

Solid-State Switching Devices for Resistive Loads

Solid-State Relays

General data

Overview

Solid-State Relays

SIRIUS solid-state relays are suitable for surface mounting on existing cooling surfaces. Mounting is quick and easy, involving just two screws. The special technology of the power semiconductor ensures there is excellent thermal contact with the heat sink. Depending on the nature of the heat sink, the capacity reaches up to 88 A on resistive loads.

The solid-state relays are available in three different versions:

- 3RF21 single-phase solid-state relay with a width of 22.5 mm
- 3RF20 single-phase solid-state relay with a width of 45 mm
- 3RF22 three-phase solid-state relay with a width of 45 mm

The 3RF21 and 3RF22 solid-state relays can be expanded with various function modules to adapt them to individual applications.

Version for resistive loads, "zero-point switching"

This standard version is often used for switching space heaters on and off.

Version for inductive loads, "instantaneous switching"

In this version the solid-state relay is specifically matched to inductive loads. Whether it is a matter of frequent actuation of the valves in a filling plant or starting and stopping small operating mechanisms in packet distribution systems, operation is carried out safely and noiselessly.

Special "Low noise" version

Thanks to a special control circuit, this special version can be used in public networks up to 16 A without any additional measures, such as interference suppressor filters. As a result, in terms of emitted interference, it conforms to limit value curve class B according to EN 60947-4-3.

Single-phase solid-state relays with a width of 22.5 mm

With its compact design and a width of just 22.5 mm, which stays the same even at currents of up to 88 A, the 3RF21 solid-state relay offers an ultra small footprint. The logical connection method, with the power infeed from above and load connection from below, ensures tidy installation in the control cabinet.

Single-phase solid-state relays with a width of 45 mm

The solid-state relays with a width of 45 mm provide for connection of the power supply lead and the load from above. This makes it easy to replace existing solid-state relays in existing arrangements. The connection of the control cable also saves space in much the same way as the 22.5 mm design, as it is simply plugged on.

Three-phase solid-state relays with a width of 45 mm

With its compact design and a width of just 45 mm, which stays the same even at currents of up to 55 A, the 3RF22 solid-state relay offers an ultra small footprint. The logical connection method, with the power infeed from above and load connection from below, ensures tidy installation in the control cabinet.

The three-phase solid-state relays are available with

- two-phase control (suitable in particular for circuits without connection to the neutral conductor) and
- three-phase control (suitable for star circuits with connection to the neutral conductor or for applications in which the system requires all phases to be switched).

Selection notes

When selecting solid-state relays, in addition to information about the network, the load and the ambient conditions it is also necessary to know details of the planned design. The solid-state relays can only conform to their specific technical specifications if they are mounted with appropriate care on an adequately dimensioned heat sink.

The following procedure is recommended:

- Determine the rated current of the load and the mains voltage
- Select the relay design and choose a solid-state relay with higher rated current than the load
- Determine the thermal resistance of the proposed heat sink
- Check the correct relay size with the aid of the diagrams

You can find more information on the Internet at:


www.siemens.com/solid-state-switching-devices

Solid-State Switching Devices for Resistive Loads

Solid-State Relays

SIRIUS 3RF21 solid-state relays,
single-phase, 22.5 mm

Selection and ordering data

Type current ¹⁾	Rated control supply voltage U_s	DT	Screw terminals ²⁾	⊕	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
A	V		Order No.					kg	
				Price per PU					
Zero-point switching Rated operational voltage U_e 24 ... 230 V									
	20	24 DC	A	3RF21 20-1AA02		1	1 unit	101	0.075
	30	acc. to EN 61131-2	A	3RF21 30-1AA02		1	1 unit	101	0.075
	50		A	3RF21 50-1AA02		1	1 unit	101	0.075
	70		A	3RF21 70-1AA02		1	1 unit	101	0.075
	90		A	3RF21 90-1AA02		1	1 unit	101	0.075
	20	110 ... 230 AC	A	3RF21 20-1AA22		1	1 unit	101	0.075
	30		A	3RF21 30-1AA22		1	1 unit	101	0.075
	50		A	3RF21 50-1AA22		1	1 unit	101	0.075
	70		A	3RF21 70-1AA22		1	1 unit	101	0.075
	90		B	3RF21 90-1AA22		1	1 unit	101	0.075
20	4 ... 30 DC	B	3RF21 20-1AA42		1	1 unit	101	0.075	
30		B	3RF21 30-1AA42		1	1 unit	101	0.075	
Zero-point switching Rated operational voltage U_e 48 ... 460 V									
20	24 DC	A	3RF21 20-1AA04		1	1 unit	101	0.075	
30	acc. to EN 61131-2	A	3RF21 30-1AA04		1	1 unit	101	0.075	
50		A	3RF21 50-1AA04		1	1 unit	101	0.075	
70		A	3RF21 70-1AA04		1	1 unit	101	0.075	
90		A	3RF21 90-1AA04		1	1 unit	101	0.075	
20	110 ... 230 AC	A	3RF21 20-1AA24		1	1 unit	101	0.075	
30		A	3RF21 30-1AA24		1	1 unit	101	0.075	
50		A	3RF21 50-1AA24		1	1 unit	101	0.075	
70		A	3RF21 70-1AA24		1	1 unit	101	0.075	
90		A	3RF21 90-1AA24		1	1 unit	101	0.075	
Zero-point switching Rated operational voltage U_e 48 ... 600 V									
70	24 DC Low Power	B	3RF21 70-1AA05-0KN0		1	1 unit	101	0.075	
20	4 ... 30 DC	B	3RF21 20-1AA45		1	1 unit	101	0.075	
30		B	3RF21 30-1AA45		1	1 unit	101	0.075	
50		B	3RF21 50-1AA45		1	1 unit	101	0.075	
70		B	3RF21 70-1AA45		1	1 unit	101	0.075	
90		B	3RF21 90-1AA45		1	1 unit	101	0.075	
Zero-point switching · Blocking voltage 1600 V, rated operational voltage U_e 48 ... 600 V									
30	24 DC	A	3RF21 30-1AA06		1	1 unit	101	0.075	
50	acc. to EN 61131-2	A	3RF21 50-1AA06		1	1 unit	101	0.075	
70		B	3RF21 70-1AA06		1	1 unit	101	0.075	
90		B	3RF21 90-1AA06		1	1 unit	101	0.075	
30	110 ... 230 AC	B	3RF21 30-1AA26		1	1 unit	101	0.075	
50		B	3RF21 50-1AA26		1	1 unit	101	0.075	
70		B	3RF21 70-1AA26		1	1 unit	101	0.075	
90		B	3RF21 90-1AA26		1	1 unit	101	0.075	
Instantaneous switching Rated operational voltage U_e 24 ... 230 V									
50	110 ... 230 AC	A	3RF21 50-1BA22		1	1 unit	101	0.075	
Instantaneous switching Rated operational voltage U_e 48 ... 460 V									
20	24 DC	B	3RF21 20-1BA04		1	1 unit	101	0.075	
30	acc. to EN 61131-2	B	3RF21 30-1BA04		1	1 unit	101	0.075	
50		B	3RF21 50-1BA04		1	1 unit	101	0.075	
70		A	3RF21 70-1BA04		1	1 unit	101	0.075	
90		B	3RF21 90-1BA04		1	1 unit	101	0.075	
Instantaneous switching · Blocking voltage 1600 V Rated operational voltage U_e 48 ... 600 V									
50	24 DC	B	3RF21 50-1BA06		1	1 unit	101	0.075	
Low noise³⁾ · Zero-point switching Rated operational voltage U_e 48 ... 460 V									
70	24 DC	B	3RF21 70-1CA04		1	1 unit	101	0.075	
	acc. to EN 61131-2								

Other rated control supply voltages on request.

¹⁾ The type current provides information about the performance capacity of the solid-state relay.
The actual permitted rated operational current I_e can be smaller depending on the connection method and cooling conditions.

²⁾ Please note that this version can only be used for a rated current of up to approx. 50 A and a conductor cross-section of 10 mm².



³⁾ See page 4/48.

* You can order this quantity or a multiple thereof.

Solid-State Switching Devices for Resistive Loads

Solid-State Relays

SIRIUS 3RF21 solid-state relays,
single-phase, 22.5 mm

Type current ¹⁾	Rated control supply voltage U_s	DT	Spring-type terminals ²⁾ 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V		Order No.	Price per PU			kg
Zero-point switching Rated operational voltage U_e 24 ... 230 V							
	20	24 DC	A	3RF21 20-2AA02	1	1 unit	101 0.075
	50	acc. to EN 61131-2	B	3RF21 50-2AA02	1	1 unit	101 0.075
	90		B	3RF21 90-2AA02	1	1 unit	101 0.075
	20	110 ... 230 AC	B	3RF21 20-2AA22	1	1 unit	101 0.075
	50		B	3RF21 50-2AA22	1	1 unit	101 0.075
	90		B	3RF21 90-2AA22	1	1 unit	101 0.075
20	4 ... 30 DC	B	3RF21 20-2AA42	1	1 unit	101 0.075	
Zero-point switching Rated operational voltage U_e 48 ... 460 V							
	20	24 DC	B	3RF21 20-2AA04	1	1 unit	101 0.075
	50	acc. to EN 61131-2	B	3RF21 50-2AA04	1	1 unit	101 0.075
	90		B	3RF21 90-2AA04	1	1 unit	101 0.075
	50	24 AC/DC	B	3RF21 50-2AA14	1	1 unit	101 0.075
	20	110 ... 230 AC	B	3RF21 20-2AA24	1	1 unit	101 0.075
	50		B	3RF21 50-2AA24	1	1 unit	101 0.075
90		B	3RF21 90-2AA24	1	1 unit	101 0.075	
Zero-point switching Rated operational voltage U_e 48 ... 600 V							
20	4 ... 30 DC	B	3RF21 20-2AA45	1	1 unit	101 0.075	
Zero-point switching · Blocking voltage 1600 V, rated operational voltage U_e 48 ... 600 V							
	50	24 DC	B	3RF21 50-2AA06	1	1 unit	101 0.075
	90	acc. to EN 61131-2	B	3RF21 90-2AA06	1	1 unit	101 0.075
	50	110 ... 230 AC	B	3RF21 50-2AA26	1	1 unit	101 0.075
	90		B	3RF21 90-2AA26	1	1 unit	101 0.075



Other rated control supply voltages on request.

- ¹⁾ The type current provides information about the performance capacity of the solid-state relay.
The actual permitted rated operational current I_e can be smaller depending on the connection method and cooling conditions.
- ²⁾ Please note that the version with spring-type terminals can only be used for a rated current of up to approx. 20 A and a conductor cross-section of 2.5 mm². Higher currents are possible by connecting two conductors per terminal.

Solid-State Switching Devices for Resistive Loads

Solid-State Relays


SIRIUS 3RF21 solid-state relays,
single-phase, 22.5 mm

Type current ¹⁾	Rated control supply voltage U_s	DT	Ring terminal lug connection 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
A	V		Order No.	Price per PU			kg	
Zero-point switching Rated operational voltage U_e 24 ... 230 V								
	20	24 DC	A	3RF21 20-3AA02	1	1 unit	101 0.075	
	50	acc. to EN 61131-2	B	3RF21 50-3AA02	1	1 unit	101 0.075	
	90		B	3RF21 90-3AA02	1	1 unit	101 0.075	
	20	110 ... 230 AC	B	3RF21 20-3AA22	1	1 unit	101 0.075	
	50		B	3RF21 50-3AA22	1	1 unit	101 0.075	
	90		B	3RF21 90-3AA22	1	1 unit	101 0.075	
Zero-point switching Rated operational voltage U_e 48 ... 460 V								
	20	24 DC	B	3RF21 20-3AA04	1	1 unit	101 0.075	
	50	acc. to EN 61131-2	B	3RF21 50-3AA04	1	1 unit	101 0.075	
	90		B	3RF21 90-3AA04	1	1 unit	101 0.075	
	20	110 ... 230 AC	B	3RF21 20-3AA24	1	1 unit	101 0.075	
	50		B	3RF21 50-3AA24	1	1 unit	101 0.075	
	90		B	3RF21 90-3AA24	1	1 unit	101 0.075	
	90	4 ... 30 DC	B	3RF21 90-3AA44	1	1 unit	101 0.075	
	Zero-point switching · Blocking voltage 1600 V, rated operational voltage U_e 48 ... 600 V							
		50	24 DC	B	3RF21 50-3AA06	1	1 unit	101 0.075
90		acc. to EN 61131-2	B	3RF21 90-3AA06	1	1 unit	101 0.075	
50		110 ... 230 AC	B	3RF21 50-3AA26	1	1 unit	101 0.075	
90			B	3RF21 90-3AA26	1	1 unit	101 0.075	

Other rated control supply voltages on request.

1) The type current provides information about the performance capacity of the solid-state relay.

The actual permitted rated operational current I_e can be smaller depending on the connection method and cooling conditions.

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg
Optional accessories							
	Screwdrivers for opening spring-type terminals	C	8WA2 880	1	1 unit	041	0.034
	Terminal covers for 3RF21 solid-state relays and 3RF23 solid-state contactors in ring terminal lug connection (After simple adaptation, this terminal cover can also be used for screw connection).	A	3RF29 00-3PA88	1	10 units	101	0.004


3RF29 00-3PA88

Solid-State Switching Devices for Resistive Loads

Solid-State Relays

SIRIUS 3RF20 solid-state relays,
single-phase, 45 mm

Selection and ordering data


Type current ¹⁾	Rated control supply voltage U_s	DT	Screw terminals ²⁾	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V		Order No.	Price per PU			kg
Zero-point switching Rated operational voltage U_e 24 ... 230 V							
	20	24 DC	A	3RF20 20-1AA02	1	1 unit	101 0.085
	30	acc. to EN 61131-2	A	3RF20 30-1AA02	1	1 unit	101 0.085
	50		A	3RF20 50-1AA02	1	1 unit	101 0.085
	70		A	3RF20 70-1AA02	1	1 unit	101 0.085
	90		A	3RF20 90-1AA02	1	1 unit	101 0.085
	20	110 ... 230 AC	A	3RF20 20-1AA22	1	1 unit	101 0.085
	30		A	3RF20 30-1AA22	1	1 unit	101 0.085
	50		A	3RF20 50-1AA22	1	1 unit	101 0.085
	70		A	3RF20 70-1AA22	1	1 unit	101 0.085
	90		A	3RF20 90-1AA22	1	1 unit	101 0.085
3RF20 20-1AA02	20	4 ... 30 DC	B	3RF20 20-1AA42	1	1 unit	101 0.085
	30		B	3RF20 30-1AA42	1	1 unit	101 0.085

Zero-point switching Rated operational voltage U_e 48 ... 460 V							
	20	24 DC	A	3RF20 20-1AA04	1	1 unit	101 0.085
	30	acc. to EN 61131-2	A	3RF20 30-1AA04	1	1 unit	101 0.085
	50		A	3RF20 50-1AA04	1	1 unit	101 0.085
	70		A	3RF20 70-1AA04	1	1 unit	101 0.085
	90		A	3RF20 90-1AA04	1	1 unit	101 0.085
	20	110 ... 230 AC	A	3RF20 20-1AA24	1	1 unit	101 0.085
	30		A	3RF20 30-1AA24	1	1 unit	101 0.085
	50		A	3RF20 50-1AA24	1	1 unit	101 0.085
	70		A	3RF20 70-1AA24	1	1 unit	101 0.085
	90		A	3RF20 90-1AA24	1	1 unit	101 0.085
	50	4 ... 30 DC	A	3RF20 50-1AA44	1	1 unit	101 0.085

Zero-point switching Rated operational voltage U_e 48 ... 600 V							
	20	4 ... 30 DC	B	3RF20 20-1AA45	1	1 unit	101 0.085
	50		B	3RF20 50-1AA45	1	1 unit	101 0.085
	70		B	3RF20 70-1AA45	1	1 unit	101 0.085
	90		B	3RF20 90-1AA45	1	1 unit	101 0.085

Zero-point switching · Blocking voltage 1600 V, rated operational voltage U_e 48 ... 600 V							
	30	24 DC	B	3RF20 30-1AA06	1	1 unit	101 0.085
	50	acc. to EN 61131-2	B	3RF20 50-1AA06	1	1 unit	101 0.085
	70		B	3RF20 70-1AA06	1	1 unit	101 0.085
	90		B	3RF20 90-1AA06	1	1 unit	101 0.085
	30	110 ... 230 AC	B	3RF20 30-1AA26	1	1 unit	101 0.085
	50		B	3RF20 50-1AA26	1	1 unit	101 0.085
	70		B	3RF20 70-1AA26	1	1 unit	101 0.085
	90		B	3RF20 90-1AA26	1	1 unit	101 0.085

Instantaneous switching Rated operational voltage U_e 48 ... 460 V							
	30	24 DC	B	3RF20 30-1BA04	1	1 unit	101 0.085
		acc. to EN 61131-2					

Type current ¹⁾	Rated control supply voltage U_s	DT	Screw terminals + spring-type terminals (control current side)	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V		Order No.	Price per PU			kg
Zero-point switching Rated operational voltage U_e 24 ... 230 V							
	50	24 DC	A	3RF20 50-4AA02	1	1 unit	101 0.085
		acc. to EN 61131-2					

¹⁾ The type current provides information about the performance capacity of the solid-state relay. The actual permitted rated operational current I_e can be smaller depending on the connection method and cooling conditions.

²⁾ Please note that this version can only be used for a rated current of up to approx. 50 A and a conductor cross-section of 10 mm².

Solid-State Switching Devices for Resistive Loads

Solid-State Relays

SIRIUS 3RF22 solid-state relays,
three-phase, 45 mm

Selection and ordering data

Type current ¹⁾	Rated control supply voltage U_s	DT	Screw terminals ²⁾	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V		Order No.	Price per PU			kg
Zero-point switching Rated operational voltage U_e 48 ... 600 V							
<i>Two-phase controlled</i>							
30	110 AC	B	3RF22 30-1AB35	1	1 unit	101	0.150
55		B	3RF22 55-1AB35	1	1 unit	101	0.150
30	4 ... 30 DC	B	3RF22 30-1AB45	1	1 unit	101	0.150
55		B	3RF22 55-1AB45	1	1 unit	101	0.150
<i>Three-phase controlled</i>							
30	110 AC	B	3RF22 30-1AC35	1	1 unit	101	0.150
55		B	3RF22 55-1AC35	1	1 unit	101	0.150
30	4 ... 30 DC	A	3RF22 30-1AC45	1	1 unit	101	0.150
55		B	3RF22 55-1AC45	1	1 unit	101	0.150
3RF22 30-1AB45							
<i>Two-phase controlled</i>							
30	110 AC	B	3RF22 30-1AB35	1	1 unit	101	0.150
55		B	3RF22 55-1AB35	1	1 unit	101	0.150
30	4 ... 30 DC	B	3RF22 30-1AB45	1	1 unit	101	0.150
55		B	3RF22 55-1AB45	1	1 unit	101	0.150
<i>Three-phase controlled</i>							
30	110 AC	B	3RF22 30-1AC35	1	1 unit	101	0.150
55		B	3RF22 55-1AC35	1	1 unit	101	0.150
30	4 ... 30 DC	A	3RF22 30-1AC45	1	1 unit	101	0.150
55		B	3RF22 55-1AC45	1	1 unit	101	0.150
3RF22 30-2AB45							
<i>Two-phase controlled</i>							
30	4 ... 30 DC	B	3RF22 30-2AB45	1	1 unit	101	0.150
55		B	3RF22 55-2AB45	1	1 unit	101	0.150
<i>Three-phase controlled</i>							
30	4 ... 30 DC	B	3RF22 30-2AC45	1	1 unit	101	0.150
55		B	3RF22 55-2AC45	1	1 unit	101	0.150
3RF22 30-2AB45							
<i>Two-phase controlled</i>							
30	4 ... 30 DC	B	3RF22 30-2AB45	1	1 unit	101	0.150
55		B	3RF22 55-2AB45	1	1 unit	101	0.150
<i>Three-phase controlled</i>							
30	4 ... 30 DC	B	3RF22 30-2AC45	1	1 unit	101	0.150
55		B	3RF22 55-2AC45	1	1 unit	101	0.150
3RF22 30-3AB45							
<i>Two-phase controlled</i>							
30	4 ... 30 DC	B	3RF22 30-3AB45	1	1 unit	101	0.150
55		B	3RF22 55-3AB45	1	1 unit	101	0.150
<i>Three-phase controlled</i>							
30	4 ... 30 DC	B	3RF22 30-3AC45	1	1 unit	101	0.150
55		B	3RF22 55-3AC45	1	1 unit	101	0.150
3RF22 30-3AB45							

1) The type current provides information about the performance capacity of the solid-state relay.

The actual permitted rated operational current I_o can be smaller depending on the connection method and cooling conditions.

2) Please note that the version with an M4 screw connection can only be used for a rated current of up to approx. 50 A and a conductor cross-section of 10 mm².

3) Please note that the version with spring-type terminals can only be used for a rated current of up to approx. 20 A and a conductor cross-section of 2.5 mm². Higher currents are possible by connecting two conductors per terminal.

Solid-State Switching Devices for Resistive Loads

Solid-State Contactors

General data

Overview

Solid-State Contactors

The complete units consist of a solid-state relay plus optimized heat sink, and are therefore ready to use. They offer defined rated currents to make selection as easy as possible. Depending on the version, current strengths of up to 88 A are achieved. Like all of our solid-state switching devices, one of their particular advantages is their compact and space-saving design.

With their insulated mounting foot they can easily be snapped onto a standard mounting rail, or they can be mounted on support plates with fixing screws. This insulation enables them to be used in circuits with protective extra-low voltage (PELV) or safety extra-low voltage (SELV) in building management systems. For other applications, such as for extended personal safety, the heat sink can be grounded through a screw terminal.

The solid-state contactors are available in 2 different versions:

- 3RF23 single-phase solid-state contactors,
- 3RF24 three-phase solid-state contactors

Single-phase versions

The 3RF23 solid-state contactors can be expanded with various function modules to adapt them to individual applications.

Version for resistive loads, "zero-point switching"

This standard version is often used for switching space heaters on and off.

Version for inductive loads, "instantaneous switching"

In this version the solid-state contactor is specifically matched to inductive loads. Whether it is a matter of frequent actuation of the valves in a filling plant or starting and stopping small operating mechanisms in packet distribution systems, operation is carried out safely and noiselessly.

Special "Low noise" version

Thanks to a special control circuit, this special version can be used in public networks up to 16 A without any additional measures, such as interference suppressor filters. As a result, in terms of emitted interference, it conforms to limit value curve class B according to EN 60947-4-3.

Special "Short-circuit proof" version

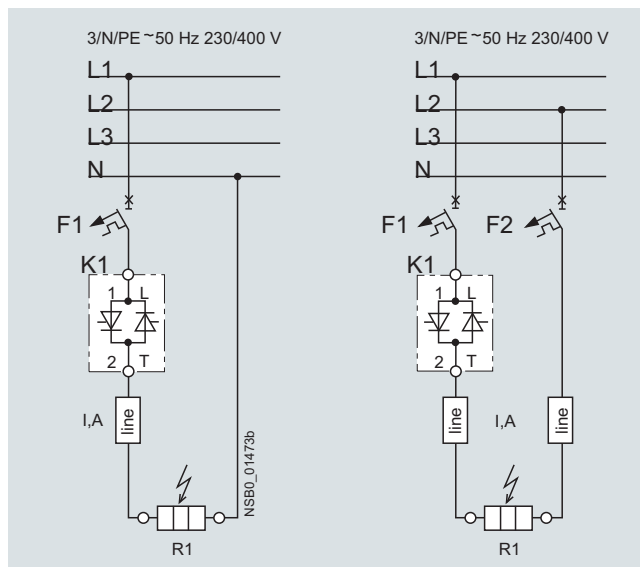
Skillful matching of the power semiconductor with the performance capacity of the solid-state contactor means that "short-circuit strength" can be achieved with a standard miniature circuit breaker. In combination with a B-type MCB or a conventional line protection fuse, the result is a short-circuit proof feeder.

In order to achieve problem-free short-circuit protection by means of miniature circuit breakers, however, certain boundary conditions must be observed. As the magnitude and duration of the short-circuit current are determined not only by the short-circuit breaking response of the miniature circuit breaker but also the properties of the wiring system, such as the internal resistance of the input to the network and damping by controls and cables, particular attention must also be paid to these parameters. The necessary cable lengths are therefore shown for the main factor, the line resistance, in the table below.

The following miniature circuit breakers with a B characteristic and 10 kA or 6 kA breaking capacity protect the 3RF23...DA.. solid-state contactors in the event of short-circuits on the load and the specified conductor cross-sections and lengths:

Rated current of the miniature circuit breaker	Example of type ¹⁾	Max. conductor cross-section	Minimum cable length from contactor to load
6 A	5SY4 106-6, 5SX2 106-6	1 mm ²	5 m
10 A	5SY4 110-6, 5SX2 110-6	1.5 mm ²	8 m
16 A	5SY4 116-6, 5SX2 116-6	1.5 mm ²	12 m
16 A	5SY4 116-6, 5SX2 116-6	2.5 mm ²	20 m
20 A	5SY4 120-6, 5SX2 120-6	2.5 mm ²	20 m
25 A	5SY4 125-6, 5SX2 125-6	2.5 mm ²	26 m

¹⁾ The miniature circuit breakers can be used up to a maximum rated voltage of 480 V!



The setup and installation above can also be used for the solid-state relays with a I^2t value of at least 6600 A²s.

Three-phase versions

The three-phase solid-state contactors for resistive loads up to 50 A are available with

- two-phase control (suitable in particular for circuits without connection to the neutral conductor) and
- three-phase control (suitable for star circuits with connection to the neutral conductor or for applications in which the system requires all phases to be switched).

The converter function module can be snapped onto both versions for the simple power control of AC loads by means of analog signals.

- Check the correct contactor size with the aid of the rated current diagram, taking account of the installation conditions

Solid-State Switching Devices for Resistive Loads

Solid-State Contactors

SIRIUS 3RF23 solid-state contactors, single-phase




Selection and ordering data

Selection notes

The solid-state contactors are selected on the basis of details of the network, the load and the ambient conditions. As the solid-state contactors are already equipped with an optimally matched heat sink, the selection process is considerably simpler than that for solid-state relays.

The following procedure is recommended:

- Determine the rated current of the load and the mains voltage
- Select a solid-state contactor with the same or higher rated current than the load

	Type current ¹⁾ I_{max}	Rated control supply voltage U_s	DT	Screw terminals	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
	A	V		Order No.					Price per PU
Zero-point switching									
Rated operational voltage U_e 24 ... 230 V									
 3RF23 10-1	10.5	24 DC	A	3RF23 10-1AA02	1	1 unit	101	0.165	
	20	acc. to EN 61131-2	A	3RF23 20-1AA02	1	1 unit	101	0.240	
	30		A	3RF23 30-1AA02	1	1 unit	101	0.400	
	40		A	3RF23 40-1AA02	1	1 unit	101	0.550	
	50		A	3RF23 50-1AA02	1	1 unit	101	0.550	
	20	24 DC Low Power	A	3RF23 20-1AA02-0KN0	1	1 unit	101	0.240	
	10.5	24 AC/DC	A	3RF23 10-1AA12	1	1 unit	101	0.165	
	10.5	110 ... 230 AC	A	3RF23 10-1AA22	1	1 unit	101	0.165	
	20		A	3RF23 20-1AA22	1	1 unit	101	0.240	
	30		A	3RF23 30-1AA22	1	1 unit	101	0.400	
	40		A	3RF23 40-1AA22	1	1 unit	101	0.550	
	50		A	3RF23 50-1AA22	1	1 unit	101	0.550	
	Zero-point switching								
	Rated operational voltage U_e 48 ... 460 V								
 3RF23 20-1	10.5	24 DC	A	3RF23 10-1AA04	1	1 unit	101	0.165	
	20	acc. to EN 61131-2	A	3RF23 20-1AA04	1	1 unit	101	0.240	
	30		A	3RF23 30-1AA04	1	1 unit	101	0.400	
	40		A	3RF23 40-1AA04	1	1 unit	101	0.550	
	50		A	3RF23 50-1AA04	1	1 unit	101	0.550	
	10.5	24 DC Low Power	A	3RF23 10-1AA04-0KN0	1	1 unit	101	0.165	
	10.5	24 AC/DC	A	3RF23 10-1AA14	1	1 unit	101	0.165	
	20		B	3RF23 20-1AA14	1	1 unit	101	0.240	
	30		A	3RF23 30-1AA14	1	1 unit	101	0.400	
	40		B	3RF23 40-1AA14	1	1 unit	101	0.550	
	50		B	3RF23 50-1AA14	1	1 unit	101	0.550	
	10.5	110 ... 230 AC	A	3RF23 10-1AA24	1	1 unit	101	0.165	
	20		A	3RF23 20-1AA24	1	1 unit	101	0.240	
	30		A	3RF23 30-1AA24	1	1 unit	101	0.400	
	40		A	3RF23 40-1AA24	1	1 unit	101	0.550	
	50		A	3RF23 50-1AA24	1	1 unit	101	0.550	
	10.5	4 ... 30 DC	B	3RF23 10-1AA44	1	1 unit	101	0.165	
	20		A	3RF23 20-1AA44	1	1 unit	101	0.240	
	30		A	3RF23 30-1AA44	1	1 unit	101	0.400	
	Zero-point switching								
Rated operational voltage U_e 48 ... 600 V									
	30	110 ... 230 AC	B	3RF23 30-1AA25	1	1 unit	101	0.400	
	10.5	4 ... 30 DC	B	3RF23 10-1AA45	1	1 unit	101	0.165	
	20		A	3RF23 20-1AA45	1	1 unit	101	0.240	
	30		A	3RF23 30-1AA45	1	1 unit	101	0.400	
	40		A	3RF23 40-1AA45	1	1 unit	101	0.550	
	50		A	3RF23 50-1AA45	1	1 unit	101	0.550	
Zero-point switching · Blocking voltage 1600 V, rated operational voltage U_e 48 ... 600 V									
 3RF23 40-1	10.5	24 DC	B	3RF23 10-1AA06	1	1 unit	101	0.165	
	20	acc. to EN 61131-2	A	3RF23 20-1AA06	1	1 unit	101	0.240	
	30		A	3RF23 30-1AA06	1	1 unit	101	0.400	
	40		B	3RF23 40-1AA06	1	1 unit	101	0.550	
	50		B	3RF23 50-1AA06	1	1 unit	101	0.550	
	10.5	110 ... 230 AC	B	3RF23 10-1AA26	1	1 unit	101	0.165	
	20		B	3RF23 20-1AA26	1	1 unit	101	0.240	
	30		B	3RF23 30-1AA26	1	1 unit	101	0.400	
	40		B	3RF23 40-1AA26	1	1 unit	101	0.550	
	50		B	3RF23 50-1AA26	1	1 unit	101	0.550	




Other rated control supply voltages on request.

¹⁾ The type current provides information about the performance of the solid-state contactor. The actual permitted rated operational current I_e can be smaller depending on the connection method and start-up conditions. For derating see the manual, "Characteristic curves".

Solid-State Switching Devices for Resistive Loads

Solid-State Contactors

SIRIUS 3RF23 solid-state contactors, single-phase

Type current ¹⁾ I_{max}	Operational current $I_e/AC-15^2)$	Rated control supply voltage U_s	DT	Screw terminals	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg	
				⊕					
A	A	V		Order No.	Price per PU				
Instantaneous switching									
Rated operational voltage U_e 24 ... 230 V									
	10.5	6	24 DC	A	3RF23 10-1BA02	1	1 unit	101	0.165
	20	12	acc. to EN 61131-2	A	3RF23 20-1BA02	1	1 unit	101	0.240
	30	15		B	3RF23 30-1BA02	1	1 unit	101	0.400
	40	20		B	3RF23 40-1BA02	1	1 unit	101	0.550
	50	25		B	3RF23 50-1BA02	1	1 unit	101	0.550
	50	27.5		B	3RF23 70-1BA02	1	1 unit	101	1.200
	50	30		B	3RF23 90-1BA02	1	1 unit	101	2.900
	10.5	6	110 ... 230 AC	B	3RF23 10-1BA22	1	1 unit	101	0.165
	20	12		B	3RF23 20-1BA22	1	1 unit	101	0.240
	30	15		B	3RF23 30-1BA22	1	1 unit	101	0.400
	40	20		B	3RF23 40-1BA22	1	1 unit	101	0.550
	50	25		B	3RF23 50-1BA22	1	1 unit	101	0.550
	50	27.5		B	3RF23 70-1BA22	1	1 unit	101	1.200
	50	30		B	3RF23 90-1BA22	1	1 unit	101	2.900
Instantaneous switching									
Rated operational voltage U_e 48 ... 460 V									
	10.5	6	24 DC	A	3RF23 10-1BA04	1	1 unit	101	0.165
	20	12	acc. to EN 61131-2	A	3RF23 20-1BA04	1	1 unit	101	0.240
	30	15		A	3RF23 30-1BA04	1	1 unit	101	0.400
	40	20		B	3RF23 40-1BA04	1	1 unit	101	0.550
	50	25		B	3RF23 50-1BA04	1	1 unit	101	0.550
	50	27.5		B	3RF23 70-1BA04	1	1 unit	101	1.200
	50	30		B	3RF23 90-1BA04	1	1 unit	101	2.900
	10.5	6	110 ... 230 AC	B	3RF23 10-1BA24	1	1 unit	101	0.165
	20	12		B	3RF23 20-1BA24	1	1 unit	101	0.240
	30	15		B	3RF23 30-1BA24	1	1 unit	101	0.400
	40	20		B	3RF23 40-1BA24	1	1 unit	101	0.550
	50	25		B	3RF23 50-1BA24	1	1 unit	101	0.550
	50	27.5		B	3RF23 70-1BA24	1	1 unit	101	1.200
	50	30		B	3RF23 90-1BA24	1	1 unit	101	2.900
	20	12	4 ... 30 DC	B	3RF23 20-1BA44	1	1 unit	101	0.240
	30	15		B	3RF23 30-1BA44	1	1 unit	101	0.400
	50	25		B	3RF23 50-1BA44	1	1 unit	101	0.550
	Instantaneous switching · Blocking voltage 1600 V								
	Rated operational voltage U_e 48 ... 600 V								
		10.5	6	24 DC	B	3RF23 10-1BA06	1	1 unit	101
20		12	acc. to EN 61131-2	A	3RF23 20-1BA06	1	1 unit	101	0.240
30		15		B	3RF23 30-1BA06	1	1 unit	101	0.400
40		20		B	3RF23 40-1BA06	1	1 unit	101	0.550
50		25		B	3RF23 50-1BA06	1	1 unit	101	0.550
50		27.5		B	3RF23 70-1BA06	1	1 unit	101	1.200
50		30		B	3RF23 90-1BA06	1	1 unit	101	2.900
10.5		6	110 ... 230 AC	B	3RF23 10-1BA26	1	1 unit	101	0.165
20		12		B	3RF23 20-1BA26	1	1 unit	101	0.240
30		15		B	3RF23 30-1BA26	1	1 unit	101	0.400
40		20		B	3RF23 40-1BA26	1	1 unit	101	0.550
50		25		B	3RF23 50-1BA26	1	1 unit	101	0.550
50		27.5		B	3RF23 70-1BA26	1	1 unit	101	1.200
50		30		B	3RF23 90-1BA26	1	1 unit	101	2.900

Other rated control supply voltages on request.

1) The type current provides information about the performance of the solid-state contactor. The actual permitted rated operational current I_e can be smaller depending on the connection method and start-up conditions. For derating see the manual, "Characteristic curves".

2) Utilization category AC-15:
Electromagnetic loads, e. g. valves according to EN 60947-5.
Parameters: max. 1200 1/h, 50 % ON Period, 10-times inrush current for 60 ms.

Solid-State Switching Devices for Resistive Loads

Solid-State Contactors

SIRIUS 3RF23 solid-state contactors, single-phase

Type current ¹⁾ I_{max}	Rated control supply voltage U_s	DT	Screw terminals	⊕	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V		Order No.		Price per PU			kg
Low noise²⁾ · Zero-point switching								
Rated operational voltage U_e 24 ... 230 V								
20	24 DC	B	3RF23 20-1CA02		1	1 unit	101	0.240
30	acc. to EN 61131-2	B	3RF23 30-1CA02		1	1 unit	101	0.400
20	110 ... 230 AC	B	3RF23 20-1CA22		1	1 unit	101	0.240
Low noise²⁾ · Zero-point switching								
Rated operational voltage U_e 48 ... 460 V								
20	24 DC	B	3RF23 20-1CA04		1	1 unit	101	0.240
	acc. to EN 61131-2							
20	110 ... 230 AC	B	3RF23 20-1CA24		1	1 unit	101	0.240
20	4 ... 30 DC	A	3RF23 20-1CA44		1	1 unit	101	0.240
Short-circuit proof with B-type MCB · Zero-point switching,								
rated operational voltage U_e 24 ... 230 V								
20	24 DC	A	3RF23 20-1DA02		1	1 unit	101	0.240
	acc. to EN 61131-2							
20	110 ... 230 AC	B	3RF23 20-1DA22		1	1 unit	101	0.240
Short-circuit proof with B-type MCB · Zero-point switching,								
rated operational voltage U_e 48 ... 460 V								
20	24 DC	A	3RF23 20-1DA04		1	1 unit	101	0.240
	acc. to EN 61131-2							
20	110 ... 230 AC	B	3RF23 20-1DA24		1	1 unit	101	0.240
20	4 ... 30 DC	A	3RF23 20-1DA44		1	1 unit	101	0.240
30		A	3RF23 30-1DA44		1	1 unit	101	0.240

3RF23 20-1



Other rated control supply voltages on request.


¹⁾ The type current provides information about the performance of the solid-state contactor. The actual permitted rated operational current I_e can be smaller depending on the connection method and start-up conditions. For derating see the manual, "Characteristic curves".

²⁾ See page 4/54.

Solid-State Switching Devices for Resistive Loads

Solid-State Contactors

SIRIUS 3RF23 solid-state contactors, single-phase

Type current ¹⁾ I_{max}	Rated control supply voltage U_s	DT	Spring-type terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V						kg
Zero-point switching Rated operational voltage U_e 24 ... 230 V							
10.5	24 DC	B	3RF23 10-2AA02	1	1 unit	101	0.166
20	acc. to EN 61131-2	A	3RF23 20-2AA02	1	1 unit	101	0.240
10.5	110 ... 230 AC	B	3RF23 10-2AA22	1	1 unit	101	0.166
20		B	3RF23 20-2AA22	1	1 unit	101	0.240
Zero-point switching Rated operational voltage U_e 48 ... 460 V							
10.5	24 DC	A	3RF23 10-2AA04	1	1 unit	101	0.166
20	acc. to EN 61131-2	A	3RF23 20-2AA04	1	1 unit	101	0.240
10.5	110 ... 230 AC	B	3RF23 10-2AA24	1	1 unit	101	0.166
20		B	3RF23 20-2AA24	1	1 unit	101	0.240
Zero-point switching · Blocking voltage 1600 V, rated operational voltage U_e 48 ... 600 V							
10.5	24 DC	B	3RF23 10-2AA06	1	1 unit	101	0.166
20	acc. to EN 61131-2	A	3RF23 20-2AA06	1	1 unit	101	0.240
10.5	110 ... 230 AC	B	3RF23 10-2AA26	1	1 unit	101	0.166
20		B	3RF23 20-2AA26	1	1 unit	101	0.240
Low noise²⁾ · Zero-point switching Rated operational voltage U_e 24 ... 230 V							
20	24 DC	B	3RF23 20-2CA02	1	1 unit	101	0.240
	acc. to EN 61131-2						
20	110 ... 230 AC	B	3RF23 20-2CA22	1	1 unit	101	0.240
Low noise²⁾ · Zero-point switching Rated operational voltage U_e 48 ... 460 V							
20	24 DC	B	3RF23 20-2CA04	1	1 unit	101	0.240
	acc. to EN 61131-2						
20	110 ... 230 AC	B	3RF23 20-2CA24	1	1 unit	101	0.240
Short-circuit proof with B-type MCB · Zero-point switching, rated operational voltage U_e 24 ... 230 V							
20	110 ... 230 AC	B	3RF23 20-2DA22	1	1 unit	101	0.240
Short-circuit proof with B-type MCB · Zero-point switching, rated operational voltage U_e 48 ... 460 V							
20	110 ... 230 AC	B	3RF23 20-2DA24	1	1 unit	101	0.240

Other rated control supply voltages on request.

¹⁾ The type current provides information about the performance of the solid-state contactor. The actual permitted rated operational current I_e can be smaller depending on the connection method and start-up conditions. For derating see the manual, "Characteristic curves".

²⁾ See page 4/54.




3RF23 20-2

Solid-State Switching Devices for Resistive Loads

Solid-State Contactors

SIRIUS 3RF23 solid-state contactors, single-phase

Type current ¹⁾ I_{max}	Rated control supply voltage U_s	DT	Ring terminal lug connection	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V		Order No.	Price per PU			kg
Zero-point switching							
Rated operational voltage U_e 24 ... 230 V							
 3RF23 30-3	10.5	24 DC	B	3RF23 10-3AA02	1	1 unit	101 0.166
	20	acc. to EN 61131-2	B	3RF23 20-3AA02	1	1 unit	101 0.200
	30		B	3RF23 30-3AA02	1	1 unit	101 0.435
	40		B	3RF23 40-3AA02	1	1 unit	101 0.550
	50		B	3RF23 50-3AA02	1	1 unit	101 0.550
	70		A	3RF23 70-3AA02	1	1 unit	101 1.200
	88		B	3RF23 90-3AA02	1	1 unit	101 2.900
	10.5	110 ... 230 AC	B	3RF23 10-3AA22	1	1 unit	101 0.166
	20		B	3RF23 20-3AA22	1	1 unit	101 0.200
	30		B	3RF23 30-3AA22	1	1 unit	101 0.435
	40		B	3RF23 40-3AA22	1	1 unit	101 0.550
	50		B	3RF23 50-3AA22	1	1 unit	101 0.550
	70		B	3RF23 70-3AA22	1	1 unit	101 1.200
	88		B	3RF23 90-3AA22	1	1 unit	101 2.900
Zero-point switching							
Rated operational voltage U_e 48 ... 460 V							
10.5	24 DC	B	3RF23 10-3AA04	1	1 unit	101 0.166	
20	acc. to EN 61131-2	B	3RF23 20-3AA04	1	1 unit	101 0.200	
30		A	3RF23 30-3AA04	1	1 unit	101 0.435	
40		B	3RF23 40-3AA04	1	1 unit	101 0.550	
50		B	3RF23 50-3AA04	1	1 unit	101 0.550	
70		A	3RF23 70-3AA04	1	1 unit	101 1.200	
88		A	3RF23 90-3AA04	1	1 unit	101 2.900	
10.5	110 ... 230 AC	B	3RF23 10-3AA24	1	1 unit	101 0.166	
20		B	3RF23 20-3AA24	1	1 unit	101 0.200	
30		B	3RF23 30-3AA24	1	1 unit	101 0.435	
40		B	3RF23 40-3AA24	1	1 unit	101 0.550	
50		B	3RF23 50-3AA24	1	1 unit	101 0.550	
70		B	3RF23 70-3AA24	1	1 unit	101 1.200	
88		B	3RF23 90-3AA24	1	1 unit	101 2.900	
20	4 ... 30 DC	B	3RF23 20-3AA44	1	1 unit	101 0.200	
30		B	3RF23 30-3AA44	1	1 unit	101 0.435	
50		B	3RF23 50-3AA44	1	1 unit	101 0.550	
Zero-point switching							
Rated operational voltage U_e 48 ... 600 V							
40	4 ... 30 DC	B	3RF23 40-3AA45	1	1 unit	101 0.550	
70		A	3RF23 70-3AA45	1	1 unit	101 1.200	
88		B	3RF23 90-3AA45	1	1 unit	101 2.900	
Zero-point switching · Blocking voltage 1600 V, rated operational voltage U_e 48 ... 600 V							
10.5	24 DC	B	3RF23 10-3AA06	1	1 unit	101 0.166	
20	acc. to EN 61131-2	B	3RF23 20-3AA06	1	1 unit	101 0.200	
30		B	3RF23 30-3AA06	1	1 unit	101 0.435	
40		B	3RF23 40-3AA06	1	1 unit	101 0.550	
50		B	3RF23 50-3AA06	1	1 unit	101 0.550	
70		B	3RF23 70-3AA06	1	1 unit	101 1.200	
88		B	3RF23 90-3AA06	1	1 unit	101 2.900	
10.5	110 ... 230 AC	B	3RF23 10-3AA26	1	1 unit	101 0.166	
20		B	3RF23 20-3AA26	1	1 unit	101 0.200	
30		B	3RF23 30-3AA26	1	1 unit	101 0.435	
40		B	3RF23 40-3AA26	1	1 unit	101 0.550	
50		B	3RF23 50-3AA26	1	1 unit	101 0.550	
70		A	3RF23 70-3AA26	1	1 unit	101 1.200	
88		B	3RF23 90-3AA26	1	1 unit	101 2.900	

Other rated control supply voltages on request.

¹⁾ The type current provides information about the performance of the solid-state contactor. The actual permitted rated operational current I_e can be smaller depending on the connection method and start-up conditions. For derating see the manual, "Characteristic curves".

Solid-State Switching Devices for Resistive Loads

Solid-State Contactors


SIRIUS 3RF23 solid-state contactors, single-phase

Type current ¹⁾ I_{max}	Operational current $I_e/AC-15^2)$	Rated control supply voltage U_s	DT	Ring terminal lug connection	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	A	V		Order No.	Price per PU			kg
Instantaneous switching								
Rated operational voltage U_e 24 ... 230 V								
70	27.5	24 DC	B	3RF23 70-3BA02	1	1 unit	101	1.200
88	30	acc. to EN 61131-2	B	3RF23 90-3BA02	1	1 unit	101	2.900
70	27.5	110 ... 230 AC	B	3RF23 70-3BA22	1	1 unit	101	1.200
88	30		B	3RF23 90-3BA22	1	1 unit	101	2.900
Instantaneous switching								
Rated operational voltage U_e 48 ... 460 V								
70	27.5	24 DC	B	3RF23 70-3BA04	1	1 unit	101	1.200
88	30	acc. to EN 61131-2	B	3RF23 90-3BA04	1	1 unit	101	2.900
70	27.5	110 ... 230 AC	B	3RF23 70-3BA24	1	1 unit	101	1.200
88	30		B	3RF23 90-3BA24	1	1 unit	101	2.900
Instantaneous switching · Blocking voltage 1600 V								
Rated operational voltage U_e 48 ... 600 V								
70	27.5	24 DC	B	3RF23 70-3BA06	1	1 unit	101	1.200
88	30	acc. to EN 61131-2	B	3RF23 90-3BA06	1	1 unit	101	2.900
70	27.5	110 ... 230 AC	B	3RF23 70-3BA26	1	1 unit	101	1.200
88	30		B	3RF23 90-3BA26	1	1 unit	101	2.900
Short-circuit proof with B-type MCB · Zero-point switching, rated operational voltage U_e 24 ... 230 V								
20	--	24 DC	B	3RF23 20-3DA02	1	1 unit	101	0.200
		acc. to EN 61131-2						
20	--	110 ... 230 AC	B	3RF23 20-3DA22	1	1 unit	101	0.200
Short-circuit proof with B-type MCB · Zero-point switching, rated operational voltage U_e 48 ... 460 V								
20	--	24 DC	B	3RF23 20-3DA04	1	1 unit	101	0.200
		acc. to EN 61131-2						
20	--	110 ... 230 AC	B	3RF23 20-3DA24	1	1 unit	101	0.200

Other rated control supply voltages on request.

¹⁾ The type current provides information about the performance of the solid-state contactor. The actual permitted rated operational current I_e can be smaller depending on the connection method and start-up conditions. For derating see the manual, "Characteristic curves".

²⁾ Utilization category AC-15: Electromagnetic loads, e. g. valves according to EN 60947-5. Parameters: max. 1200 1/h, 50 % ON Period, 10-times inrush current for 60 ms.

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg
Optional accessories							
	C	8WA2 880		1	1 unit	041	0.034
	A	3RF29 00-3PA88		1	10 units	101	0.004
Screwdrivers for opening spring-type terminals Terminal covers for 3RF21 solid-state relays and 3RF23 solid-state contactors in ring terminal lug connection (after simple adaptation, this terminal cover can also be used for screw connection)							

3RF29 00-3PA88

Solid-State Switching Devices for Resistive Loads

Solid-State Contactors

**SIRIUS 3RF24 solid-state contactors,
three-phase**
Selection and ordering data

Type current ¹⁾ I_{max}	Rated control supply voltage U_s	DT	Screw terminals	⊕	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V		Order No.					kg

Zero-point switching
Rated operational voltage U_e 48 ... 600 V


3RF24 20-1AB45

Two-phase controlled

10.5	4 ... 30 DC	A	3RF24 10-1AB45		1	1 unit	101	0.320
20		A	3RF24 20-1AB45		1	1 unit	101	0.400
30		A	3RF24 30-1AB45		1	1 unit	101	0.540
40		B	3RF24 40-1AB45		1	1 unit	101	0.800
50		A	3RF24 50-1AB45		1	1 unit	101	1.100
10.5	110 AC	B	3RF24 10-1AB35		1	1 unit	101	0.320
20		B	3RF24 20-1AB35		1	1 unit	101	0.400
30		B	3RF24 30-1AB35		1	1 unit	101	0.540
40		B	3RF24 40-1AB35		1	1 unit	101	0.800
50		B	3RF24 50-1AB35		1	1 unit	101	1.100
10.5	230 AC	B	3RF24 10-1AB55		1	1 unit	101	0.320
20		B	3RF24 20-1AB55		1	1 unit	101	0.400
30		B	3RF24 30-1AB55		1	1 unit	101	0.540
40		B	3RF24 40-1AB55		1	1 unit	101	0.800
50		B	3RF24 50-1AB55		1	1 unit	101	1.100



3RF24 10-1AC45

Three-phase controlled

10.5	4 ... 30 DC	A	3RF24 10-1AC45		1	1 unit	101	0.320
20		A	3RF24 20-1AC45		1	1 unit	101	0.540
30		A	3RF24 30-1AC45		1	1 unit	101	0.800
40		A	3RF24 40-1AC45		1	1 unit	101	1.100
50		A	3RF24 50-1AC45		1	1 unit	101	1.850
10.5	110 AC	B	3RF24 10-1AC35		1	1 unit	101	0.320
20		B	3RF24 20-1AC35		1	1 unit	101	0.540
30		B	3RF24 30-1AC35		1	1 unit	101	0.800
40		B	3RF24 40-1AC35		1	1 unit	101	1.100
50		B	3RF24 50-1AC35		1	1 unit	101	1.850
10.5	230 AC	B	3RF24 10-1AC55		1	1 unit	101	0.320
20		B	3RF24 20-1AC55		1	1 unit	101	0.540
30		B	3RF24 30-1AC55		1	1 unit	101	0.800
40		B	3RF24 40-1AC55		1	1 unit	101	1.100
50		B	3RF24 50-1AC55		1	1 unit	101	1.850

¹⁾ The type current provides information about the performance of the solid-state contactor. The actual permitted rated operational current I_e can be smaller depending on the connection method and start-up conditions. For derating see the manual, "Characteristic curves".


Solid-State Switching Devices for Resistive Loads

Solid-State Contactors

SIRIUS 3RF24 solid-state contactors, three-phase



3RF24 10-2AB45

Type current ¹⁾ I_{max}	Rated control supply voltage U_s	DT	Spring-type terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V		Order No.	Price per PU			kg


Zero-point switching Rated operational voltage U_e 48 ... 600 V

Two-phase controlled

10	4 ... 30 DC	B	3RF24 10-2AB45	1	1 unit	101	0.320
20		B	3RF24 20-2AB45	1	1 unit	101	0.400
10	230 AC	B	3RF24 10-2AB55	1	1 unit	101	0.320
20		B	3RF24 20-2AB55	1	1 unit	101	0.400

Three-phase controlled

10	4 ... 30 DC	B	3RF24 10-2AC45	1	1 unit	101	0.320
20		B	3RF24 20-2AC45	1	1 unit	101	0.540
10	230 AC	B	3RF24 10-2AC55	1	1 unit	101	0.320
20		B	3RF24 20-2AC55	1	1 unit	101	0.540

Type current ¹⁾ I_{max}	Rated control supply voltage U_s	DT	Ring terminal lug connection 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V		Order No.	Price per PU			kg

Zero-point switching Rated operational voltage U_e 48 ... 600 V

Two-phase controlled

50	4 ... 30 DC	B	3RF24 50-3AB45	1	1 unit	101	1.100
50	230 AC	B	3RF24 50-3AB55	1	1 unit	101	1.100

Three-phase controlled

50	4 ... 30 DC	B	3RF24 50-3AC45	1	1 unit	101	1.850
50	230 AC	B	3RF24 50-3AC55	1	1 unit	101	1.850

¹⁾ The type current provides information about the performance of the solid-state contactor. The actual permitted rated operational current I_e can be smaller depending on the connection method and start-up conditions. For derating see the manual, "Characteristic curves".

Solid-State Switching Devices for Resistive Loads

3RF29 Function Modules

General data

Overview

Function modules for SIRIUS 3RF2 solid-state switching devices

A great variety of applications demand an expanded range of functionality. With our function modules, these requirements can be met really easily. The modules are mounted simply by clicking them into place; straight away the necessary connections are made with the solid-state relay or contactor. The plug-in connection to control the solid-state switching devices can simply remain in use.

The following function modules are available:

- Converters
- Load monitoring
- Heating current monitoring
- Power controllers
- Power regulators

With the exception of the converter, the function modules can be used only with single-phase solid-state switching devices.

Recommended assignment of the function modules to the 3RF21 single-phase solid-state relays

Order No.	Accessories					
	Converters	Load monitoring Basic	Extended	Heating current monitoring	Power controllers ¹⁾	Power regulators ¹⁾
Type current = 20 A						
3RF21 20-1A.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA13	--	3RF29 20-0KA13	3RF29 20-0HA13
3RF21 20-1A.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF21 20-1A.22	--	--	3RF29 20-0GA33	--	--	--
3RF21 20-1A.24	--	--	3RF29 20-0GA36	--	--	--
3RF21 20-1A.42	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA13	--	3RF29 20-0KA13	3RF29 20-0HA13
3RF21 20-1A.45	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF21 20-1B.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF21 20-2A.02	3RF29 00-0EA18	--	--	--	--	--
3RF21 20-2A.04	3RF29 00-0EA18	--	--	--	--	--
3RF21 20-2A.22	--	--	--	--	--	--
3RF21 20-2A.24	--	--	--	--	--	--
3RF21 20-2A.42	3RF29 00-0EA18	--	--	--	--	--
3RF21 20-2A.45	3RF29 00-0EA18	--	--	--	--	--
3RF21 20-3A.02	3RF29 00-0EA18	--	3RF29 20-0GA13	--	--	3RF29 20-0HA13
3RF21 20-3A.04	3RF29 00-0EA18	--	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF21 20-3A.22	--	--	3RF29 20-0GA33	--	3RF29 20-0KA13	3RF29 20-0HA13
3RF21 20-3A.24	--	--	3RF29 20-0GA36	--	3RF29 20-0KA16	3RF29 20-0HA16
Type current = 30 A						
3RF21 30-1A.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF21 30-1A.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 30-1A.06	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 30-1A.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF21 30-1A.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF21 30-1A.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF21 30-1A.42	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF21 30-1A.45	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 30-1B.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
Type current = 50 A						
3RF21 50-1A.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF21 50-1A.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 50-1A.06	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 50-1A.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF21 50-1A.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF21 50-1A.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF21 50-1A.45	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 50-1B.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 50-1B.06	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 50-1B.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF21 50-2A.02	3RF29 00-0EA18	--	--	--	--	--
3RF21 50-2A.04	3RF29 00-0EA18	--	--	--	--	--
3RF21 50-2A.06	3RF29 00-0EA18	--	--	--	--	--
3RF21 50-2A.14	3RF29 00-0EA18	--	--	--	--	--
3RF21 50-2A.22	--	--	--	--	--	--
3RF21 50-2A.24	--	--	--	--	--	--
3RF21 50-2A.26	--	--	--	--	--	--
3RF21 50-3A.02	3RF29 00-0EA18	--	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF21 50-3A.04	3RF29 00-0EA18	--	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 50-3A.06	3RF29 00-0EA18	--	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 50-3A.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF21 50-3A.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF21 50-3A.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36

¹⁾ The use of power controllers/regulators is also possible on zero-point switching versions for full-wave control mode. The generalized phase control mode is recommended only for the combination with instantaneous switching versions.

Solid-State Switching Devices for Resistive Loads

3RF29 Function Modules

General data

Order No.	Accessories					
	Converters	Load monitoring		Heating current monitoring	Power controllers ¹⁾	Power regulators ¹⁾
		Basic	Extended			
Type current = 70 A						
3RF21 70-1A.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF21 70-1A.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 70-1A.05	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 70-1A.06	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 70-1A.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF21 70-1A.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF21 70-1A.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF21 70-1A.45	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 70-1B.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 70-1C.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
Type current = 90 A						
3RF21 90-1A.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF21 90-1A.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 90-1A.06	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 90-1A.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF21 90-1A.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF21 90-1A.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF21 90-1A.45	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 90-1B.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF21 90-2A.02	3RF29 00-0EA18	--	--	--	--	--
3RF21 90-2A.04	3RF29 00-0EA18	--	--	--	--	--
3RF21 90-2A.06	3RF29 00-0EA18	--	--	--	--	--
3RF21 90-2A.22	--	--	--	--	--	--
3RF21 90-2A.24	--	--	--	--	--	--
3RF21 90-2A.26	--	--	--	--	--	--
3RF21 90-3A.02	3RF29 00-0EA18	--	3RF29 90-0GA13	--	--	3RF29 90-0HA13
3RF21 90-3A.04	3RF29 00-0EA18	--	3RF29 90-0GA16	3RF29 32-0JA16	3RF29 90-0KA16	3RF29 90-0HA16
3RF21 90-3A.06	3RF29 00-0EA18	--	3RF29 90-0GA16	3RF29 32-0JA16	3RF29 90-0KA16	3RF29 90-0HA16
3RF21 90-3A.22	--	--	3RF29 90-0GA33	--	--	3RF29 90-0HA33
3RF21 90-3A.24	--	--	3RF29 90-0GA36	--	--	3RF29 90-0HA36
3RF21 90-3A.26	--	--	3RF29 90-0GA36	--	--	3RF29 90-0HA36
3RF21 90-3A.44	3RF29 00-0EA18	--	3RF29 90-0GA16	3RF29 32-0JA16	3RF29 90-0KA16	3RF29 90-0HA16

¹⁾ The use of power controllers/regulators is also possible on zero-point switching versions for full-wave control mode. The generalized phase control mode is recommended only for the combination with instantaneous switching versions.

Recommended assignment of the function modules to the 3RF22 three-phase solid-state relays

Order No.	Accessories					
	Converters	Load monitoring		Heating current monitoring	Power controllers	Power regulators
		Basic	Extended			
Type current up to 55 A						
3RF22 ..-1A...	3RF29 00-0EA18	--	--	--	--	--
3RF22 ..-2A...	3RF29 00-0EA18	--	--	--	--	--
3RF22 ..-3A...	3RF29 00-0EA18	--	--	--	--	--

Recommended assignment of the function modules to the 3RF23 single-phase solid-state contactors

Order No.	Accessories					
	Converters	Load monitoring		Heating current monitoring	Power controllers ¹⁾	Power regulators ¹⁾
		Basic	Extended			
Type current $I_e = 10.5 A$						
3RF23 10-1A.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA13	3RF29 16-0JA13	3RF29 20-0KA13	3RF29 20-0HA13
3RF23 10-1A.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 10-1A.06	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 10-1A.12	3RF29 00-0EA18	--	3RF29 20-0GA13	3RF29 16-0JA13	3RF29 20-0KA13	3RF29 20-0HA13
3RF23 10-1A.14	3RF29 00-0EA18	--	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 10-1A.22	--	--	3RF29 20-0GA33	--	--	3RF29 20-0HA33
3RF23 10-1A.24	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 10-1A.26	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 10-1A.44	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 10-1A.45	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16

Solid-State Switching Devices for Resistive Loads

3RF29 Function Modules

General data

Order No.	Accessories					
	Converters	Load monitoring		Heating current monitoring	Power controllers ¹⁾	Power regulators ¹⁾
		Basic	Extended			
Type current $I_e = 10.5 A$						
3RF23 10-1B.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA13	3RF29 16-0JA13	3RF29 20-0KA13	3RF29 20-0HA13
3RF23 10-1B.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 10-1B.06	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 10-1B.22	--	--	3RF29 20-0GA33	--	--	3RF29 20-0HA33
3RF23 10-1B.24	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 10-1B.26	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 10-2A.02	3RF29 00-0EA18	--	--	--	--	--
3RF23 10-2A.04	3RF29 00-0EA18	--	--	--	--	--
3RF23 10-2A.06	3RF29 00-0EA18	--	--	--	--	--
3RF23 10-2A.22	--	--	--	--	--	--
3RF23 10-2A.24	--	--	--	--	--	--
3RF23 10-2A.26	--	--	--	--	--	--
3RF23 10-3A.02	3RF29 00-0EA18	--	3RF29 20-0GA13	3RF29 16-0JA13	3RF29 20-0KA13	3RF29 20-0HA13
3RF23 10-3A.04	3RF29 00-0EA18	--	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 10-3A.06	3RF29 00-0EA18	--	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 10-3A.22	--	--	3RF29 20-0GA33	--	--	3RF29 20-0HA33
3RF23 10-3A.24	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 10-3A.26	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
Type current $I_e = 20 A$						
3RF23 20-1A.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA13	--	3RF29 20-0KA13	3RF29 20-0HA13
3RF23 20-1A.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-1A.06	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-1A.14	3RF29 00-0EA18	--	3RF29 20-0GA16	--	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-1A.22	--	--	3RF29 20-0GA33	--	--	3RF29 20-0HA33
3RF23 20-1A.24	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 20-1A.26	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 20-1A.44	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-1A.45	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-1B.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA13	--	3RF29 20-0KA13	3RF29 20-0HA13
3RF23 20-1B.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-1B.06	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-1B.22	--	--	3RF29 20-0GA33	--	--	3RF29 20-0HA33
3RF23 20-1B.24	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 20-1B.26	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 20-1B.44	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-1C.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA13	--	3RF29 20-0KA13	3RF29 20-0HA13
3RF23 20-1C.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-1C.22	--	--	3RF29 20-0GA33	--	--	3RF29 20-0HA33
3RF23 20-1C.24	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 20-1C.44	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-1D.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA13	--	3RF29 20-0KA13	3RF29 20-0HA13
3RF23 20-1D.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-1D.22	--	--	3RF29 20-0GA33	--	--	3RF29 20-0HA33
3RF23 20-1D.24	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 20-1D.44	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-2A.02	3RF29 00-0EA18	--	--	--	--	--
3RF23 20-2A.04	3RF29 00-0EA18	--	--	--	--	--
3RF23 20-2A.06	3RF29 00-0EA18	--	--	--	--	--
3RF23 20-2A.22	--	--	--	--	--	--
3RF23 20-2A.24	--	--	--	--	--	--
3RF23 20-2A.26	--	--	--	--	--	--
3RF23 20-2C.02	3RF29 00-0EA18	--	--	--	--	--
3RF23 20-2C.04	3RF29 00-0EA18	--	--	--	--	--
3RF23 20-2C.22	--	--	--	--	--	--
3RF23 20-2C.24	--	--	--	--	--	--
3RF23 20-2D.22	--	--	--	--	--	--
3RF23 20-2D.24	--	--	--	--	--	--
3RF23 20-3A.02	3RF29 00-0EA18	--	3RF29 20-0GA13	--	3RF29 20-0KA13	3RF29 20-0HA13
3RF23 20-3A.04	3RF29 00-0EA18	--	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-3A.06	3RF29 00-0EA18	--	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-3A.22	--	--	3RF29 20-0GA33	--	--	3RF29 20-0HA33
3RF23 20-3A.24	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 20-3A.26	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
3RF23 20-3A.44	3RF29 00-0EA18	--	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16

¹⁾ The use of power controllers/regulators is also possible on zero-point switching versions for full-wave control mode. The generalized phase control mode is recommended only for the combination with instantaneous switching versions.

Solid-State Switching Devices for Resistive Loads

3RF29 Function Modules

General data

Order No.	Accessories					
	Converters	Load monitoring		Heating current monitoring	Power controllers ¹⁾ / Power regulators ¹⁾	
		Basic	Extended			
Type current $I_e = 20\text{ A}$						
3RF23 20-3D.02	3RF29 00-0EA18	--	3RF29 20-0GA13	--	3RF29 20-0KA13	3RF29 20-0HA13
3RF23 20-3D.04	3RF29 00-0EA18	--	3RF29 20-0GA16	3RF29 32-0JA16	3RF29 20-0KA16	3RF29 20-0HA16
3RF23 20-3D.22	--	--	3RF29 20-0GA33	--	--	3RF29 20-0HA33
3RF23 20-3D.24	--	--	3RF29 20-0GA36	--	--	3RF29 20-0HA36
Type current $I_e = 30\text{ A}$						
3RF23 30-1A.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 30-1A.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 30-1A.06	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 30-1A.14	3RF29 00-0EA18	--	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 30-1A.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF23 30-1A.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 30-1A.25	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 30-1A.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 30-1A.44	3RF29 00-0EA18	--	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 30-1A.45	3RF29 00-0EA18	--	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 30-1B.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 30-1B.04	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 30-1B.06	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 30-1B.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF23 30-1B.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 30-1B.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 30-1B.44	3RF29 00-0EA18	--	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 30-1C.02	3RF29 00-0EA18	3RF29 20-0FA08	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 30-1D.44	3RF29 00-0EA18	--	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 30-3A.02	3RF29 00-0EA18	--	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 30-3A.04	3RF29 00-0EA18	--	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 30-3A.06	3RF29 00-0EA18	--	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 30-3A.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF23 30-3A.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 30-3A.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 30-3A.44	3RF29 00-0EA18	--	3RF29 50-0GA16	3RF29 32-0JA16	3RF29 50-0KA16	3RF29 50-0HA16
Type current $I_e = 40\text{ A}$						
3RF23 40-1A.02	3RF29 00-0EA18	--	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 40-1A.04	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 40-1A.06	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 40-1A.14	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 40-1A.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF23 40-1A.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 40-1A.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 40-1A.45	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 40-1B.02	3RF29 00-0EA18	--	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 40-1B.04	3RF29 00-0EA18	--	3RF29 50-0GA13	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 40-1B.06	3RF29 00-0EA18	--	3RF29 50-0GA13	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 40-1B.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF23 40-1B.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 40-1B.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 40-3A.02	3RF29 00-0EA18	--	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 40-3A.04	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 40-3A.06	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 40-3A.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF23 40-3A.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 40-3A.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 40-3A.45	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
Type current $I_e = 50\text{ A}$						
3RF23 50-1A.02	3RF29 00-0EA18	--	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 50-1A.04	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 50-1A.06	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 50-1A.14	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 50-1A.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF23 50-1A.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 50-1A.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 50-1A.45	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16

¹⁾ The use of power controllers/regulators is also possible on zero-point switching versions for full-wave control mode. The generalized phase control mode is recommended only for the combination with instantaneous switching versions.

Solid-State Switching Devices for Resistive Loads

3RF29 Function Modules

General data

Order No.	Accessories					
	Converters	Load monitoring		Heating current monitoring	Power controllers ¹⁾	Power regulators ¹⁾
		Basic	Extended			
Type current $I_e = 50$ A						
3RF23 50-1B.02	3RF29 00-0EA18	--	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 50-1B.04	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 50-1B.06	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 50-1B.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF23 50-1B.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 50-1B.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 50-1B.44	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 50-3A.02	3RF29 00-0EA18	--	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 50-3A.04	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 50-3A.06	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 50-3A.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF23 50-3A.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 50-3A.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 50-3A.44	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
Type current $I_e = 70$ A						
3RF23 70-1B.02	3RF29 00-0EA18	--	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 70-1B.04	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 70-1B.06	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 70-1B.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF23 70-1B.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 70-1B.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 70-3A.02	3RF29 00-0EA18	--	3RF29 90-0GA13	--	--	3RF29 90-0HA13
3RF23 70-3A.04	3RF29 00-0EA18	--	3RF29 90-0GA16	--	3RF29 90-0KA16	3RF29 90-0HA16
3RF23 70-3A.06	3RF29 00-0EA18	--	3RF29 90-0GA16	--	3RF29 90-0KA16	3RF29 90-0HA16
3RF23 70-3A.22	--	--	3RF29 90-0GA33	--	--	3RF29 90-0HA33
3RF23 70-3A.24	--	--	3RF29 90-0GA36	--	--	3RF29 90-0HA36
3RF23 70-3A.26	--	--	3RF29 90-0GA36	--	--	3RF29 90-0HA36
3RF23 70-3A.45	3RF29 00-0EA18	--	3RF29 90-0GA16	--	3RF29 90-0KA16	3RF29 90-0HA16
3RF23 70-3B.02	3RF29 00-0EA18	--	3RF29 90-0GA13	--	--	3RF29 90-0HA13
3RF23 70-3B.04	3RF29 00-0EA18	--	3RF29 90-0GA16	--	3RF29 90-0KA16	3RF29 90-0HA16
3RF23 70-3B.06	3RF29 00-0EA18	--	3RF29 90-0GA16	--	3RF29 90-0KA16	3RF29 90-0HA16
3RF23 70-3B.22	--	--	3RF29 90-0GA33	--	--	3RF29 90-0HA33
3RF23 70-3B.24	--	--	3RF29 90-0GA36	--	--	3RF29 90-0HA36
3RF23 70-3B.26	--	--	3RF29 90-0GA36	--	--	3RF29 90-0HA36
Type current $I_e = 90$ A						
3RF23 90-1B.02	3RF29 00-0EA18	--	3RF29 50-0GA13	--	--	3RF29 50-0HA13
3RF23 90-1B.04	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 90-1B.06	3RF29 00-0EA18	--	3RF29 50-0GA16	--	3RF29 50-0KA16	3RF29 50-0HA16
3RF23 90-1B.22	--	--	3RF29 50-0GA33	--	--	3RF29 50-0HA33
3RF23 90-1B.24	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 90-1B.26	--	--	3RF29 50-0GA36	--	--	3RF29 50-0HA36
3RF23 90-3A.02	3RF29 00-0EA18	--	3RF29 90-0GA13	--	--	3RF29 90-0HA13
3RF23 90-3A.04	3RF29 00-0EA18	--	3RF29 90-0GA16	--	3RF29 90-0KA16	3RF29 90-0HA16
3RF23 90-3A.06	3RF29 00-0EA18	--	3RF29 90-0GA16	--	3RF29 90-0KA16	3RF29 90-0HA16
3RF23 90-3A.22	--	--	3RF29 90-0GA33	--	--	3RF29 90-0HA33
3RF23 90-3A.24	--	--	3RF29 90-0GA36	--	--	3RF29 90-0HA36
3RF23 90-3A.26	--	--	3RF29 90-0GA36	--	--	3RF29 90-0HA36
3RF23 90-3A.45	3RF29 00-0EA18	--	3RF29 90-0GA16	--	3RF29 90-0KA16	3RF29 90-0HA16
3RF23 90-3B.02	3RF29 00-0EA18	--	3RF29 90-0GA13	--	--	3RF29 90-0HA13
3RF23 90-3B.04	3RF29 00-0EA18	--	3RF29 90-0GA16	--	3RF29 90-0KA16	3RF29 90-0HA16
3RF23 90-3B.06	3RF29 00-0EA18	--	3RF29 90-0GA16	--	3RF29 90-0KA16	3RF29 90-0HA16
3RF23 90-3B.22	--	--	3RF29 90-0GA33	--	--	3RF29 90-0HA33
3RF23 90-3B.24	--	--	3RF29 90-0GA36	--	--	3RF29 90-0HA36
3RF23 90-3B.26	--	--	3RF29 90-0GA36	--	--	3RF29 90-0HA36

¹⁾ The use of power controllers/regulators is also possible on zero-point switching versions for full-wave control mode. The generalized phase control mode is recommended only for the combination with instantaneous switching versions.

Recommended assignment of the function modules to the 3RF24 three-phase solid-state contactors

Order No.	Accessories					
	Converters	Load monitoring		Heating current monitoring	Power controllers	Power regulators
		Basic	Extended			
Type current up to 50 A						
3RF24 ..-1..4.	3RF29 00-0EA18	--	--	--	--	--
3RF24 ..-2..4.	--	--	--	--	--	--
3RF24 ..-3..4.	3RF29 00-0EA18	--	--	--	--	--
3RF24 ..-4..5.	--	--	--	--	--	--

Solid-State Switching Devices for Resistive Loads

3RF29 Function Modules

SIRIUS converters for 3RF

Overview

Converters for 3RF2 solid-state switching devices

These modules are used to convert analog control signals, such as those output from many temperature controllers for example, into a pulse-width-modulated digital signal. The connected solid-state contactors and relays can therefore regulate the output of a load as a percentage.

Application

This function module is used for conversion from an analog input signal to an on/off ratio. The module can only be used in conjunction with 3RF21 and 3RF23 single-phase solid-state switching devices or 3RF22 and 3RF24 three-phase devices. It can be used on versions with 24 V DC and 24 V AC/DC control supply voltage.

Selection and ordering data

Rated operational current I_e	Rated operational voltage U_e	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V							kg

Converters



Rated control supply voltage 24 V AC/DC

--	--	A	3RF29 00-0EA18		1	1 unit	101	0.041
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Solid-State Switching Devices for Resistive Loads

3RF29 Function Modules

SIRIUS load monitoring for 3RF

Overview

Load monitoring for 3RF2 single-phase solid-state switching devices

Many faults can be quickly detected by monitoring a load circuit connected to the solid-state switching device, as made possible with this module. Examples include the failure of load elements (up to 6 in the basic version or up to 12 in the extended version), alloyed power semiconductors, a lack of voltage or a break in a load circuit. A fault is indicated by one or more LEDs and reported to the controller by way of a PLC-compatible output.

The principle of operation is based on permanent monitoring of the current intensity. This figure is continuously compared with the reference value stored once during start-up by the simple press of a button. In order to detect the failure of one of several loads, the current difference must be 1/6 (in the basic version) or 1/12 (in the extended version) of the reference value. In the event of a fault, an output is actuated and one or more LEDs indicate the fault.

Application

The device is used for monitoring one or more loads (partial loads). The function module can only be used in conjunction with a 3RF21 solid-state relay or a 3RF23 solid-state contactor. The devices with spring-type connections in the load circuit are not suitable.

Selection and ordering data

Rated operational current I_e	Rated operational voltage U_e	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
A	V							

Basic load monitoring



Rated control supply voltage 24 V DC

6	--	A	3RF29 06-0FA08		1	1 unit	101	0.068
20	--	A	3RF29 20-0FA08		1	1 unit	101	0.068
• With mounted 3RF29 00-0RA88 cover								
6	--	A	3RF29 06-0FA08-0KH0		1	1 unit	101	0.068
20	--	A	3RF29 20-0FA08-0KH0		1	1 unit	101	0.068

Extended load monitoring



Rated control supply voltage 24 V AC/DC

20	110 ... 230	A	3RF29 20-0GA13		1	1 unit	101	0.175
20	400 ... 600	A	3RF29 20-0GA16		1	1 unit	101	0.175
50	110 ... 230	A	3RF29 50-0GA13		1	1 unit	101	0.175
50	400 ... 600	A	3RF29 50-0GA16		1	1 unit	101	0.175
90	110 ... 230	A	3RF29 90-0GA13		1	1 unit	101	0.175
90	400 ... 600	A	3RF29 90-0GA16		1	1 unit	101	0.175

Rated control supply voltage 110 V AC

20	110 ... 230	A	3RF29 20-0GA33		1	1 unit	101	0.175
20	400 ... 600	A	3RF29 20-0GA36		1	1 unit	101	0.175
50	110 ... 230	A	3RF29 50-0GA33		1	1 unit	101	0.175
50	400 ... 600	A	3RF29 50-0GA36		1	1 unit	101	0.175
90	110 ... 230	A	3RF29 90-0GA33		1	1 unit	101	0.175
90	400 ... 600	A	3RF29 90-0GA36		1	1 unit	101	0.175

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
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Optional accessories



3RF29 00-0RA88

Sealable covers for function modules (not for converters)

B	3RF29 00-0RA88			1	10 units	101	0.001
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Solid-State Switching Devices for Resistive Loads

3RF29 Function Modules

SIRIUS heating current monitoring for 3RF

Overview

Heating current monitoring for 3RF2 single-phase solid-state switching devices

Many faults can be quickly detected by monitoring a load circuit connected to the solid-state switching device, as made possible with this module. Examples include the failure of up to 6 load elements, alloyed power semiconductors, a lack of voltage or a break in a load circuit. A fault is indicated by LEDs and reported to the controller by way of a relay output (NC contact).

The principle of operation is based on permanent monitoring of the current intensity. This figure is continuously compared with the reference value stored once during start-up. In order to detect the failure of one of several loads, the current difference must be 1/6 of the reference value. In the event of a fault, an output is actuated and the LEDs indicate the fault.

The heating current monitoring has a teach input and therefore differs from the load monitoring. This remote teaching function enables simple adjustment to changing loads without manual intervention.

Special versions: deviations from the standard version

3RF29 ...0JA1.-1KK0

If the current is below 50% of the lower teach current during the teach routine, the device will go into "Standby" mode; the LOAD LED will flicker. The device thus detects a non-connected load, e. g. channels not required for tool heaters, and does not signal a fault. This mode can be reset by re-teaching.

Application

The device is used for monitoring one or more loads (partial loads). The function module can only be used in conjunction with a 3RF21 solid-state relay or a 3RF23 solid-state contactor. The devices with spring-type connections in the load circuit are not suitable.

Selection and ordering data

Rated operational current I_e	Rated operational voltage U_e	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	V							kg

Heating current monitoring¹⁾



Rated control supply voltage 24 V AC/DC

16	110 ... 230	A	3RF29 16-0JA13		1	1 unit	101	0.175
16	110 ... 230	A	3RF29 16-0JA13-1KK0		1	1 unit	101	0.175
16	400 ... 600	A	3RF29 16-0JA16-1KK0		1	1 unit	101	0.175
32	110 ... 230	A	3RF29 32-0JA13-1KK0		1	1 unit	101	0.175
32	400 ... 600	A	3RF29 32-0JA16		1	1 unit	101	0.175
32	400 ... 600	A	3RF29 32-0JA16-1KK0		1	1 unit	101	0.175

¹⁾ Supplied without control connector. The control connector can be purchased from Phoenix Contact by quoting Order No. 1982 790 (2.5 HC/6-ST-5.08).

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg

Optional accessories



3RF29 00-ORA88

Sealable covers for function modules (not for converters)

B	3RF29 00-ORA88		1	10 units	101	0.001
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Solid-State Switching Devices for Resistive Loads

3RF29 Function Modules

SIRIUS power controllers for 3RF

Overview

Power controllers for 3RF2 single-phase solid-state switching devices

The power controller is a function module for the autonomous power control of complex heating systems and inductive loads.

The following functions have been integrated:

- **Power controller** for adjusting the power of the connected load. Here, the setpoint value is set with a rotary knob on the module as a percentage with reference to the 100 % power stored as a setpoint value.
- **Inrush current limitation:** With the aid of an adjustable voltage ramp, the inrush current is limited by means of phase control. This is useful above all with loads such as lamps or infrared lamps which have an inrush transient current.
- **Load circuit monitoring** for detecting load failure, partial load faults, alloyed power semiconductors, lack of voltage or a break in the load circuit.

Note:

With the phase control operating mode, a partial load fault is detected by cyclic "scanning" of the load; the exact mode of operation is described in the data sheets!

Special versions: deviations from the standard version

3RF29 04-0KA13-0KCO

During the teaching process the connected solid-state relay or contactor is not activated; i. e. no current flow takes place. No current reference value is stored. No part-load monitoring!

3RF29 ...0KA1.-0KTO

No part-load monitoring!

Application

The power controller can be used for:

- Complex heating systems
- Inductive loads
- Loads with temperature-dependent resistor
- Loads with ageing after long-time service
- Simple indirect control of temperature

The power controller can be used on the instantaneously switching 3RF21 and 3RF23 solid-state switching devices (single-phase). If only the full-wave operating mode is used, the power controller can also be used on the "zero-point switching" solid-state relays and contactors.

Power control

The power controller adjusts the power in the connected load by means of a solid-state switching device depending on the setpoint selection. It does not compensate for changes in the mains voltage or load resistance. The setpoint value can be predefined externally as a 0 to 10 V signal or internally by means of a potentiometer. Depending on the setting of the potentiometer (f_R), the control is carried out according to the principle of full-wave control or generalized phase control.

Full-wave control

In this operating mode the output is adjusted to the required setpoint value changing the on-to-off period. The period duration is predefined at one second.

Generalized phase control

In this operating mode the output is adjusted to the required setpoint value by changing the current flow angle. In order to observe the limit values of the conducted interference voltage for industrial networks, the load circuit must include a reactor with a rating of at least 200 μ H.

Selection and ordering data

Rated operational current I_e	Rated operational voltage U_e	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
A	V							

Power controllers



Rated control supply voltage 24 V AC/DC

4	110 ... 230	A	3RF29 04-0KA13-0KCO		1	1 unit	101	0.175
4		A	3RF29 04-0KA13-0KTO		1	1 unit	101	0.175
20		A	3RF29 20-0KA13		1	1 unit	101	0.175
50		A	3RF29 50-0KA13		1	1 unit	101	0.175
90		A	3RF29 90-0KA13		1	1 unit	101	0.175
20	400 ... 600	A	3RF29 20-0KA16		1	1 unit	101	0.175
50		A	3RF29 50-0KA16		1	1 unit	101	0.175
50		A	3RF29 50-0KA16-0KTO		1	1 unit	101	0.175
90		A	3RF29 90-0KA16		1	1 unit	101	0.175

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg

Optional accessories



Sealable covers for function modules (not for converters)

B	3RF29 00-ORA88		1	10 units	101	0.001
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3RF29 00-ORA88

* You can order this quantity or a multiple thereof.

Solid-State Switching Devices for Resistive Loads

3RF29 Function Modules

SIRIUS power regulators for 3RF

Overview

Power regulators for 3RF2 single-phase solid-state switching devices

The power regulator is a function module for the autonomous power control of complex heating systems.

The following functions have been integrated:

- **Power controller with proportional-action control** for adjusting the power of the connected load. Here, the setpoint value is set with a rotary knob on the module as a percentage with reference to the 100 % power stored as a setpoint value. Changes in the mains voltage or in the load resistance are compensated in this case.
- **Inrush current limitation:** With the aid of an adjustable voltage ramp, the inrush current is limited by means of phase control. This is useful above all with loads such as lamps which have an inrush transient current.
- **Load circuit monitoring** for detecting load failure, alloyed power semiconductors, lack of voltage or a break in the load circuit. Part-load monitoring is not possible. Load fluctuations are compensated.

Application

The power regulator can be used for:

- Complex heating systems
- Heating elements with temperature-dependent resistor
- Heating elements with ageing after long-time service
- Simple indirect control of temperature

The power regulator can be used on the instantaneously switching 3RF21 and 3RF23 solid-state switching devices (single-phase). If only the full-wave operating mode is used, the power regulator can also be used on the zero-point switching solid-state relays and contactors.

Power control

The power regulator adjusts the power in the connected load by means of a solid-state switching device depending on the taught power and the selected setpoint. Changes in the mains voltage or in the load resistance are thus compensated by the power regulator. The setpoint value can be predefined externally as a 0 to 10 V signal or internally by means of a potentiometer. Depending on the setting of the potentiometer (t_B), the adjustment is carried out according to the principle of full-wave control or generalized phase control.

Full-wave control

In this operating mode the output is adjusted to the required setpoint value changing the on-to-off period. The period duration is predefined at one second.

Generalized phase control

In this operating mode the output is adjusted to the required setpoint value by changing the current flow angle. In order to observe the limit values of the conducted interference voltage for industrial networks, the load circuit must include a reactor with a rating of at least 200 μ H.

Selection and ordering data

Rated operational current I_e	Rated operational voltage U_e	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
A	V							

Power regulators



Rated control supply voltage 24 V AC/DC

20	110 ... 230	A	3RF29 20-0HA13		1	1 unit	101	0.175
20	400 ... 600	A	3RF29 20-0HA16		1	1 unit	101	0.175
50	110 ... 230	A	3RF29 50-0HA13		1	1 unit	101	0.175
50	400 ... 600	A	3RF29 50-0HA16		1	1 unit	101	0.175
90	110 ... 230	A	3RF29 90-0HA13		1	1 unit	101	0.175
90	400 ... 600	A	3RF29 90-0HA16		1	1 unit	101	0.175

Rated control supply voltage 110 V AC

20	110 ... 230	A	3RF29 20-0HA33		1	1 unit	101	0.175
20	400 ... 600	A	3RF29 20-0HA36		1	1 unit	101	0.175
50	110 ... 230	A	3RF29 50-0HA33		1	1 unit	101	0.175
50	400 ... 600	A	3RF29 50-0HA36		1	1 unit	101	0.175
90	110 ... 230	A	3RF29 90-0HA33		1	1 unit	101	0.175
90	400 ... 600	A	3RF29 90-0HA36		1	1 unit	101	0.175

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg

Optional accessories



3RF29 00-0RA88

Sealable covers for function modules (not for converters)

B	3RF29 00-0RA88			1	10 units	101	0.001
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Solid-State Switching Devices for Switching Motors

Solid-State Contactors

General data

Overview



Solid-state contactors for switching motors

The solid-state contactors for switching motors are intended for frequently switching on and off three-phase current operating mechanisms up to 7.5 kW and reversing up to 3.0 kW. The devices are constructed with complete insulation and can be mounted directly on circuit breakers and SIRIUS overload relays, resulting in a very simple integration into motor feeders.

These three-phase solid-state contactors are equipped with a two-phase control which is particularly suitable for typical motor current circuits without connecting to the neutral conductor.

Important features

- Insulated enclosure with integrated heat sink
- Degree of protection IP20
- Integrated mounting foot to snap on a standard mounting rail or for assembly onto a support plate
- Variety of connection methods
- Plug-in control connection
- Display via LEDs

Switching functions

The solid-state contactors to switch motors are "instantaneous switching" because this method is particularly suited for inductive loads. By distributing the ON point over the entire sine curve of the mains voltage, disturbances are reduced to a minimum.

Selecting solid-state contactors

The solid-state contactors are selected on the basis of details of the network, the load and the ambient conditions. As the solid-state contactors are already equipped with an optimally matched heat sink, the selection process is considerably simpler than that for solid-state relays.

The following procedure is recommended:

- Determine the rated current of the load and the mains voltage
- Select a solid-state contactor with the same or higher rated current than the load
- Testing the maximum permissible switching frequency based on the characteristic curves ([see manual](#)). To do this, the starting current, the starting time and the motor loaded in in the operating phase must be known.
- If the permissible switching frequency is under the desired frequency, it is possible to achieve an increase by overdimensioning the motor!

Alternatively the correct device size can be determined on the Internet by entering the network and motor data along with the application and ambient conditions in the tool for the selection of solid-state contactors for switching motors. You will find the tool at:

www.siemens.com/solid-state-switching-devices

Benefits

- Units with integrated heat sink, "ready to use"
- Compact and space-saving design
- Reversing contactors with integrated interlocking

Application

There is no typical design of a load feeder with solid-state relays or solid-state contactors; instead, the great variety of connection methods and control voltages offers universal application opportunities. SIRIUS solid-state relays and solid-state contactors can be installed in fuseless or fused feeders, as required. There are special versions with which it is even possible to achieve short-circuit strength in a fuseless design.

Standards and approvals

- IEC 60947-4-3
- UL 508, CSA for North America¹⁾
- CE marking for Europe
- C-Tick approval for Australia

¹⁾ Please note: Use overvoltage protection device; max. cut-off-voltage 6000 V; min. energy handling capability 100 J.

Solid-State Switching Devices for Switching Motors

Solid-State Contactors

General data

More information

Connection methods

You can choose between the following connection methods for the solid-state contactors for switching motors:

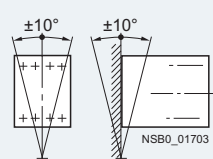
Screw connection

The screw connection system is the standard among industrial controls. Open terminals and a plus-minus screw are just two features of this technology. Two conductors of up to 6 mm² can be connected in just one terminal. As a result, loads of up to 50 A can be connected.

Spring-type terminal connection system

This innovative technology manages without any screw connection. This means that very high vibration resistance is achieved. Two conductors of up to 2.5 mm² can be connected to each terminal. As a result, loads of up to 20 A can be dealt with.

Specification

Order No.	3RF24 ...-BB.. 3RF24 ...-BD..	
General data		
Ambient temperature		
• During operation, derating from 40 °C	°C	-25 ... +60
• During storage	°C	-55 ... +80
Installation altitude	m	0 ... 1000; derating over 1000 m upon request
Shock resistance acc. to IEC 60068-2-27	g/rms	15/11
Vibration resistance acc. to IEC 60068-2-6	g	2
Degree of protection		IP20
Insulation strength at 50/60 Hz (main/control circuit to floor)	V rms	4000
Electromagnetic compatibility (EMC)		
• Emitted interference acc. to IEC 60947-4-3		Class A for industrial applications ¹⁾ Class A for industrial applications
- Conducted interference voltage		
- Emitted, high-frequency interference voltage		
• Interference immunity		
- Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3)	kV	Contact discharge: 4; Air discharge: 8; Behavior criterion 2
- Induced RF fields acc. to IEC 61000-4-6	MHz	0.15 ... 80; 140 dBµV; Behavior criterion 1
- Burst acc. to IEC 61000-4-4	kV	2/5 kHz; behavior criterion 1
- Surge acc. to IEC 61000-4-5	kV	Conductor - Ground: 2; Conductor - Conductor: 1; Behavior criterion 2
Permissible mounting positions		
		

Short-circuit protection

Despite the rugged power semiconductors that are used, solid-state switching devices respond more sensitively to short-circuits in the load feeder. Consequently, special precautions have to be taken against destruction, depending on the type of design.

Siemens generally recommends using SITOR semiconductor fuses. These fuses also provide protection against destruction in the event of a short-circuit even when the solid-state contactors and solid-state relays are fully utilized.

Alternatively, if there is lower loading, protection can also be provided by standard fuses or miniature circuit breakers. This protection is achieved by overdimensioning the solid-state switching devices accordingly.

¹⁾ These products were built as Class A devices. The use of these devices in residential areas could result in lead in radio interference. In this case these may be required to introduce additional interference suppression measures.

Notes on integration in the load feeders

The SIRIUS solid-state switching devices are very easy to integrate into the load feeders thanks to their industrial connection method and design.

Particular attention must however be paid to the circumstances of the installation and ambient conditions, as the performance of the solid-state switching devices is largely dependent on these. Depending on the version, certain restrictions must be observed. Detailed information, for example in relation to solid-state contactors about the minimum spacing and to solid-state relays about the choice of heat sink, is given in the technical specifications ([see manual](#)) and the product data sheets.

For applications with a very large power requirement it is possible to use SIVOLT AC power controller. [More information on the product range can be found in the Catalog DA 68 or in our Mall.](#)

support.automation.siemens.com/WW/view/de/10862346

See ID: 10752358

Short-circuit and overload protection

Despite the rugged power semiconductors that are used, solid-state switching devices respond more sensitively to short-circuits in the load feeder. Consequently, special precautions have to be taken against destruction, depending on the type of design.

Siemens generally recommends using SITOR semiconductor protection fuses. These fuses also provide protection against destruction in the event of a short-circuit even when the solid-state contactors and solid-state relays are fully utilized.

Alternatively, if there is lower loading, protection can also be provided by standard fuses or miniature circuit breakers. This protection is achieved by overdimensioning the solid-state switching devices accordingly. The technical specifications and the product data sheets contain details both about the solid-state fuse protection itself and about use of the devices with conventional protection equipment.

Semiconductor motor and reversing contactors can be easily combined with the 3RV motor starter protectors and 3RB2 overload relay from the SIRIUS modular system. Thus, fuseless and fuse motor feeders can be designed easily and in a space-saving manner.

Electromagnetic compatibility (EMC)

The solid-state switching devices are suitable for interference-free operation in industrial networks without further measures. If they are used in public networks, it may be necessary for conducted interference to be reduced by means of filters.

Suitable filters can be ordered from EPCOS AG. You can find more information on the Internet at:

www.epcos.com

Solid-State Switching Devices for Switching Motors

Solid-State Contactors

SIRIUS 3RF24 solid-state contactors, three-phase

Overview

These two-phase controlled, instantaneous switching solid-state contactors in the insulating enclosure are offered in 45 mm width to 5.2 A – and in 90 mm width to 16 A. This means that it is possible to operate motors up to 7.5 kW.

The devices with screw connection can use a link module¹⁾ to directly connect to a circuit breaker. Direct mounting on a 3RB20 electronic overload relay²⁾ is possible. Rapid-switching fuseless and fuse motor feeders can thereby be implemented in a time-saving manner.

Selection and ordering data

Motor contactors · Instantaneous switching · Two-phase controlled

Rated operational current I_e	Rated power at I_e and U_e	Rated control supply voltage U_s	DT	Screw terminals		PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
				Order No.	Price per PU				
A	400 V kW	V							kg
Rated operational voltage U_e 48 ... 460 V									
5.2	2.2	24 DC	A	3RF24 05-1BB04		1	1 unit	101	0.250
9.2	4.0	acc. to EN 61131-2	B	3RF24 10-1BB04		1	1 unit	101	0.380
12.5	5.5		B	3RF24 12-1BB04		1	1 unit	101	0.380
16	7.5		B	3RF24 16-1BB04		1	1 unit	101	0.380
5.2	2.2	110 ... 230 AC	B	3RF24 05-1BB24		1	1 unit	101	0.250
9.2	4.0		B	3RF24 10-1BB24		1	1 unit	101	0.380
12.5	5.5		B	3RF24 12-1BB24		1	1 unit	101	0.380
16	7.5		B	3RF24 16-1BB24		1	1 unit	101	0.380
Rated operational voltage U_e 48 ... 600 V, blocking voltage 1600 V									
5.2	2.2	24 DC	B	3RF24 05-1BB06		1	1 unit	101	0.250
9.2	4.0	acc. to EN 61131-2	B	3RF24 10-1BB06		1	1 unit	101	0.380
12.5	5.5		B	3RF24 12-1BB06		1	1 unit	101	0.380
16	7.5		B	3RF24 16-1BB06		1	1 unit	101	0.380
5.2	2.2	110 ... 230 AC	B	3RF24 05-1BB26		1	1 unit	101	0.250
9.2	4.0		B	3RF24 10-1BB26		1	1 unit	101	0.380
12.5	5.5		B	3RF24 12-1BB26		1	1 unit	101	0.380
16	7.5		B	3RF24 16-1BB26		1	1 unit	101	0.380
Spring-type terminals									
Rated operational current I_e	Rated power at I_e and U_e	Rated control supply voltage U_s	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	400 V kW	V							kg
Rated operational voltage U_e 48 ... 460 V									
5.2	2.2	24 DC	B	3RF24 05-2BB04		1	1 unit	101	0.250
9.2	4.0	acc. to EN 61131-2	B	3RF24 10-2BB04		1	1 unit	101	0.380
12.5	5.5		B	3RF24 12-2BB04		1	1 unit	101	0.380
16	7.5		B	3RF24 16-2BB04		1	1 unit	101	0.380
5.2	2.2	110 ... 230 AC	B	3RF24 05-2BB24		1	1 unit	101	0.250
9.2	4.0		B	3RF24 10-2BB24		1	1 unit	101	0.380
12.5	5.5		B	3RF24 12-2BB24		1	1 unit	101	0.380
16	7.5		B	3RF24 16-2BB24		1	1 unit	101	0.380
Rated operational voltage U_e 48 ... 600 V, blocking voltage 1600 V									
5.2	2.2	24 DC	B	3RF24 05-2BB06		1	1 unit	101	0.250
9.2	4.0	acc. to EN 61131-2	B	3RF24 10-2BB06		1	1 unit	101	0.380
12.5	5.5		B	3RF24 12-2BB06		1	1 unit	101	0.380
16	7.5		B	3RF24 16-2BB06		1	1 unit	101	0.380
5.2	2.2	110 ... 230 AC	B	3RF24 05-2BB26		1	1 unit	101	0.250
9.2	4.0		B	3RF24 10-2BB26		1	1 unit	101	0.380
12.5	5.5		B	3RF24 12-2BB26		1	1 unit	101	0.380
16	7.5		B	3RF24 16-2BB26		1	1 unit	101	0.380



3RF24 05-1BB



3RF24 10-1BB



3RF24 10-2BB

¹⁾ For 3RA19 21-1AA00 link modules see next page.

²⁾ For 3RB20 overload relays see Chapter 5.

Solid-State Switching Devices for Switching Motors

Solid-State Contactors

SIRIUS 3RF24 solid-state reversing contactors, three-phase




Overview

The integration of four conducting paths to a reverse switch, combined in one enclosure makes this device a particularly compact solution. Compared to conventional systems, for which two contactors are required, it is possible to save up to 50 % width with the three-phase reversing contactors. Devices with 45 mm width cover motors up to 2.2 kW – and those with 90 mm width up to 3 kW.

Due to the integration into the SIRIUS modular system, it is possible to make a connection to a SIRIUS motor starter protector using a link module or with a 3RB20¹⁾ solid-state overload relay without additional steps. It is possible to mount fuseless or fused motor feeders easily and quickly.

Selection and ordering data

Reversing contactors · Instantaneous switching · Two-phase controlled



Rated operational current I_e	Rated power at I_e and U_e	Rated control supply voltage U_s	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
A	400 V kW	V		Order No.	Price per PU			kg
Rated operational voltage U_e 48 ... 460 V								
	3.8	1.5	24 DC	B	3RF24 03-1BD04	1	1 unit	101 0.280
	5.4	2.2	acc. to EN 61131-2	B	3RF24 05-1BD04	1	1 unit	101 0.280
	7.4	3.0		B	3RF24 10-1BD04	1	1 unit	101 0.410
	3.8	1.5	110 ... 230 AC	B	3RF24 03-1BD24	1	1 unit	101 0.280
	5.4	2.2		B	3RF24 05-1BD24	1	1 unit	101 0.280
	7.4	3.0		B	3RF24 10-1BD24	1	1 unit	101 0.410
								

3RF24 03-1BD

3RF24 10-1BD

¹⁾ For 3RB20 overload relays see Chapter 5.

Accessories

Version	Packing material	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
			Order No.	Price per PU			kg
Link modules							
	For mechanical and electrical connection between contactor and motor starter protector with screw terminals	Single-unit packaging	▶ 3RA19 21-1AA00	1	1 unit	101	0.037
		Multi-unit packaging	▶ 3RA19 21-1A	1	10 units	101	0.028

3RA19 21-1AA00