Industrial Controls
Switching Devices
SIRIUS - SIRIUS 3RA28 Function modules for mounting on 3RT2 contactors

Manual

Edition 09/2016

siemens.com
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**
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**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.

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Note the following:

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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.
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Introduction

1.1 Responsibility of the user for system configuration and functionality

The function modules described here have been developed to carry out different control tasks as part of a plant or machine. The function modules are available for direct-on-line start, reversing start and star-delta (wye-delta) start.

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.

Note
Comply in each case with the valid national assembly regulations and standards when configuring the system.

1.2 Purpose of the manual

This manual describes the SIRIUS 3RA28 function modules for mounting on SIRIUS 3RT2 contactors and provides the following information:

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

The information in this manual enables you to configure and commission the function modules.
1.3 **Required basic knowledge**

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

1.4 **Scope of the manual**

The manual is valid for the described function modules. It contains a description of the devices that are valid at the time of publication.
1.5 Siemens Industry Online Support

Information and Service

In Siemens Industry Online Support, you can obtain up-to-date information from our global support database quickly and simply. To accompany our products and systems, we offer a wealth of information and services that provide support in every phase of the lifecycle of your machine or plant – from planning and implementation, through commissioning, up to maintenance and modernization:

- Product support
- Application examples
- Services
- Forum
- mySupport

Link: Siemens Industry Online Support [https://support.industry.siemens.com/cs/ww/en/]

Product support

You will find here all the information and comprehensive know-how covering all aspects of your product:

- FAQs
  Our answers to frequently asked questions.

- Manuals/operating instructions
  Read online or download, available as PDF or individually configurable.

- Certificates
  Clearly sorted according to approving authority, type and country.

- Characteristic curves
  For support in planning and configuring your system.

- Product announcements
  The latest information and news concerning our products.

- Downloads
  You can find here updates, service packs, HSPs and much more for your product.

- Application examples
  Function blocks, background and system descriptions, performance statements, demonstration systems, and application examples, clearly explained and represented.

- Technical data
  Technical product data for support in planning and implementing your project.

Link: Product support [https://support.industry.siemens.com/cs/ww/en/ps]
mySupport

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  Your personal mailbox for exchanging information and managing your contacts

- **Inquiries**
  Use our online form for specific solution suggestions, or send your technical inquiry directly to a specialist in Technical Support

- **Notifications**
  Make sure you always have the latest information - individually tailored to your needs

- **Filters**
  Simple management and re-use of your filter settings from Product Support and the Technical Forum

- **Favorites / Tags**
  Create your own knowledge database by assigning "Favorites" and "Tags" to documents – simply and efficiently

- **Entries last viewed**
  Clear presentation of your last viewed entries

- **Documentation**
  Configure your individual documentation from different manuals – quickly and without complications

- **Personal data**
  Change personal data and contact information here

- **CAx data**
  Simple access to thousands of items of CAx data such as 3D models, 2D dimension drawings, EPLAN macros and much more

### 1.6 Further documentation

To install and connect the function modules, you require the operating instructions of the function modules used.

You can find a list of operating instructions and an overview of the manuals pertaining to the SIRIUS modular system in the appendix "References (Page 77)".
1.7 **DataMatrix code**

A DataMatrix code is lasered on the front of all units of the function modules, on the left on the basic module. In the case of basic and coupling modules, there is a further DataMatrix code behind the labeling plate.

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 front DataMatrix code as a bit stream:

- Article number
- Serial number (abbreviated)

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

```
1P  Article number  +  S
Data identifier  Net content  Separator  Serial number
```

The following device information is encoded in the front DataMatrix code behind the labeling plate as a bit stream:

- Article number
- Serial number
- Where appropriate, MAC address

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

```
1P  Article number  +  S
Data identifier  Net content  Separator  Serial number (+ 23S MAC address)
```

The following device information is encoded in the side rating plate as a bit stream:

- Article number
- Serial number
- Where appropriate, MAC address

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

```
1P  Article number  +  S
Data identifier  Net content  Separator  Serial number (+ 23S MAC address)
```

---

**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.
1.8 Siemens Industry Online Support app

Siemens Industry Online Support app

You can use the Siemens Industry Online Support app to access all the device-specific information available on the Siemens Industry Online Support portal for a particular article number, including operating instructions, manuals, datasheets, FAQs etc. The Siemens Industry Online Support app is available for iOS, Android or Windows Phone devices. You can download the app from the following links:

[QR Code for Android]
[QR Code for iOS]
[QR Code for Windows Phone]

1.9 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.

1.10 Technical Assistance

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](mailto:technical-assistance@siemens.com)
Internet: [http://www.siemens.com/sirius/technical-assistance](http://www.siemens.com/sirius/technical-assistance)
Applicable regulations, standards, and approvals

The following general regulations and standards apply for the 3RA28 function modules:

<table>
<thead>
<tr>
<th>General regulations</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 61812-1</td>
<td>Electrical relays, timing relays</td>
</tr>
<tr>
<td>DIN VDE 0435 Part 2021</td>
<td></td>
</tr>
<tr>
<td>IEC 61000-6-2</td>
<td>Electromagnetic compatibility</td>
</tr>
<tr>
<td>IEC 61000-6-4</td>
<td></td>
</tr>
<tr>
<td>IEC 60947-5-1</td>
<td>Low-voltage switchgear and controlgear</td>
</tr>
<tr>
<td>DIN VDE 0660 Part 200</td>
<td></td>
</tr>
<tr>
<td>IEC 60721-3-1</td>
<td>Environmental conditions</td>
</tr>
<tr>
<td>IEC 60721-3-3</td>
<td></td>
</tr>
<tr>
<td>IEC 60529</td>
<td>Degree of protection</td>
</tr>
<tr>
<td>CE</td>
<td>The timing relays have UL and CSA approval for use all over the world. They have also been prototype-tested by the GL, LRS, and DM shipbuilding companies.</td>
</tr>
<tr>
<td>UL</td>
<td></td>
</tr>
<tr>
<td>CSA</td>
<td></td>
</tr>
<tr>
<td>CCC</td>
<td></td>
</tr>
<tr>
<td>C-Tick</td>
<td></td>
</tr>
<tr>
<td>Marine approval</td>
<td></td>
</tr>
</tbody>
</table>

Approvals/Test reports

Confirmation of approvals, along with test certificates and declarations of conformity, can be obtained on the Internet from Technical Assistance ([http://www.siemens.com/sirius/technical-assistance](http://www.siemens.com/sirius/technical-assistance)).

Reference

The standards from Catalog IC 10 "SIRIUS Industrial Controls" in the appendix always apply. You will find extracts from the most important standards relating to the SIRIUS modular system in the Internet ([http://www.siemens.com/sirius/support](http://www.siemens.com/sirius/support)) ("SIRIUS - System Overview", Article Number: 3ZX1012-0RA01-5AC1).
Product description

Applications

Function modules are used to perform various control jobs on automatic production lines and for processing machines. They are suited to all time-delayed switching operations in control, starting, protection, and regulation circuits, and ensure a high degree of repeat accuracy for delay times, once they have been set.

The function modules are subdivided into function modules with communication interfacing and function modules without communication interfacing.

<table>
<thead>
<tr>
<th>Function modules</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA28 function modules</td>
<td>Electronic timing relays with semiconductor output</td>
</tr>
<tr>
<td></td>
<td>Solid-state time-delay auxiliary switches</td>
</tr>
<tr>
<td></td>
<td>Function module for star-delta (wye-delta) start</td>
</tr>
<tr>
<td>3RA27 function modules with communication connection</td>
<td>Function modules for AS-Interface</td>
</tr>
<tr>
<td></td>
<td>Function modules for IO-Link</td>
</tr>
</tbody>
</table>

This chapter describes 3RA28 function modules without a communication connection. You will find information about function modules with a communication connection in the corresponding manuals.

Function

Function modules are used to delay switching functions.

System integration

The 3RA28 function modules have been matched to the contactors in the 3RT2 and 3RH2 series both electrically and mechanically, and can be integrated in the feeders by directly mounting them on contactors. The function modules can be used for size S00, S0, S2 and S3 contactors.

The 3RA27 function modules can only be used for communication-capable contactors.

1) The 3RA28 function modules must not be mounted on 3RH2 coupling relays.
Connection system

Users can choose either function modules with screw-type connection system or function modules with spring-loaded connection system.

Reference

| More information ... | Can be found in ...
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>About function modules for reversing start</td>
<td>Appendix entitled &quot;References&quot; under &quot;Manuals - SIRIUS Modular System [Page 77]&quot; in the &quot;SIRIUS - SIRIUS 3RT Contactors/Contactor Assemblies&quot; manual</td>
</tr>
</tbody>
</table>
3.1 Device versions

Device versions

- Function modules for direct-on-line start
  - Solid-state timing relays with semiconductor output
  - Solid-state time-delay auxiliary switches
- Function modules for star-delta (wye-delta) start

Characteristics

The table below provides an overview of the versions of 3RA28 function modules for mounting on 3RT2 and 3RH2 contactors.

1) The 3RA28 function modules must not be mounted on 3RH2 coupling relays.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Versions</th>
<th>Function module for star-delta (wye-delta) start</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Function modules for direct-on-line start</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Electronic timing relay with semiconductor output</strong></td>
<td><strong>Solid-state time-delay auxiliary switches</strong></td>
</tr>
<tr>
<td>Function</td>
<td>ON-delay and OFF-delay with control signal</td>
<td>ON and OFF-delay with/without control signal</td>
</tr>
<tr>
<td>Article numbers</td>
<td>3RA2811-.CW10/3RA2812-.DW10</td>
<td>3RA2813--W10/3RA2814--W10/3RA2815--W10</td>
</tr>
<tr>
<td></td>
<td>3RA2831-.D.10/3RA2832-.D.10</td>
<td>3RA2816-DEW20 comprising:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 basic module</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 coupling modules</td>
</tr>
<tr>
<td>Size</td>
<td>For size S00, S0 contactors.</td>
<td>One module for size S00, S0, S2 and S3 contactors.</td>
</tr>
<tr>
<td>Width</td>
<td>45 mm</td>
<td>135 mm (3 x 45 mm)</td>
</tr>
<tr>
<td>Connection system</td>
<td>Screw-type, spring-loaded</td>
<td>Without terminals (can be used for contactor screw-type and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>spring-loaded connection systems)</td>
</tr>
</tbody>
</table>
## 3.1 Device versions

### 3RA28 version overview

<table>
<thead>
<tr>
<th>Article number</th>
<th>Function</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Screw connection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3RA2811-1CW10</td>
<td>ON-delay, two-wire</td>
<td>Thyristor</td>
</tr>
<tr>
<td>3RA2812-1DW10</td>
<td>OFF-delay with control signal</td>
<td>PowerMos</td>
</tr>
<tr>
<td>3RA2831-1DG10</td>
<td>ON-delay</td>
<td>PowerMos</td>
</tr>
<tr>
<td>3RA2831-1DH10</td>
<td>ON-delay</td>
<td>PowerMos</td>
</tr>
<tr>
<td>3RA2832-1DG10</td>
<td>OFF-delay with control signal</td>
<td>PowerMos</td>
</tr>
<tr>
<td>3RA2832-1DH10</td>
<td>OFF-delay with control signal</td>
<td>PowerMos</td>
</tr>
<tr>
<td>3RA2813-1AW10</td>
<td>ON-delay</td>
<td>1 CO contact</td>
</tr>
<tr>
<td>3RA2813-1FW10</td>
<td>ON-delay</td>
<td>1 NO contact</td>
</tr>
<tr>
<td>3RA2813-1FW10</td>
<td>ON-delay</td>
<td>1 NC contact</td>
</tr>
<tr>
<td>3RA2814-1AW10</td>
<td>OFF-delay with control signal</td>
<td>1 CO contact</td>
</tr>
<tr>
<td>3RA2814-1FW10</td>
<td>OFF-delay with control signal</td>
<td>1 NO contact</td>
</tr>
<tr>
<td>3RA2815-1AW10</td>
<td>OFF-delay without control signal</td>
<td>1 CO contact</td>
</tr>
<tr>
<td>3RA2815-1FW10</td>
<td>OFF-delay without control signal</td>
<td>1 NO contact</td>
</tr>
<tr>
<td>3RA2815-1FW10</td>
<td>OFF-delay without control signal</td>
<td>1 NC contact</td>
</tr>
<tr>
<td><strong>Spring-loaded connection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3RA2811-2CW10</td>
<td>ON-delay, two-wire</td>
<td>Thyristor</td>
</tr>
<tr>
<td>3RA2812-2DW10</td>
<td>OFF-delay with control signal</td>
<td>PowerMos</td>
</tr>
<tr>
<td>3RA2831-2DG10</td>
<td>ON-delay</td>
<td>PowerMos</td>
</tr>
<tr>
<td>3RA2831-2DH10</td>
<td>ON-delay</td>
<td>PowerMos</td>
</tr>
<tr>
<td>3RA2832-2DG10</td>
<td>OFF-delay with control signal</td>
<td>PowerMos</td>
</tr>
<tr>
<td>3RA2832-2DH10</td>
<td>OFF-delay with control signal</td>
<td>PowerMos</td>
</tr>
<tr>
<td>3RA2813-2AW10</td>
<td>ON-delay</td>
<td>1 CO contact</td>
</tr>
<tr>
<td>3RA2813-2FW10</td>
<td>ON-delay</td>
<td>1 NO contact</td>
</tr>
<tr>
<td>3RA2814-2AW10</td>
<td>OFF-delay with control signal</td>
<td>1 NO contact</td>
</tr>
<tr>
<td>3RA2814-2FW10</td>
<td>OFF-delay with control signal</td>
<td>1 NC contact</td>
</tr>
<tr>
<td>3RA2815-2AW10</td>
<td>OFF-delay without control signal</td>
<td>1 CO contact</td>
</tr>
<tr>
<td>3RA2815-2FW10</td>
<td>OFF-delay without control signal</td>
<td>1 NO contact</td>
</tr>
<tr>
<td>3RA2815-2FW10</td>
<td>OFF-delay without control signal</td>
<td>1 NC contact</td>
</tr>
<tr>
<td><strong>Plug-in, without terminals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3RA2816-0EW20</td>
<td>Star-delta (wye-delta) function module</td>
<td>2 NO contacts (internal)</td>
</tr>
<tr>
<td>3RA2910-0</td>
<td>Sealable cover cap</td>
<td>—</td>
</tr>
</tbody>
</table>

The 8th digit of the article number designates the terminal type:

0: No terminals
1: Screw-type terminals
2: Spring-loaded terminals
### 3.2 Performance features

#### Features

The function modules have the following features:

<table>
<thead>
<tr>
<th>Function module</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function modules for direct-on-line start</td>
<td>Electronic timing relays with semiconductor output</td>
</tr>
<tr>
<td></td>
<td>• ON-delay (1 NO contact)</td>
</tr>
<tr>
<td></td>
<td>• OFF-delay with control signal (1 NO contact)</td>
</tr>
<tr>
<td></td>
<td>• Versions with screw-type and spring-loaded connection systems</td>
</tr>
<tr>
<td>Solid-state time-delay auxiliary switches</td>
<td>• ON-delay (1 NO contact + 1 NC contact or 1 CO contact)</td>
</tr>
<tr>
<td></td>
<td>• ON-delay with/without control signal (1 NO contact + 1 NC contact or 1 CO contact)</td>
</tr>
<tr>
<td></td>
<td>• Versions with screw-type and spring-loaded connection systems</td>
</tr>
<tr>
<td>Function modules for star-delta (wye-delta) start</td>
<td>Star-delta (wye-delta) start</td>
</tr>
<tr>
<td></td>
<td>• Control exclusively via contactor A1/A2 – no further control circuit wiring required</td>
</tr>
<tr>
<td></td>
<td>• No control current wiring thanks to plug-in technology and connecting cables</td>
</tr>
<tr>
<td></td>
<td>• Interchange proof construction</td>
</tr>
<tr>
<td></td>
<td>• Timing function for switching over from star to delta in basic module</td>
</tr>
<tr>
<td></td>
<td>• Electrical interlock without additional wiring</td>
</tr>
<tr>
<td></td>
<td>• Changeover delay time set to a non-adjustable value of ≥ 50 ms</td>
</tr>
</tbody>
</table>
3.3 Applications

3.3.1 Function modules for direct-on-line start

Applications

The function modules for direct-on-line start are used for the time-delayed switching of contactors. The following function modules are available:

- Electronic timing relay with semiconductor output
- Solid-state time-delay auxiliary switch with 1 CO contact or 1 NC contact/1 NO contact

Features of direct-on-line starters

The function module for direct-on-line start has the following features:

- All modules with wide control voltage range
- Integrated varistor (surge suppressor)
- Applicable for size S00, S0, S2 and S3 contactors.

The following table is an overview of which function modules you can use for which size of contactors.

<table>
<thead>
<tr>
<th>Function Modules</th>
<th>S00</th>
<th>S0</th>
<th>S2</th>
<th>S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2811, 3RA2812</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3RA2831, 3RA2832</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3RA2813, 3RA2814, 3RA2815</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

- Large wide voltage range (24 ... 240 V AC/DC), except for 3RA2831, 3RA2832
- Extended operating ranges (24 ... 90 V, 90 ... 240 V), for 3RA2831 and 3RA2832 only
- 3 selectable time ranges (1 s, 10 s, 100 s)
- Operating time adjustment from 5 ... 100% per time range
- Switch position indicator for the contactor below (plunger)

Reference

<table>
<thead>
<tr>
<th>More Information ...</th>
<th>Is available in ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>About application areas</td>
<td>Chapter entitled &quot;Configuration&quot; (Page 33)</td>
</tr>
</tbody>
</table>
3.3.2 Function modules for star-delta (wye-delta) start

Applications

The function module for star-delta (wye-delta) start is used to switch from star (wye) to delta operation.

Features

The function module for star-delta (wye-delta) start has the following features:

- All modules with wide control voltage range
- Integrated varistor (surge suppressor)
- One module kit for contactor screw-type and spring-loaded connection systems
- One module kit for S00, S0, S2 and S3 size contactors (options only with main circuit connecting comb)
- Large wide voltage range (24 to 240 V AC/DC) and
- 3 selectable time ranges (10 s, 30 s, 60 s)
- Operating time adjustment from 5 to 100% per time range (corresponds to 0.5 s to 60 s)
- Changeover delay set to a non-adjustable value of \( \geq 50 \) ms
- Switch position indication for the contactor below in the form of a mechanical switch position indicator (plunger)
- Control exclusively via A1/A2 on the line contactor below
- No further wiring required

The wide voltage and the wide time range ensure advanced use of the function modules.
3RA2816-0EW20 function module for contactor assemblies for star-delta (wye-delta) start

The function module for plugging into contactor assemblies for star-delta (wye-delta) start for sizes S00, S0, S2 and S3 comprises the following devices:

- 1 basic module with time setting
- 2 coupling modules with corresponding connecting cable to coupling or function module

The function module replaces the entire control circuit wiring and combines the functions of the following devices and tasks:

- Timing relay star-delta (wye-delta) function
- Auxiliary switches
- Auxiliary conductor wiring
- Electrical interlock
- Switch position indicator for the contactor below (plunger)
Note

Fitting of auxiliary switches

When the 3RA2816-0EW20 function module for star-delta (wye-delta) start is used, the following applies:
No more than one 3RH29 lateral auxiliary switch block (product version E03 and higher) may be mounted onto the line contactor (Q11) and onto the star (wye) contactor (Q12).
3.4 3RA28 function modules

Function module for direct-on-line start (electronic timing relays with semiconductor output/solid-state time-delay auxiliary switches)

1. Timing relay attachment
2. Time range selector switch: Sets the time base (1 s, 10 s, 100 s)
3. Operating time adjustment switch: Sets the relative time (5 to 100%)
4. Mechanical plunger: Indicates the switching state of the contactor
5. Screw/spring-loaded terminals: The terminals are available as both screw-type and spring-loaded connections.

Figure 3-2 Electronic timing relays with semiconductor output/solid-state time-delay auxiliary switches

Function module for star-delta (wye-delta) start

The function module for star-delta (wye-delta) start comprises a basic module with integrated control logic and two coupling modules of the same type.

1. Basic module with integrated control logic
2. Coupling module
3. Coil control: Basic module: Voltage measurement at the line contactor, Coupling module: Controls the contactor below
4. Ribbon cable: Electrical connection of modules
5. Slot for connecting cable: Routes the supply voltage and electrical interlock
6. Time range selector switch: Sets the time base (10 s, 30 s, 60 s)
7. Operating time adjustment switch: Sets the relative time (5 to 100%)
8. Mechanical plunger: Indicates the switching state of the contactor

Figure 3-3 Basic module and coupling modules for the contactor assembly for star-delta (wye-delta) start
Product combinations

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.

The 3RA28 function modules are designed for size S00, S0, S2 and S3 contactors. The operating range of the 3RA28 function modules is 0.85 to 1.1 Us. You can mount the function modules on the front of SIRIUS 3RT2/3RH2 contactors or 3RA24 contactor assemblies.

3RA24 pre-wired assemblies are available for star-delta (wye-delta) start.

Reference

<table>
<thead>
<tr>
<th>More information ...</th>
<th>Can be found in the appendix ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>About the possible combinations of standard products from the SIRIUS modular system</td>
<td>&quot;References&quot; under &quot;Manuals - SIRIUS Modular System (Page 77)&quot; in the &quot;SIRIUS - System Overview&quot; manual</td>
</tr>
<tr>
<td>About the pre-wired contactor assembly for star-delta (wye-delta) start</td>
<td>&quot;References&quot; under &quot;Manuals - SIRIUS Modular System (Page 77)&quot; in the &quot;SIRIUS - SIRIUS 3RT Contactors/Contactor Assemblies&quot; manual</td>
</tr>
</tbody>
</table>
Functions

5.1 Overvoltage protection

All function modules feature an integrated varistor which attenuates the contactor coil below.

5.2 Time-delayed switching of contactors

Electronic timing relays with semiconductor output (3RA2811-.CW10 / 3RA2812-.DW10 / 3RA2831-.D.10 / 3RA2832-.D.10) or solid-state time-delay auxiliary switches (3RA2813-...W10 / 3RA2814-...W10 / 3RA2815-...W10) are used for the time-delayed switching of contactors. The wide voltage range and the selectable time ranges ensure the advanced use of the function modules.

5.2.1 Response delay

Contacts

Function modules are available with the following contacts:

<table>
<thead>
<tr>
<th>Time-delayed switching of contactors</th>
<th>3RA2811-.CW10</th>
<th>1 semiconductor output (NO contact)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2831-.DG10</td>
<td>1 semiconductor output (NO contact)</td>
<td></td>
</tr>
<tr>
<td>3RA2831-.DH10</td>
<td>1 semiconductor output (NO contact)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time-delayed switching of auxiliary contacts</th>
<th>3RA2813-.AW10</th>
<th>1 CO contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2813-.FW10</td>
<td>1 NC contact and 1 NO contact</td>
<td></td>
</tr>
</tbody>
</table>

Time ranges

The function modules support time-delayed switching from 0.05 to 100 s.

Note

Rated operational current, residual current in the case of a non-switched output, and voltage drop in the case of a switched output must be taken into account.
### Function charts

<table>
<thead>
<tr>
<th>Function</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2811-.CW10</td>
<td><img src="3RA2811-.CW10.png" alt="Diagram" /></td>
</tr>
<tr>
<td>3RA2831-.DG10</td>
<td><img src="3RA2831-.DG10.png" alt="Diagram" /></td>
</tr>
<tr>
<td>3RA2831-.DH10</td>
<td><img src="3RA2831-.DH10.png" alt="Diagram" /></td>
</tr>
<tr>
<td>3RA2813-.AW10</td>
<td><img src="3RA2813-.AW10.png" alt="Diagram" /></td>
</tr>
<tr>
<td>3RA2813-.FW10</td>
<td><img src="3RA2813-.FW10.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>

### Method of operation

The set operating time \( t \) starts when the electronic timing relay (3RA2811) with semiconductor output is connected to the supply voltage via A3 (timing relay) and A2 (contactor). Once the time has elapsed, the semiconductor switches through and controls the contactor below.

The set operating time \( t \) starts when the electronic timing relay (3RA2831) with semiconductor output is connected to the supply voltage via A3 and A4. Once the time has elapsed, the semiconductor switches through and controls the contactor below.

The supply voltage is connected to the solid-state time-delay auxiliary switch (3RA2813) via A1/A2 (contactor). The set operating time \( t \) starts when the supply voltage is connected. The output relay switches once the time has elapsed.
5.2 Time-delayed switching of contactors

5.2.2 OFF-delay with control signal

Contacts

Function modules are available with the following contacts:

<table>
<thead>
<tr>
<th>Time-delayed switching of contactors</th>
<th>Function module</th>
<th>Contact type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2812-.DW10</td>
<td>1 semiconductor output (NO contact)</td>
<td></td>
</tr>
<tr>
<td>3RA2832-.DG10</td>
<td>1 semiconductor output (NO contact)</td>
<td></td>
</tr>
<tr>
<td>3RA2832-.DH10</td>
<td>1 semiconductor output (NO contact)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time-delayed switching of auxiliary contacts</th>
<th>Function module</th>
<th>Contact type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2814-.AW10</td>
<td>1 CO contact</td>
<td></td>
</tr>
<tr>
<td>3RA2814-.FW10</td>
<td>1 NC contact and 1 NO contact</td>
<td></td>
</tr>
</tbody>
</table>

Time ranges

The function modules support time-delayed switching from 0.05 to 100 s.

Function charts

<table>
<thead>
<tr>
<th>Function module</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2812-.DW10</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td>3RA2832-.DG10</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td>3RA2832-.DH10</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td>3RA2814-.AW10</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td>3RA2814-.FW10</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
</tbody>
</table>
Method of operation

On the electronic timing relay (3RA2812/3RA282), the supply voltage is connected via terminals A3/A4. If the control voltage is connected to start contact B1, the semiconductor will switch through and control the contactor below. The operating time t starts when the start contact is disconnected. The minimum ON duration of 35 ms must be observed.

The supply voltage is connected to the solid-state time-delay auxiliary switch (3RA2814) via terminals A3 and A2 (contactor). The output relay switches when the control voltage is connected to the start contact B1. The operating time t starts when the start contact is disconnected. The minimum ON duration of 35 ms must be observed.
5.2 Time-delayed switching of contactors

5.2.3 OFF-delay without control signal

Contacts

3RA2815 function modules switch time-delayed auxiliary contacts. They are available with the following contacts:

- 3RA2815-.AW10: 1 CO contact
- 3RA2815-.FW10: 1 NC contact and 1 NO contact

Time ranges

The function modules support time-delayed switching from 0.05 to 100 s.

Function charts

<table>
<thead>
<tr>
<th>3RA2815-.AW10</th>
<th>3RA2815-.FW10</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram AW10" /></td>
<td><img src="image2" alt="Diagram FW10" /></td>
</tr>
</tbody>
</table>

Method of operation

When the voltage is connected to A1/A2 (contactor), the solid-state time-delay auxiliary switch (3RA2815) switches the output relay. The operating time t starts when the voltage is disconnected. The relay switches back to the idle state at the end of the operating time t. There is an assurance that if the minimum ON duration is not observed either the time lapse will not start or, if the time lapse has started, it will always be completed in an orderly fashion. Users can rely on intermediate states of the functional sequence, such as "no relay dropout", being detected. The minimum ON duration of 200 ms must be observed.
5.2 Time-delayed switching of contactors

5.2.4 Star-delta (wye-delta) function

Contacts

The function module (comprising basic module with integrated control logic and 2 coupling modules) has 2 internal NO contacts.

Time ranges

The start time in star operation can be set between 0.5 and 60 s. The changeover delay is set to a non-adjustable value of ≥ 50 ms.

Function chart

```
<table>
<thead>
<tr>
<th>3RA2816-0EW20</th>
<th>A1/A2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Q12</td>
<td></td>
</tr>
<tr>
<td>Q13</td>
<td></td>
</tr>
</tbody>
</table>
```

Method of operation

The function module for star-delta (wye-delta) start is responsible for the electrical interlock and the timing relay function (dead interval from star (wye) operation to delta operation). Control is exclusively via A1/A2 on the line contactor below. Additional wiring is therefore not required. The supply voltage is routed via a ribbon cable, eliminating the need for control circuit wiring.

The instantaneous star contact and the time-delayed delta contact share the same contact root.

To avoid inter-phase short circuits, the changeover delay from star (wye) to delta is ≥ 50 ms.
6.1 SIRIUS system configurator

Reference

To assist you with configuration, the “SIRIUS 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 system configurator“ on the Internet [http://www.siemens.com/sirius/configurators].
6.2 Configuration

3RA2811-.CW10

The function module is controlled via the terminal A3 and the internal contacts of the contactor A2. After expiry of the time t, the semiconductor becomes conductive and switches on the contactor Q.

**Note**
Contactor coil terminal A1 must not be connected.

3RA2831-.D.10

The 3RA2831 function module is connected to voltage via A3, A4. After expiry of the time t, the semiconductor becomes conductive and switches on the contactor Q.

**Note**
Contactor coil terminals A1 and A2 must not be connected.
3RA2812-DW10, 3RA2832-D.10

If the 3RA2812/3RA2832 electronic timing relay with semiconductor output is fitted, the contactor coil is contacted through the timing relay.

**Note**

Contactor coil terminals A1 and A2 must not be connected.

3RA2813

The 3RA2813 solid-state time-delay auxiliary switch has the following features:

- The voltage is supplied through the plug-in contacts directly via the contactor’s coil terminals, parallel to A1/A2.
- The timing function is activated by switching on the contactor on which the solid-state time-delay auxiliary switch is mounted.
- A varistor is integrated in the solid-state time-delay auxiliary switch to attenuate contactor coil switching overvoltages.
The 3RA2814 solid-state time-delay auxiliary switch has the following features:

- Voltage is supplied directly through plug-in contact A2 through the contactor’s coil terminals and terminal A3 on the timing relay.
- The timing function is activated by switching on the contactor on which the solid-state time-delay auxiliary switch is mounted, via A1 on the contactor coil.
- The 3RA2814 operates with a control signal.
- The minimum ON duration at the start contact is 35 ms.
- A varistor is integrated in the solid-state time-delay auxiliary switch to attenuate contactor coil switching overvoltages.
The 3RA2815 solid-state time-delay auxiliary switch has the following features:

- The voltage is supplied through the plug-in contacts directly via the contactor's coil terminals, parallel to A1/A2.
- The timing function is activated by switching on the contactor on which the solid-state time-delay auxiliary switch is mounted.
- The 3RA2815 solid-state time-delay auxiliary switch operates without a control signal.
- The minimum ON duration is 200 ms.
- A varistor is integrated in the solid-state time-delay auxiliary switch to attenuate contactor coil switching overvoltages.

**Note**

The setting of the output contacts is not defined in as-supplied state (bistable relay). Connect the control voltage and then disconnect it again to set the contacts to the normal position.
3RA2816-0EW20

The 3RA2816 function module for star-delta (wye-delta) start has the following features:

- The voltage is supplied through the plug-in contacts directly via the contactor's coil terminals, parallel to A1/A2.
- The start time in star operation is activated by switching on the contactor.
- The changeover delay is \( \geq 50 \) ms (this is a non-adjustable value).
- A varistor is integrated in the basic module to attenuate contactor coil switching overvoltages.
7.1 Mounting instructions

Electronic timing relay with semiconductor output/solid-state time-delay auxiliary switch

Note
For the "OFF-delay without control signal" function

The setting of the output contact is not defined in as-supplied state (bistable relay). Connect the control voltage and then disconnect it again to set the contact to the normal position.

Note
The solid-state time-delay auxiliary switch cannot be attached to coupling relays.

7.2 Minimum clearances and mounting position

Minimum clearances and mounting position

The minimum clearances and the mounting position are set dependent upon the type of mounting.

7.3 Mounting

7.3.1 Function modules for direct-on-line start (electronic timing relay with semiconductor output/solid-state time-delay auxiliary switch)

Minimum clearances and mounting position

The minimum clearances and the mounting position are set dependent upon the type of mounting.

You can find more information on minimum clearances and the permissible mounting position in the “SIRIUS - SIRIUS 3RT Contactors/Contactor Assemblies” manual.

Mounting SIRIUS 3RA28 function modules

⚠️ DANGER
Hazardous Voltage
Will Cause Death, Serious Injury or Property Damage
Turn off and lock out all power supplying this device before working on this device.

The function modules for direct-on-line start (electronic timing relay with semiconductor output/solid-state time-delay auxiliary switch) are connected to the front of the contactors.

① Check that the interlock slide is engaged in the uppermost position.
2. Attach the function module to the contactor from the front.

3. Push the interlock slide down with a screwdriver (3 mm blade width) until it engages.
7.3.2 Function module for star-delta (wye-delta) start

**DANGER**

Hazardous Voltage
Will Cause Death, Serious Injury, or Property Damage
Turn off and lock out all power supplying this device before working on this device.

Prerequisite for mounting the function module for star-delta (wye-delta) start

**Note**

To mount the timing relay for star-delta (wye-delta) start you need to disassemble the link modules (which will vary depending on the connection system) used to connect the control current paths of the pre-wired contactor assembly for star-delta (wye-delta) start.

![Figure 7-1 Removal of the wiring modules for connecting the control current paths on a contactor assembly for star-delta (wye-delta) start with screw-type connections of size S00](image-url)
7.3 Mounting

Figure 7-2  Removal of the wiring modules for connecting the control current paths on a contactor assembly for star-delta (wye-delta) start with spring-loaded connections of size S00

Figure 7-3  Removal of the wiring modules for connecting the control current paths on a contactor assembly for star-delta (wye-delta) start with screw-type connections of size S0
Mounting

7.3 Mounting

Figure 7-4  Removal of the wiring modules for connecting the control current paths on a contactor assembly for star-delta (wye-delta) start with spring-loaded connections of size S0

Figure 7-5  Removal of the wiring modules for connecting the control current paths on a contactor assembly for star-delta (wye-delta) start with screw-type connections of size S2

Note
Removal of the wiring modules

The procedure for removing the wiring modules on a contactor assembly for star-delta (wye-delta) start of size S3 is identical.
Figure 7-6  Removal of the wiring modules for connecting the control current paths on a contactor assembly for star-delta (wye-delta) start with spring-loaded connections of size S2
Mounting the function module for star-delta (wye-delta) start

① Check that the interlock slide is engaged in the uppermost position.

② Release the cover cap on the interface connection.

③ Remove the cover cap for the interface connection from the connector by lifting it up and out.
4. Attach the basic module/coupling module to the contactor from the front. To do this, insert the contacts into the openings on the contactor.

5. Push the locking slide down with a screwdriver until it engages.
⑥ Insert the coded module connector into the slot in the correct position from above until the module connector engages in the locking mechanism.

⑦ To complete the process, lock the module connector.

---

**Note**

**Fitting of auxiliary switches**

When the 3RA2816-0EW20 function module for star-delta (wye-delta) start is used, the following applies:

No more than one 3RH29 lateral auxiliary switch block (product version E03 and higher) may be mounted onto the line contactor (Q11) and onto the star (wye) contactor (Q12).
7.4 Disassembly

7.4.1 Function modules for direct-on-line start (solid-state timing relay with semiconductor output/solid-state time-delay auxiliary switch)

**DANGER**

Hazardous Voltage
Will Cause Death, Serious Injury or Property Damage
Turn off and lock out all power supplying this device before working on this device.

1. Press the screwdriver towards the contactor.
2. Push the locking slide up with a screwdriver. It is not possible to unlock from below.
Pull the function module toward you and away from the contactor.
7.4.2 Function module for star-delta (wye-delta) start

DANGER

Hazardous Voltage
Will Cause Death, Serious Injury or Property Damage
Turn off and lock out all power supplying this device before working on this device.

① Use a screwdriver to release the locking mechanisms.
② Remove the module connectors from the slot by lifting them up and out.
Mounting

7.5 Replacing the removable terminal

③ Press the screwdriver towards the contactor.

④ Push the interlock slide up with a screwdriver. It is not possible to unlock from below.

⑤ Pull the basic module and the two coupling modules toward you and away from the contactors.
7.5 Replacing the removable terminal

DANGER
Hazardous Voltage
Will Cause Death, Serious Injury or Property Damage
Turn off and lock out all power supplying this device before working on this device.

① Press the interlock.

② Remove the terminal.
Mounting

7.5 Replacing the removable terminal

③ Attach the new terminal and press the terminal into the device until the interlock audibly engages.
Connection

8.1 Connecting the function modules for direct-on-line start

8.1.1 Connecting the solid-state timing relay with semiconductor output

Connection types

The electronic timing relay with semiconductor output is connected via removable terminals with the following connection options:

- Screw-type
- Spring-loaded

Connection

You will find information on connection of the screw-type and spring-loaded connection terminals in the appendix entitled "References" under [Manuals - SIRIUS Modular System (Page 77)] and in the "SIRIUS- System Overview" manual.

Note

During the mounting process, the electronic timing relay is connected to coil terminals A1 and A2 at the same time (by means of plug-in contacts). Contactor coil terminals which are not required are not covered by the timing relay enclosure. 

Avoid incorrect connection.

Note

The 3RA2811 timing relay with ON-delay is connected to the contactor coil in series. 

Contactor coil terminal A1 must not be connected.
8.1 Connecting the function modules for direct-on-line start

**Note**

Contactor coil terminals A1 and A2 must not be connected when using the 3RA2831 function module.

<table>
<thead>
<tr>
<th>Description</th>
<th>Terminal</th>
<th>Circuit diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2811-.CW10 ON-delay</td>
<td>A3 (+)</td>
<td><img src="image1" alt="Circuit Diagram 1" /></td>
</tr>
<tr>
<td>3RA2831-.D.10 ON-delay</td>
<td>A3 (+)</td>
<td><img src="image2" alt="Circuit Diagram 2" /></td>
</tr>
</tbody>
</table>

**Note**

If the 3RA2812 timing relay with OFF-delay is fitted, the contactor coil is contacted through the timing relay.

Contactor coil terminals A1 and A2 must not be connected.

<table>
<thead>
<tr>
<th>Description</th>
<th>Terminal</th>
<th>Circuit diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2812-.DW10 OFF-delay with control signal</td>
<td>B1 (+) A4 (-) A3 (+)</td>
<td><img src="image3" alt="Circuit Diagram 3" /></td>
</tr>
<tr>
<td>3RA2832-.D.10 OFF-delay with control signal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Reference**

You will find further information about the conductor cross-sections in the appendix entitled "References" under "SIRIUS Modular System (Page 77)" manuals and in the "SIRIUS - System Overview" manual.
8.1.2 Connecting the solid-state time-delay auxiliary switch

Connection types

The solid-state time-delay auxiliary switch is connected via removable terminals with the following connection options:

- Screw-type
- Spring-loaded

Connection

You will find information about connection of the screw-type and spring-loaded terminals in the "appendix" under "Manuals - SIRIUS Modular System" (Page 77) and in the "SIRIUS-System Overview" manual.

<table>
<thead>
<tr>
<th>Description</th>
<th>Terminal</th>
<th>Circuit diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2813-.AW10 ON-delay, 1 CO contact</td>
<td>18 NO 15 NC 16 NC</td>
<td><img src="image" alt="Circuit diagram" /></td>
</tr>
<tr>
<td>3RA2813-.FW10 ON-delay, 1 NC contact/1 NO contact</td>
<td>27 NO 28 NO 35 NC 36 NC</td>
<td><img src="image" alt="Circuit diagram" /></td>
</tr>
<tr>
<td>3RA2814-.AW10 OFF-delay with control signal, 1 CO contact</td>
<td>18 NO 15 NC 16 NC A3 (+)</td>
<td><img src="image" alt="Circuit diagram" /></td>
</tr>
</tbody>
</table>
### Connection

#### 8.1 Connecting the function modules for direct-on-line start

<table>
<thead>
<tr>
<th>Description</th>
<th>Terminal</th>
<th>Circuit diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2814-.FW10 OFF-delay with control signal, 1 NC contact/1 NO contact</td>
<td>27 NO, 28 NO, 35 NC, 36 NC, A3 (+)</td>
<td><img src="image" alt="Circuit Diagram 1" /></td>
</tr>
<tr>
<td>3RA2815-.AW10 OFF-delay without control signal, 1 CO contact</td>
<td>18 NO, 15 NC, 16 NC</td>
<td><img src="image" alt="Circuit Diagram 2" /></td>
</tr>
<tr>
<td>3RA2815-.FW10 OFF-delay without control signal, 1 NC contact/1 NO contact</td>
<td>27 NO, 28 NO, 35 NC, 36 NC</td>
<td><img src="image" alt="Circuit Diagram 3" /></td>
</tr>
</tbody>
</table>

### Reference

You will find further information about the conductor cross-sections in the appendix entitled "References" under "SIRIUS Modular System (Page 77)" manuals and in the "SIRIUS - System Overview" manual.
8.2 Connecting the function module for star-delta (wye-delta) start

Control

Control is exclusively via terminals A1 and A2 on the line contactor; no further control circuit wiring is required.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Terminal</th>
<th>Circuit diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RA2816-0EW20</td>
<td>—</td>
<td><img src="image" alt="Circuit Diagram" /></td>
</tr>
</tbody>
</table>
8.3 Conductor cross-sections

8.3.1 Conductor cross-sections for screw-type connection systems

The tables below define the permissible conductor cross-sections for main terminals and auxiliary conductor connections in sizes S00, S0, S2 and S3 for screw-type connection systems.

Table 8-1 Conductor cross-sections for screw-type terminals

<table>
<thead>
<tr>
<th>Connection type</th>
<th>3RA2811, 3RA2812, 3RA2813, 3RA2814, 3RA2815, 3RA2831, 3RA2832</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 x (0.5 … 4) mm²</td>
<td>1 x (0.5 … 4) mm²</td>
</tr>
<tr>
<td>2 x (0.5 … 2.5) mm²</td>
<td>2 x (0.5 … 2.5) mm²</td>
</tr>
<tr>
<td>1 x (0.5 … 2.5) mm²</td>
<td>1 x (0.5 … 2.5) mm²</td>
</tr>
<tr>
<td>2 x (0.5 … 1.5) mm²</td>
<td>2 x (0.5 … 1.5) mm²</td>
</tr>
<tr>
<td>AWG</td>
<td>2 x (20 to 14)</td>
</tr>
</tbody>
</table>
### 8.3.2 Conductor cross-sections for spring-loaded connection systems

**Conductor cross-sections for spring-loaded connection systems**

The tables below define the permissible conductor cross-sections for main terminals and auxiliary conductor connections in sizes S00, S0, S2 and S3 for spring-loaded connection systems.

Table 8-2  Conductor cross-sections for spring-loaded terminals

<table>
<thead>
<tr>
<th>Connection type</th>
<th>3RA2811, 3RA2812, 3RA2813, 3RA2814, 3RA2815, 3RA2831, 3RA2832</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>3RA2908-1A (3.0 x 0.5) mm</td>
</tr>
<tr>
<td><img src="image2" alt="Diagram" /></td>
<td>2 x (0.25 … 1.5) mm²</td>
</tr>
<tr>
<td><img src="image3" alt="Diagram" /></td>
<td>2 x (0.25 … 1.5) mm²</td>
</tr>
<tr>
<td><img src="image4" alt="Diagram" /></td>
<td>2 x (0.25 … 1.5) mm²</td>
</tr>
<tr>
<td>AWG</td>
<td>2 x (24 to 16)</td>
</tr>
</tbody>
</table>
Connection

8.3 Conductor cross-sections
9.1 Setting the times

Setting options for function modules

On function modules for direct-on-line start (electronic timing relays with semiconductor output/solid-state time-delay auxiliary switches), use the time range selector switch to set the time base to 1 s, 10 s or 100 s. Use the operating time adjustment switch to set the relative time between 5 and 100% (to support operating times between 0.05 s and 100 s).

On the function module for star-delta (wye-delta) start, you can preset the dead interval from star to delta operation to 10 s, 30 s or 60 s and the operating time to between 0.5 s and 60 s (using the adjustment switch). The changeover delay from star (wye) to delta operation is set to a non-adjustable value of ≥ 50 ms.

Example time setting

Time base on time range selector switch = 100 s, relative time on operating time adjustment switch = 50%:

This results in an operating time of 50 s.
Operation

9.1 Setting the times
10.1 Sealable cover

Description

Sealable covers are transparent molded-plastic caps with a break-off clip (preset breaking point).

You can use a sealable cover to protect 3RA28 function modules against unauthorized operation.

Mounting the sealable cover

① Break off the clip on the sealable cover (preset breaking point).
② Insert the clip into the opening on the function module, until it engages.
③ Insert the sealable cover into the openings on the function module.
④ Seal the clip to secure it against unauthorized removal.
Accessories

10.1 Sealable cover
11.1 Technical data in Siemens Industry Online Support

Technical data sheet

1. Enter the full article number of the desired device in the "Product" field, and confirm with the Enter key.
2. Click the "Technical data link.

Compare products
You can compare the technical specifications of selected products.

1. Select the products you want to compare.
2. Click the "Compare technical data" button.

Function modules for mounting on 3RT2 contactors

Minimum clearances and mounting position
The minimum clearances and the mounting position are set dependent upon the type of mounting.
## Technical data

### 11.1 Technical data in Siemens Industry Online Support

You can find more information on minimum clearances and the permissible mounting position in the "SIRIUS - SIRIUS 3RT Contactors/Contactor Assemblies" [link](http://support.automation.siemens.com/WW/view/en/60306557) manual.

<table>
<thead>
<tr>
<th>Type</th>
<th>3RA2811</th>
<th>3RA2831</th>
<th>3RA2812</th>
<th>3RA2832</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic timing relays with semiconductor output</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Use with 3RT2 contactor**

- **Size S00, S0**
  - Yes — — Yes —
- **Size S2, S3**
  - — Yes — Yes —

**Rated insulation voltage U<sub>i</sub>**
- Pollution degree 3 Overvoltage category III
  - V AC 300 300 300 300

**Rated impulse withstand voltage**
- kV AC 4 4 4 4

**Operating range of excitation**
- 0.85 ... 1.1x Us
- 0.95 ... 1.05 times the rated frequency

**Rated power**
- W 1 1 1 1

**Power input at 230 V AC, 50 Hz**
- VA 1 1 1 1

**DIAZED fuse operating class gG**
- A — — —

**Switching frequency under load**

- **With I<sub>e</sub> 230 V AC**
  - h<sup>-1</sup> 2500 2500 2500 2500
- **With 3RT2 contactor; 230 V AC**
  - h<sup>-1</sup> 2500 2500 2500 2500

**Recovery time**
- ms 50 50 50 50

**Minimum ON duration**
- ms — — 35 35

**Residual current**
- max. mA 5 — — —

**Voltage drop when switched-through**
- max. V 3.5 — — —

**Setting accuracy in relation to full-scale value**
- typ. ± % 15 15 15 15

**Repeat accuracy**
- max. ± % 1 1 1 1

**Electrical durability (operating cycles)**

- **on contactor (size S00 / S0)**
  - Operating cycles: 10 x 10<sup>6</sup> — 10 x 10<sup>6</sup> —
- **on contactor (size S2)**
  - Operating cycles: — 5 x 10<sup>6</sup> — 5 x 10<sup>6</sup>
- **on contactor (size S3)**
  - Operating cycles: — 3 x 10<sup>6</sup> — 3 x 10<sup>6</sup>

**Mechanical durability (operating cycles)**

- **on contactor (size S00 / S0)**
  - Operating cycles: 100 x 10<sup>6</sup> — 100 x 10<sup>6</sup> —
- **on contactor (size S2)**
  - Operating cycles: — 5 x 10<sup>6</sup> — 5 x 10<sup>6</sup>
- **on contactor (size S3)**
  - Operating cycles: — 3 x 10<sup>6</sup> — 3 x 10<sup>6</sup>
### Technical data

#### 11.1 Technical data in Siemens Industry Online Support

<table>
<thead>
<tr>
<th>Type</th>
<th>3RA2811</th>
<th>3RA2831</th>
<th>3RA2812</th>
<th>3RA2832</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissible ambient temperature</td>
<td>°C</td>
<td>-25 ... +60</td>
<td>-25 ... +60</td>
<td>-25 ... +60</td>
</tr>
<tr>
<td>• Operation</td>
<td>°C</td>
<td>-25 ... +60</td>
<td>-25 ... +60</td>
<td>-25 ... +60</td>
</tr>
<tr>
<td>• Storage</td>
<td>°C</td>
<td>-40 ... +80</td>
<td>-40 ... +80</td>
<td>-40 ... +80</td>
</tr>
<tr>
<td>Degree of protection to DIN EN 60947-1, Annex C</td>
<td></td>
<td>IP20</td>
<td>IP20</td>
<td>IP20</td>
</tr>
<tr>
<td>Permissible mounting position</td>
<td></td>
<td>Any (see contactor)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock resistance with half-sine acc. to IEC 60068-2-27</td>
<td>g/ms</td>
<td>15/11</td>
<td>15/11</td>
<td>15/11</td>
</tr>
<tr>
<td>Vibration resistance (IEC 60068-2-6)</td>
<td>Hz/mm</td>
<td>10-55/0.35</td>
<td>10-55/0.35</td>
<td>10-55/0.35</td>
</tr>
<tr>
<td>Electromagnetic compatibility (EMC) acc. to</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IEC 61000-6-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IEC 61000-6-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IEC 61812-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IEC 60947-4-1</td>
</tr>
<tr>
<td>Overvoltage protection</td>
<td></td>
<td>Varistor integrated</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Technical data

#### 11.1 Technical data in Siemens Industry Online Support

<table>
<thead>
<tr>
<th>Type</th>
<th>3RA2813</th>
<th>3RA2814</th>
<th>3RA2815</th>
<th>3RA2816</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid-state time-delay auxiliary switches</td>
<td>Star-delta (wye-delta) module kit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Use with 3RT2 contactor

- **Size S00, S0**: Yes, Yes, Yes, Yes
- **Size S2, S3**: Yes, Yes, Yes, Yes

#### Rated insulation voltage \( U_{i} \), Pollution degree 3, Overvoltage category III

<table>
<thead>
<tr>
<th>Voltage</th>
<th>kV AC</th>
<th>300</th>
<th>300</th>
<th>300</th>
<th>300</th>
</tr>
</thead>
</table>

#### Rated impulse withstand voltage

<table>
<thead>
<tr>
<th>Voltage</th>
<th>kV AC</th>
<th>4</th>
<th>4</th>
<th>4</th>
<th>4</th>
</tr>
</thead>
</table>

#### Operating range of excitation

- 0.85 ... 1.1 \( \times \) Us
- 0.95 ... 1.05 times the rated frequency

#### Rated power

<table>
<thead>
<tr>
<th>Power</th>
<th>W</th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power input at 230 V AC, 50 Hz</td>
<td>VA</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

#### Rated operational current \( I_{e} \)

- **AC-15 at 24 to 250 V, 50 Hz**: A, 3, 3, 3, —
- **DC-13 at 24 V**: A, 1, 3, 3, —
- **DC-13 at 125 V**: A, 0.2, 0.2, 0.2, —
- **DC-13 at 250 V**: A, 0.1, 0.1, 0.1, —

#### DIAZED fuse operating class gG

| Fuse | A | 4 | 4 | 4 | 4 |

#### Switching frequency under load

- With \( I_{e} \): 230 V AC h\(^{-1}\) 2500 2500 2500 —
- With 3RT2 contactor; 230 V AC h\(^{-1}\) 2500 2500 2500 —

#### Recovery time

<table>
<thead>
<tr>
<th>Time</th>
<th>ms</th>
<th>150</th>
<th>150</th>
<th>150</th>
<th>150</th>
</tr>
</thead>
</table>

#### Minimum ON duration

<table>
<thead>
<tr>
<th>Duration</th>
<th>ms</th>
<th>—</th>
<th>35</th>
<th>200</th>
<th>—</th>
</tr>
</thead>
</table>

#### Residual current max. mA

| Current | mA | — | — | — | — |

#### Voltage drop when switched-through max. V

| Voltage | V | — | — | — | — |

#### Setting accuracy in relation to full-scale value typ. \% 15 15 15 15

#### Repeat accuracy max. \% 1 1 1 1

#### Electrical durability (operating cycles)

<table>
<thead>
<tr>
<th>Cycles</th>
<th>100 x 10(^3)</th>
<th>100 x 10(^3)</th>
<th>100 x 10(^3)</th>
<th>100 x 10(^3)</th>
</tr>
</thead>
</table>

#### Mechanical durability (operating cycles)

<table>
<thead>
<tr>
<th>Cycles</th>
<th>10 x 10(^6)</th>
<th>10 x 10(^6)</th>
<th>10 x 10(^6)</th>
<th>10 x 10(^6)</th>
</tr>
</thead>
</table>

#### Permissible ambient temperature

- **Operation**: °C -25 ... +60 -25 ... +60 -25 ... +60 -25 ... +60
- **Storage**: °C -40 ... +80 -40 ... +80 -40 ... +80 -40 ... +80

#### Degree of protection to DIN EN 60947-1, Annex C

<table>
<thead>
<tr>
<th>Protection</th>
<th>IP20</th>
<th>IP20</th>
<th>IP20</th>
<th>IP20</th>
</tr>
</thead>
</table>

#### Permissible mounting position

<table>
<thead>
<tr>
<th>Position</th>
<th>Any (see contactor)</th>
</tr>
</thead>
</table>

#### Shock resistance with half-sine acc. to IEC 60068-2-27

<table>
<thead>
<tr>
<th>Acceleration</th>
<th>g/ms</th>
<th>15/11</th>
<th>15/11</th>
<th>15/11</th>
<th>15/11</th>
</tr>
</thead>
</table>

---

SIRIUS - SIRIUS 3RA28 function modules for mounting on 3RT2 contactors

Manual, 09/2016, A5E03656507620A/RS-AC/004
## Technical data in Siemens Industry Online Support

### 11.1 Technical data

**SIRIUS - SIRIUS 3RA28 function modules for mounting on 3RT2 contactors**

Manual, 09/2016, A5E03656507620A/RS-AC/004

#### Table 11-1 Conductor cross-sections with screw-type connection system

<table>
<thead>
<tr>
<th>Type</th>
<th>3RA2811, 3RA2812, 3RA2831, 3RA2832, 3RA2813, 3RA2814, 3RA2815</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td><strong>mm²</strong> 1 x (0.5 to 4)/2 x (0.5 to 2.5)</td>
</tr>
<tr>
<td>Finely stranded with end sleeve</td>
<td><strong>mm²</strong> 1 x (0.5 to 2.5)/2 x (0.5 to 1.5)</td>
</tr>
<tr>
<td>AWG cable, solid or stranded</td>
<td><strong>AWG</strong> 2 x (20 to 14)</td>
</tr>
<tr>
<td>Connection screw</td>
<td><strong>M3</strong> (for normal screwdrivers size 2 and Pozidriv 2)</td>
</tr>
<tr>
<td>Tightening torque</td>
<td><strong>Nm</strong> 0.8 to 1.2</td>
</tr>
</tbody>
</table>

#### Table 11-2 Conductor cross-sections for spring-loaded connection system

<table>
<thead>
<tr>
<th>Type</th>
<th>3RA2811, 3RA2812, 3RA2831, 3RA2832, 3RA2813, 3RA2814, 3RA2815</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td><strong>mm²</strong> 2 x (0.25 to 1.5)</td>
</tr>
<tr>
<td>Finely stranded with end sleeve</td>
<td><strong>mm²</strong> 2 x (0.25 to 1.5)</td>
</tr>
<tr>
<td>Finely stranded without end sleeve</td>
<td><strong>mm²</strong> 2 x (0.25 to 1.5)</td>
</tr>
<tr>
<td>AWG cable, solid or stranded</td>
<td><strong>AWG</strong> 2 x (24 to 16)</td>
</tr>
</tbody>
</table>
12.1 CAx data

You can find the CAx data in the Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en-ps/16208/td).

1. Enter the full article number of the desired device in the "Product" field, and confirm with the Enter key.
2. Click the "CAx data link."
12.2 Internal circuit diagrams

3RA28 function modules

3RA2811-.CW10
ON-delay, semiconductor output

3RA2812-.DW10, 3RA2832-.D.10
OFF-delay with control signal, semiconductor output

3RA2813-.AW10
ON-delay, 1 CO contact

3RA2814-.AW10
OFF-delay with control signal, 1 CO contact

3RA2815-.AW10
OFF-delay without control signal, 1 CO contact

3RA2831-.D.10
ON-delay, semiconductor output

3RA2813-.FW10
ON-delay, 1 NC contact, 1 NO contact

3RA2814-.FW10
OFF-delay with control signal, 1 NC contact, 1 NO contact

3RA2815-.FW10
OFF-delay without control signal, 1 NC contact, 1 NO contact
12.3 Typical circuits

Momentary-contact circuit

![Momentary-contact circuit diagram](image)

Figure 12-1 Function module (3RA28), momentary-contact circuit

Maintained-contact circuit

![Maintained-contact circuit diagram](image)

Figure 12-2 Function module (3RA28), maintained-contact circuit
Main circuit

Figure 12-3  Circuit diagram, main circuit
A.1 References

Further references


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

Operating instructions

<table>
<thead>
<tr>
<th>Title</th>
<th>Article number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIRIUS electronic timing relay with semiconductor output S00/S0</td>
<td>3ZX1012-0RA11-2BA1</td>
</tr>
<tr>
<td>(3RA2811 and 3RA2812)</td>
<td></td>
</tr>
<tr>
<td>SIRIUS electronic timing relay with semiconductor output S2/S3</td>
<td>3ZX1012-0RA28-3AA1</td>
</tr>
<tr>
<td>(3RA2831 and 3RA2832)</td>
<td></td>
</tr>
<tr>
<td>SIRIUS solid-state delayed auxiliary switch S00/S0/S2/S3</td>
<td>3ZX1012-0RA13-1AA1</td>
</tr>
<tr>
<td>(3RA2813, 3RA2814 and 3RA2815)</td>
<td></td>
</tr>
<tr>
<td>SIRIUS function module for star-delta (wye-delta) start S00/S0/S2/S3</td>
<td>3ZX1012-0RA16-1AA1</td>
</tr>
<tr>
<td>(3RA2816-0EW20)</td>
<td></td>
</tr>
</tbody>
</table>

A.2 Manuals - SIRIUS Modular System

Manuals - SIRIUS Modular System

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

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

<table>
<thead>
<tr>
<th>Information about ...</th>
<th>Is available in ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SIRIUS - system overview</td>
<td>• “SIRIUS - System Overview” [<a href="http://support.automation.siemens.com/WW/view/en/60311318">http://support.automation.siemens.com/WW/view/en/60311318</a>]</td>
</tr>
<tr>
<td></td>
<td>manual (Article number: 3ZX1012-0RA01-5AC1)</td>
</tr>
</tbody>
</table>
### Information about... Is available in...

- **Contactors and contactor assemblies 3RT, 3RH and 3RA**  
  "SIRIUS - SIRIUS 3RT contactors and contactor assemblies"  
  manual  
  (Article number: 3ZX1012-0RT20-5AC1)

- **3RF34 electronic switching devices**  
  "SIRIUS - SIRIUS 3RF34 electronic Switching Devices"  
  manual  
  (Article number: 3ZX1012-0RF34-5AC1)

- **3RW soft starters**  
  "SIRIUS 3RW30/3RW40 Soft Starters"  
  manual  
  (Article number: 3ZX1012-0RW30-1AC1)  
  "SIRIUS 3RW44 Soft Starter"  
  manual  
  (Article number: 3ZX1012-0RW44-1AC1)

- **3RV motor starter protectors**  
  "SIRIUS - SIRIUS 3RV" motor starter protectors  
  manual  
  (Article number: 3ZX1012-0RV20-5AC1)

- **3RU, 3RB overload relays**  
  "SIRIUS 3RU thermal overload relays / SIRIUS 3RB electronic overload relays"  
  (Article number: 3ZX1012-0RU20-5AC1)

- **3RB24 electronic overload relay**  
  "3RB24 electronic Overload Relay for IO-Link"  
  manual  
  (Article number: 3ZX1012-0RB24-0AC0)

- **3UG4 monitoring relays / 3RR2 current monitoring relays**  
  "3UG4/3RR2 Monitoring Relays" manual  
  (Article number: 3ZX1012-0UG40-0AC0)

- **3RS1/3RS2 temperature monitoring relays**  
  "3RS1/3RS2 temperature monitoring relays" manual  
  (Article number: 3ZX1012-0RS10-1AC1)

- **3UG48 monitoring relays / 3RR24 current monitoring relays for IO-Link**  
  "3UG48/3RR24 Monitoring Relays for IO-Link"  
  manual  
  (Article number: 3ZX1012-0UG48-0AC1)

- **3RS14/3RS15 temperature monitoring relays for IO-Link**  
  "3RS14/3RS15 temperature monitoring relays for IO-Link"  
  manual  
  (Article number: 3ZX1012-0RS14-0AC0)

- **3RA load feeders**  
  "SIRIUS - SIRIUS 3RA load feeders" manual  
  (Article number: 3ZX1012-0RA21-5AC1)
<table>
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| 3RA6 compact starters | "SIRIUS 3RA6 Compact Starter" manual  
(Article number: 3RA6992-0A) |
| 3RA28 function modules for mounting on contactors | "SIRIUS Innovations - SIRIUS 3RA28 Function Modules for mounting on 3RT2 Contactors" manual  
(Article number: 3ZX1012-0RA28-5AC1) |
| 3RA27 function modules for connection to the higher-level control | "SIRIUS - SIRIUS 3RA2712 function modules for AS-Interface" manual  
(Article number: 3ZX1012-0RA27-0AC0)  
"SIRIUS - SIRIUS 3RA2711 function modules for IO-Link" manual  
(Article number: 3ZX1012-0RA27-1AC1) |
| 4SI SIRIUS electronic module (3RK1005-0LB00-0AA0)* | "4SI SIRIUS Electronic Module" manual  
(Article number: 3ZX1012-0LB00-0AA0) |
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 [http://www.siemens.com/sirius/support].

- **Product information**
  Catalogs and other informative documents can be obtained from the Information Center and Download Center [http://www.siemens.com/sirius/infomaterial].

- **Online ordering system**
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- **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 [http://www.siemens.com/sirius/technical-assistance]. You can also submit your question directly to a technical consultant using our support request service.
B.1 CAx data


1. Enter the full article number of the desired device in the “Product” field, and confirm with the Enter key.

2. Click the “CAx data link.”
**B.2 Dimensions in mm**

**Note**
All dimensions are specified in mm.

**B.3 Solid-state timing relays with semiconductor output and solid-state time-delay auxiliary switches**

Figure B-1  Electronic timing relay with spring-loaded terminal

<table>
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B.3 Solid-state timing relays with semiconductor output and solid-state time-delay auxiliary switches

Figure B-2   Electronic timing relay with screw connection

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B.4 Star-delta (wye-delta) modules

1. Star-delta (wye-delta) function module (mounted)
2. Contactor
3. Coupling modules
4. Basic module

Figure B-3  Star-delta (wye-delta) function module with spring-loaded terminal

<table>
<thead>
<tr>
<th>Article number</th>
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</tbody>
</table>
Dimension drawings

B.4 Star-delta (wye-delta) modules

1. Star-delta (wye-delta) function module (mounted)
2. Contactor
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4. Basic module

Figure B-4 Star-delta (wye-delta) function module with screw connection

<table>
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<th>Article number</th>
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</tbody>
</table>
Dimension drawings

B.4 Star-delta (wye-delta) modules

1. Star-delta (wye-delta) function module (mounted)
2. Contactor
3. Coupling modules
4. Basic module

Table B-1 Dimensions in mm

<table>
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<th>Size</th>
<th>a</th>
<th>b</th>
<th>c</th>
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