



**SIEMENS**

## Start-up with a small footprint – the SIRIUS 3RM1 Motor Starter

The SIRIUS 3RM1 Motor Starter –  
multifunctional with a width of just 22.5 mm

[www.usa.siemens.com/3RM1](http://www.usa.siemens.com/3RM1)



product  
design award

2013

Answers for industry.

# Getting started – even when things are tight SIRIUS 3RM1 Motor Starters

Space-saving systems require maximum efficiency and can pose significant challenges for system engineers. Systems and machinery are becoming increasingly compact and are expected to have smaller footprints, but at the same time they typically require more auxiliary drives. Because every inch counts in a control cabinet, SIRIUS 3RM1 Motor Starters are precisely tailored to meet these requirements and represent the solution for the development of cutting-edge and future-oriented systems. Their innovative housing concept even received the internationally renowned iF product design award 2013 by the International Forum Design (iF) organization.

It's easy to get started: The new motor starters are so narrow that they fit into the smallest space.

**In brief: SIRIUS 3RM1 Motor Starters – multifunctional with a width of just 22.5 mm.**



Whether direct or reversing starters – with SIRIUS 3RM1 Motor Starters, you can implement compact control cabinet solutions for small motors up to 3 HP.



### Compact

- › **Narrow 22.5mm width**
- › **Multifunctionality**
  - Direct and reversing starters
  - Overload protection
  - Safe shutdown

### Simple

- › **Less wiring**
  - in control circuit thanks to device connectors
  - in main circuit with the infeed system
- › **Fast diagnostics**

### Economical

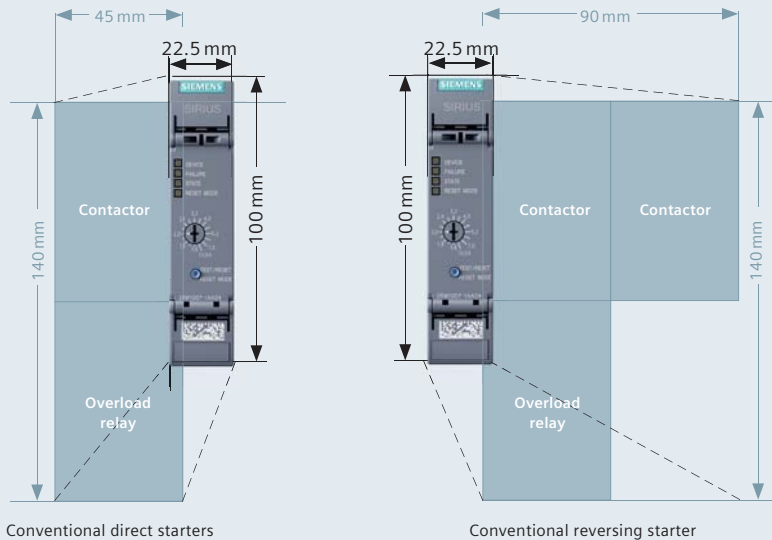
- › **Durable and energy-efficient hybrid switching technology**
- › **Low device variance through wide adjustment range**

The new SIRIUS 3RM1 Motor Starters are designed for installation in control cabinets and require minimal space: They combine the functionality of contactors and overload relays in a width of just 22.5 mm. In addition, thanks to their use of hybrid switching technology, they have all the benefits of relay and semiconductor technology in a single device, which increases their cost-effectiveness.

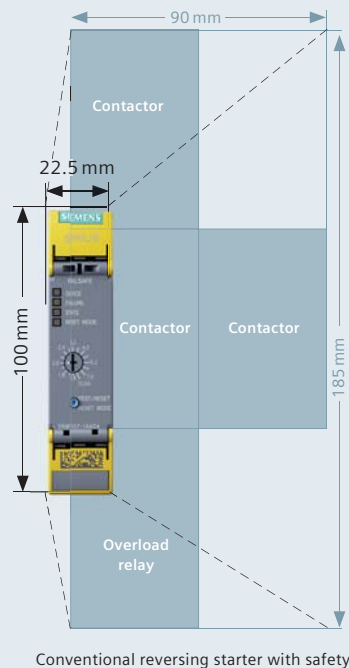
The motor starters make your work easier, offering easy adjustment of motor current, minimal wiring costs, and fast troubleshooting. With these motor starters, you can build more compact control cabinets and increase the efficiency of your systems while saving time and money in the installation.

# Functionality that adapts

## SIRIUS 3RM1 Motor Starters – the compact solution



The new motor starters optimally round out the SIRIUS portfolio of industrial controls technology: They combine several functions – such as direct or reversing start and overload protection – into a uniformly compact and extremely narrow footprint.



The compact SIRIUS 3RM1 Motor Starter replaces combinations of multiple power contactors and overload relays, thereby minimizing the required space in the cabinet.

### Narrow width

The motor starters are distinguished by their narrow width of just 22.5 mm. That saves room in the control cabinet and provides the ideal conditions for systems and machines with many small motors up to 3 HP.

Even subsequent expansions are easier to plan and implement: If more motors are needed in the system, thanks to their narrow width it's easy to add additional SIRIUS 3RM1 Motor Starters to the ones already installed in the control cabinet.

### Multifunctional

#### Direct and reversing starters

Motor starters are available as direct starters or with a reversing starter function, all in a uniform housing design. The operation, configuration, and the width for both device types are an identical 22.5mm.

#### Overload protection

Every motor starter is equipped with integrated electronic overload protection. In other words, you no longer need a separate overload relay when you use these motor starters. The result is lower wiring costs, shorter installation time, and more room on the DIN rail.

### Safe Shut Down

To meet the requirements for safe shut-downs, SIRIUS 3RM1 Motor Starters are also available in a safety version. They can be used in combination with the modular safety relays to easily implement locally limited safety applications.

The motor starters for safe shutdowns are available as direct and reversing starters. They are certified in accordance with SIL 3, PLe and Cat 4.

#### ATEX certified

The motor overload protection of the safety version is ATEX certified, which means that it can also be used for motors in explosion proof areas with flammable dust and gases.



# Controlling smaller motors

## Diverse range of applications

SIRIUS 3RM1 Motor Starters can be used in many industrial areas to control auxiliary motors, such as those used for pumps, fans, and hoisting equipment, in machine tool and production machines, as well as in conveyor technology. The devices are optimally suited for group installation in which multiple motor starters can be protected by using just a single circuit breaker or fuse.

## Ideal addition to the SIRIUS switching technology portfolio

The SIRIUS portfolio is ideally positioned for higher switching currents. The new motor starters perfectly round out the existing SIRIUS industrial switching technology portfolio in the field of smaller motors. With a width of just 22.5 mm, the new SIRIUS 3RM1 Motor Starters are perfect for control cabinets where space is at a premium.

## Group installation for a conveyor system

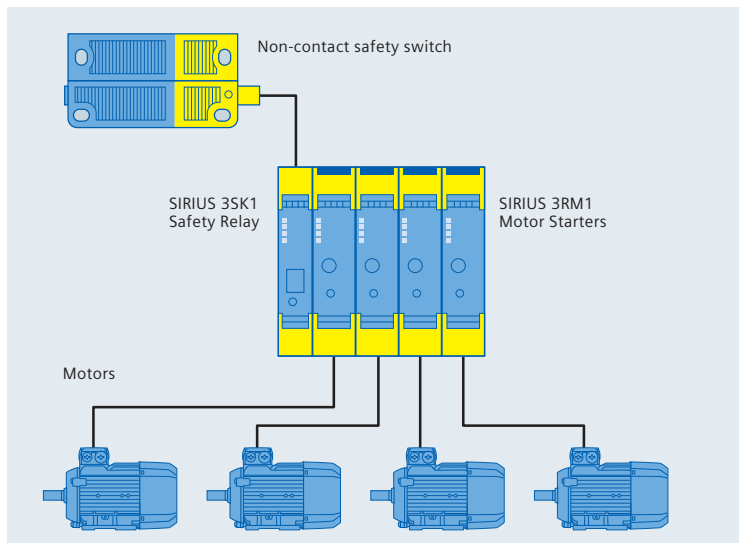
With SIRIUS 3RM1 Motor Starters, you can quickly and easily implement group installations with integrated overload protection for a wide range of applications — one example would be for conveyor systems with numerous electric motors. In the main circuit, the three-phase feeder terminal and three-phase busbar supply the motor starters, eliminating the need for complex wiring for the infeed. In a group installation, a single UL489 circuit breaker can provide short circuit protection up to 10 kA at 480V and 12.5A max. Alternatively, class J fuses up to 35A provides group short circuit protection up to 100 kA at 480V.

Significant provisions are in place for the expansion of the conveyor system — the infeed system has the flexibility to be expanded, allowing additional motor starters to be integrated into an existing group design with minimal effort. Project planning is simplified through the new motor starter configurator.

## Safe shutdown in a filling system

The combination of failsafe 3RM1 Motor starters with SIRIUS 3SK1 Safety Relays makes it easy to implement locally limited safety applications. One example can be found in the protective door monitoring of a bottle filling system, which makes it possible to safely enter the filling station.

To accomplish this, the motors of the conveyor belts are connected to the new motor starters. On the control current side, the motor starters are connected to a SIRIUS 3SK1 Safety Relay via the device connector. If the monitored door is opened, the safety relay receives a signal from a connected non-contact safety switch, evaluates it, and sends the information to all the motor starters in the group via the device connector. The fail-safe motor starters react by safely shutting down all the connected motors. This makes it possible to safely enter the filling station.



Combination of one SIRIUS 3SK1 safety relay and four motor starters for a safe group shutdown.

# Simplicity that pays off

Simple wiring during installation and an easy-to-read status indicator during operation save you time. Whether during project planning, assembly, or maintenance – the new motor starters will make everything easier for you.

## Reduced wiring

### Control circuit

To provide for the simultaneous and safe shutdown of several motor starters via a SIRIUS 3SK1 Safety Relay, you can simply interconnect the devices without additional wiring using a device connector. Signals are exchanged between the devices, and cyclical monitoring and the shutdown are carried out wirelessly. In addition, the device connector supplies voltage to all the devices.

### Main circuit

A special infeed system can be used to quickly, easily, and safely supply multiple motor starters in the main circuit – the motor starters are interconnected via three-phase busbars and supplied via a three-phase feeder terminal. The busbar's special design even makes it possible for individual devices to be quickly and easily removed from the starter group.

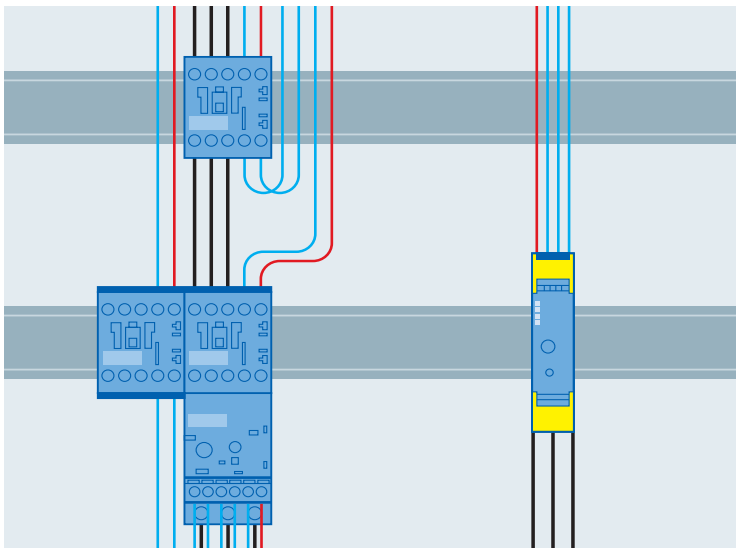
## Simple connection

You benefit from convenient connection technology when it comes to wiring the devices. The screw connections for the control circuit have an optimized angle to provide access for tools and cables from the same direction. Alternatively, no tools whatsoever are needed for wiring spring-loaded connections – simply insert the solid core cables manually, and you're done.

If necessary, you can even individually swap out the removable connection terminals on the unit.

## Easy-to-read status indicator

Thanks to the LED status indicator on the housing of the SIRIUS 3RM1 Motor Starters, you can see at a glance whether all the functions are operational or whether there are any problems. This makes it possible to quickly detect and correct any faults.



Reduced wiring and significant space savings compared to conventional designs.



The infeed system supplies group configurations up to a total current of 16 A.

# Innovative housing concept

## Labeled hinged covers

Simple orientation thanks to laser labeling for the individual connections in the cover



## Connection terminals

Easily replaceable connection terminals, available with screw-type or spring-loaded technology



Screw-type connection

## Device connector

Easy, wireless connection and 24 V supply of multiple motor starters for connecting to SIRIUS 3SK1 Safety Relays for safe shutdown



## Sealable cover

Simple protection against unauthorized access



Spring-loaded connection

**Width**  
Economical, space-saving width of just 22.5 mm



## LED status indicator

Fast, selective start-up, and clear LED error display

## Rotary encoder switch

Easy setting of the motor current to be monitored

## Test/reset button

Acknowledgement if a malfunction occurs

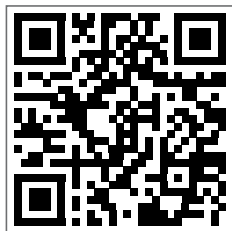
1. Reset in case of overload
2. Implement the test function
3. Switch from manual to automatic reset

## 2D matrix code

Fast and easy scanning of order and serial numbers; corresponding Siemens app available at [www.siemens.com/sirius/support-app](http://www.siemens.com/sirius/support-app)

# Efficiency that drives

Increase the efficiency in the control cabinet with energy-efficient and durable technology and benefit from a clear spectrum of devices.



Scan and experience the benefits of hybrid switching technology!

## Durable and energy efficient

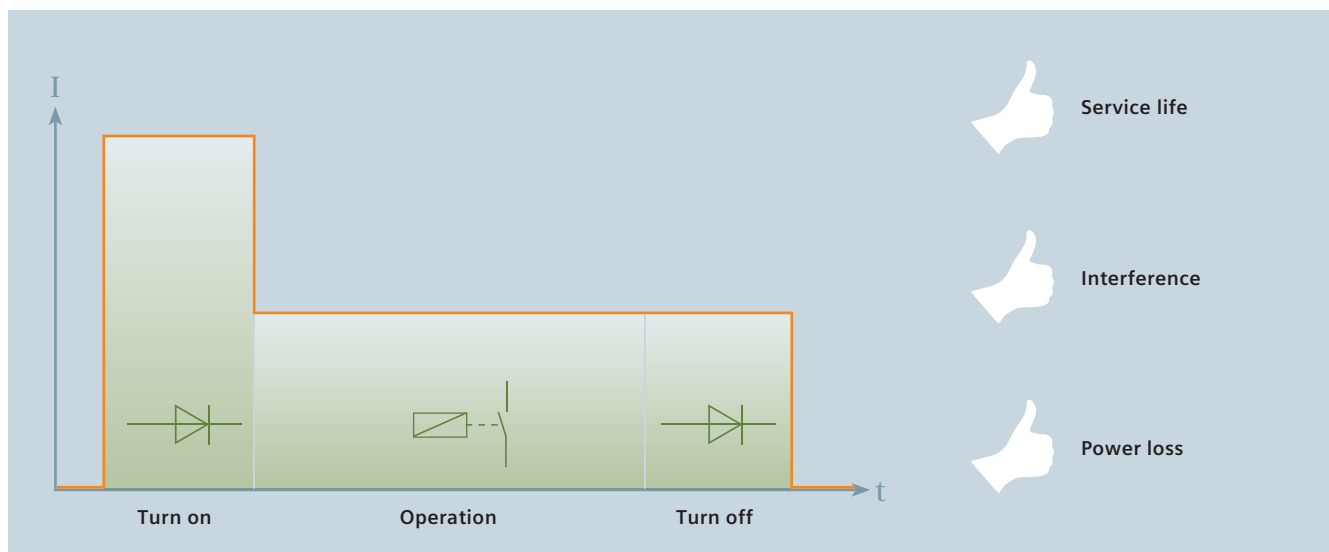
Hybrid switching technology uses low-wear semiconductor technology for turning the motor on and off; during operation, it uses energy-efficient relay technology. That provides durability, particularly in cases of high switching frequency. This technology significantly reduces maintenance costs and extends the service life of the motor starters. In addition, thanks to the hybrid switching technology, the motor starters have a lower level of electromagnetic interference, which increases the availability of your systems.

Integrated electronic overload protection provides for additional energy savings. This results in a lower level of internal power loss compared to motor branch circuits with thermal overload protection. As a result, you benefit from reduced heat generation and lower cooling costs. That saves energy.

## Flexible use

SIRIUS 3RM1 Motor Starters give you greater latitude when it comes to project planning as well as motor replacements: You can use a rotary encoder switch to easily set the motor starters in their specific adjustment range to the current of the connected motor.

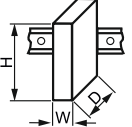
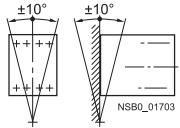
That reduces the number of device models, which saves you warehouse space and processing costs. Additionally, you retain flexibility longer when it comes to the planning and design of motors and control cabinets. Finally, if a motor in the system is replaced by a more powerful or a weaker model at a later point, in most cases you can simply reset the existing motor starter — eliminating the need to replace it.



The hybrid switching technology of the motor starters combines the benefits of relay technology with those of semiconductor technology, making it particularly energy efficient as well as offering low wear and low interference.



# Technical specifications

Type	3RM1		
<b>Mechanical components and environment</b>			
<b>Dimensions (W x H x D)</b> <ul style="list-style-type: none"> <li>Width</li> <li>Height</li> <li>Depth</li> </ul>		mm 22.5 mm 100 mm 136.5 (from the standard mounting rail) mm 141.6 (entire enclosure depth)	
<b>Ambient temperature</b> <ul style="list-style-type: none"> <li>During operation</li> <li>During storage</li> <li>During transport</li> </ul>	°C -25 ... +60 °C -40 ... +70 °C -40 ... +70		
<b>Installation altitude at height above sea level maximum</b>	m	4 000	
<b>Shock resistance</b>		6g/11 ms	
<b>Vibration resistance</b>		1 ... 6 Hz, 15 mm; 20 m/s <sup>2</sup> , 500 Hz	
<b>IP degree of protection</b>		IP20	
<b>Mounting position</b> 			
<b>Electromagnetic compatibility (EMC)</b>			
<b>Emitted interference</b> <ul style="list-style-type: none"> <li>Conductor-bound HF-interference emission according to CISPR11</li> <li>Field-bound HF-interference emission according to CISPR11</li> </ul>		Class A for Industrial environment Class A for Industrial environment	
<b>Interference immunity</b> <ul style="list-style-type: none"> <li>Electrostatic discharge according to IEC 61000-4-2</li> <li>Conducted interference injection as high frequency interference according to IEC 61000-4-6</li> <li>Conducted interference BURST according to IEC 61000-4-4</li> <li>Conducted interference - phase-to-ground SURGE according to IEC 61000-4-5</li> <li>Conducted interference - phase-to-phase SURGE according to IEC 61000-4-5</li> </ul>		4 kV contact discharge / 8 kV air discharge 10 V 2 kV / 5 kHz 2 kV 1 kV	
Type	3RM1 .01	3RM1 .02	3RM1 .07
<b>Main circuit</b>			
<b>Rated operational voltage</b>	V	48-500	
<b>Operating frequency</b>	Hz	50	
	Hz	60	
<b>Rated insulation voltage</b>	V	600	
<b>Rated impulse withstand voltage</b>	kV	6	
<b>Rated operational current at 480 V at AC</b>	A	0.5	2
<b>Active power loss, typical</b>	W	0.02	0.3
<b>Minimum load in % of I<sub>M</sub></b>	%	20	
<b>Adjustable current response value</b> <ul style="list-style-type: none"> <li>of the inverse-time delayed overload release</li> </ul>	A	0.1 ... 0.5	0.4 ... 2
			1.6 ... 7

## Control circuits and connection methods

Type		3RM1 ...-AA04	3RM1 ...-AA14
<b>Control circuits</b>			
<b>Type of voltage of the control supply voltage</b>		DC	AC/DC
<b>Control supply voltage 1</b>			
• At DC	V	24	110
• At AC	V	—	110 ... 230
<b>Frequency of the control supply voltage</b>			
	Hz	—	50
	Hz	—	60
<b>Operating range factor of the control supply voltage rated value</b>			
• At DC		0.8 ... 1.25	0.85 ... 1.1
• At AC		—	0.85 ... 1.1
<b>Control current</b>	A	0.08	0.05
<b>Input voltage at the digital input</b>			
• At DC	V	24	110
• At AC	V	—	110 ... 230
<b>Input voltage at the digital input with signal &lt;1&gt;</b>			
• At DC	V	19.2 ... 30	93 ... 121
• At AC	V	—	93 ... 253
<b>Input current at the digital input with signal &lt;1&gt; typical</b>	A	0.01	0.002
<b>Connection methods</b>			
<b>Connectable conductor cross-section for main contacts</b>			
• Solid	mm <sup>2</sup>	0.5 ... 4	
• Finely stranded			
– With end sleeves	mm <sup>2</sup>	0.5 ... 2.5	
– Without end sleeves	mm <sup>2</sup>	—	0.5 ... 4
<b>Connectable conductor cross-section for auxiliary contacts</b>			
• Solid	mm <sup>2</sup>	0.5 ... 2.5	0.5 ... 1.5
• Finely stranded			
– With end sleeves	mm <sup>2</sup>	0.5 ... 2.5	0.5 ... 1
– Without end sleeves	mm <sup>2</sup>	—	0.5 ... 1.5
<b>AWG number as coded connectable conductor cross-section</b>			
• For main contacts		20 ... 12	
• For auxiliary contacts		20 ... 14	20 ... 16

**Note:** All the above technical specifications are relevant for selecting the motor starters. Details about installation conditions and the use of the motor starters, and particularly about the derating of the rated current, can be found in the manual and the data sheets.

# SIRIUS 3RM1 hybrid motor starters



3RM10/12 motor starter



3RM11/13 Failsafe motor starter



## 3RM1 motor starter for direct-on-line starting and reversing functionality

UL Ratings at 480VAC		Amp Ratings		Single Phase HP Ratings ①			Three Phase HP Ratings ①			Screw Terminals 	Spring Loaded Terminals 
FLA	LRA	AC3	AC1	115V	200V	230V	200V	230V	460V	Order No.	Order No.
Rated control supply voltage $U_s = 24$ VDC											
0.5 A	3.5 A	0.5	—	—	—	—	—	—	—	3RM1□01-1AA04	3RM1□01-2AA04
2 A	14 A	2	—	—	—	1/8	1/3	1/3	3/4	3RM1□02-1AA04	3RM1□02-2AA04
6.1A	43A	7	10	1/4	1/2	1/2	1	1 1/2	3	3RM1□07-1AA04	3RM1□07-2AA04
Rated control supply voltage $U_s = 110-230$ VAC 50/60 Hz and 110 VDC											
0.5 A	3.5 A	0.5	—	—	—	—	—	—	—	3RM1□01-1AA14	3RM1□01-2AA14
2 A	14 A	2	—	—	—	1/8	1/3	1/3	3/4	3RM1□02-1AA14	3RM1□02-2AA14
6.1A	43A	7	10	1/4	1/2	1/2	1	1 1/2	3	3RM1□07-1AA14	3RM1□07-2AA14

- |                            |   |   |
|----------------------------|---|---|
| Direct starter             | 0 | 0 |
| Failsafe direct starter    | 1 | 1 |
| Reversing starter          | 2 | 2 |
| Failsafe reversing starter | 3 | 3 |

Use numbers above in place of 5th digit to build 3RM1 part number based on desired configuration

Versions with spring loaded terminals for control wiring and screw terminals for power connections are also available. Specify a 3 in the eighth digit of the part number. For example: 3RM1007-3AA04

Online configurator see [www.siemens.com/sirius/configurators](http://www.siemens.com/sirius/configurators)

For the product manual <http://www.usa.siemens.com/controls/3rm1>

① Selection depends on motor full load amps. Horsepower ratings for reference only.

# Accessories for 3RM1 motor starters

The following accessories are available for the 3RM1 motor starter:

- › **Three-phase infeed system**
- › **Device connectors**
- › **Spare terminals for main and control circuits**
  - With screw terminals
  - With push-in spring-type terminals
- › **Push-in lugs for wall mounting of the motor starters**
- › **Sealable covers**

## Three-phase infeed system (3RM19 three-phase busbar system)

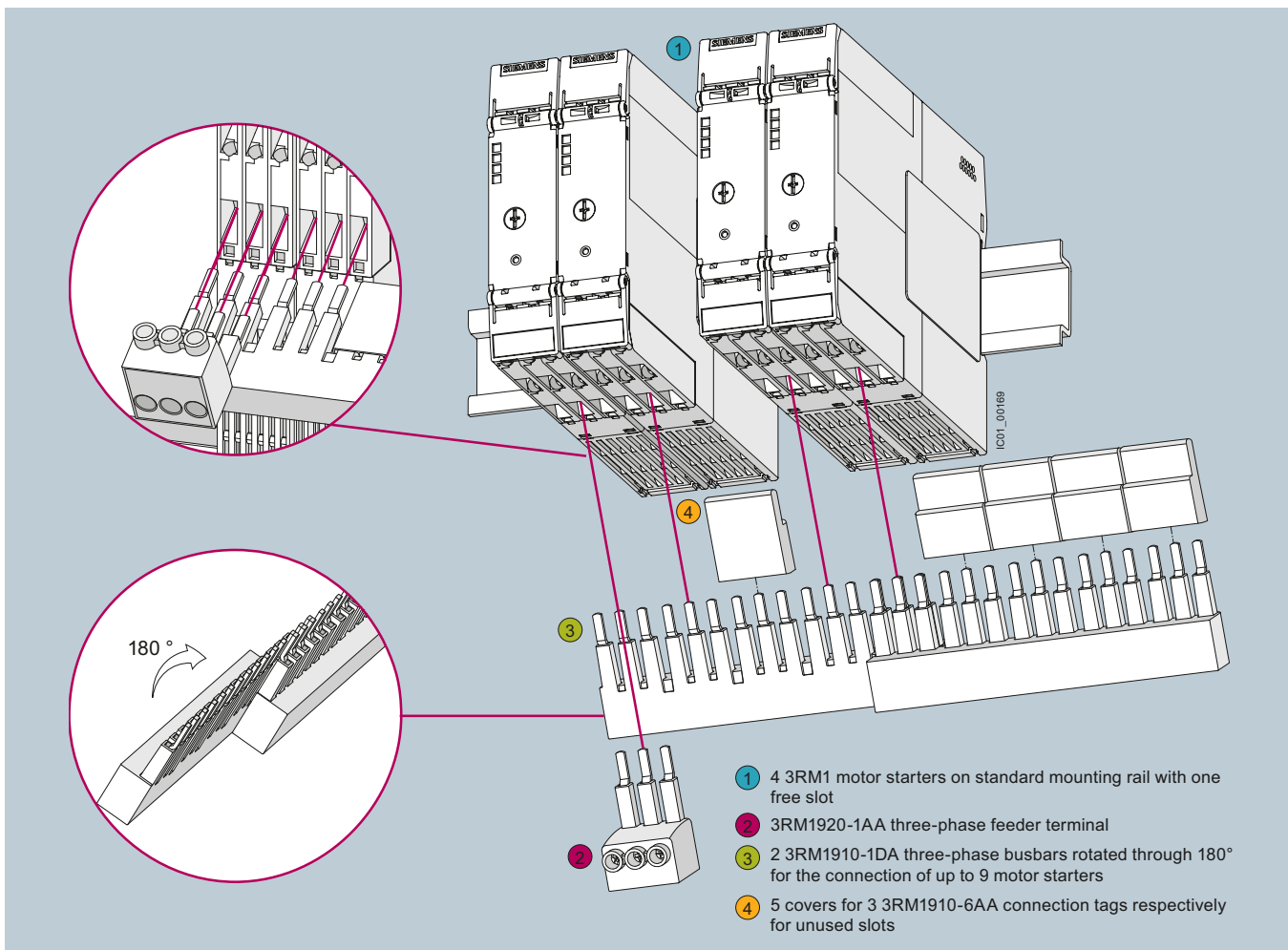
Special three-phase busbar systems can be used to provide a simple, time-saving and safe means of feeding two or more 3RM1 motor starters with screw terminals.

These busbars are available in three lengths, allowing 2, 3 or 5 motor starters (arranged side-by-side) to be connected at the same time. More than 5 devices can be connected by clamping the tags of an additional busbar rotated by 180° (e.g. 6 devices using one 5-pole busbar and one 2-pole busbar).

A single motor starter can be removed from the assembly without loosening the terminal screws of neighboring motor starters.

The maximum summation current must not exceed 16 A. Primary infeed is connected via a three-phase feeder terminal.

The three-phase busbars are finger-safe but empty connection tags must be fitted with covers.



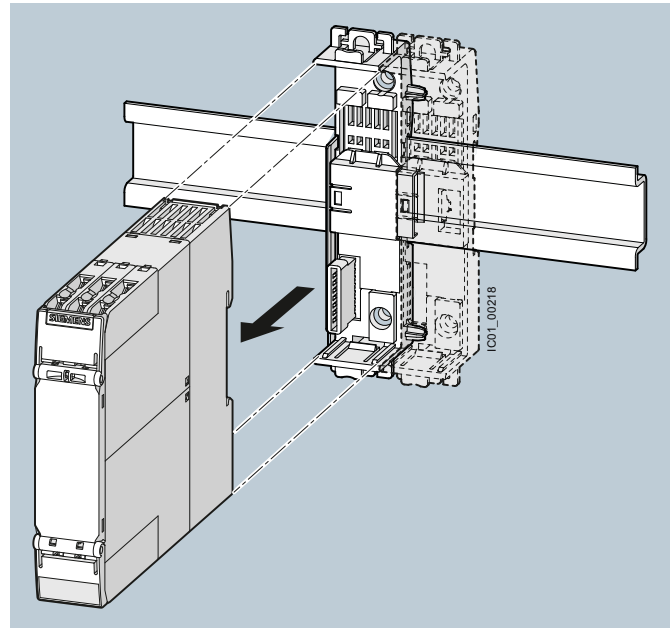
3RM19 infeed system with three-phase feeder terminal: In the above example, two three-phase busbars (5-pole busbars) rotated through 180° allow up to 9 3RM1 motor starters to be connected. Contact with the unused connection tags in unoccupied positions is prevented safely by the covers.



## Device connectors


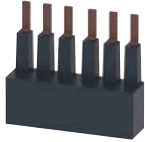
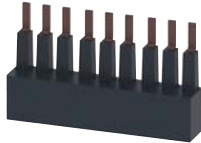


With the aid of device connectors snapped onto a TH 35 standard mounting rail or screwed to a flat mounting wall, several motor starters can be jointly supplied with control supply voltage. This requires the control supply voltage to be applied to the A1 and A2 terminals of only one motor starter.

The last motor starter in a row should be placed on a device termination connector which allows for a flush termination.



Device connectors snapped onto a standard mounting rail to allow the joint connection of the control supply voltage for 3RM1 motor starters.



## Selection and ordering data

	Product designation	Order No.	Standard Pack Qty.
	<b>3RM19 three-phase infeed system for 3RM1 with screw terminals</b>		
	Three-phase feeder terminal	3RM1920-1AA	1
	Three-phase busbar systems • For 2 motor starters	3RM1910-1AA	1
	• For 3 motor starters	3RM1910-1BA	1
	• For 5 motor starters	3RM1910-1DA	1
	Covers for connection tags of the three-phase busbars	3RM1910-6AA	1

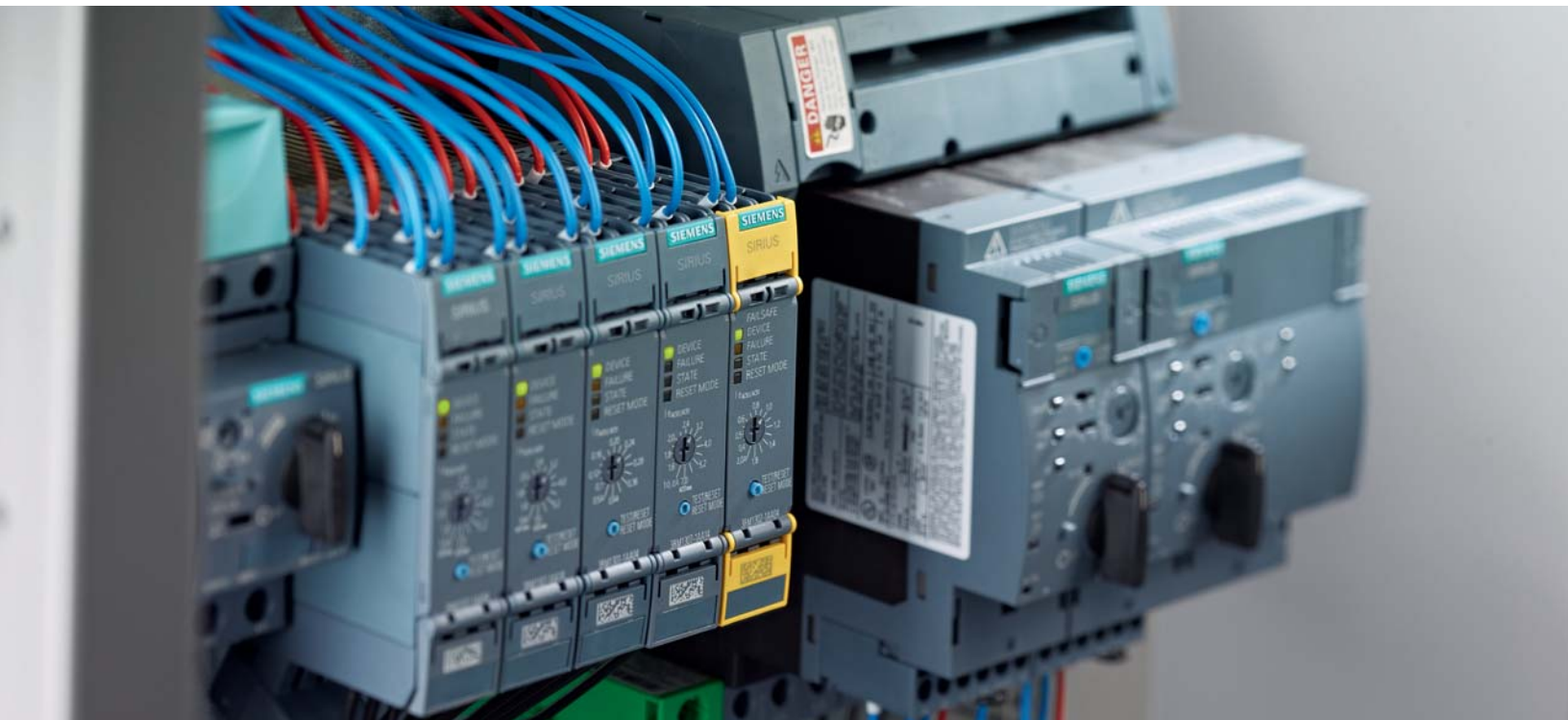
## Selection and ordering data

	Product designation	Order No.	Standard Pack Qty.
<b>Device connectors for the electrical connection of SIRIUS devices in the industrial standard mounting rail enclosure</b>			
	<b>Device connector type 2, 7-pole, 22.5 mm</b> Use for: – Beginning left hand connector – Subsequent positions where a starter is present – Maximum of 5 starters per system	3ZY1212-2EA00	1
3ZY1212-2EA00			
	<b>Device loop through connector type 2, 7-pole, 22.5 mm</b> Use for: – When 22.5mm spacing is required and no starter is present	3ZY1212-2AB00	1
	<b>Device termination connectors type 2, 7-pole, 22.5 mm</b> Use for: – Terminating connector for the right hand position – Terminating cover is assembled to 3ZY1212-2EA00	3ZY1212-2FA00	1
3ZY1212-2FA00			
<b>Removable terminals for SIRIUS 3RM1 devices</b>			
	<b>Power Terminals (Line and Load), 2-pole</b> • Screw terminal, 1 x 4 mm <sup>2</sup>	3ZY1122-1BA00	6
3ZY1122-1BA00			
	• Push-in terminal, 1 x 4 mm <sup>2</sup>	3ZY1122-2BA00	6
3ZY1122-2BA00			
	<b>Control Terminals, 3-pole</b> • Screw terminal, 1 x 2.5 mm <sup>2</sup>	3ZY1131-1BA00	6
3ZY1131-1BA00			
	• Push-in terminal, 1 x 2.5 mm <sup>2</sup>	3ZY1131-2BA00	6
3ZY1131-2BA00			

### Selection and ordering data

Further accessories	Product designation	Order No.	Standard Pack Qty.
	<b>Push-in lugs for wall mounting</b> (2 lugs per motor starter are required, Standard pack quantity is sufficient for 5 motor starters)	3ZY1311-0AA00	10
	<b>Sealable covers 22.5 mm</b>	3ZY1321-2AA00	5

Manuals are available as a PDF download;  
 see [usa.siemens.com/3RM1](http://usa.siemens.com/3RM1)



SIRIUS 3RM1  
MotorStarters—  
scan and view



## Additional information

To learn more about SIRIUS MOTOR STARTERS:  
[www.usa.siemens.com/3RM1](http://www.usa.siemens.com/3RM1)

To learn more about SIRIUS:  
[www.usa.siemens.com/sirius-innovations](http://www.usa.siemens.com/sirius-innovations)

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