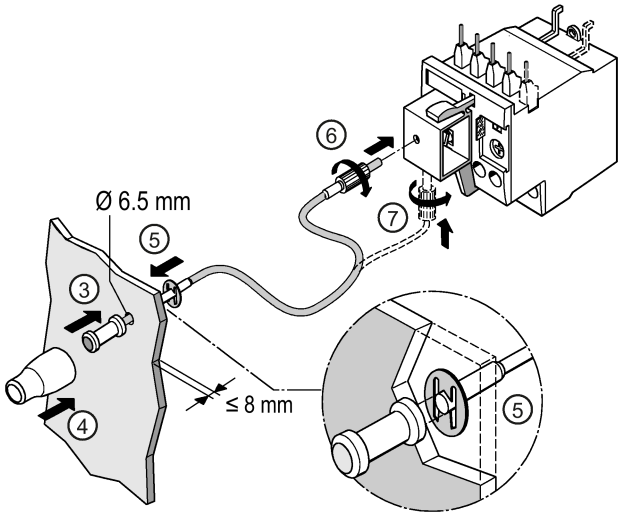
The cable is available in the following lengths:

- 400 mm and
- 600 mm

10.3.2.2 Mounting/Disassembly

The figure below shows how the cable release with holder is mounted based on the example of a size S00 3RU21 thermal overload relay:

Table 10- 9 Mounting the cable release

Step	Instructions	Figure
1	Attach the hook on the release slide to the designated opening on the overload relay.	
2	Fold the module up so that the locking latch snaps into the overload relay.	
3 / 4	Fit the actuating element into the front cover, and attach the sleeve to the actuating element.	
5	Secure the actuating element with the spring lock washer.	
6 / 7	Insert the cable release into the appropriate opening and turn to tighten.	

⚠ WARNING

Hazardous Voltage

Risk of death or serious injury.

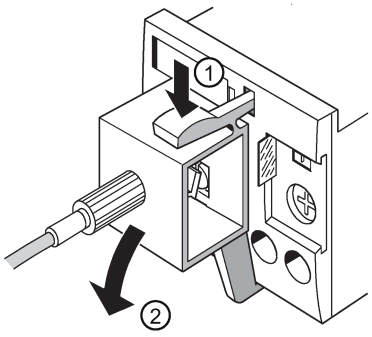
Before starting work, disconnect the system and the device from the power supply.

The cable pull must not come into contact with live parts.

Disassembly

The figure below shows how to disassemble the holder for the cable release based on the example of the 3RU21 thermal overload relay:

Table 10- 10 Cable release disassembly

Step	Instructions	Figure
1	Press the locking latch down.	
2	Tilt the module toward you and take it off the overload relay.	

10.4 Module for electrical remote RESET (3RU21 only)

10.4.1 Description

Function

An electrical remote RESET module which is compatible for use with all sizes is available for the 3RU21 thermal overload relay. This module enables the overload relay to be reset electrically from the control room following tripping. The module's coil is dimensioned for an operating duration of 0.2 s to 4 s; maintained-contact operation is not permissible.

10.4.2 Connecting the remote RESET

Connection

The screw connections on the terminals of the electrical remote RESET module have the same format as the screw connections on the auxiliary contacts of the 3RU21 overload relay.

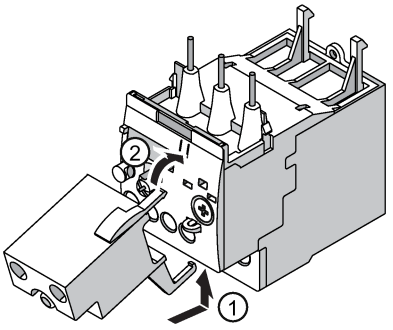
Table 10- 11 Connection data for the remote RESET

Operating range	The operating range of the coil is 0.85 to 1.1 x U_s
Power input	The power input of the electrical remote RESET module is: 80 V AC, 70 W DC
Switching frequency	60/h
Voltages	The electrical remote RESET module is available for the following voltages: • 24 to 30 V AC/VDC • 110 to 127 V AC/VDC • 220 to 250 V AC/VDC

10.4.3 Mounting/Disassembly

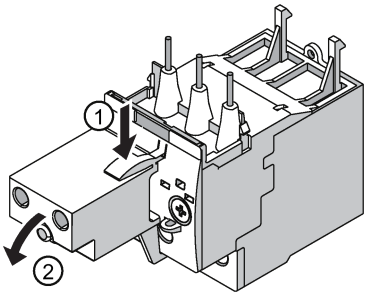
The figure below shows how to assemble the electrical remote RESET module based on the example of size S0.

Table 10- 12 Mounting the electrical remote RESET module on the thermal overload relay

Step	Operating instruction	Figure
1	Attach the hook to the designated opening.	
2	Fold the module up so that the locking latch snaps into the overload relay.	

Disassembly

Table 10- 13 Disassembling the electrical remote RESET module from the thermal overload relay

Step	Operating instruction	Figure
1	Press the locking latch down.	
2	Tilt the module toward you and take it off the overload relay.	

10.5 Sealable cover

10.5.1 Description

Sealable cover

There is one sealable cover for thermal overload relays and one for solid-state relays; both are compatible for use with all sizes. The 3RV2908-0P cover can be used as an accessory for 3RU2 thermal overload relays and 3RV2 motor starter protectors/circuit breakers (acc. to UL).

The sealable cover can be used to protect the rotary button for setting the rated motor current and the CO contact for the tripping classes (3RB31 only) against unauthorized manipulation.

10.5.2 Mounting

Table 10- 14 Mounting the sealable cover on the 3RU21 overload relay

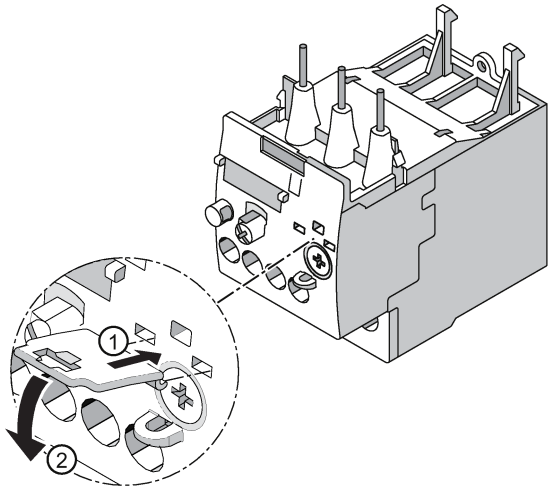
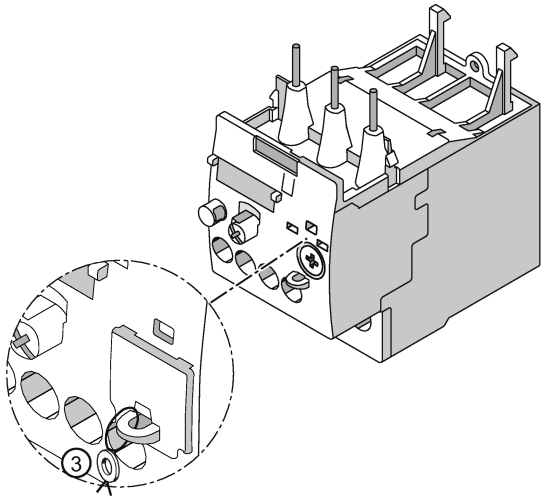
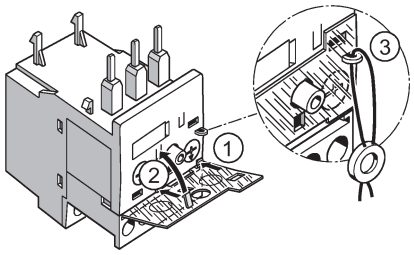
Step	Operating instruction	Figure
1 / 2	Attach the hooks on the cover to the openings on the overload relay and fold the cover down.	
3	Seal the cover to secure it against unauthorized removal.	

Table 10- 15 Mounting the sealable cover on the 3RB30/3RB31 overload relay

Step	Operating instruction	Figure
1 / 2	Attach the hooks on the cover to the openings on the overload relay and fold the cover up.	
3	Seal the cover to secure it against unauthorized removal.	

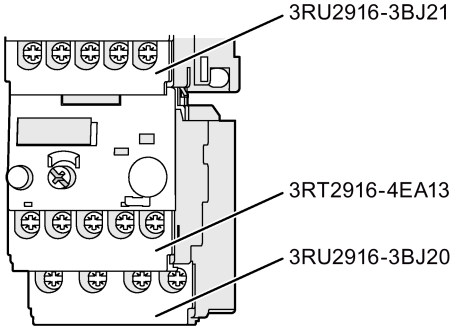
10.6 Covers for ring cable lug connections

10.6.1 Description

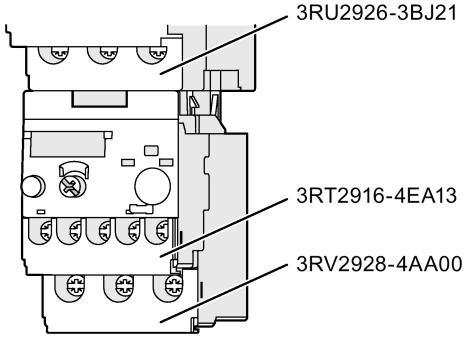
Function

Covers must be fitted to thermal overload relays with ring cable lug connection system to achieve finger-safety according to IEC 61140. Both line-side and output-side covers are available.

Additional covers are not required for devices with spring-loaded and screw-type connection systems.



Size S00, 3RU2116



Size S0, 3RU2126

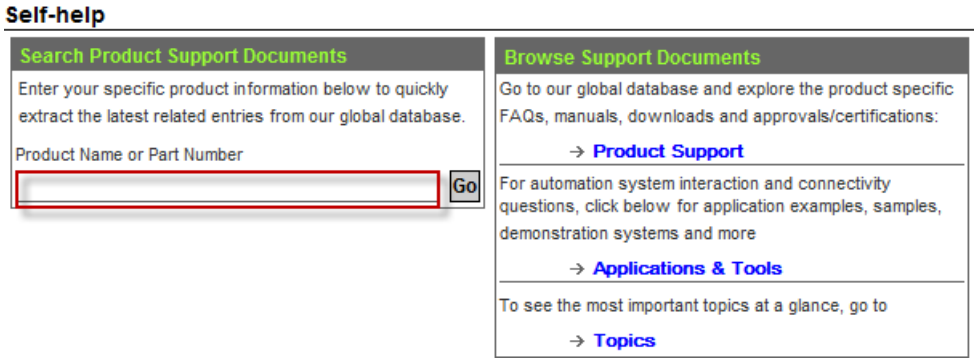
Technical data

11

11.1 Product data sheet

You will find the current SIRIUS Innovations product data sheets in the Service&Support Portal (http://support.automation.siemens.com).

Enter the article number of the device in the "Product Name or Part Number" field and confirm your selection by clicking on the "Go" button.



On the "Product Support" page, select the "Technical/CAx data" tab.

Select the "Technical Data" option box and a list of the contents of the product data sheet will appear:

- Technical data
- Approvals/Certificates
- Dimension drawing
- Wiring diagram
- Internal circuit diagram

3RT2015-1AB01 CONTACTOR,AC3:3KW 1NO AC24V 50/60HZ

Product information | Entries | Technical / CAx data | Modification Manual | Successor product

Technical Data | CAx data

CONTACTOR, AC-3, 3KW/400V, 1NO, AC 24V, 50/60 HZ, 3-POLE, SZ S00 SCREW TERMINAL

General technical data:		
product brand name		SIRIUS
Size of the contactor		S00
Product extension		
• auxiliary switch		Yes
• function module for communication		No
Protection class IP / on the front		IP20
Protection against electrical shock		finger-safe
Degree of pollution		3
Installation altitude / at a height over sea level / maximum	m	2,000
Ambient temperature		
• during storage	°C	-55...+80
• during operating	°C	-25...+60
Shock resistance		
• at rectangular impulse		
• at AC		6,7g / 5 ms, 4,2g / 10 ms
• at sine pulse		
• at AC		10,5g / 5 ms, 6,6g / 10 ms
Impulse voltage resistance / rated value	kV	6
Insulation voltage / rated value	V	690
Maximum permissible voltage for protective separation / between coil and main contacts / in	V	400

Using the "Create PDF" button on the right-hand side, you have the option of downloading your selection in a PDF file.
All information on the product you have chosen is at your disposal free of charge around the clock and you always get the current version.

11.2 Performance features

11.2.1 General data

Table 11- 1 General data for 3RU21 and 3RB30/3RB31 overload relays

Feature	Description	3RU21	3RB30/3RB31
Sizes	• Are matched to the dimensions, connections and technical features of the other devices in the SIRIUS modular system (contactors, etc.) • Permit the mounting of slim-line and compact load feeders in widths of 45 mm (S00), 45 mm (S0) and 55 mm (S2) • Make configuration easier	S00 / S0 / S2	S00 / S0 / S2
Overlapping current range	• Allows straightforward and consistent configuration with one series of overload relays (for small to large loads)	0.11 to 80 A	0.1 to 80 A

11.2.2 Protection functions - overview

Table 11- 2 Protection functions supported by 3RU21 and 3RB30/3RB31 overload relays

Feature	Description	3RU21	3RB30/3RB31
Tripping in the event of overload	• Provides optimum current-dependent protection of loads against impermissibly high temperature rise due to overload	✓	✓
Tripping in the event of phase asymmetry	• Provides optimum current-dependent protection of loads against impermissibly high temperature rise due to phase asymmetry	✓	✓
Tripping in the event of phase failure	• Minimizes the temperature rise of the three-phase motor in the event of a phase failure	✓	✓
Protection of single-phase loads	• Enables single-phase loads to be protected	✓	--
Tripping in the event of ground fault by means of internal ground-fault detection (can be activated)	• Provides optimum protection of loads in the event of high-impedance faults to ground caused by moisture, condensation, damaged insulation, etc. • Eliminates the need for additional special equipment • Saves space in the control cabinet • Reduces wiring time and wiring costs	--	✓ (3RB31 only)

11.2.3 Equipment

Table 11- 3 Equipment on 3RU21 and 3RB30/3RB31 overload relays

Feature	Description	3RU21	3RB30/3RB31
RESET function	• Enables manual or automatic resetting of the relay	✓	✓
Remote RESET function	• Enables remote resetting of the relay	✓ 1)	✓ 2)
TEST function for auxiliary contacts	• Enables simple function testing and wiring	✓	✓
TEST function for electronics	• Allows checking of the electronics	--	✓
Status display	• Displays the current operating state	✓	✓
Integrated auxiliary contacts:			
1 NO contact	• Can be used to output signals	✓	✓
1 NC contact	• Enable shutdown of the connected contactor to protect the load	✓	✓

1) Via a separate module.

2) Only on the 3RB31 electrically with 24 V DC.

11.2.4 Configuration of load feeders

Table 11- 4 Configuration of load feeders with 3RU21 and 3RB30/3RB31

Feature	Description	3RU21	3RB30/3RB31
Short-circuit-proof up to 100 kA at 690 V (in conjunction with the appropriate fuses or the appropriate motor starter protector)	• Provides optimum protection of the loads and operating personnel in the event of short circuits due to insulation faults or faulty switching operations	✓	✓
Electrical and mechanical matching to 3RT2 contactors	• Simplifies configuration • Reduces connection outlay and costs • Enables stand-alone installation as well as space-saving direct mounting	✓	✓
Spring-loaded connection system	• Enables fast connections • Ensures that connections are vibration-resistant • Enables maintenance-free connections	✓	✓

11.2.5 Features of overload relays

Table 11- 5 Other characteristics of 3RU21 and 3RB30/3RB31 overload relays

Feature	Description	3RU21	3RB30/3RB31
Temperature compensation	• Allows the use of the relays without derating even at high temperatures • Prevents premature tripping • Allows compact control cabinet installation without clearance between the devices/load feeders • Simplifies configuration • Enables space to be saved in the control cabinet	✓	✓
High long-term stability	• Provides reliable protection of loads even after years under severe operating conditions	✓	✓
Wide setting ranges	• Reduce the number of variants • Minimize the engineering outlay and costs • Enable savings to be made where storage overheads, storage costs, and tied-up capital are concerned	--	✓ (1:4)
Tripping class CLASS 5E	• Enables solutions for motors which start up very quickly and require special protection measures	--	✓ (3RB31 only)
Tripping class > CLASS 10E	• Enable solutions for heavy-duty starting	--	✓
Low power loss	• Reduces power consumption (power consumption is up to 98% less than with thermal overload relays) and thus energy costs • Minimizes the temperature rise of the contactor and the control cabinet - in some cases this may eliminate the need for control cabinet cooling • Enables space to be saved through direct mounting on the contactor even at high motor currents (i.e. no heat decoupling is required)	--	✓
Intrinsic supply	• Eliminates the need for configuration and connecting an additional control circuit	--[1)]	✓
Variable setting of tripping classes (The required tripping class can be set dependent upon the prevailing starting conditions using a rotary switch.)	• Reduces the number of variants • Minimizes the engineering outlay and costs • Enables savings to be made where storage overheads, storage costs, and tied-up capital are concerned	--	✓ (3RB31 only)

[1)] As SIRIUS 3RU21 thermal overload relays work on the basis of the bimetal principle, they do not require a control supply voltage.

11.3 3RU21 thermal overload relays

11.3.1 3RU2116/3RU2126 thermal overload relays

11.3.1.1 General technical data

General technical data for 3RU2116/3RU2126 overload relays

Table 11- 6 General technical data for 3RU2116/3RU2126 overload relays

Type		**3RU2116**	**3RU2126**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Tripping in the event of		Overload and phase failure	
Tripping class acc. to IEC/EN 60947-4-1		CLASS 10	
Phase loss sensitivity		Yes	
Overload warning		No	
Resetting and recovery			
• Reset options following tripping		Manual, automatic, and remote RESET[1)]	
• Recovery time		Depending on the level of the tripping current and the tripping characteristic curve	
Equipment			
• Display of operating state on device		Yes, by means of TEST function/switch position indicator slide	
• TEST function		Yes	
• RESET key		Yes	
• STOP button		Yes	
ATEX		Suitable for overload protection of explosion-proof motors of protection type "increased safety" Ex e	
• EC type examination certificate number according to Directive 94/9/EC (ATEX)		DMT 98 ATEX G 001	
Ambient temperature			
• Storage/transport	°C	-55 ... + 80	
• Operation	°C	-40 ... + 70	
• Temperature compensation	°C	Up to 60	
• Permissible rated current for control cabinet internal temperature			
- Up to 60° C	%	100 (current reduction is required above +60 °C)	
- 60 °C to 70 °C	%	87	

Type		**3RU2116**	**3RU2126**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Repeat terminals			
• Coil repeat terminal		Yes	Not required
• Auxiliary switch repeat terminal		Yes	Not required
Degree of protection acc. to IEC 60529		IP20	
Touch protection acc. to IEC 61140		Screw connection and spring-loaded terminals: finger-safe Ring cable lug connection: finger-safe only with optional terminal covers	
Shock resistance with sine acc. to IEC 60068-2-27		15g / 11 ms [2]	
Resistance to extreme climates - Humidity	%	90	
Dimensions		See Dimension drawings for 3RU21 thermal overload relays (Page 151)	
Installation altitude above sea level	m	Up to 2,000; above this, please contact us	
Mounting position		See Minimum clearances and mounting position (Page 59)	
Type of fixing		Contactor mounting/stand-alone assembly with terminal support[3]	

[1] Remote RESET in conjunction with the appropriate accessory

[2] Auxiliary contacts 95/96 and 97/98: 8g / 11 ms.

[3] For screw and snap-on mounting onto DIN rail TH 35.

11.3.1.2 Main circuit

Technical data for the main circuit, 3RU2116/3RU2126 overload relays

Table 11- 7 Technical data for the main circuit, 3RU2116/3RU2126 overload relays

Type		**3RU2116**	**3RU2126**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Rated insulation voltage U_i (pollution degree 3)	V	690	
Rated impulse withstand voltage U_{imp}	kV	6	
Rated operating voltage U_e	V	690	
Type of current			
• DC current		Yes	
• AC current		Yes, frequency range up to 400 Hz	
Current setting	A	0.11 to 0.16 to 11 to 16	1.8 to 2.5 to 34 to 40
Power loss per device (max.)	W	4,1 ... 6,3	5,1 ... 7,5
Short-circuit protection			
• With fuse without contactor		See "Selection and ordering data" in Catalog IC 10 - SIRIUS	
• With fuse and contactor		See the configuration guide titled "Configuring SIRIUS Innovations - Selection data for load feeders in fuseless and fused designs (http://support.automation.siemens.com/WW/view/en/50250592)".	
Protective separation between main and auxiliary current paths acc. to IEC/EN 60947-1	V	440	440 / 690 [2)]

[2)] 690 V operating voltage for protective separation applies to devices with screw or ring cable lug connection up to the 25 A setting range. 440 V applies in excess of this and in the case of devices with spring-loaded connection.

11.3.1.3 Main circuit terminals

Technical data for main circuit connection, 3RU2116/3RU2126 overload relays

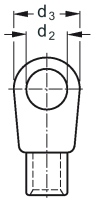
Table 11- 8 Technical data for main circuit connection, 3RU2116/3RU2126 overload relays

Type		**3RU2116**	**3RU2126**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Connection type		**Screw connection**	
• Connection screw		M3, Pozidriv size 2	M4, Pozidriv size 2
• Operating tool		∅ 5 ... 6	∅ 5 ... 6
• Tightening torque	Nm	0,8 ... 1,2	2 ... 2,5
• Conductor cross-sections (min./max.), 1-wire or 2-wire connection possible			
- Solid	mm^2	2 x (0.5 to 1.5)[1)] 2 x (0.75 to 2.5)[1)] max. 2 x 4	2 x (1 to 2.5)[1)] 2 x (2.5 to 10)[1)]
- Finely stranded with end sleeve (DIN 46228 Part 1)	mm^2	2 x (0.5 to 1.5)[1)] 2 x (0.75 to 2.5)[2)]	2 x (1 to 2.5)[1)] 2 x (2.5 to 6)[1)] max. 1 x 10
- AWG cables, solid or stranded	AWG	2 x (20 to 16)[1)] 2 x (18 to 14)[1)] 2 x 12	2 x (16 to 12)[1)] 2 x (14 to 8)[1)]
Connection type		**Spring-loaded connection**	
• Operating tool		∅ 3.0 x 0.5 ∅ 3.5 x 0.5	
• Conductor cross-sections (min./max.)			
- Solid	mm^2	1 x (0.5 to 4)	1 x (1 to 10)
- Finely stranded without end sleeve	mm^2	1 x (0.5 to 2.5)	1 x (1 to 6)
- Finely stranded with end sleeve (DIN 46228 Part 1)	mm^2	1 x (0.5 to 2.5)	1 x (1 to 6)
- AWG cables, solid or stranded	AWG	1 x (20 to 12)	1 x (18 to 8)

Type		**3RU2116**	**3RU2126**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Connection type		**Ring cable lug connection**	
Connection screw		M3, Pozidriv size 2	M4, Pozidriv size 2
Operating tool	mm	∅ 5 ... 6	∅ 5 ... 6
Specified tightening torque	Nm	0,8 ... 1,2	2 ... 2,5
Ring cable lugs that can be used	mm	d_2[2)] = min. 3.2, d_3[2)] = max. 7.5	d_2[2)] = min. 4.3, d_3[2)] = max. 12.2
• DIN 46234 without insulating sleeve			
• DIN 46225 without insulating sleeve			
• DIN 46237 with insulating sleeve			
• JIS C2805 type R without insulating sleeve			
• JIS C2805 type RAV with insulating sleeve			
• JIS C2805 type RAP with insulating sleeve			

1) If two different conductor cross-sections are being connected to one clamping point, both cross-sections must be located in the range indicated. If identical cross-sections are used, this restriction does not apply.

2) 690 V operating voltage for protective separation applies to devices with screw or ring cable lug connection up to the 25 A setting range. 440 V applies in excess of this and in the case of devices with spring-loaded connection.



11.3.1.4 Auxiliary circuit

Technical data for the auxiliary circuit, 3RU2116/3RU2126 overload relays

Table 11- 9 Technical data for the auxiliary circuit, 3RU2116/3RU2126 overload relays

Type		**3RU2116**	**3RU2126**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Number of NO contacts			1
Number of NC contacts			1
Auxiliary contacts - Assignment			1 NO for the "tripped" signal; 1 NC for disconnecting the contactor
Rated insulation voltage U_i (pollution degree 3)	V		690
Rated impulse withstand voltage U_{imp}	kV		6
Contact rating of the auxiliary contacts			
• NC with alternating current AC-14/AC-15, rated operating current I_e at U_e:			
- 24 V	A		4
- 120 V	A		4
- 125 V	A		4
- 230 V	A		3
- 400 V	A		2
- 600 V	A		0,75
- 690 V	A		0,75
• NO with alternating current AC-14/AC-15, rated operating current I_e at U_e:			
- 24 V	A		3
- 120 V	A		3
- 125 V	A		3
- 230 V	A		2
- 400 V	A		1
- 600 V	A		0,75
- 690 V	A		0,75
• NC, NO with direct current DC-13, rated operating current I_e at U_e:			
- 24 V	A		2
- 110 V	A		0,22
- 125 V	A		0,22
- 220 V	A		0,11
• Conventional thermal current I_{th}	A		6

Type		**3RU2116**	**3RU2126**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Short-circuit protection			
• With fuse			
- Operating class gL/gG	A		6
- Quick-response	A		10
• With miniature circuit breaker (C characteristic)	A		6[1)]
Protective separation between auxiliary current paths acc. to IEC/EN 60947-1	V		440
CSA and UL rated data			
Auxiliary circuit – Switching capacity			B600, R300

1) Up to $I_k \leq 0.5$ kA; U ≤ 260 V

11.3.1.5 Auxiliary circuit connections

Technical data for auxiliary circuit connection, 3RU2116/3RU2126 overload relays

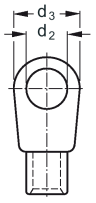
Table 11- 10 Technical data for auxiliary circuit connection, 3RU2116/3RU2126 overload relays

Type		**3RU2116**	**3RU2126**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Connection type		**Screw connection**	
• Connection screw			M3, Pozidriv size 2
• Operating tool	mm		∅ 5 ... 6
• Tightening torque	Nm		0,8 ... 1,2
• Conductor cross-sections (min./max.), 1-wire or 2-wire			
- Solid	mm^2		2 x (0.5 to 1.5)[1)]; 2 x (0.75 to 2.5)[1)]
- Finely stranded with end sleeve (DIN 46228 Part 1)	mm^2		2 x (0.5 to 1.5)[1)]; 2 x (0.75 to 2.5)[1)]
- AWG cables, solid or stranded	AWG		2 x (20 to 16)[1)], 2 x (18 to 14)[1)]

Type		**3RU2116**	**3RU2126**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Connection type		**Spring-loaded connection**	
• Operating tool	mm	∅ 3.0 x 0.5. ∅ 3.5 x 0.5	
• Conductor cross-sections (min./max.)			
- Solid	mm^2	2 x (0.5 to 2.5)	
- Finely stranded without end sleeve	mm^2	2 x (0.5 to 2.5)	
- Finely stranded with end sleeve (DIN 46228 Part 1)	mm^2	2 x (0.5 to 1.5)	
- AWG cables, solid or stranded	AWG	2 x (20 to 14)	
Connection type		**Ring cable lug connection**	
Connection screw		M3, Pozidriv size 2	
Operating tool	mm	∅ 5 ... 6	
Specified tightening torque	Nm	0,8 ... 1,2	
Ring cable lugs that can be used	mm	d_2[2)] = min. 3.2, d_3[2)] = max. 7.5	
• DIN 46234 without insulating sleeve			
• DIN 46225 without insulating sleeve			
• DIN 46237 with insulating sleeve			
• JIS C2805 type R without insulating sleeve			
• JIS C2805 type RAV with insulating sleeve			
• JIS C2805 type RAP with insulating sleeve			

1) If two different conductor cross-sections are being connected to one clamping point, both cross-sections must be located in the range indicated. If identical cross-sections are used, this restriction does not apply.

2)



11.3.2 3RU2136 thermal overload relay

11.3.2.1 General technical data

General technical data for 3RU2136 overload relays

		3RU2136-....
product brand name		SIRIUS
Product designation		3RU2 thermal overload relay
Size of overload relay		S2
Number of poles for main current circuit		3
Size of the contactor can be combined company-specific		S2
Product component		
• RESET button		Yes
• STOP pushbutton		Yes
• trip indicator		Yes
Product function removable terminal for auxiliary and control circuit		No
Product component auxiliary switch		Yes
Installation altitude at a height over sea level maximum	m	2000
Ambient temperature		
• during transport	°C	-55 … +80
• during storage	°C	-55 … +80
• during operating	°C	-40 … +70
Design of display for switching status		Slide switch
Relative humidity during operating phase	%	0 … 90
Resistance against vibration		—
Shock resistance according to IEC 60068-2-27		8g / 11 ms
Protection class IP		
• of the terminal		IP00
• on the front		IP20
varification of suitability concerning ATEX		on request
Temperature compensation	°C	-40 … +60

		3RU2136-....
Item designation according to DIN EN 81346-2		F
maximum permissible voltage for safe isolation		
• in networks with grounded star point between main and auxiliary circuit	V	690
• in networks with grounded star point between main and auxiliary circuit	V	690
• in networks with grounded star point between auxiliary and auxiliary circuit		415
• in networks with non-grounded star point between auxiliary and auxiliary circuit		415

11.3.2.2 Main circuit

Technical data for the main circuit, 3RU2136 overload relays

		3RU2136-....
Insulation voltage with degree of pollution 3 rated value	V	690
Impulse voltage resistance rated value	kV	6
Operating voltage rated value	V	690
Voltage type for main circuit		AC/DC
Operating frequency		
• rated value	Hz	50 … 60
Type of assignement		2
Derating factor for rated value of the operating current up to 60 °C interior cabinet temperature		1
Derating factor for rated value of the operating current up to 70 °C interior cabinet temperature		0.87

11.3.2.3 Main circuit terminals

Technical data for main circuit connection, 3RU2136 overload relays

		3RU2136-....
Arrangement of electrical connectors for main current circuit		Top and bottom
Design of the electrical connection for main current circuit		screw-type terminals
Type of the connectable conductor cross-section		
• for main contacts		
– solid or multi-stranded		2x (1 ... 35 mm²), 1x (1 ... 50 mm²)
– finely stranded with conductor end processing		2x (1 ... 25 mm²), 1x (1 ... 35 mm²)
• for AWG conductors for main contacts		2x (18 ... 2), 1x (18 ... 1)
Tightening torque for main contacts with screw-type terminals	N·m	3 … 4.5
Design of the thread of the connection screw for main contacts		M6
Design of screwdriver shaft		5 to 6 mm diameter
size of screwdriver tip		Pozidriv PZ 2

11.3.2.4 Auxiliary circuit

Technical data for the auxiliary circuit, 3RU2136 overload relays

		3RU2136-....
Number of NO contacts for auxiliary contacts		1
• note		for message "Tripped"
Number of NC contacts for auxiliary contacts		1
• note		for contactor disconnection
Voltage type for auxiliary and control circuit		AC/DC
Design of the fuse link for short-circuit protection of the auxiliary switch required		fuse gL/gG: 6 A, quick: 10 A
Design of the auxiliary switch		integrated
Number of changeover contacts for auxiliary contacts		0
Operating current of the auxiliary contacts at AC-15		
• at 24 V	A	3
• at 110 V		3
• at 120 V		3
• at 125 V		3
• at 230 V		2
• at 400 V		1
• at 600 V		0.75
• at 690 V	A	0.75
Operating current of the auxiliary contacts at DC-13		
• at 24 V	A	2
• at 110 V	A	0.22
• at 125 V		0.22
• at 220 V		0.11
Recovery time after overload trip		
• with automatic reset typical	s	600
• with remote-reset	s	600
• with manual reset	s	600

11.3.2.5 Auxiliary circuit connections

Technical data for auxiliary circuit connection, 3RU2136 overload relays

		3RU2136-..B.	3RU2136-..D.
Design of the electrical connection for auxiliary and control current circuit		screw-type terminals	spring-loaded terminals
Type of the connectable conductor cross-section			
• for auxiliary contacts			
– solid or multi-stranded		2x (0,5 ... 1,5 mm²), 2x (0,75 ... 2,5 mm²)	2x (0,5 ... 2,5 mm²)
– finely stranded			
– without conductor final cutting		—	2x (0,5 ... 2,5 mm²)
– with conductor end processing		2x (0,5 ... 1,5 mm²), 2x (0,75 ... 2,5 mm²)	2x (0,5 ... 1,5 mm²)
• for AWG conductors		2x (20 ... 16), 2x (18 ... 14)	2x (20 ... 14)
Tightening torque for auxiliary contacts			
• with screw-type terminals	N·m	0.8 … 1.2	—
Design of the thread of the connection screw of the auxiliary and control pins		M3	—

11.3.2.6 Protection function

Technical data for the protection function, 3RU2136 overload relays

	3RU2136-....
Product function overload protection	Yes
Product function overload warning	No
Product function phase disturbance recognition	Yes
Product function short-circuit to earth recognition	No
Design of the overload circuit breaker	thermal

11.3.2.7 Safety

Technical data for safety, 3RU2136 overload relays

You can obtain information on the safety-related data of 3RU2136 thermal overload relays from the Product Data Sheet (Page 101) or upon request from Technical Assistance (http://www.siemens.com/sirius/technical-assistance).

11.3.2.8 Mounting/fixing/dimensions

Technical data for mounting/fixing/dimensions, 3RU2136 overload relays

		3RU2136-...0	3RU2136-...1
Mounting type		direct mounting	stand-alone installation
mounting position		any	
Depth	mm	105	117
Height	mm	90	105
Width	mm	55	
Distance, to be maintained, conductive elements			
• downwards	mm	10	
• backwards	mm	0	
• sidewards	mm	10	
• forwards	mm	10	
• upwards	mm	10	
Distance, to be maintained, to earthed part			
• downwards	mm	10	
• backwards	mm	0	
• sidewards	mm	10	
• forwards	mm	10	
• upwards	mm	10	

11.3.2.9 UL/CSA rated data

Technical data - UL/CSA rated data, 3RU2136 overload relays

		3RU2136-....
Operating voltage according to UL 60947 rated value	V	600
Contact rating designation for auxiliary contacts according to UL		B600 / R300

11.3.2.10 Rated operating current, short-circuit protection, tripping class, and active power loss

Technical data for current and short-circuit protection

	Adjustable response current of the current-dependent overload release		Design of the fuse link for short-circuit protection of the main circuit necessary	Trip class	Active power loss total typical
	initial value	final value			
	A	A			W
3RU2136-4A..	11	16	fuse gL/gG: 40 A	CLASS 10	8
3RU2136-4B..	14	20	Fuse gL/gG: 50 A	CLASS 10	8
3RU2136-4D..	18	25	fuse gL/gG: 63 A	CLASS 10	8
3RU2136-4E..	22	32	Fuse gL/gG: 80 A	CLASS 10	11
3RU2136-4F..	28	40	Fuse gL/gG: 80 A	CLASS 10	11
3RU2136-4G..	36	45	fuse gL/gG: 100 A	CLASS 10	11
3RU2136-4H..	40	50	fuse gL/gG: 100 A	CLASS 10	11
3RU2136-4Q..	47	57	fuse gL/gG: 100 A	CLASS 10	11
3RU2136-4J..	54	65	fuse gL/gG: 125 A	CLASS 10	12
3RU2136-4K..	62	73	fuse gL/gG: 160 A	CLASS 10A	13
3RU2136-4R..	70	80	fuse gL/gG: 160 A	CLASS 10A	14

Technical data for rated operating current UL/CSA

	Full-load current (FLA) for 3-phase motor	
	at 480 V rated value	at 600 V rated value
	A	A
3RU2136-4A..	16	16
3RU2136-4B..	20	20
3RU2136-4D..	25	25
3RU2136-4E..	32	32
3RU2136-4F..	40	40
3RU2136-4G..	45	45
3RU2136-4H..	50	50
3RU2136-4Q..	57	57
3RU2136-4J..	65	65
3RU2136-4K..	73	73
3RU2136-4R..	80	80

11.4 3RB30/3RB31 solid-state overload relays

11.4.1 3RB301/3RB302/3RB311/3RB312 solid-state overload relays

11.4.1.1 General technical data

General technical data for 3RB30/3RB31 overload relays

Table 11- 11 General technical data for 3RB30/3RB31 overload relays

Type			3RB301., 3RB311.	3RB302., 3RB312.
Size			**S00**	**S0**
Width			**45 mm**	**45 mm**
Tripping in the event of			Overload, phase failure, and phase asymmetry + ground fault (3RB31 only)	
Tripping class acc. to IEC/EN 60947-4-1		CLASS	3RB30: 10E/20E, 3RB31: 5E, 10E, 20E and 30E adjustable	
Phase loss sensitivity			Yes	
Overload warning			No	
Resetting and recovery				
• Reset options following tripping			Manual, automatic, and remote RESET (depending on the version)	
• Recovery time				
	- Automatic RESET	min	approx. 3 min	
	- Manual RESET	min	Immediately	
	- Remote RESET	min	Immediately	
Equipment				
• Display of operating state on device			Yes, via switch position indicator slide	
• TEST function			Yes, electronics can be tested by pressing the TEST button/ auxiliary contacts and wiring of control circuit are tested by moving the switch position indicator slide/ self-monitoring	
• RESET button			Yes	
• STOP button			No	

Type			**3RB301., 3RB311.**	**3RB302., 3RB312.**
Size			**S00**	**S0**
Width			**45 mm**	**45 mm**
ATEX			Suitable for overload protection of explosion-proof motors of protection type "increased safety" Ex e	
• EC type examination certificate number conforming to Directive 94/9/EC (ATEX)			PTB 09 ATEX 3001  II (2) G [Ex e] [Ex d] [Ex px] II (2) D [Ex t] [Ex p]	
• Safety data values given below apply for an ambient temperature of 40 °C.				
	SIL		SIL 1	
	HFT		0	
	λ_{safe}	1 / h	440×10^{-9}	
	λ_{DD}	1 / h	105×10^{-9}	
	λ_{DU}	1 / h	296×10^{-9}	
	SFF	%	65	
	DC	%	26	
	MTBF	Years	130	
	$PFD_{avg\ (for\ 36\ months)}$		$< 1{,}0 \times 10^{-2}$	
	Architecture		1001	
	T1 value (repeat test)		DIN EN 60079-17, Section 4.4	
	$T_{lifetime}$	Years	20	
Ambient temperatures				
• Storage/transport		°C	-40 ... +80	
• Operation		°C	-25 ... +60	
• Temperature compensation		°C	+60	
• Permissible rated operating current				
	- At internal control cabinet temperature 60°C	%	100	100 [1)]
	- 70 °C	%	On request	
Repeat terminals				
• Coil repeat terminal			Yes	Not required
• Auxiliary switch repeat terminal			Yes	Not required
Degree of protection acc. to IEC 60529			IP20	
Touch protection			Finger-safe	
Shock resistance with sine acc. to IEC 60068-2-27			15g / 11 ms [2)]	

Type		**3RB301., 3RB311.**	**3RB302., 3RB312.**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Electromagnetic compatibility (EMC) - Immunity			
• Conducted interference suppression			
	- Burst acc. to IEC 61000-4-4 (corresponds to severity 3)	kV	2 (power ports), 1 (signal ports)
	- Surge acc. to IEC 61000-4-5 (corresponds to severity 3)	kV	2 (line to ground), 1 (line to line)
	- RF coupling according to IEC 61000-4-6	V	10
• Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to severity 3)		kV	8 (air discharge), 6 (contact discharge)
• Field-related interference suppression to IEC 61000-4-3 (corresponds to severity 3)		V/m	10
Electromagnetic interference emission acc. to IEC 60947-1			CISPR 11, environment B (residential area)
Resistance to extreme climates - Humidity		%	95
Dimensions			See Dimension drawings (dimensions in mm) (Page 151)
Installation altitude above sea level		m	Up to 2,000
Mounting position			Any
Type of fixing			Direct mounting/stand-alone assembly with terminal support

1) Permissible rated current in the case of heavy-duty starting size S0 at 10 to 40 A:
- CLASS 20E, I_{emax} = 32 A,
- CLASS 30E, I_{emax} = 25 A.

2) Signaling contact 97/98 in "tripped" position: 9g / 11 ms.

11.4.1.2 Main circuit

Technical data for the main circuit, 3RB30/3RB31 overload relays

Table 11- 12 Technical data for the main circuit, 3RB30/3RB31 overload relays

Type		**3RB301., 3RB311.**	**3RB302., 3RB312.**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Rated insulation voltage U_i (pollution degree 3)	V	690	
Rated impulse withstand voltage U_{imp}	kV	6	
Rated operating voltage U_e	V	690	
Type of current			
• DC current		No	
• AC current		Yes, 50/60 Hz ± 5%	
Current setting	A	0.1 to 0.4 to 4 to 16	0.1 to 0.4 to 10 to 40
Power loss per device (max.)	W	0,05 ... 0,2	
Short-circuit protection			
• With fuse without contactor		See "Selection and ordering data" in Catalog IC 10 - SIRIUS	
• With fuse and contactor		See the configuration guide titled "Configuring SIRIUS Innovations - Selection data for load feeders in fuseless and fused designs (http://support.automation.siemens.com/WW/view/en/50250592)".	
Protective separation between main and auxiliary current paths acc. to IEC/EN 60947-1 (pollution degree 2)	V	690[1)]	

[1)] For networks with grounded neutral point, otherwise 600 V.

11.4.1.3 Conductor cross-sections main circuit

Technical data for main circuit connection, 3RB30/3RB31 overload relays

Table 11- 13 Technical data for main circuit connection, 3RB30/3RB31 overload relays

Type		**3RB301., 3RB311.**	**3RB302., 3RB312.**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Connection type		**Screw connection**	
• Connection screw		M3, Pozidriv size 2	M4, Pozidriv size 2
• Operating tool		∅ 5 ... 6	∅ 5 ... 6
• Tightening torque	Nm	0,8 ... 1,2	2 ... 2,5
• Conductor cross-sections (min. / max.), 1-wire or 2-wire			
- Solid	mm^2	2 x (0.5 to 1.5)[1)] 2 x (0.75 to 2.5)[1)] 2 x (0.5 to 4)[1)]	2 x (1 to 2.5)[1)] 2 x (2.5 to 10)[1)]
- Finely stranded with end sleeve	mm^2	2 x (0.5 to 1.5)[1)] 2 x (0.75 to 2.5)[1)]	2 x (1 to 2.5)[1)] 2 x (2.5 to 6)[1)] max. 1 x 10
- AWG cables, solid or stranded	AWG	2 x (20 to 16)[1)] 2 x (18 to 14)[1)] 2 x 12[1)]	2 x (16 to 12)[1)] 2 x (14 to 8)[1)]
Connection type		**Spring-loaded connection**	
• Operating tool		∅ 3.0 x 0.5 and ∅ 3.5 x 0.5	
• Conductor cross-sections (min./max.)			
- Solid	mm^2	1 x (0.5 to 4)	1 x (1 to 10)
- Finely stranded without end sleeve	mm^2	1 x (0.5 to 2.5)	1 x (1 to 6)
- Finely stranded with end sleeve (DIN 46228 Part 1)	mm^2	1 x (0.5 to 2.5)	1 x (1 to 6)
- AWG cables, solid or stranded	AWG	1 x (20 to 12)	1 x (18 to 8)

[1)] If two different conductor cross-sections are being connected to one clamping point, both cross-sections must be located in the range indicated. If identical cross-sections are used, this restriction does not apply.

11.4.1.4 Auxiliary circuit

Technical data for the auxiliary circuit, 3RB30/3RB31 overload relays

Table 11- 14 Technical data for the auxiliary circuit, 3RB30/3RB31 overload relays

Type		**3RB301., 3RB311.**	**3RB302., 3RB312.**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Number of NO contacts			1
Number of NC contacts			1
Auxiliary contacts - Assignment			1 NO for the "tripped" signal; 1 NC for disconnecting the contactor
Rated insulation voltage U_i (pollution degree 3)	V		300
Rated impulse withstand voltage U_{imp}	kV		4
Contact rating of the auxiliary contacts			
• NC with alternating current AC-15, rated operating current I_e at U_e:			
24 V	A		4
120 V	A		4
125 V	A		4
250 V	A		3
• NO with alternating current AC15, rated operating current I_e at U_e:			
24 V	A		4
120 V	A		4
125 V	A		4
250 V	A		3
• NC, NO with direct current DC-13, rated operating current I_e at U_e:			
24 V	A		2
60 V	A		0,55
110 V	A		0,3
125 V	A		0,3
250 V	A		0,11
• Conventional thermal current I_{th}	A		5
Short-circuit protection			
• With fuse operating class gL/gG	A		6

Type		**3RB301., 3RB311.**	**3RB302., 3RB312.**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Ground-fault protection (3RB31 only)		The information refers to sinusoidal fault currents at 50/60 Hz	
• Tripping value I_{Δ}		> 0.75 x I_{motor}	
• Operating range I		Lower current setting < I_{motor} < 3.5 x upper current setting	
• Response time t_{trip} (in steady-state condition)	s	< 1	
Current consumption of the integrated electrical remote RESET (3RB31 only) Connection terminals A3, A4		24 V DC, max. 200 mA for approx. 20 ms, thereafter < 10 mA	
Protective separation between auxiliary current paths acc. to IEC/EN 60947-1	V	300	
CSA and UL rated data			
Auxiliary circuit – Switching capacity		3RB30: B600, R300; 3RB31: B300, R300	

11.4.1.5 Conductor cross sections, auxiliary circuit

Technical data for auxiliary circuit connection, 3RB30/3RB31 overload relays

Table 11- 15 Technical data for auxiliary circuit connection, 3RB30/3RB31 overload relays

Type		**3RB301., 3RB311.**	**3RB302. 3RB312.**
Size		**S00**	**S0**
Width		**45 mm**	**45 mm**
Connection type		**Screw connection**	
• Connection screw			Pozidriv, size 2
• Operating tool			∅ 5 ... 6
• Tightening torque	Nm		0,8 ... 1,2
• Conductor cross-sections (min./max.), 1-wire or 2-wire			
- Solid	mm^2		1 x (0.5 to 4); 2 x (0.5 to 2.5)
- Finely stranded with end sleeve	mm^2		1 x (0.5 to 2.5); 2 x (0.5 to 1.5)
- AWG cables, solid or stranded	AWG		2 x (20 to 14)
Connection type		**Spring-loaded connection**	
• Operating tool			∅ 3.0 x 0.5
• Conductor cross-sections (min./max.), 1-wire or 2-wire connection possible			
- Solid	mm^2		2 x (0.25 to 1.5)
- Finely stranded with end sleeve	mm^2		2 x (0.25 to 1.5)
- Stranded	mm^2		2 x (0.25 to 1.5)
- AWG cables, solid or stranded	AWG		2 x (24 to 16)

11.4.2 3RB303/3RB313 solid-state overload relays

11.4.2.1 General technical data

General technical data for 3RB303./3RB313. overload relays

		3RB3.3.-..B.	3RB3.3.-..D.	3RB3.3.-..W.	3RB3.3.-..X.
product brand name		SIRIUS			
Product designation		solid-state overload relay			
Size of overload relay		S2			
Number of poles for main current circuit		3			
Size of the contactor can be combined company-specific		S2			
Product component RESET button		Yes			
Product component STOP pushbutton		No			
Product component trip indicator		Yes			
Product function removable terminal for auxiliary and control circuit		Yes			
Product component auxiliary switch		Yes			
Installation altitude at a height over sea level maximum	m	2000			
Ambient temperature					
• during transport	°C	-40 … +80			
• during storage	°C	-40 … +80			
• during operating	°C	-25 … +60			
Design of display for switching status		Slide switch			
Relative humidity during operating phase	%	0 … 95			
Resistance against vibration		1-6 Hz, 15 mm; 6-500 Hz, 20 m/s²; 10 cycles			
Shock resistance according to IEC 60068-2-27		15g / 11 ms			
Shock resistance according to IEC 60068-2-27 note		Signaling contact 97 / 98 in position "Tripped": 8g / 11 ms			

		3RB3.3.-..B.	3RB3.3.-..D.	3RB3.3.-..W.	3RB3.3.-..X.
Protection class IP of the terminal		IP00		IP20	
Protection class IP on the front		IP20			
varification of suitability concerning ATEX		on request			
Temperature compensation	°C	-25 … +60			
Item designation according to DIN EN 81346-2		F			
maximum permissible voltage for safe isolation					
• in networks with grounded star point between main and auxiliary circuit	V	690			
• in networks with grounded star point between main and auxiliary circuit	V	600			
• in networks with grounded star point between auxiliary and auxiliary circuit	V	300			
• in networks with non-grounded star point between auxiliary and auxiliary circuit	V	300			
EMC immunity to interference according to IEC 60947-1		corresponds to degree of severity 3			
EMC emitted interference according to IEC 60947-1		CISPR 11, environment B (residential area)			
Electrostatic discharge according to IEC 61000-4-2		6 kV contact discharge / 8 kV air discharge			
Field-bound parasitic coupling according to IEC 61000-4-3		10 V/m			
Conductor-bound parasitic coupling BURST according to IEC 61000-4-4		2 kV (power ports), 1 kV (signal ports)			
Conductor-bound parasitic coupling conductor-earth SURGE according to IEC 61000-4-5		2 kV (line to ground)			
Conductor-bound parasitic coupling conductor-conductor SURGE according to IEC 61000-4-5		1 kV (line to line)			

11.4.2.2 Main circuit

Technical data for the main circuit, 3RB303./3RB313. overload relays

	Insulation voltage with degree of pollution 3 rated value	Impulse voltage resistance rated value	Voltage type for main circuit	Type of assignement	Design of the fuse link for short-circuit protection of the main circuit necessary	Operational current	
						for heavy starting CLASS 20 maximum	for heavy starting CLASS 30 maximum
	V	V				A	A
3RB3.3.-.QB.	690	6 000	AC	2	fuse gL/gG: 160 A	25	25
3RB3.3.-.QD.	690	6 000	AC	2	fuse gL/gG: 160 A	25	25
3RB3.3.-.QW.	690	6 000	AC	2	fuse gL/gG: 160 A	25	25
3RB3.3.-.QX.	690	6 000	AC	2	fuse gL/gG: 160 A	25	25
3RB3.3.-.UB.	690	6 000	AC	2	Fuse gL/gG: 200 A	50	50
3RB3.3.-.UD.	690	6 000	AC	2	Fuse gL/gG: 200 A	50	50
3RB3.3.-.UW.	690	6 000	AC	2	Fuse gL/gG: 200 A	50	50
3RB3.3.-.UX.	690	6 000	AC	2	Fuse gL/gG: 200 A	50	50
3RB3.3.-.WB.	690	6 000	AC	2	fuse gL/gG: 250 A	60	50
3RB3.3.-.WD.	690	6 000	AC	2	fuse gL/gG: 250 A	60	50
3RB3.3.-.WW.	690	6 000	AC	2	fuse gL/gG: 250 A	80	80
3RB3.3.-.WX.	690	6 000	AC	2	fuse gL/gG: 250 A	80	80

11.4.2.3 Main circuit terminals

Technical data for main circuit connection, 3RB303./3RB313. overload relays

		3RB3.3.-..B.	3RB3.3.-..D.	3RB3.3.-..W.	3RB3.3.-..X.
Arrangement of electrical connectors for main current circuit		Top and bottom			
Design of the electrical connection for main current circuit		screw-type terminals		straight-through transformers	
Type of the connectable conductor cross-section					
• for main contacts					
– solid or multi-stranded		1x (1 ... 50 mm²), 2x (1 ... 35 mm²)		—	
– finely stranded					
– without conductor final cutting		—			
– with conductor end processing		1x (1 ... 35 mm²), 2x (1 ... 25 mm²)		—	
• for AWG conductors		2x (18 ... 2), 1x (18 ... 1)		—	
Tightening torque for main contacts					
• with screw-type terminals	N·m	3 … 4.5		—	
Design of the thread of the connection screw for main contacts		M6		—	
Design of screwdriver shaft		Diameter 5 to 6 mm			
size of screwdriver tip		Pozidriv PZ 2			

11.4.2.4 Auxiliary circuit

Technical data for the auxiliary circuit, 3RB303./3RB313. overload relays

		3RB303.-....	3RB313.-....
Number of NO contacts for auxiliary contacts		1	
• note		for message "tripped"	
Number of NC contacts for auxiliary contacts		1	
• note		for contactor disconnection	
Number of changeover contacts for auxiliary contacts		0	
Voltage type for auxiliary and control circuit		AC/DC	
Design of the fuse link for short-circuit protection of the auxiliary switch required		fuse gL/gG: 6 A	
Design of the auxiliary switch		integrated	
Operating current of the auxiliary contacts at AC-15			
• at 24 V	A	4	
• at 110 V	A	4	
• at 120 V	A	4	
• at 125 V	A	4	
• at 230 V	A	3	
Operating current of the auxiliary contacts at DC-13			
• at 24 V	A	2	
• at 60 V	A	0.55	
• at 110 V	A	0.3	
• at 125 V	A	0.3	
• at 220 V	A	0.11	
Recovery time after overload trip			
• with automatic reset typical	s	180	
• with remote-reset	s	0	
• with manual reset	s	0	

11.4.2.5 Auxiliary circuit connections

Technical data for auxiliary circuit connection, 3RB303./3RB313. overload relays

		3RB3.3.-..B.	3RB3.3.-..W.	3RB3.3.-..D.	3RB3.3.-..X.
Design of the electrical connection		screw-type terminals		spring-loaded terminals	
Type of the connectable conductor cross-section for auxiliary contacts solid or multi-stranded		1x (0,5 ... 4 mm²), 2x (0,5 ... 2,5 mm²)		1x (0,25 ... 1,5 mm²), 2x (0,25 ... 1,5 mm²)	
• for auxiliary contacts finely stranded without conductor final cutting		—		1x (0.25 ... 1.5 mm²), 2x (0.25 ... 1.5 mm²)	
• for auxiliary contacts finely stranded with conductor end processing		1x (0.5 ... 2.5 mm²), 2x (0.5 ... 1.5 mm²)		1x (0.25 ... 1.5 mm²), 2x (0.25 ... 1.5 mm²)	
• for AWG conductors for auxiliary contacts		1x (20 ... 14), 2x (20 ... 14)		1x (24 ... 16), 2x (24 ... 16)	
Tightening torque for auxiliary contacts					
• with screw-type terminals	N·m	0.8 … 1.2		—	
Design of the thread of the connection screw of the auxiliary and control pins		M3		—	
Design of screwdriver shaft		Diameter 5 to 6 mm			
size of screwdriver tip		Pozidriv PZ 2			

11.4.2.6 Protection function

Technical data for protection function, 3RB303./3RB313. overload relays

	3RB303.-1...	3RB303.-2...
Product function		
• overload protection	Yes	
• overload warning	No	
• phase disturbance recognition	Yes	
• short-circuit to earth recognition	No	
Design of the overload circuit breaker	electronic	
Trip class	CLASS 10E	CLASS 20E

		3RB313.-4...
Product function		
• overload protection		Yes
• overload warning		No
• phase disturbance recognition		Yes
• short-circuit to earth recognition		Yes
Design of the overload circuit breaker		electronic
Trip class		CLASS 5E, 10E, 20E and 30E adjustable
Type of ground fault protection		Sinusoidal fault currents at 50 / 60 Hz
Current response value of the ground fault protection minimum		0,75 x IMotor
Working range of the ground fault protection		
• relative to current setting value		Lower current setting value < IMotor Upper current setting value x 3.5 > IMotor
Response time of the ground fault protection in settled state	s	1
Operating voltage for remote-reset function for DC	V	24
Reset current for remote-reset function		
• maximum	A	0.2
– note		Current only flows for 20 ms
• typical	A	—

11.4.2.7 Mounting/fixing/dimensions

Technical data for mounting/fixing/dimensions, 3RB303./3RB313. overload relays

		3RB3.3.-..B.	3RB3.3.-..D.	3RB3.3.-..W.	3RB3.3.-..X.
Mounting type		direct mounting		stand-alone installation	
mounting position		any			
Depth	mm	104		109	
Height	mm	99		81	
Width	mm	55			
Distance, to be maintained, conductive elements					
• downwards	mm	10			
• backwards	mm	0			
• sidewards	mm	10			
• forwards	mm	10			
• upwards	mm	10			
Distance, to be maintained, to earthed part					
• downwards	mm	10			
• backwards	mm	0			
• sidewards	mm	10			
• forwards	mm	10			
• upwards	mm	10			

11.4.2.8 UL/CSA rated data

Technical data for UL/CSA rated data, 3RB303./3RB313. overload relays

	Operating voltage according to UL 60947 rated value	Full-load current (FLA) for 3-phase motor		Contact rating designation for auxiliary contacts according to UL
		at 480 V rated value	at 600 V rated value	
	V	A	A	
3RB303.-.Q..	600	25	25	B600 / R300
3RB303.-.U..	600	50	50	B600 / R300
3RB303.-.W..	600	80	80	B600 / R300
3RB313.-.Q..	600	25	25	B300 / R300
3RB313.-.U..	600	50	50	B300 / R300
3RB313.-.W..	600	80	80	B300 / R300

11.4.2.9 Rated operating current and active power loss

Technical data for current and fusing

	Adjustable response current of the current-dependent overload release		Active power loss total typical
	initial value	final value	
	A	A	W
3RB303.-.QW.	6	25	0.1
3RB303.-.QX.	6	25	0.1
3RB303.-.QD.	6	25	0.5
3RB303.-.QB.	6	25	0.5
3RB303.-.UW.	12.5	50	0.1
3RB303.-.UX.	12.5	50	0.1
3RB303.-.UD.	12.5	50	1.8
3RB303.-.UB.	12.5	50	1.8
3RB303.-.WW.	20	80	0.2
3RB303.-.WX.	20	80	0.2
3RB303.-.WD.	20	80	4.6
3RB303.-.WB.	20	80	4.6
3RB313.-.QW.	6	25	0.1
3RB313.-.QX.	6	25	0.1
3RB313.-.QB.	6	25	0.5
3RB313.-.QD.	6	25	0.5
3RB313.-.UW.	12.5	50	0.1
3RB313.-.UX.	12.5	50	0.1
3RB313.-.UB.	12.5	50	1.8
3RB313.-.UD.	12.5	50	1.8
3RB313.-.WW.	20	80	0.2
3RB313.-.WX.	20	80	0.2
3RB313.-.WD.	20	80	4.6
3RB313.-.WB.	20	80	4.6

Circuit diagrams

12

Internal circuit diagrams

You can find the internal circuit diagrams for SIRIUS Innovations products online in the image database (www.siemens.com/industrial-controls/bilddb).

Enter the article number of the device in the "Article number" field and, in the "Type of object" selection menu on the left-hand side, select "Unit wiring diagram".

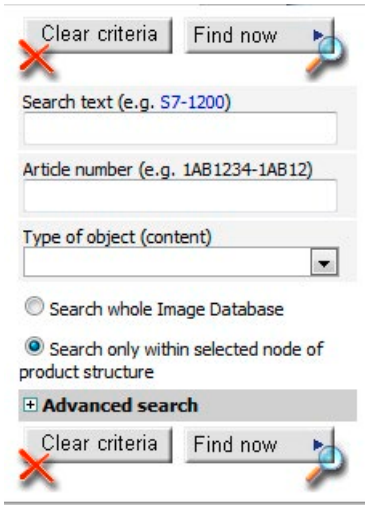


Figure 12-1 Image database

Internal circuit diagrams for 3RU21

3RU2116-..B., 3RU2116-..J.

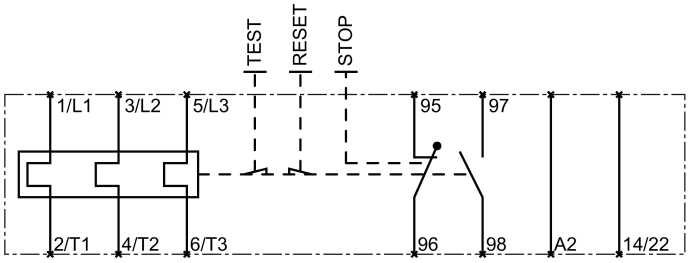


Figure 12-2 Thermal overload relay, screw-type and ring cable lug connection systems, S00

3RU2116-..C.

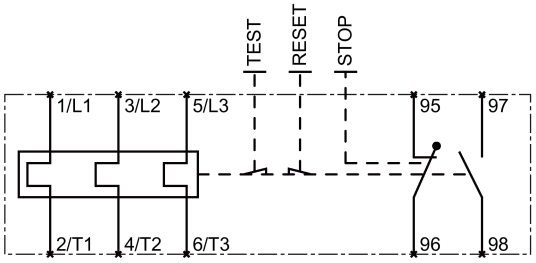


Figure 12-3 Thermal overload relay, spring-loaded connection system, S00

3RU2126-....

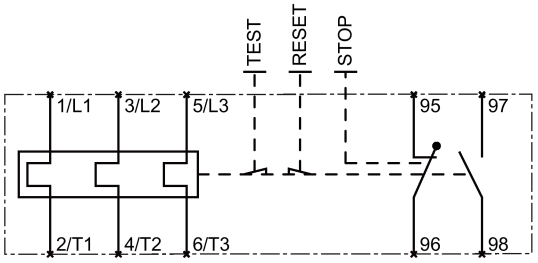


Figure 12-4 Thermal overload relay, S0

3RU2136-....

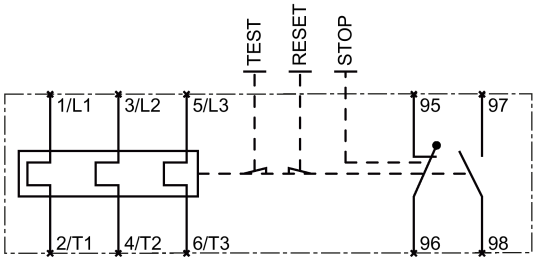


Figure 12-5 Thermal overload relay, S2

Internal circuit diagrams for 3RB30

3RB3016-..B.

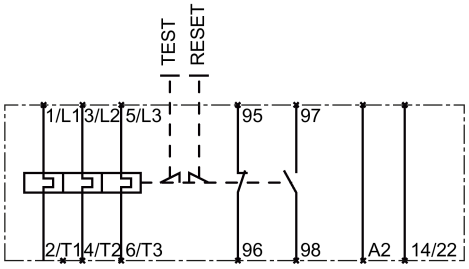


Figure 12-6 3RB30 solid-state overload relay, screw-type connection system, S00

3RB3016-..E.

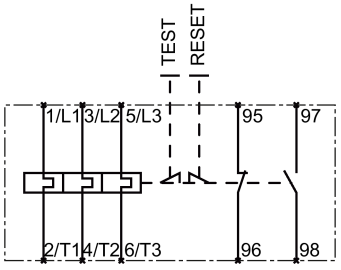


Figure 12-7 3RB30 solid-state overload relay, spring-loaded connection system, S00

3RB3026-....

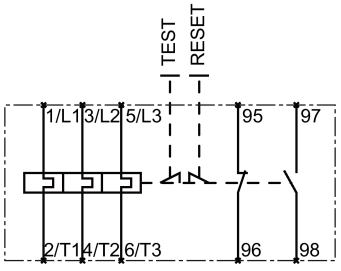


Figure 12-8 3RB30 solid-state overload relay, S0

3RB3036-....

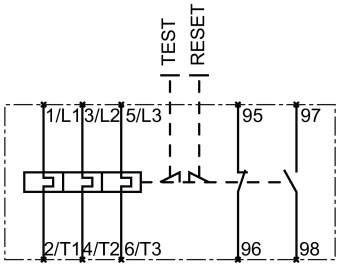


Figure 12-9 3RB30 solid-state overload relay, S2

Internal circuit diagrams for 3RB31

3RB3113-..B.

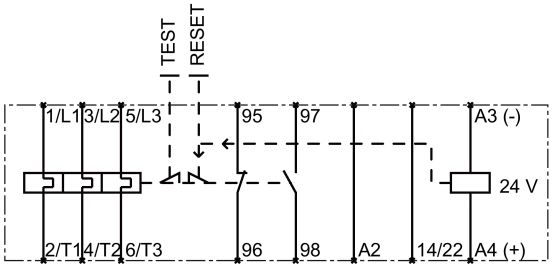


Figure 12-10 3RB31 solid-state overload relay, screw-type connection system, S00

3RB3113-..E.

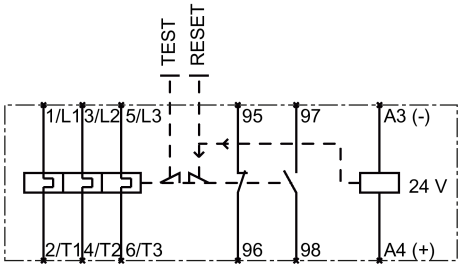


Figure 12-11 3RB31 solid-state overload relay, spring-loaded connection system, S00

3RB3123-....

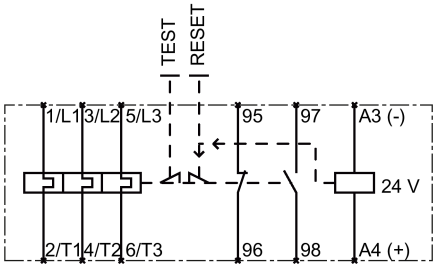


Figure 12-12 3RB31 solid-state overload relay, S0

3RB3133-....

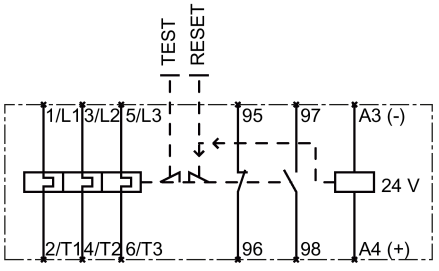


Figure 12-13 3RB31 solid-state overload relay, S2

Types of coordination

A

Types of coordination

Standard DIN EN 60947-4-1 (VDE 0660 Part 102) or IEC 60947-4-1 distinguishes between two types of coordination (type of coordination), which are referred to as coordination type "1" and coordination type "2". In the case of both types of coordination, the short-circuit is reliably mastered. the only differences are in the extent of the damage sustained by the device following a short circuit.

Type of coordination 1

The load feeder may be non-operational after a short circuit has been cleared. Damage to the contactor and the overload release is also permissible.

Type of coordination 2

After short-circuit disconnection, there must be no damage to the overload release or to any other part. The load feeder can resume operation without needing to be renewed. Welding of the contactor contacts only is permitted if these can be separated easily without significant deformation.

References

B

B.1 References

Further references

You will find further information on the 3RU2/3RB3 overload relays (http://support.automation.siemens.com/WW/view/en/20357459/133300) on the Internet.

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 (http://www.siemens.com/sirius/manuals). Simply enter the article number of the relevant item into the search field.

Operating instructions

Title	Article number
SIRIUS thermal overload relay S00/S0 (3RU2116/3RU2126)	3ZX1012-0RU21-1AA1
SIRIUS thermal overload relay S2 (3RU2136)	3ZX1012-0RU21-3AA1
SIRIUS solid-state overload relay S00/S0 (3RB301 and 3RB311/3RB302 and 3RB312)	3ZX1012-0RB30-1AA1
SIRIUS solid-state overload relay S2 (3RB303 and 3RB313)	3ZX1012-0RB30-3AA1

B.2 SIRIUS Innovations manuals

SIRIUS Innovations manuals

You can download the SIRIUS Innovations manuals from the Internet (http://www.siemens.com/sirius/manuals).

Simply enter the Article number of the relevant item into the search field.

Information about ...	Is available in ...
• SIRIUS Innovations - system overview	• "SIRIUS Innovations - System Overview" (http://support.automation.siemens.com/WW/view/en/60311318) manual (Article number: 3ZX1012-0RA01-5AC1)
• 3RT2, 3RH2, and 3RA23/24 contactors and contactor assemblies	• "SIRIUS Innovations - SIRIUS 3RT2 Contactors / Contactor Assemblies" (http://support.automation.siemens.com/WW/view/en/60306557) manual (Article number: 3ZX1012-0RT20-5AC1)
• 3RF34 solid-state switching devices	• "SIRIUS Innovations - SIRIUS 3RF34 Solid-State Switching Devices" (http://support.automation.siemens.com/WW/view/en/60298187) manual (Article number: 3ZX1012-0RF34-5AC1)
• 3RW soft starters	• "SIRIUS 3RW30 / 3RW40 Soft Starters" (http://support.automation.siemens.com/WW/view/en/38752095) manual (Article number: 3ZX1012-0RW30-1AC1) • "SIRIUS 3RW44 Soft Starter" (http://support.automation.siemens.com/WW/view/en/21772518) manual (Article number: 3ZX1012-0RW30-1AC1)
• 3RV2 motor starter protectors	• "SIRIUS Innovations - SIRIUS 3RV2 Motor Starter Protector" (http://support.automation.siemens.com/WW/view/en/60279172) manual (Article number: 3ZX1012-0RV20-5AC1)
• 3RU2, 3RB30/31 overload relays	• "SIRIUS Innovations - SIRIUS 3RU2 / 3RB3 Overload Relays" (http://support.automation.siemens.com/WW/view/en/60298164) manual (Article number: 3ZX1012-0RU20-5AC1)
• 3RB24 solid-state overload relays	• "3RB24 Solid-State Overload Relay for IO-Link" (http://support.automation.siemens.com/WW/view/en/46165627) manual (Article number: 3ZX1012-0RB24-0AC0)

Information about ...	Is available in ...
• 3UG4 monitoring relays/3RR2 current monitoring relays	• "3UG4 / 3RR2 Monitoring Relays" (http://support.automation.siemens.com/WW/view/en/70210263) manual (Article number: 3ZX1012-0UG40-0AC0)
• 3RS1/3RS2 temperature monitoring relays	• "3RS1 / 3RS2 Temperature Monitoring Relays" (http://support.automation.siemens.com/WW/view/en/54999309) manual (Article number: 3ZX1012-0RS10-1AC1)
• 3UG48 monitoring relays	• "3UG48 Monitoring Relays for IO-Link" (http://support.automation.siemens.com/WW/view/en/68834040) manual (Article number: 3ZX1012-0UG48-0AC1)
• 3RS14/3RS15 temperature monitoring relays	• "3RS14 / 3RS15 Temperature Monitoring Relays for IO-Link" (http://support.automation.siemens.com/WW/view/en/54375463) manual (Article number: 3ZX1012-0RS14-0AC0)
• 3RA21/22 load feeders	• "SIRIUS Innovations - SIRIUS 3RA21 / 3RA22 Load Feeders" (http://support.automation.siemens.com/WW/view/en/60284351) manual (Article number: 3ZX1012-0RA21-5AC1)
• 3RA6 compact starters	• "SIRIUS 3RA6 Compact Starter" (http://support.automation.siemens.com/WW/view/en/27865747) manual (Article number: 3RA6992-0A)
• 3RA28 function modules for mounting on contactors	• Manual "SIRIUS Innovations - SIRIUS 3RA28 Function Modules for mounting on 3RT2 Contactors" (http://support.automation.siemens.com/WW/view/en/60279150) (Article number: 3ZX1012-0RA28-5AC1)
• 3RA27 function modules for connection to the higher-level control	• "Function Modules for AS-Interface" (http://support.automation.siemens.com/WW/view/en/39318922) manual (Article number: 3ZX1012-0RA27-0AC0) • "Function Modules for IO-Link" (http://support.automation.siemens.com/WW/view/en/39319600) manual (Article number: 3ZX1012-0RA27-1AC1)
• 4SI SIRIUS electronic module (3RK1005-0LB00-0AA0)"	• "4SI SIRIUS Electronic Module (3RK1005-0LB00-0AA0)" (http://support.automation.siemens.com/WW/view/en/37856470) manual (Article number: 3ZX1012-0LB00-0AA1)

B.3 More information

More information

More information is available from Siemens on the Internet via the following links.

- **Product documentation**
  You will find a list of manuals/operating instructions, characteristic curves, and certificates on the Internet (www.siemens.com/industrial-controls/support).
- **Product information**
  Catalogs and other informative documents can be obtained from the Information Center and Download Center (www.siemens.com/industrial-controls/infomaterial).
- **Online ordering system**
  You will find the online ordering system with all the latest data on the ordering and information platform (www.siemens.com/industrial-controls/mall).
- **Technical Assistance**
  Siemens supports you with all technical product and system enquiries – both before and after delivery. You can access our Service & Support Portal on the Internet (www.siemens.com/industrial-controls/technical-assistance). You can also submit your question directly to a technical consultant using our support request service.

Dimension drawings (dimensions in mm)

C

Note

All dimensions are specified in mm.

C.1 Dimension drawings for 3RU21 thermal overload relays

3RU2116-..B0 (S00, screw connection, contactor mounting)

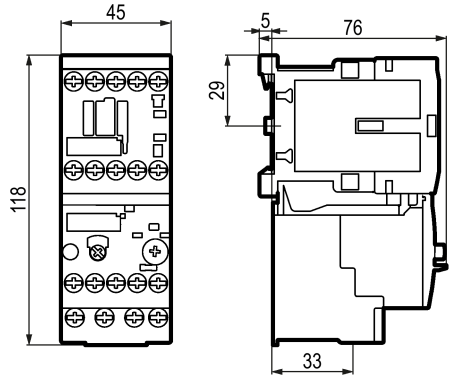


Figure C-1 3RU2116-..B0

3RU2116-4.B1 (S00, screw connection, mounting on stand-alone assembly support)

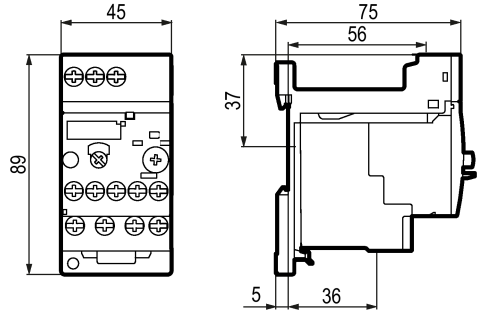


Figure C-2 3RU2116-4.B1

3RU2116-..C0 (S00, spring-loaded connection, contactor mounting)

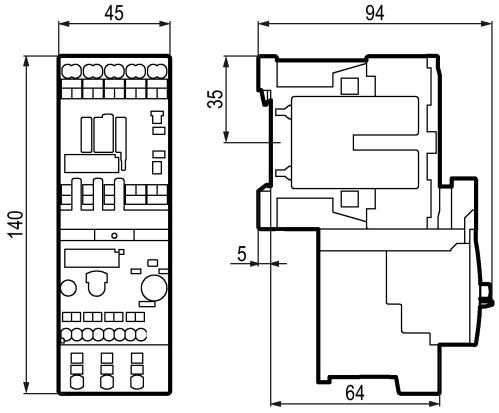


Figure C-3 3RU2116-..C0

3RU2116-..C1 (S00, spring-loaded connection, mounting on stand-alone assembly support)

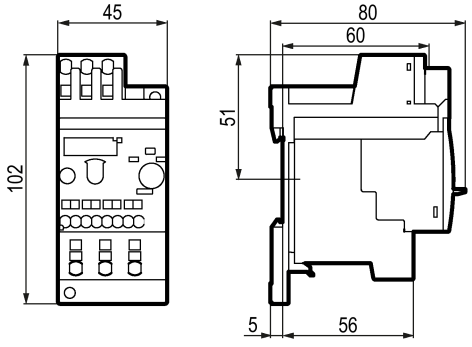
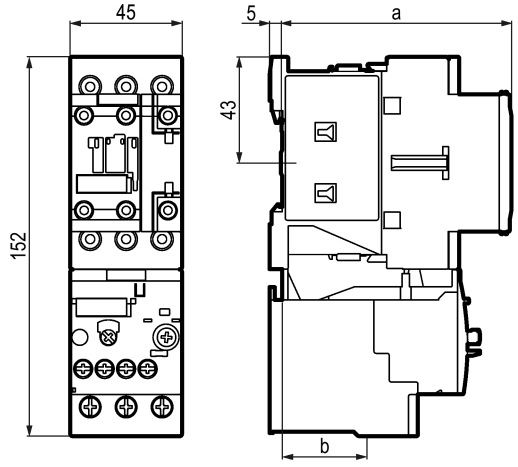


Figure C-4 3RU2116-..C1

3RU2126-..B0 (S0, screw connection, contactor mounting)



a AC: 92; DC/UC: 102

b AC: 34; DC/UC: 44

Figure C-5 3RU2126-..B0

3RU2126-4.B1 (S0, screw connection, mounting on stand-alone assembly support)

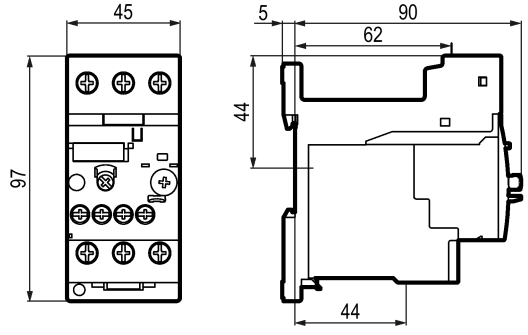
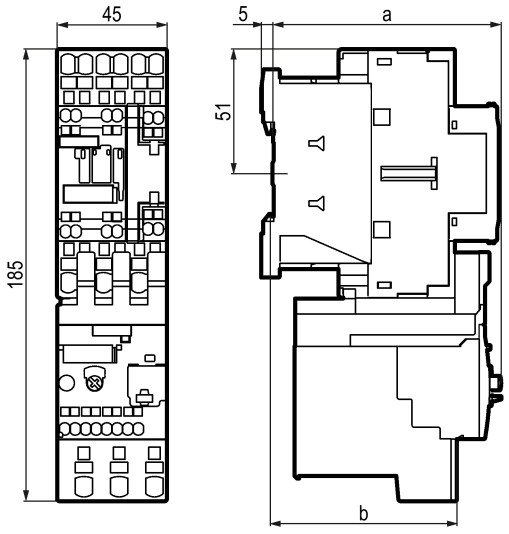


Figure C-6 3RU2126-4.B1

3RU2126-..C0 (S0, spring-loaded connection, contactor mounting)



a AC: 93; DC/UC: 103

b AC: 76; DC/UC: 86

Figure C-7 3RU2126-..C0

3RU2126-4.C1 (S0, spring-loaded connection, mounting on stand-alone assembly support)

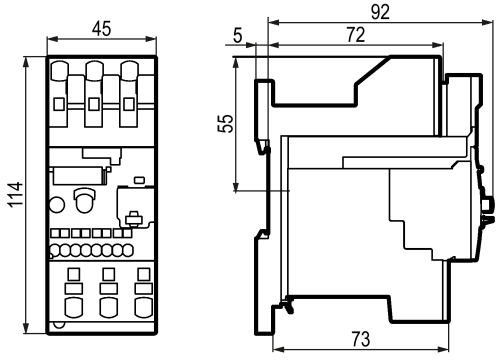


Figure C-8 3RU2126-4.C1

3RU2136-..B0 (S2, screw connection, contactor mounting)

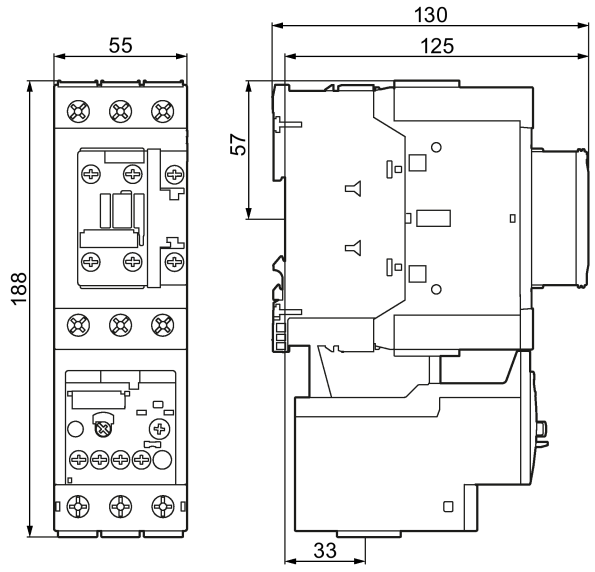


Figure C-9 3RU2136-..B0

3RU2136-..B1 (S2, screw connection, mounting on stand-alone assembly support)

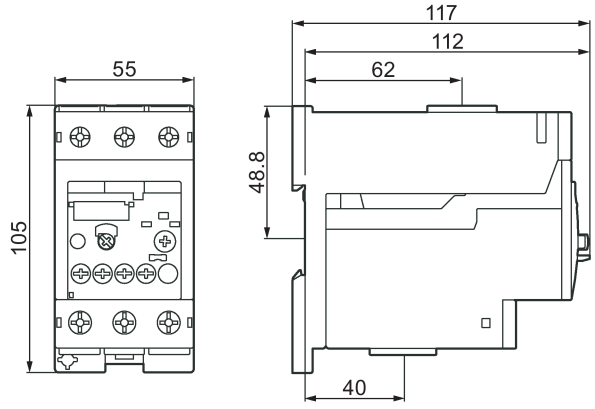


Figure C-10 3RU2136-..B1 and 3RU2936-3AA01

3RU2136-..D0 (S2, spring-loaded connection, contactor mounting)

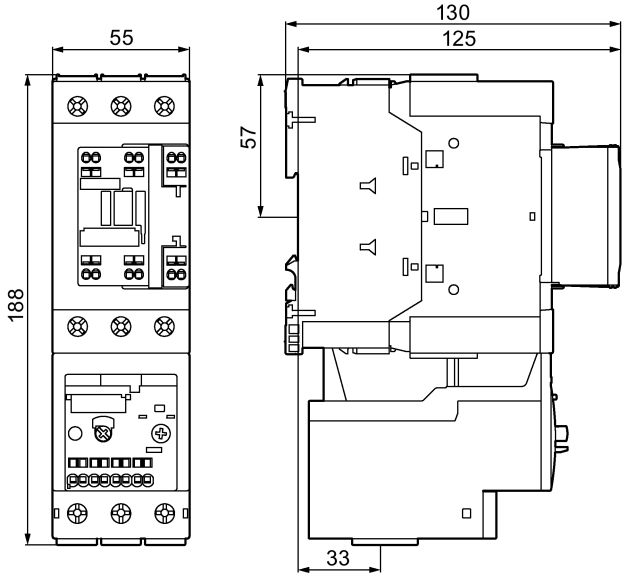


Figure C-11 3RU2136-..D0

3RU2136-..D1 (S2, spring-loaded connection, mounting on stand-alone assembly support)

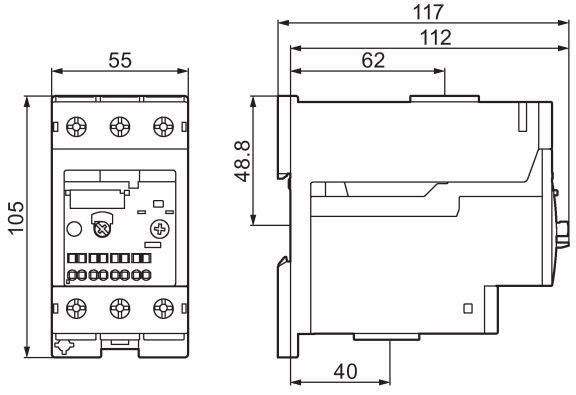


Figure C-12 3RU2136-..D1 and 3RU2936-3AA01

C.2 Dimension drawings for 3RB30/3RB31 solid-state overload relays

3RB3.1.-..B0 (S00, screw connection, contactor mounting)

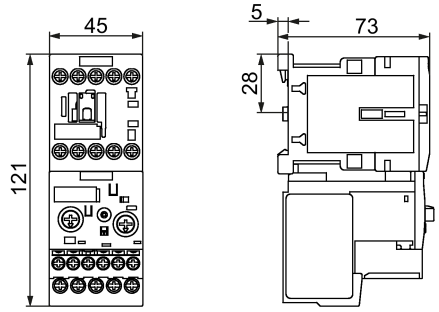


Figure C-13 3RB3.1.-..B0

3RB3.1.-..B0 (S00, screw connection, mounting on stand-alone assembly support)

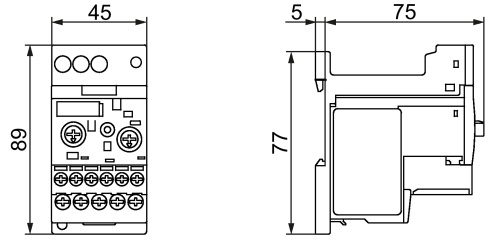


Figure C-14 3RB3.1.-..B0 and 3RU2916-3AA01

3RB3.1.-..E0 (S00, spring-loaded connection, contactor mounting)

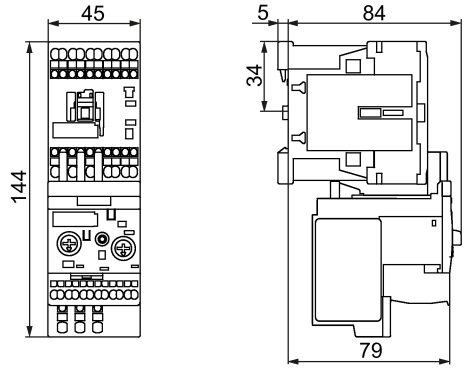


Figure C-15 3RB3.1.-..E0

3RB3.1.-..E0 (S00, spring-loaded connection, mounting on stand-alone assembly support)

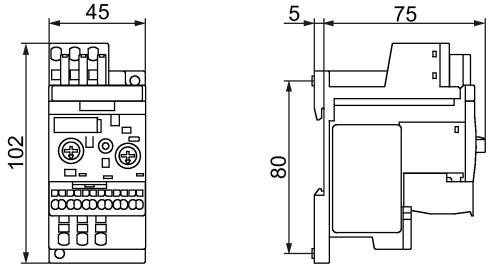
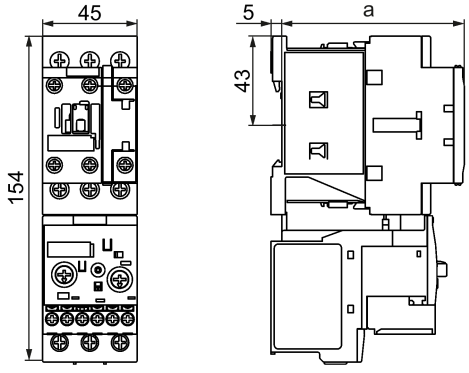


Figure C-16 3RB3.1.-..E0 and 3RU2916-3AC01

3RB3.2.-..B0 (S0, screw connection, contactor mounting)



a AC: 87; DC/UC: 97

Figure C-17 3RB3.2.-..B0

3RB3.2.-..B0 (S0, screw connection, mounting on stand-alone assembly support)

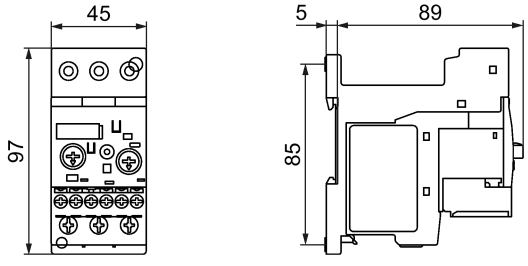
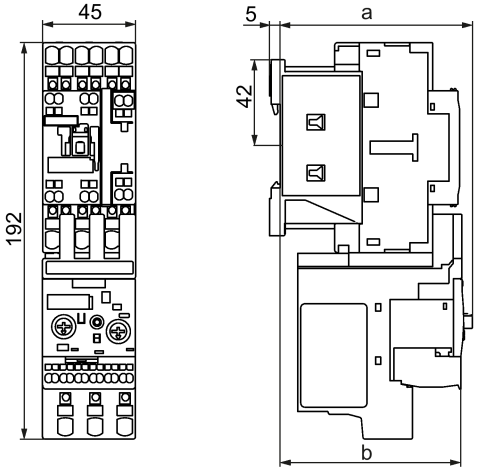


Figure C-18 3RB3.2.-..B0 and 3RU2926-3AA01

3RB3.2.-..E0 (S0, spring-loaded connection, contactor mounting)



a AC: 93; DC/UC: 103

b AC: 88; DC/UC: 98

Figure C-19 3RB3.2.-..E0

3RB3.2.-..E0 (S0, spring-loaded connection, mounting on stand-alone assembly support)

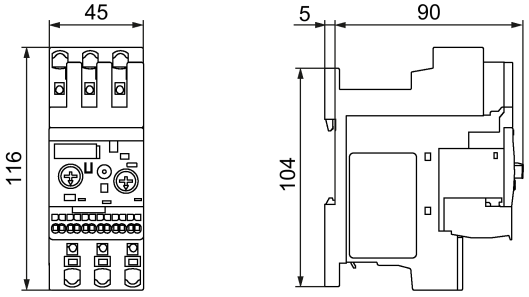


Figure C-20 3RB3.2.-..E0 and 3RU2926-3AC01

3RB3.3.-..B0 (S2, screw connection, contactor mounting)

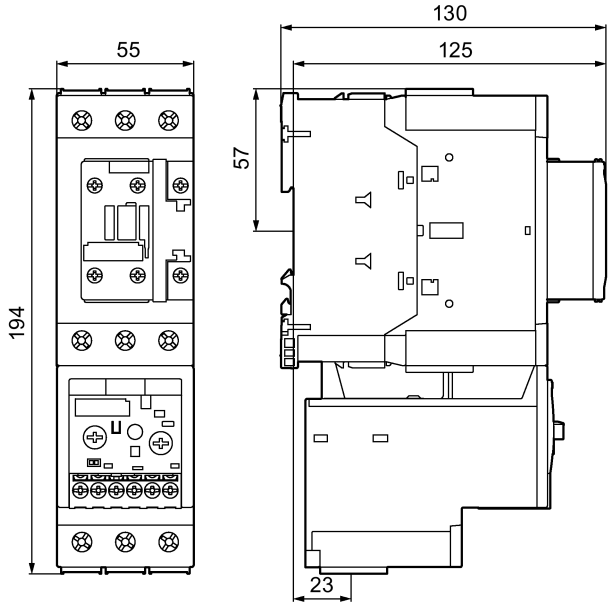


Figure C-21 3RB3.3.-..B0

3RB3.3.-..B0 (S2, screw connection, mounting on stand-alone assembly support)

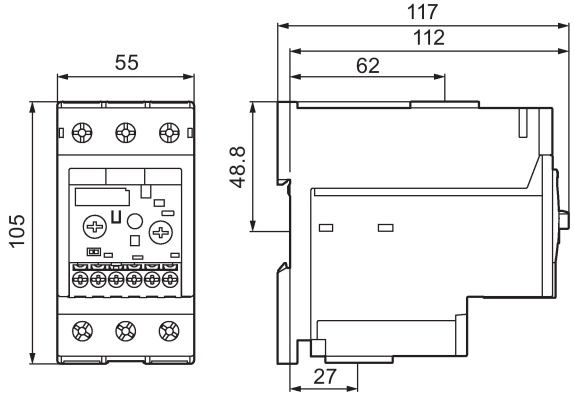


Figure C-22 3RB3.3.-..B0 and 3RU2936-3AA01

3RB3.3.-..D0 (S2, spring-loaded connection, contactor mounting)

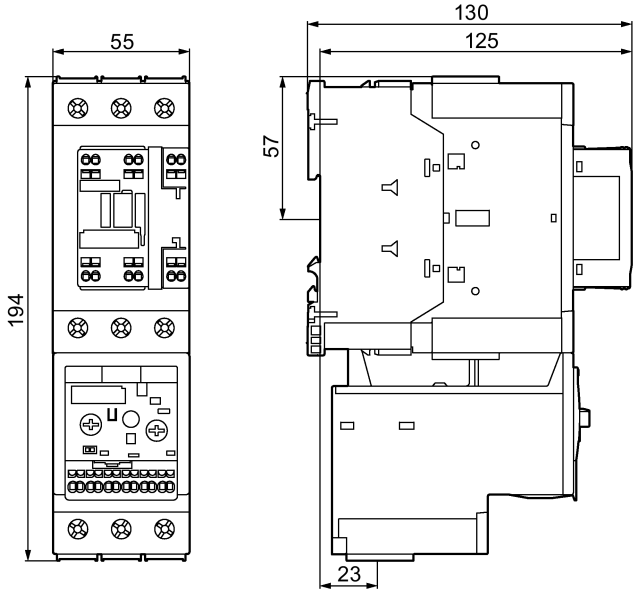


Figure C-23 3RB3.3.-..D0

3RB3.3.-..D0 (S2, spring-loaded connection, mounting on stand-alone assembly support)

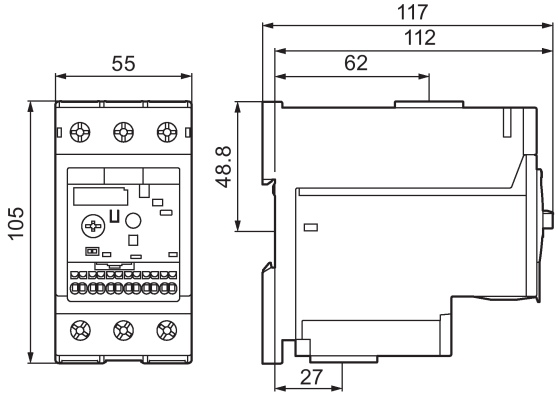


Figure C-24 3RB3.3.-..D0 and 3RU2936-3AA01

3RB3.3.-..W. (S2, screw connection, through-hole technology)

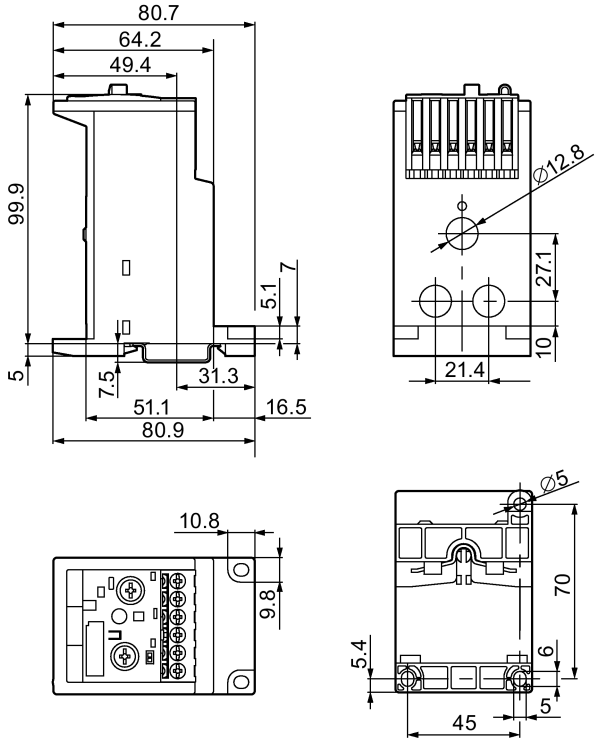


Figure C-25 3RB3.3.-..W.

3RB3.3.-..X. (S2, spring-loaded connection, through-hole technology)

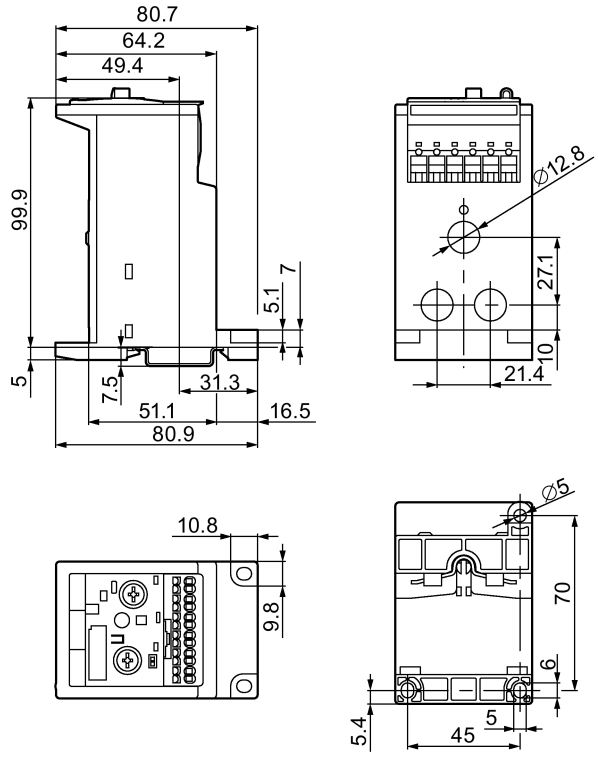


Figure C-26 3RB3.3.-..X.

C.3 3RT2 contactors drilling plan

Drilling plans for 3RT2.1.-1/3RT2.1-4. contactors

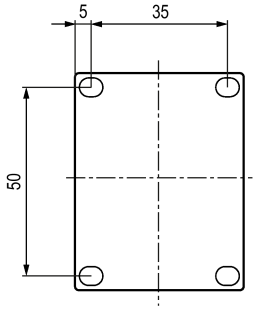


Figure C-27 Drilling plan for contactors with screw-type connections and ring cable lug connections (size S00)

Drilling plan for 3RT2.1.-2 contactors

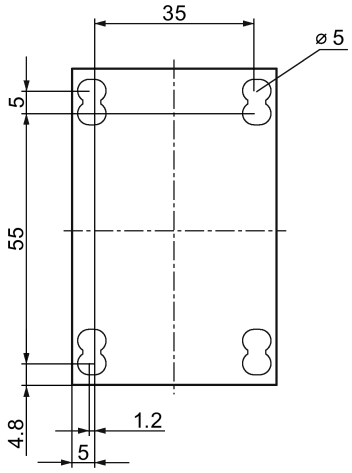


Figure C-28 Drilling plan for contactors with spring-loaded connections (size S00)

Drilling plan for 3RT2.2. contactors

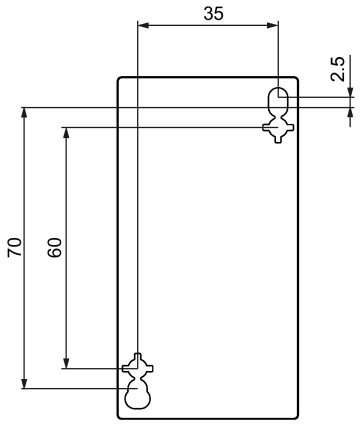


Figure C-29 Drilling plan for 3RT2.2. contactors (size S0)

Drilling plan for 3RT2.3. contactors

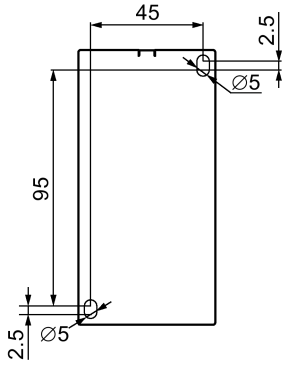


Figure C-30 Drilling plan for 3RT2.3. contactors (size S2)

C.4 Dimension drawings and drilling plan for 3RU29.6 stand-alone assembly supports

3RU2916-3AA01 (S00, screw connection)

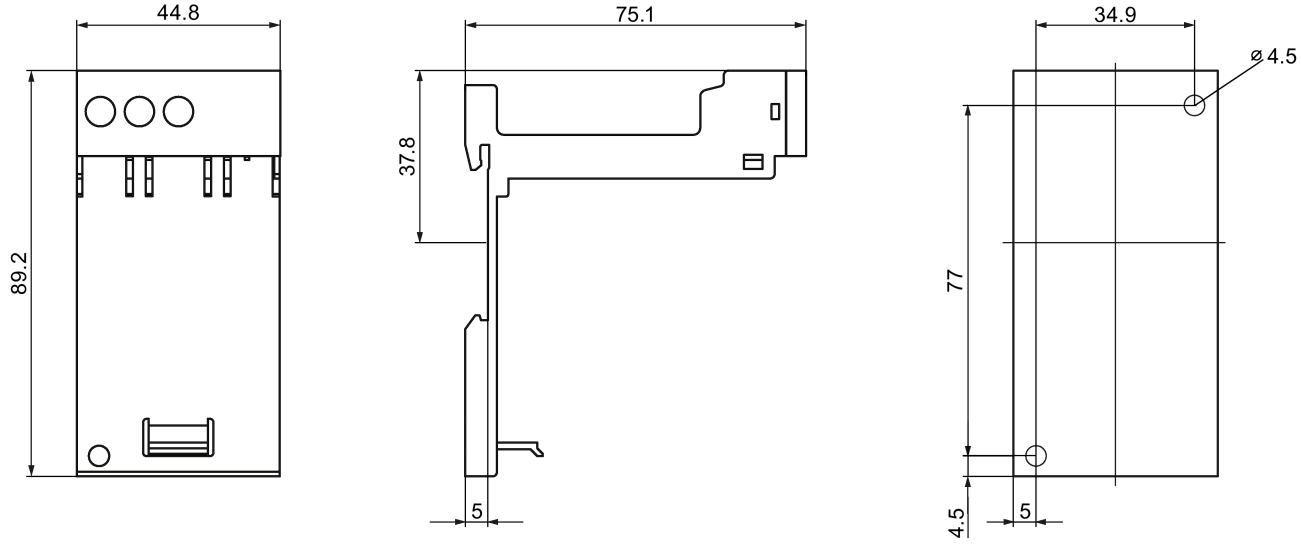


Figure C-31 3RU2916-3AA01

3RU2916-3AC01 (S00, spring-loaded connection)

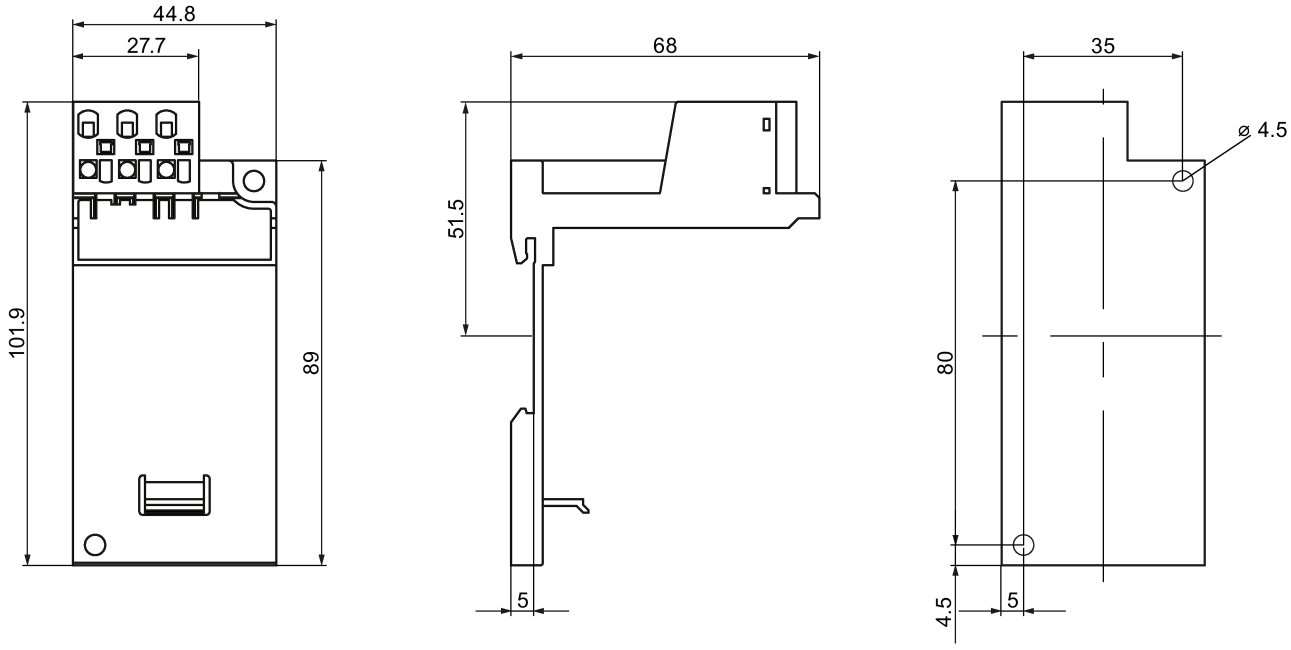


Figure C-32 3RU2916-3AC01

3RU2926-3AA01 (S0, screw connection)

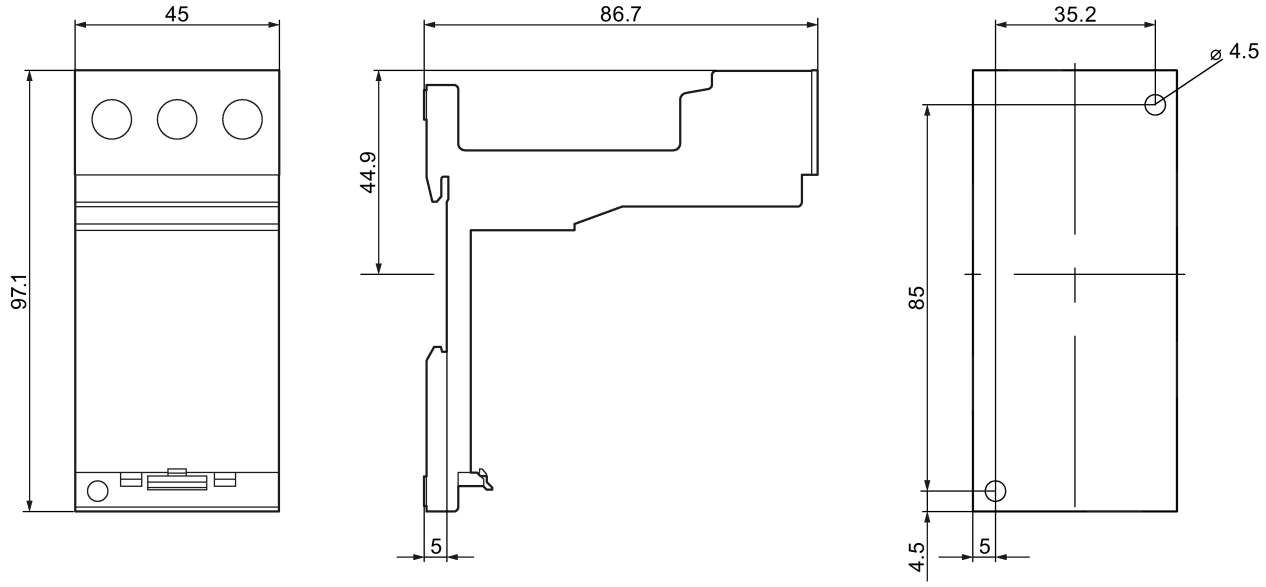


Figure C-33 3RU2926-3AA01

3RU2926-3AC01 (S0, spring-loaded connection)

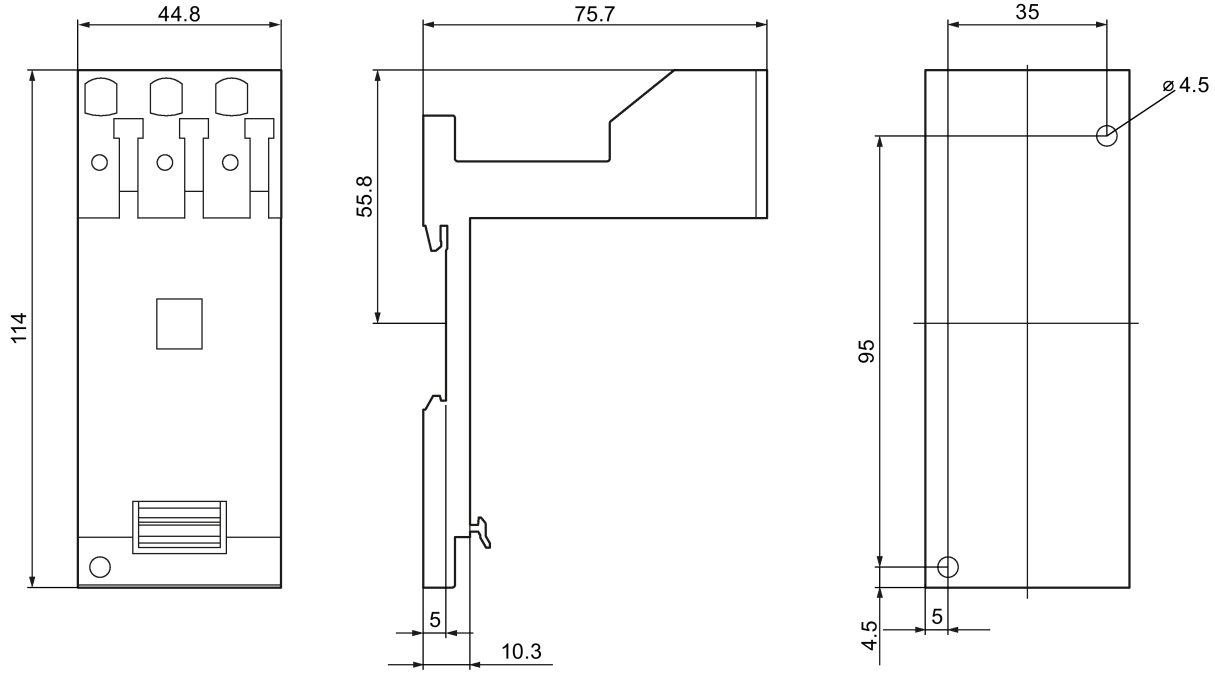


Figure C-34 3RU2926-3AC01

3RU2936-3AA01 (S2, screw connection)

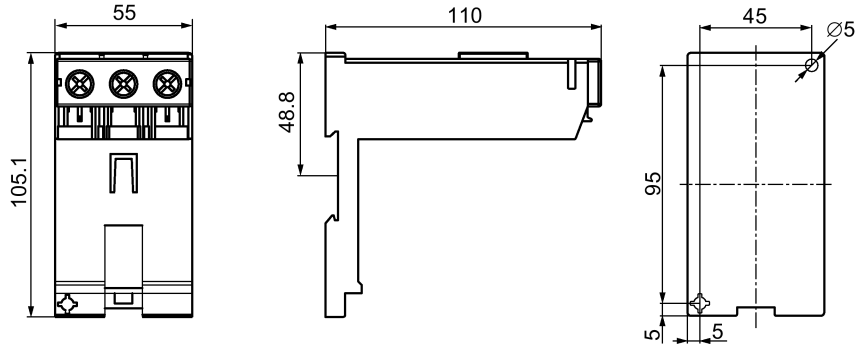


Figure C-35 3RU2936-3AA01

Correction sheet

D

Correction sheet

Have you noticed any errors while reading this manual? If so, please use this form to tell us about them. We welcome comments and suggestions for improvement.

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Table D- 1 Errors, comments, and suggestions for improvements

Index

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O

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R

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