Switching Devices: Soft Starters, Semiconductor Switching Devices, Control Devices, AS-I

3

Introduction

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Overview

Products at a glance

3RF21

3RF20

3RF23

3RW30/31

3RW34

3RW22

		Order No.	Page
SIRIUS SC semiconductor switching devices			
Semiconductor relays			
22.5 mm semiconductor relays **45 mm semiconductor relays**	• Construction width of 22.5 mm and 45 mm • Compact and space-saving design • "Zero-point switching" version • Mounting onto existing heat sinks	3RF21, 3RF20	3/12 3/15
Semiconductor contactors			
SIRIUS SC semiconductor contactors	• Complete units consisting of a semiconductor relay and an optimized heat sink, "ready to use" • Compact and space-saving design • Versions for resistive loads "zero-point switching" and inductive loads "instantaneous switching" • Special designs "Low Noise" and "Short-Circuit Resistant"	3RF23	3/22
Function modules	For extending the functionality of the 3RF21 semiconductor relays and the 3RF23 semiconductor contactors for many different applications:		
Converters	• The converter is used to convert an analog input signal to an on/off ratio	3RF29 00-0EA18	3/26
Load monitors	• Load monitoring of one or more loads (partial loads)	3RF29	3/27
Output regulators	• The output regulator supplies the current by means of a semiconductor switching device depending on a setpoint value. Closed-loop control: Full wave control or generalized phase control	3RF29	3/28
SIRIUS/SIKOSTART soft starters			
For standard applications			
SIRIUS soft starters	• SIRIUS 3RW30/31 soft starters for soft starting and smooth ramp-down of three-phase asynchronous motors • Service range - Pumps - Compressors - Conveyors	3RW30, 3RW31	3/46
SIKOSTART soft starters	• SIKOSTART 3RW34 soft starters for soft starting and smooth ramp-down of three-phase asynchronous motors • Methods of connection - Inline circuit - Inside-delta circuit • Service range - Pumps - Compressors - Fans - Conveyors	3RW34	3/58
For advanced applications			
SIKOSTART soft starters	• In addition to soft starting and smooth ramp-down, the solid-state SIKOSTART 3RW22 soft starters provide numerous functions for higher-level requirements. They cover a rating range of up to 710 kW (at 400 V) • SIKOSTART 3RW22 soft starters for controlled soft starting and smooth ramp-down, for braking, and energy-saving operation of three-phase asynchronous motors • Service range - Pumps - Compressors - Fans, blowers - Conveyors - Breakers - Mills - Agitators - Sanding machines - Wire drawing/textile machines - Presses - Machine tools	3RW22	3/70

Products at a glance

3UF5

3UF1 8

6ED1 052

6ED1 055

6ED1 057

		Order No.	Page
Motor management systems			
SIMOCODE-DP motor protection and control devices	• SIMOCODE-DP comprises - Basic unit - Expansion module and - Control module • For use in low-voltage switchgear for motor control centers of the process industry; establishes the intelligent connection between the motor feeder and the process I&C system • Increases plant availability • Saves costs during construction, commissioning and operation of the plant • Multifunctional, electronic motor protection and plant monitoring • Comprehensive motor and plant diagnostics • Integrated control programs (instead of extensive hardware wiring) • Open communication via PROFIBUS DP, the standard for fieldbus systems	3UF5	3/86
Current transformers for overload protection	• Protection converters for activating overload relays • Ensures proportional current transfer up to a multiple of the primary rated current	3UF1 8	3/97
LOGO! logic modules			
LOGO! logic modules	• Compact, user-friendly, and low-cost solution for simple control tasks • Universal: - Building installation and wiring (lighting, shutters, awnings, doors, access control, barriers, ventilation systems, etc.) - Cabinet installation - Machine and device construction (pumps, small presses, compressors, hydraulic lifts, conveyors ...) - Special controls for conservatories and greenhouses - Signal preprocessing for other controllers • Flexible expansion depending on the application		
LOGO! Modular basic variants	• With interface for connecting extension modules	6ED1 052-1	3/103
LOGO! Modular pure variants	• With integrated interface for connecting extension modules	6ED1 052-2	3/104
LOGO! Modular extension modules	• For connection to LOGO! Modular with digital inputs and outputs or analog inputs	6ED1 055-1	3/106
LOGO! Modular communications modules	• For communication between the LOGO! master and external EIB components via EIB.	6BK1 700-0	3/107
LOGO!Contact	• Switching module for switching resistive loads and motors directly	6ED1 057-4	3/108
LOGO!Soft	• Multilingual software for switching program generation for LOGO! on the PC	6ED1 058-0	3/109
AS-Interface			
System overview	• Digital and analog signals at plant or machine level can be transferred by AS-Interface in binary form • AS-Interface is the universal interface between the higher-level control levels and simple binary actuators and sensors		3/110

General data

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Overview

SIRIUS SC semiconductor switching devices

- Semiconductor relays
- Semiconductor contactors
- Function modules

SIRIUS SC – for almost unending activity

Conventional electromechanical switching devices are often overtaxed by the rise in the number of switching operations. A high switching frequency results in frequent failure and short replacement cycles. However, this does not have to be the case, because with the latest generation of our SIRIUS SC semiconductor switching devices we provide you with semiconductor relays and contactors with a particularly long service life – for almost unending activity even under the toughest conditions and under high mechanical load, but also in noise-sensitive areas.

Proved time and again in service

SIRIUS SC semiconductor switching devices have become firmly established in industrial use. They are used above all in applications where loads are switched frequently – mainly with resistive load controllers, with the control of electrical heat or the control of valves and motors in conveyor systems. In addition to its use in areas with high switching frequencies, thanks to its silent switching SIRIUS SC is also ideally suited to noise-sensitive areas such as offices or hospitals.

The most reliable solution for any application

Compared with mechanical switching devices, our SIRIUS SC semiconductor switching devices stand out because of their considerably higher service life. Thanks to the high product quality, their switching is extremely precise, reliable and above all insusceptible to faults. With its variable connection methods and a wide spread of control voltages, the SIRIUS SC family is universally applicable. Depending on the individual requirements of the application, our modular switching devices can also be quite easily expanded by the addition of standardized function modules.

Always on the sunny side with SIRIUS SC

Because SIRIUS SC offers even more:

- The space-saving and compact side-by-side mounting ensure reliable operation up to an ambient temperature of +60 °C.
- Thanks to fast project planning and the ease of installation and start-up you save not only time but also expense.

Type	Semiconductor relays		Semiconductor contactors	Function modules			
	22.5 mm	45 mm		Converters	Load monitors		Power controllers
					Basic	Extended	
Use							
Simple use of existing semiconductor relays	❍	✔	❍				
Complete "Ready to use"	❍	❍	✔				
Space-saving	✔		✔	✔	✔		
Can be extended with modular function modules	✔		✔				
Frequent switching and monitoring of loads and semiconductor relays/semiconductor contactors	✔		✔		✔	✔	
Monitoring of more than 6 partial loads	✔		✔			✔	
Control of the heating power via an analog input	✔		✔	✔			✔
Power control	✔		✔				✔
Mounting							
Mounting on standard mounting rail or mounting plate			✔				
Snapped directly onto semiconductor relay or contactor				✔	✔	✔	✔
For use with coolplate	✔	✔					
Cable routing							
Connection of load circuit as for controlgear	✔		✔				
Connection of load circuit from above		✔		✔	✔	✔	✔

✔ Function is available
❍ Function is possible

Benefits

- Considerable space savings thanks to a width of only 22.5 mm
- Variety of connection techniques: screw connection, spring-type connection or ring terminal end, there is no problem - they are all finger-safe
- Flexible for all applications with function modules for retrofitting
- Possibility of fuseless short-circuit resistant design

Advantages:

- Saves time and costs with fast installation and commissioning, short setting-up times and easy wiring
- Extremely long life, low maintenance, rugged and reliable
- Space-saving and safe thanks to side-by-side mounting up to an ambient temperature of +60 °C
- Modular design: standardized function modules and heat sinks can be used in conjunction with semiconductor relays to satisfy individual requirements
- Safety due to lifelong, vibration-resistant and shock-resistant spring-loaded terminal connection system even under tough conditions

Area of application

Applications

Example plastic machine industry:

Thanks to their high switching endurance, SIRIUS SC semiconductor switching devices are ideally suited for use in the control of electroheat. This is because the more precise the temperature regulation process has to be, the higher the switching frequency. The accurate regulation of electroheat is used for example in many processes in the plastic machine industry:

- Band heaters heat the extrudate to the correct temperature in plastic extruders
- Heat emitters heat plastic blanks to the correct temperature
- Heat drums dry plastic granules
- Heating channels keep molds at the correct temperature in order to manufacture different plastic parts without defects.

The powerful SIRIUS SC semiconductor relays and contactors can be used to control several heating loads at the same time. By using a load monitoring module the individual partial loads can easily be monitored, and in the event of a failure a signal is generated to be sent to the controller.

Protecting the semiconductor relays and semiconductor contactors with miniature circuit-breakers (B MCB)

Short-circuit protection and line protection with miniature circuit-breakers is easy to achieve with SIRIUS SC semiconductor relays and semiconductor contactors in comparison with designing load feeders with fuses. A special version of the semiconductor contactors can be protected against damage in the case of a short-circuit with a miniature circuit-breaker with type B tripping characteristic. This allows the low-cost and simple design of fuseless load feeders with full protection of the switching device.

Design

There is no typical design of a load feeder with semiconductor relays or semiconductor contactors; instead, the great variety of connection systems and control voltages offers universal application opportunities. SIRIUS SC semiconductor relays and semiconductor 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.

Functions

Connection

All SIRIUS SC semiconductor switching devices are characterized by the great variety of connection methods. You can choose between the following connection techniques:

SIGUT connection system

The SIGUT connection system is the standard among industrial switching devices. 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-loaded 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.

Ring terminal end connection

The ring terminal end connection is equipped with an M5 screw. Ring terminal ends of up to 25 mm² can be connected. In this way it is possible to connect even high powers with current intensities of up to 88 A safely. Finger safety is provided in this case too with a special cover.

Switching functions

In order to guarantee an optimized control method for different loads, the functionality of our semiconductor switching devices can be adapted accordingly.

The "**zero-point switching**" method has proved to be ideal for resistive loads, i.e. where the power semiconductor is activated at zero voltage.

For inductive loads, on the other hand, for example in the case of valves, it is better to go with "**instantaneous switching**". By distributing the ON point over the entire sine curve of the mains voltage, disturbances are reduced to a minimum.

Performance characteristics

The performance of the semiconductor switching devices is substantially determined by the type of power semiconductors used and the internal design. In the case of the SIRIUS SC semiconductor contactors and semiconductor relays, only thyristors are used in place of less powerful Triacs.

Two of the most important features of thyristors are the blocking voltage and the maximum load integral:

Blocking voltage

Thyristors with a high blocking voltage can also be operated without difficulty in power systems with high interference voltages. Separate protective measures, such as a protective circuit with a varistor, are not necessary in most cases.

With SIRIUS SC, for example, thyristors with 800 V blocking voltage are fitted for operation in power systems up to 230 V. Thyristors with up to 1600 V are used for power systems with higher voltages.

Maximum load integral

One of the purposes of specifying the maximum load integral (I^2t) is to determine the rating of the short-circuit protection. Only a large power semiconductor with a correspondingly high I^2t value can be given appropriate protection against destruction from a short-circuit by means of a protective device matched to the application. However, SIRIUS SC is also characterized by the optimum matching of the thyristors (I^2t value) with the rated currents. The rated currents specified on the devices in conformance with EN 60947-4-3 were confirmed by extensive testing.

Further information is available on the Internet at:
www.siemens.de/siriussc

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General data

Further information

Notes on integration in the load feeders

The SIRIUS SC semiconductor switching devices are very easy to integrate into the load feeders thanks to their industrial connection technology and design.

Particular attention must however be paid to the circumstances of the installation and ambient conditions, as the performance of the semiconductor switching devices is largely dependent on these. Depending on the version, certain restrictions must be observed. Detailed information, for example in relation to semiconductor contactors about the minimum spacing and to semiconductor relays about the choice of heat sink, is given in the product data sheets and the technical specifications in the A&D Mall.

Despite the rugged power semiconductors that are used, semiconductor 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 semiconductor contactors and semiconductor relays are fully utilized.

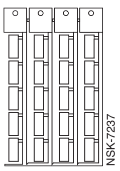
Alternatively, if there is lower loading, protection can also be provided by standard fuses or miniature circuit-breakers. This protection is achieved by overdimensioning the semiconductor switching devices accordingly. The technical specifications in the A&D Mall and the product data sheets contains details both about the semiconductor fuse protection itself and about use of the SIRIUS SC devices with conventional protection equipment.

The SIRIUS SC semiconductor switching devices are suitable for interference-free operation in industrial power systems without further measures. If they are used in public power systems, it may be necessary for conducted interference to be reduced by means of filters. This does not include the special type 3RF23 20-.CA.. "low noise" semiconductor contactors. These comply with the class B limit values up to a rated current of 16 A. If other versions are used, and at currents of over 16 A, standard filters can be used in order to comply with the limit values. The decisive factors when it comes to selecting the filters are essentially the current loading and the other parameters (operational voltage, design type, etc.) in the load feeder.

Suitable filters can be ordered from EPCOS AG
(see Appendix –> External Partners).
For more information go to www.epcos.com

Selection and ordering data

Accessories

	Designation	Labeling area/color W × H mm × mm	DT	Order No.	PS*	Weight per PU approx. kg
Blank identification plates						
 Item code labels 1 frame = 20 labels	**Item code labels for "SIRIUS"** [1]	10 × 7 pastel turquoise	D	**3RT19 00-1SB10**	816 units	0.030
		20 × 7 pastel turquoise	A	**3RT19 00-1SB20**	340 units	0.067
	"SIRIUS" labels for sticking	19 × 6 pastel turquoise	D	**3RT19 00-1SB60**	4700 units	0.003
		19 × 6 zinc yellow	C	**3RT19 00-1SD60**	4700 units	0.003

1) Computer labeling system for individual labeling of item code labels available from:
murrplastik Systemtechnik GmbH (see Appendix –> External Partners).

* This quantity or a multiple thereof can be ordered.

Overview

Semiconductor relays

SIRIUS SC semiconductor relays are suitable for surface mounting on existing cooling surfaces. Installation 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 3RF21 semiconductor relays can be expanded with various function modules to adapt them to individual applications.

The semiconductor relays are available in 2 different widths:

- 3RF21 semiconductor relay with a width of 22.5 mm
- 3RF20 semiconductor relay with a width of 45 mm

Both variants are only available in the "zero-point switching" version. This standard version is ideally suited for operation with resistive loads.

Further information

Notes on selection

These notes are intended for general orientation and will no doubt be sufficient for most applications. If the installation conditions differ significantly from the examples described here, you can contact our Technical Assistance team for further help.

Telephone: +49 9131 7 43833
Fax: +49 9131 7 42899
e-mail: nst.technical-assistance@siemens.com

For more information on the Internet go to
www.siemens.de/lowvoltage/technical-assistance

Selecting semiconductor relays

When selecting semiconductor relays, in addition to information about the power system, the load and the ambient conditions it is also necessary to know details of the planned design. The semiconductor 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 semiconductor 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

For more information on the Internet go to
www.siemens.com/siriussc

22.5 mm semiconductor relays

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Overview

22.5 mm semiconductor relays

With its compact design, which stays the same even at currents of up to 88 A, the 3RF21 semiconductor relay is the ultimate in space-saving construction, at a width of 22.5 mm. The logical connection arrangement, with the power infeed from above and connection of the load from below, ensures tidy installation in the control cabinet.

Technical specifications

Type		3RF21 ..-1....	3RF21 ..-2....	3RF21 ..-3....
General data				
Ambient temperature				
during operation, derating from 40 °C	°C	-25 ... +60		
when stored	°C	-55 ... +80		
Site altitude	m	0 ... 1000; derating from 1000		
Shock resistance acc. to IEC 60068-2-27	g/ms	15/11		
Vibration resistance acc. to IEC 60068-2-6	g	2		
Degree of protection		IP20		
Electromagnetic compatibility (EMC)				
Emitted interference				
• Conducted interference voltage acc. to IEC 60947-4-3		Class A for industrial applications		
• Emitted, high-frequency interference voltage acc. to IEC 60947-4-3		Class A for industrial applications		
Noise 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	2/5.0 kHz; behavior criterion 1		
• Surge acc. to IEC 61000-4-5	kV	Conductor - ground 2; conductor - conductor 1; behavior criterion 2		
Connection technique		**Screw-type connection**	**Spring-loaded connection**	**Ring cable connection**
Main contact connection				
Conductor cross-section				
Solid	mm^2	2 × (1.5 ... 2.5), 2 × (2.5 ... 6)	2 × (0,5 ... 2.5)	-
Finely stranded with end sleeve	mm^2	2 × (1.5 ... 2.5), 2 × (2.5 ... 6), 1 × 10	2 × (0.5 ... 1.5)	-
Finely stranded without end sleeves	mm^2		2 × (0.5 ... 2.5)	-
Solid or stranded AWG conductors	AWG	2 × (14 ... 10)	2 × (18 ... 14)	-
Insulation stripping length	mm	10	10	-
Terminal screw		M 4	-	M 5
• Tightening torque	Nm	2 ... 2.5	-	2 ... 2.5
	lb.in	18 ... 22	-	18 ... 22
Cable lug				
• DIN		-	-	DIN 46234 -5-2.5, -5-6, -5-10, -5-16, -5-25
• JIS		-	-	JIS C 2805 R 2-5, 5.5-5, 8-5, 14-5
Auxiliary/control contact connections				
Conductor cross-section	mm^2	1x (0.5 ... 2.5); 2x (0.5 ... 1)	0.5 ... 1.5	1x (0.5 ... 2.5); 2x (0.5 ... 1)
	AWG	20 ... 12	20 ... 12	20 ... 12
Insulation stripping length	mm	7	10	7
Terminal screw		M 3	-	M 3
• Tightening torque	Nm	0.5 ... 0.6	-	0.5 ... 0.6
	lb.in	4.5 ... 5.3	-	4.5 ... 5.3

Type		3RF21 ..-....2	3RF21 ..-....4	3RF21 ..-....6
Main circuit				
Rated operational voltage U_e	V	24 ... 230	230 ... 460	400 ... 600
• Tolerance	%	-15 / +10		
• Rated frequency	Hz	50/60		
Rated insulation voltage U_i	V	600		
Blocking voltage	V	800	1200	1600
Rate of voltage rise	V/µs	1000		

Order No.	I_{max} 1) at R_{thha}/T_u = 40 °C		I_e to IEC 60947-4-3 at R_{thha}/T_u = 40 °C		I_e to UL/CSA at R_{thha}/T_u = 50 °C		Power loss for I_{max}	Minimum load current	Leakage current
	A	K/W	A	K/W	A	K/W	W	A	mA
Main circuit									
3RF21 20-.....	20	2.0	20	2.0	20	1.7	28.6	0.5	10
3RF21 30-1....	30	1.1	30	1.1	30	0.88	44.2	0.5	10
3RF21 50-1....	50	0.68	50	0.68	50	0.53	66	0.5	10
3RF21 50-2....	50	0.68	20	4.2	20	3.3	66	0.5	10
3RF21 50-3....	50	0.68	50	0.68	50	0.53	66	0.5	10
3RF21 70-1....	70	0.4	50	0.95	50	0.8	94	0.5	10
3RF21 90-1....	88	0.33	50	1.25	50	1.02	118	0.5	10
3RF21 90-2....	88	0.33	20	5.0	20	4.0	118	0.5	10
3RF21 90-3....	88	0.33	88	0.33	83	0.29	118	0.5	10

1) I_{max} provides information about the performance of the semiconductor relay. The actual permitted operational current I_e can be smaller depending on the connection method and cooling conditions.

Order No.	Rated impulse withstand capacity I_{tsm}	I^2t value
	A	A^2s
Main circuit		
3RF21 20-.....	200	200
3RF21 30-.AA.2	300	450
3RF21 30-.AA.4	300	450
3RF21 30-.AA.6	400	800
3RF21 50-.....	600	1800
3RF21 70-.AA.2	1200	7200
3RF21 70-.AA.4	1200	7200
3RF21 70-.AA.6	1150	6600
3RF21 90-.....	1150	6600

Type		**3RF21 ..-....0**	**3RF21 ..-....2**
Control circuit			
Method of operation		DC operation	AC operation
Rated control supply voltage U_s	V	24 to EN 61131-2	110 ... 230
Max. rated control voltage	V	30	253
Rated control current at U_s	mA	15	6
Rated frequency of the control supply voltage	Hz	-	50/60
Response voltage	V	15	90
for tripping current	mA	2	2
Drop-out voltage	V	5	40
Operating times			
closing time	ms	1 additionally max. one half-wave	40 additionally max. one half-wave
opening time	ms	1 additionally max. one half-wave	40 additionally max. one half-wave

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22.5 mm semiconductor relays

Order No.	Accessories		
	Converters	Load monitors	
		Basic	Extended
Type current = **20 A**			
3RF21 2.-1..02 **3RF21 2.-1..04**	3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08	3RF29 20-0GA13 3RF29 20-0GA16
3RF21 2.-1..22 **3RF21 2.-1..24**	- -	- -	3RF29 20-0GA33 3RF29 20-0GA36
3RF21 2.-2..02 **3RF21 2.-2..04**	3RF29 00-0EA18 3RF29 00-0EA18	- -	- -
3RF21 2.-3..02 **3RF21 2.-3..04**	3RF29 00-0EA18 3RF29 00-0EA18	- -	3RF29 20-0GA13 3RF29 20-0GA16
3RF21 2.-3..22 **3RF21 2.-3..24**	- -	- -	3RF29 20-0GA33 3RF29 20-0GA36
Type current = **30 A**			
3RF21 3.-1..02 **3RF21 3.-1..04** **3RF21 3.-1..06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08 3RF29 20-0FA08	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16
3RF21 3.-1..22 **3RF21 3.-1..24** **3RF21 3.-1..26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36
Type current = **50 A**			
3RF21 5.-1..02 **3RF21 5.-1..04** **3RF21 5.-1..06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08 3RF29 20-0FA08	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16
3RF21 5.-1..22 **3RF21 5.-1..24** **3RF21 5.-1..26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36
3RF21 5.-2..02 **3RF21 5.-2..04** **3RF21 5.-2..06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	- - -
3RF21 5.-3..02 **3RF21 5.-3..06** **3RF21 5.-3..04**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16
3RF21 5.-3..22 **3RF21 5.-3..24** **3RF21 5.-3..26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36
Type current = **70 A**			
3RF21 7.-1..02 **3RF21 7.-1..04** **3RF21 7.-1..06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08 3RF29 20-0FA08	3RF29 90-0GA13 3RF29 90-0GA16 3RF29 90-0GA16
3RF21 7.-1..22 **3RF21 7.-1..24** **3RF21 7.-1..26**	- - -	- - -	3RF29 90-0GA33 3RF29 90-0GA36 3RF29 90-0GA36
Type current = **90 A**			
3RF21 9.-1..02 **3RF21 9.-1..04** **3RF21 9.-1..06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08 3RF29 20-0FA08	3RF29 90-0GA13 3RF29 90-0GA16 3RF29 90-0GA16
3RF21 9.-1..22 **3RF21 9.-1..24** **3RF21 9.-1..26**	- - -	- - -	3RF29 90-0GA33 3RF29 90-0GA36 3RF29 90-0GA36
3RF21 9.-2..02 **3RF21 9.-2..06** **3RF21 9.-2..04**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	- - -
3RF21 9.-3..02 **3RF21 9.-3..04** **3RF21 9.-3..06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 90-0GA13 3RF29 90-0GA16 3RF29 90-0GA16
3RF21 9.-3..22 **3RF21 9.-3..26** **3RF21 9.-3..24**	- - -	- - -	3RF29 90-0GA33 3RF29 90-0GA36 3RF29 90-0GA36

Fused design with semiconductor protection (similar to type of coordination "2")[1)]

The semiconductor protection for the SIRIUS SC controlgear can be implemented with different protective devices. This allows protection by means of LV HRC fuses of operational class gL/gG or miniature circuit-breakers. Siemens recommends the use of special SITOR semiconductor fuses. The table below lists the maximum permissible fuses for each SIRIUS SC controlgear.

If a fuse is used with a higher rated current than specified, semiconductor protection is no longer guaranteed. However, smaller fuses with a lower rated current for the load can be used without problems.
For protective devices with operational class gL/gG and for 3NE1 SITOR full range fuses, the minimum cross-sections for the conductors to be protected must be taken into account.

Order No.	All-range fuse LV design gR/SITOR 3NE1	Semiconductor protection fuse Cylindrical design			Cable and line protection fuse				
		10 × 38 mm aR/SITOR 3NC1 0	14 × 51 mm aR/SITOR 3NC1 4	22 × 58 mm aR/SITOR 3NC2 2	LV design gL/gG/3NA	Cylindrical design 10 × 38 mm gL/gG/3NW	14 × 51 mm gL/gG/3NW	22 × 58 mm gL/gG/3NW	DIAZED quick 5SB
3RF21 2.-....2	3NE1 814-0	3NC1 020	3NC1 420	3NC2 220	3NA2 803	3NW6 001-1	3NW6 101-1	-	5SB1 71
3RF21 2.-....4	3NE1 813-0	3NC1 016	3NC1 420	3NC2 220	3NA2 801	-	3NW6 101-1	-	5SB1 41
3RF21 3.-....2	3NE1 815-0	3NC1 032	3NC1 432	3NC2 232	3NA2 803	-	3NW6 103-1	-	5SB3 11
3RF21 3.-....4	3NE1 815-0	3NC1 025	3NC1 432	3NC2 232	3NA2 803	-	3NW6 101-1	-	5SB1 71
3RF21 3.-....6	3NE1 815-0	3NC1 032	3NC1 432	3NC2 232	3NA2 803-6	-	-		-
3RF21 5.-....2	3NE1 817-0	-	3NC1 450	3NC2 250	3NA2 810	-	3NW6 107-1	3NW6 207-1	5SB3 21
3RF21 5.-....4	3NE1 802-0	-	3NC1 450	3NC2 250	3NA2 807	-	-	3NW6 205-1	5SB3 11
3RF21 5.-....6	3NE1 803-0	-	3NC1 450	3NC2 250	3NA2 807-6	-	-	-	-
3RF21 7.-....2[2)]	3NE1 820-0	-	-	3NC2 280	3NA2 817	-	-	3NW6 217-1	5SB3 31
3RF21 7.-....4[2)]	3NE1 020-2	-	-	3NC2 280	3NA2 812	-	-	3NW6 212-1	5SB3 21
3RF21 7.-....6[2)]	3NE1 020-2	-	-	3NC2 280	3NA2 812-6	-	-	-	-
3RF21 9.-....2[2)]	3NE1 021-2	-	-	3NC2 200	3NA2 817	-	-	3NW6 217-1	5SB3 31
3RF21 9.-....4[2)]	3NE1 021-2	-	-	3NC2 280	3NA2 812	-	-	3NW5 212-1	5SB3 21
3RF21 9.-....6[2)]	3NE1 020-2	-	-	3NC2 280	3NA2 812-6	-	-	-	-

1) Type of coordination "2" acc. to EN 60947-4-1:
In the event of a short-circuit, the controlgear in the load feeder must not endanger persons or the installation. They must be suitable for further operation. For fused configurations, the protective device must be replaced.

2) These versions can also be protected against short-circuit with miniature circuit-breakers as described on page 3/16.

22.5 mm semiconductor relays

Selection and ordering data


3RF21 20-1AA02


3RF21 20-2AA02


3RF21 20-3AA02

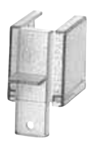
Type current 1)	Maximum achievable power for type current and U_e = 115 V	230 V	400 V	DT	**Screw connection** 2)	PS*	Weight per PU approx.	DT	**Spring-loaded connection** 3)	PS*	Weight per PU approx.	DT	**Ring cable connection**	PS*	Weight per PU approx.
A	kW	kW	kW		Order No.		kg		Order No.		kg		Order No.		kg
Zero-point switching, rated operational voltage U_e = 24 V to 230 V															
20	2.3	4.6	-	A	**3RF21 20-1AA□2**	1 unit	0.052	B	**3RF21 20-2AA□2**	1 unit	0.052	B	**3RF21 20-3AA□2**	1 unit	0.052
30	3.5	6.9	-	A	**3RF21 30-1AA□2**	1 unit	0.052		-				-		
50	5.8	11.5	-	A	**3RF21 50-1AA□2**	1 unit	0.052	B	**3RF21 50-2AA□2**	1 unit	0.052	B	**3RF21 50-3AA□2**	1 unit	0.052
70	8.1	16.1	-	A	**3RF21 70-1AA□2**	1 unit	0.052		-				-		
88	10.4	20.7	-	A	**3RF21 90-1AA□2**	1 unit	0.052	B	**3RF21 90-2AA□2**	1 unit	0.052	B	**3RF21 90-3AA□2**	1 unit	0.052
Zero-point switching, rated operational voltage U_e = 230 V to 460 V															
20	-	4.6	8	A	**3RF21 20-1AA□4**	1 unit	0.052	B	**3RF21 20-2AA□4**	1 unit	0.052	B	**3RF21 20-3AA□4**	1 unit	0.052
30	-	6.9	12	A	**3RF21 30-1AA□4**	1 unit	0.052		-				-		
50	-	11.5	20	A	**3RF21 50-1AA□4**	1 unit	0.052	B	**3RF21 50-2AA□4**	1 unit	0.052	B	**3RF21 50-3AA□4**	1 unit	0.052
70	-	16.1	28	A	**3RF21 70-1AA□4**	1 unit	0.052		-				-		
88	-	20.7	36	A	**3RF21 90-1AA□4**	1 unit	0.052	B	**3RF21 90-2AA□4**	1 unit	0.052	B	**3RF21 90-3AA□4**	1 unit	0.052
Zero-point switching, rated operational voltage U_e = 400 V to 600 V															
30	-	-	12	B	**3RF21 30-1AA□6**	1 unit	0.052		-				-		
50	-	-	20	B	**3RF21 50-1AA□6**	1 unit	0.052	B	**3RF21 50-2AA□6**	1 unit	0.052	B	**3RF21 50-3AA□6**	1 unit	0.052
70	-	-	28	B	**3RF21 70-1AA□6**	1 unit	0.052		-				-		
88	-	-	36	B	**3RF21 90-1AA□6**	1 unit	0.052	B	**3RF21 90-2AA□6**	1 unit	0.052	B	**3RF21 90-3AA□6**	1 unit	0.052
Order No. extension for rated control supply voltage U_s															
DC 24 V acc. to EN 61131-2					0				0				0		
AC 110 V ... 230 V					2				2				2		

Other rated control supply voltages on request.

1) The type current provides information about the performance of the semiconductor relay. The actual permitted 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 50 A and a conductor cross-section of 10 mm².

3) Please note that this version can only be used for a rated current of up to 20 A and a conductor cross-section of 2.5 mm².

	Version	DT	Order No.	PS*	Weight per PU approx.
					kg
Accessories					
	Screwdriver for spring-loaded connection system	A	**8WA2 880**	1 unit	0.034
 3RF29 00-3PA88	**Terminal cover** for 3RF21 semiconductor relays and 3RF23 semiconductor contactors with ring terminal end (after simple adaptation, this terminal cover can also be used for screw connection).	A	**3RF29 00-3PA88**	10 units	0.010

* This quantity or a multiple thereof can be ordered.

Overview

45 mm semiconductor relays

The semiconductor 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 semiconductor 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.

Technical specifications

Type		3RF20
General data		
Ambient temperature during operation, derating at 40 °C when stored	 °C °C	 -25 ... +60 -55 ... +80
Site altitude	m	0 ... 1000; derating from 1000
Shock resistance acc. to IEC 60068-2-27	g/ms	15/11
Vibration resistance acc. to IEC 60068-2-6	g	2
Degree of protection		IP20
Electromagnetic compatibility (EMC) Emitted interference • Conducted interference voltage IEC acc. to 60947-4-3 • Emitted, high-frequency interference voltage acc. to IEC 60947-4-3		 Class A for industrial applications Class A for industrial applications
Noise immunity • Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3) • Induced RF fields acc. to IEC 61000-4-6 • Burst acc. to IEC 61000-4-4 • Surge acc. to IEC 61000-4-5	 kV MHz kV kV	 Contact discharge 4; air discharge 8; behavior criterion 2 0.15 ... 80; 140 dBµV; behavior criterion 1 2/5.0 kHz; behavior criterion 1 Conductor - ground 2; conductor - conductor 1; behavior criterion 2
Connection, main contacts, screw connection Conductor cross-section Solid Finely stranded with end sleeve Solid or stranded AWG conductors Insulation stripping length Terminal screw • Tightening torque	 mm^2 mm^2 AWG mm Nm lb.in	 2 × (1.5 ... 2.5); 2 × (2.5 ... 6) 2 × (1.5 ... 2.5); 2 × (2.5 ... 6); 1 × 10 2 × (14 ... 10) 10 M 4 2 ... 2.5 18 ... 22
Connection, auxiliary/control contacts, screw connection Conductor cross-section Insulation stripping length Terminal screw • Tightening torque	 mm^2 mm Nm lb.in	 1x (0.5 ... 2.5); 2x (0.5 ... 1.0); AWG 20 ... 12 7 M 3 0.5 ... 0.6 4.5 ... 5.3

Type		3RF20 .0-1AA.2	3RF20 .0-1AA.4	3RF20 .0-1AA.6
Main circuit				
Rated operational voltage U_e • Tolerance • Rated frequency	V % Hz	24 ... 230 -15/+10 50/60	230 ... 460	400 ... 600
Rated insulation voltage U_i	V	600		
Blocking voltage	V	800	1200	1600
Rage of voltage rise	V/µs	1000		

3

45 mm semiconductor relays

Order No.	I_{max} 1) at R_{thha}/T_u = 40 °C		I_e to IEC 60947-4-3 at R_{thha}/T_u = 40 °C		I_e to UL/CSA at R_{thha}/T_u = 50 °C		Power loss for I_{max}	Minimum load current	Leakage current
	A	K/W	A	K/W	A	K/W	W	A	mA
Main circuit									
3RF20 20-1AA..	20	2.0	20	2.0	20	1.7	28.6	0.5	10
3RF20 30-1AA..	30	1.1	30	1.1	30	0.88	44.2	0.5	10
3RF20 50-1AA..	50	0.68	50	0.68	50	0.53	66	0.5	10
3RF20 70-1AA..	70	0.4	50	0.95	50	0.8	94	0.5	10
3RF20 90-1AA..	88	0.33	50	1.25	50	1.02	118	0.5	10

1) I_{max} provides information about the performance of the semiconductor relay. The actual permitted operational current I_e can be smaller depending on the connection method and cooling conditions.

Order No.	Rated impulse withstand capacity I_{tsm}	I^2t value
	A	A^2s
Main circuit		
3RF20 20-1AA..	200	200
3RF20 30-1AA.2 **3RF20 30-1AA.4** **3RF20 30-1AA.6**	300 300 400	450 450 800
3RF20 50-1AA..	600	1800
3RF20 70-1AA.2 **3RF20 70-1AA.4** **3RF20 70-1AA.6**	1200 1200 1150	7200 7200 6600
3RF20 90-1AA..	1150	6600

Type		**3RF20 .0-1AA0.**	**3RF20 .0-1AA2.**
Control circuit			
Method of operation		DC operation	AC operation
Rated control supply voltage U_s	V	24 acc. to EN 61131-2	110 ... 230
Max. rated control voltage	V	30	253
Rated control current at U_s	mA	15	6
Rated frequency of the control supply voltage	Hz	-	50/60
Response voltage for tripping current	V mA	15 2	90 2
Drop-out voltage	V	5	40
Operating times closing time opening time	 ms ms	 1 additional max. one half-wave 1 additional max. one half-wave	 40 additional max. one half-wave 40 additional max. one half-wave

Fused design with semiconductor protection (similar to type of coordination "2")[1)]

The semiconductor protection for the SIRIUS SC control gear can be used with different protective devices. This allows protection by means of LV HRC fuses of operational class gL/gG or miniature circuit-breakers. Siemens recommends the use of special SITOR semiconductor fuses. The table below lists the maximum permissible fuses for each SIRIUS SC controlgear.

If a fuse is used with a higher rated current than specified, semi-conductor protection is no longer guaranteed. However, smaller fuses with a lower rated current for the load can be used without problems.
For protective devices with operational class gL/gG and for SITOR full range fuses 3NE1, the minimum cross-sections for the conductor to be connected must be taken into account.

Order No.	All-range fuse LV design gR/SITOR 3NE1	Semiconductor protection fuse Cylindrical design			Cable and line protection fuse				
					LV design gL/gG/3NA	Cylindrical design			DIAZED quick 5SB
		10 × 38 mm aR/SITOR 3NC1 0	14 × 51 mm aR/SITOR 3NC1 4	22 × 58 mm aR/SITOR 3NC2 2		10 × 38 mm gL/gG 3NW	14 × 51 mm gL/gG 3NW	22 × 58 mm gL/gG 3NW	
3RF20 20-1AA.2	3NE1 814-0	3NC1 020	3NC1 420	3NC2 220	3NA2 803	3NW6 001-1	3NW6 101-1	-	5SB1 71
3RF20 20-1AA.4	3NE1 813-0	3NC1 016	3NC1 420	3NC2 220	3NA2 801	-	3NW6 101-1	-	5SB1 41
3RF20 30-1AA.2	3NE1 815-0	3NC1 032	3NC1 432	3NC2 232	3NA2 803	-	3NW6 103-1	-	5SB3 11
3RF20 30-1AA.4	3NE1 815-0	3NC1 025	3NC1 432	3NC2 232	3NA2 803	-	3NW6 101-1	-	5SB1 71
3RF20 30-1AA.6	3NE1 815-0	3NC1 032	3NC1 432	3NC2 232	3NA2 803-6	-	-	-	-
3RF20 50-1AA.2	3NE1 817-0	-	3NC1 450	3NC2 250	3NA2 810	-	3NW6 107-1	3NW6 207-1	5SB3 21
3RF20 50-1AA.4	3NE1 802-0	-	3NC1 450	3NC2 250	3NA2 807	-	-	3NW6 205-1	5SB3 11
3RF20 50-1AA.6	3NE1 803-0	-	3NC1 450	3NC2 250	3NA2 807-6	-	-	-	-
3RF20 70-1AA.2[2)]	3NE1 820-0	-	-	3NC2 280	3NA2 817	-	-	3NW6 217-1	5SB3 31
3RF20 70-1AA.4[2)]	3NE1 020-2	-	-	3NC2 280	3NA2 812	-	-	3NW6 212-1	5SB3 21
3RF20 70-1AA.6[2)]	3NE1 020-2	-	-	3NC2 280	3NA2 812-6	-	-	-	-
3RF20 90-1AA.2[2)]	3NE1 021-2	-	-	3NC2 200	3NA2 817	-	-	3NW6 217-1	5SB3 31
3RF20 90-1AA.4[2)]	3NE1 021-2	-	-	3NC2 280	3NA2 812	-	-	3NW6 212-1	5SB3 21
3RF20 90-1AA.6[2)]	3NE1 020-2	-	-	3NC2 280	3NA2 812-6	-	-	-	-

1) Type of coordination "2" acc. to EN 60947-4-1:
In the event of a short-circuit, the control gear in the load feeder must not endanger persons or the installation. They must be suitable for further operation. For fused configurations, the protective device must be replaced.

2) These versions can also be protected against short-circuit with miniature circuit-breakers as described on page 3/16.

Selection and ordering data


3RF20 20-1AA02

Type current[1)]	Maximum achievable power for type current and U_e = 115 V	230 V	400 V	DT	Order No.[2)]	PS*	Weight per PU approx.
A	kW	kW	kW				kg
Zero-point switching, rated operational voltage U_e = 24 V to 230 V							
20	2.3	4.6	-	A	**3RF20 20-1AA□2**	1 unit	0.062
30	3.5	6.9	-	A	**3RF20 30-1AA□2**	1 unit	0.062
50	5.8	11.5	-	A	**3RF20 50-1AA□2**	1 unit	0.062
70	8.1	16.1	-	A	**3RF20 70-1AA□2**	1 unit	0.062
88	10.4	20.7	-	A	**3RF20 90-1AA□2**	1 unit	0.062
Zero-point switching, rated operational voltage U_e = 230 V to 460 V							
20	-	4.6	8	A	**3RF20 20-1AA□4**	1 unit	0.062
30	-	6.9	12	A	**3RF20 30-1AA□4**	1 unit	0.062
50	-	11.5	20	A	**3RF20 50-1AA□4**	1 unit	0.062
70	-	16.1	28	A	**3RF20 70-1AA□4**	1 unit	0.062
88	-	20.7	36	A	**3RF20 90-1AA□4**	1 unit	0.062
Zero-point switching, rated operational voltage U_e = 400 V to 600 V							
30	-	-	12	B	**3RF20 30-1AA□6**	1 unit	0.062
50	-	-	20	B	**3RF20 50-1AA□6**	1 unit	0.062
70	-	-	28	B	**3RF20 70-1AA□6**	1 unit	0.062
88	-	-	36	B	**3RF20 90-1AA□6**	1 unit	0.062
Order No. extension for rated control supply voltage U_s							
DC 24 V acc. to EN 61131-2					**0**		
AC 110 V ... 230 V					**2**		

Other rated control supply voltages on request.

1) The type current provides information about the performance of the semi-conductor relay. The actual permitted 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 50 A and a conductor cross-section of 10 mm^2.

*This quantity or a multiple thereof can be ordered.

SIRIUS SC semiconductor contactors

Overview

The complete self-contained units consist of a semiconductor 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 intensities of up to 88 A are achieved. Like all of our semiconductor 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 carrier 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 engineering. For other applications, such as for extended personal safety, the heat sink can be grounded through a screw connection.

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 semiconductor 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 drives in packet distribution systems, operation is carried out safely and noiselessly.

Special "low noise" version

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

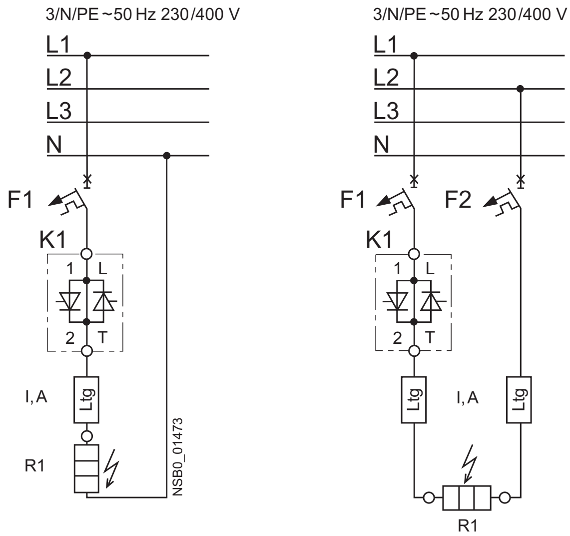
Special "short-circuit" version

Skilful matching of the power semiconductor with the performance of the semiconductor 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 fuse, the result is a short-circuit resistant 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 switching devices and cables, particular attention must also be paid to these parameters. The necessary cable lengths are therefore shown for the main factor, the conductor resistance, in the table below.

The following miniature circuit-breakers with a B characteristic and 10 kA breaking capacity protect the 3RF2320-.DA.. semiconductor contactors in the event of short-circuits on the load and the specified conductor cross-sections and lengths:

Rated current of miniature circuit-breakers	Example of type	Max. conductor cross-section	Min. cable length from contactor to load
6 A	5SY4 106-6	1 mm²	5 m
10 A	5SY4 110-6	1.5 mm²	8 m
16 A	5SY4 116-6	1.5 mm²	12 m
16 A	5SY4 116-6	2.5 mm²	20 m
20 A	5SY4 120-6	2.5 mm²	20 m



The setup and installation above can also be used for the semiconductor relays with a I^2t value of at least 6600 A^2s.

Technical specifications

Order No.		3RF23 ..-.A...	3RF23 ..-.B...	3RF23 ..-.C...	3RF23 ..-.D...
General data					
Ambient temperature during operation, derating at 40 °C when stored	 °C °C	 -25 ... +60 -55 ... +80			
Site altitude	m	0 ... 1000; derating from 1000			
Shock resistance acc. to IEC 60068-2-27	g/ms	15/11			
Vibration resistance acc. to IEC 60068-2-6	g	2			
Degree of protection		IP20			
Electromagnetic compatibility (EMC)					
Emitted interference acc. to IEC 60947-4-3 • Conducted interference voltage • Emitted high-frequency interference voltage		Class A for industrial applications		Class A for industrial applications; Class B for residential/business/commercial areas up to 16 A, AC51 Low Noise	Class A for industrial applications
Noise immunity • Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3) • Induced RF fields acc. to IEC 61000-4-6 • Burst acc. to IEC 61000-4-4 • Surge acc. to IEC 61000-4-5	 kV MHz kV kV	 Contact discharge 4; air discharge 8; behavior criterion 2 0.15 ... 80; 140 dBµV; behavior criterion 1 2/5.0 kHz; behavior criterion 1 Conductor - ground 2; conductor - conductor 1; behavior criterion 2			

Order No.		3RF23 ..-1....	3RF23 ..-2....	3RF23 ..-3....
General data				
Connection technique		**Screw connection**	**Spring-loaded connection**	**Ring cable connection**
Main contact connection				
Conductor cross-section				
Solid	mm^2	2 × (1.5 ... 2.5), 2 × (2.5 ... 6)	2 × (0.5 ... 2.5)	-
Finely stranded with end sleeve	mm^2	2 × (1.5 ... 2.5), 2 × (2.5 ... 6), 1 × 10	2 × (0.5 ... 1.5)	-
Finely stranded without end sleeves	mm^2		2 × (0.5 ... 2.5)	-
Solid or stranded AWG conductors	AWG	2 × (14 ... 10)	2 × (18 ... 14)	-
Insulation stripping length	mm	10	10	-
Terminal screw		M 4	-	M 5
• Tightening torque	Nm	2 ... 2.5	-	2 ... 2.5
• Tightening torque	lb.in	18 ... 22	-	18 ... 22
Cable lug				
• DIN		-	-	DIN 46234 -5-2.5, -5-6, -5-10, -5-16, -5-25
• JIS		-	-	JIS C 2805 R 2-5, 5.5-5, 8-5, 14-5
Auxiliary/control contact connections				
Conductor cross-section	mm^2	1x (0.5 ... 2.5); 2x (0.5 ... 1.0)	0.5 ... 1.5	1x (0.5 ... 2.5); 2x (0.5 ... 1.0)
	AWG	20 ... 12	20 ... 12	20 ... 12
Insulation stripping length	mm	7	10	7
Terminal screw		M 3	-	M 3
• Tightening torque	Nm	0.5 ... 0.6	-	0.5 ... 0.6
	lb.in	4.5 ... 5.3	-	4.5 ... 5.3

Type		3RF23 ..-....2	3RF23 ..-....4	3RF23 ..-....6
Main circuit				
Rated operational voltage U_e	V	24 ... 230	230 ... 460	400 ... 600
• Tolerance	%	-15/+10		
• Rated frequency	Hz	50/60 Hz		
Rated insulation voltage U_i	V	600		
Blocking voltage	V	800	1200	1600
Rate of voltage rise	V/μs	1000		

Order No.	Type current AC-51[1] I_{max} at 40 °C	acc. to IEC 60947-4-3 at 40 °C	UL/CSA at 50 °C	Power loss at I_{max}	Minimum load current	Leakage current	Rated impulse withstand capacity I_{tsm}	I^2t value
	A	A	A	W	A	mA	A	A^2s
Main circuit								
3RF23 1.-A..2 **3RF23 1.-A..4** **3RF23 1.-A..6**	10.5	7.5	9.6	11	0.5	10	200 200 400	200 200 800
3RF23 2.-A..2 **3RF23 2.-C..2** **3RF23 2.-D..2**	20	13.2	17.6	20	0.5	10 25 10	600 600 1150	1800 1800 6600
3RF23 2.-A..4 **3RF23 2.-C..4** **3RF23 2.-D..4**						10 25 10	600 600 1150	1800 1800 6600
3RF23 2.-A..6						10	600	1800
3RF23 3.-A..2 **3RF23 3.-A..4** **3RF23 3.-A..6**	30	22	27	33	0.5	10	600	1800
3RF23 4.-A..2 **3RF23 4.-A..4** **3RF23 4.-A..6**	40	33	36	44	0.5	10	1200 1200 1150	7200 7200 6600
3RF23 5.-A..2 **3RF23 5.-A..4** **3RF23 5.-A..6**	50	36	45	54	0.5	10	1150	6600
3RF23 7.-A..2 **3RF23 7.-A..4** **3RF23 7.-A..6**	70	70	62	83	0.5	10	1150	6600
3RF23 9.-A..2 **3RF23 9.-A..4** **3RF23 9.-A..6**	88	88	80	117	0.5	10	1150	6600

1) The type current provides information about the performance of the semi-conductor contactor. The actual permitted operational current I_e can be smaller depending on the connection method and start-up conditions. Derating acc. to curves from page 3/30!

SIRIUS SC semiconductor contactors

Order No.	Type current AC-51[1)] I_{max} at 40 °C	acc. to IEC 60947-4-3 at 40 °C	UL/CSA at 50 °C	AC-15	Parameters	Power loss at I_{max}	Minimum load current	Leakage current	Rated impulse withstand capacity I_{tsm}	I^2t value
	A	A	A	A		W	A	mA	A	A^2s
Main circuit										
3RF23 1.-.B..2 **3RF23 1.-.B..4** **3RF23 1.-.B..6**	10.5	7.5	9.6	6	1200 1/h 50 % ED	11	0.5	10	200 200 400	200 200 800
3RF23 2.-.B..2 **3RF23 2.-.B..4** **3RF23 2.-.B..6**	20	13.2	17.6	12	1200 1/h 50 % ED	20	0.5	10	600	1800
3RF23 3.-.B..2 **3RF23 3.-.B..4** **3RF23 3.-.B..6**	30	22	27	15	1200 1/h 50 % ED	33	0.5	10	600	1800
3RF23 4.-.B..2 **3RF23 4.-.B..4** **3RF23 4.-.B..6**	40	33	36	20	1200 1/h 50 % ED	44	0.5	10	1200 1200 1150	7200 7200 6600
3RF23 5.-.B..2 **3RF23 5.-.B..4** **3RF23 5.-.B..6**	50	36	45	25	1200 1/h 50 % ED	54	0.5	10	1150	6600
3RF23 7.-.B..2 **3RF23 7.-.B..4** **3RF23 7.-.B..6**	70	70	62	27.5	1200 1/h 50 % ED	83	0.5	10	1150	6600
3RF23 9.-.B..2 **3RF23 9.-.B..4** **3RF23 9.-.B..6**	88	88	80	30	1200 1/h 50 % ED	117	0.5	10	1150	6600

1) The type current provides information about the performance of the semiconductor contactor. The actual permitted operational current I_e can be smaller depending on the connection method and start-up conditions. Derating acc. to curves from page 3/30!

Type		**3RF23 ..-...0.**	**3RF23 ..-...2.**
Control circuit			
Method of operation		DC operation	AC operation
Rated control supply voltage U_s	V	24 to EN 61131-2	110 ... 230
Max. rated control voltage	V	30	253
Rated control current at U_s	mA	15	6
Rated frequency of the control supply voltage	Hz		50/60
Response voltage for tripping current	V mA	15 2	90 2
Drop-out voltage	V	5	40
Operating times closing time opening time	 ms ms	 1 additional max. one half-wave 1 additional max. one half-wave	 40 additional max. one half-wave 40 additional max. one half-wave

Order No.	Accessories			
	Converters	Load monitors		Power controllers
		Basic	Extended	
Type current = **10.5 A**				
3RF23 1.-1A.02 **3RF23 1.-1A.04** **3RF23 1.-1A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08 3RF29 20-0FA08	3RF29 20-0GA13 3RF29 20-0GA16 3RF29 20-0GA16	- - -
3RF23 1.-1A.22 **3RF23 1.-1A.24** **3RF23 1.-1A.26**	- - -	- - -	3RF29 20-0GA33 3RF29 20-0GA36 3RF29 20-0GA36	- - -
3RF23 1.-1B.02 **3RF23 1.-1B.04** **3RF23 1.-1B.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08 3RF29 20-0FA08	3RF29 20-0GA13 3RF29 20-0GA16 3RF29 20-0GA16	3RF29 20-0HA13 3RF29 20-0HA16 3RF29 20-0HA16
3RF23 1.-1B.22 **3RF23 1.-1B.24** **3RF23 1.-1B.26**	- - -	- - -	3RF29 20-0GA33 3RF29 20-0GA36 3RF29 20-0GA36	3RF29 20-0HA33 3RF29 20-0HA36 3RF29 20-0HA36
3RF23 1.-2A.02 **3RF23 1.-2A.04** **3RF23 1.-2A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	- - -	- - -
3RF23 1.-2A.22 **3RF23 1.-2A.24** **3RF23 1.-2A.26**	- - -	- - -	- - -	- - -
3RF23 1.-3A.02 **3RF23 1.-3A.04** **3RF23 1.-3A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 20-0GA13 3RF29 20-0GA16 3RF29 20-0GA16	- - -
3RF23 1.-3A.22 **3RF23 1.-3A.24** **3RF23 1.-3A.26**	- - -	- - -	3RF29 20-0GA33 3RF29 20-0GA36 3RF29 20-0GA36	- - -
Type current = **20 A**				
3RF23 2.-1A.02 **3RF23 2.-1A.04** **3RF23 2.-1A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08 3RF29 20-0FA08	3RF29 20-0GA13 3RF29 20-0GA16 3RF29 20-0GA16	- - -
3RF23 2.-1A.22 **3RF23 2.-1A.24** **3RF23 2.-1A.26**	- - -	- - -	3RF29 20-0GA33 3RF29 20-0GA36 3RF29 20-0GA36	- - -
3RF23 2.-1B.02 **3RF23 2.-1B.04** **3RF23 2.-1B.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08 3RF29 20-0FA08	3RF29 20-0GA13 3RF29 20-0GA16 3RF29 20-0GA16	3RF29 20-0HA13 3RF29 20-0HA16 3RF29 20-0HA16
3RF23 2.-1B.22 **3RF23 2.-1B.24** **3RF23 2.-1B.26**	- - -	- - -	3RF29 20-0GA33 3RF29 20-0GA36 3RF29 20-0GA36	3RF29 20-0HA33 3RF29 20-0HA36 3RF29 20-0HA36
3RF23 2.-1C.02 **3RF23 2.-1C.04**	3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08	3RF29 20-0GA13 3RF29 20-0GA16	- -
3RF23 2.-1C.22 **3RF23 2.-1C.24**	- -	- -	3RF29 20-0GA33 3RF29 20-0GA36	- -
3RF23 2.-1D.02 **3RF23 2.-1D.04**	3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08	3RF29 20-0GA13 3RF29 20-0GA16	- -
3RF23 2.-1D.22 **3RF23 2.-1D.24**	- -	- -	3RF29 20-0GA33 3RF29 20-0GA36	- -
3RF23 2.-2A.02 **3RF23 2.-2A.04** **3RF23 2.-2A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	- - -	- - -
3RF23 2.-2A.22 **3RF23 2.-2A.24** **3RF23 2.-2A.26**	- - -	- - -	- - -	- - -
3RF23 2.-2C.02 **3RF23 2.-2C.04**	3RF29 00-0EA18 3RF29 00-0EA18	- -	- -	- -
3RF23 2.-2C.22 **3RF23 2.-2C.24**	- -	- -	- -	- -
3RF23 2.-2D.22 **3RF23 2.-2D.24**	- -	- -	- -	- -
3RF23 2.-3A.02 **3RF23 2.-3A.04** **3RF23 2.-3A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 20-0GA13 3RF29 20-0GA16 3RF29 20-0GA16	- - -
3RF23 2.-3A.22 **3RF23 2.-3A.24** **3RF23 2.-3A.26**	- - -	- - -	3RF29 20-0GA33 3RF29 20-0GA36 3RF29 20-0GA36	- - -
3RF23 2.-3D.02 **3RF23 2.-3D.04**	3RF29 00-0EA18 3RF29 00-0EA18	- -	3RF29 20-0GA13 3RF29 20-0GA16	- -
3RF23 2.-3D.22 **3RF23 2.-3D.24**	- -	- -	3RF29 20-0GA33 3RF29 20-0GA36	- -

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SIRIUS SC semiconductor contactors

Order No.	Accessories			
	Converters	Load monitors		Power controllers
		Basic	Extended	
Type current = **30 A**				
3RF23 3.-1A.02 **3RF23 3.-1A.04** **3RF23 3.-1A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08 3RF29 20-0FA08	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16	- - -
3RF23 3.-1A.22 **3RF23 3.-1A.24** **3RF23 3.-1A.26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36	- - -
3RF23 3.-1B.02 **3RF23 3.-1B.04** **3RF23 3.-1B.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	3RF29 20-0FA08 3RF29 20-0FA08 3RF29 20-0FA08	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16	3RF29 50-0HA13 3RF29 50-0HA16 3RF29 50-0HA16
3RF23 3.-1B.22 **3RF23 3.-1B.24** **3RF23 3.-1B.26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36	3RF29 50-0HA33 3RF29 50-0HA36 3RF29 50-0HA36
3RF23 3.-3A.02 **3RF23 3.-3A.04** **3RF23 3.-3A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16	- - -
3RF23 3.-3A.22 **3RF23 3.-3A.24** **3RF23 3.-3A.26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36	- - -
Type current = **40 A**				
3RF23 4.-1A.02 **3RF23 4.-1A.04** **3RF23 4.-1A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16	- - -
3RF23 4.-1A.22 **3RF23 4.-1A.24** **3RF23 4.-1A.26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36	- - -
3RF23 4.-1B.02 **3RF23 4.-1B.04** **3RF23 4.-1B.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16	3RF29 50-0HA13 3RF29 50-0HA16 3RF29 50-0HA16
3RF23 4.-1B.22 **3RF23 4.-1B.24** **3RF23 4.-1B.26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36	3RF29 50-0HA33 3RF29 50-0HA36 3RF29 50-0HA36
3RF23 4.-3A.02 **3RF23 4.-3A.04** **3RF23 4.-3A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16	- - -
3RF23 4.-3A.22 **3RF23 4.-3A.24** **3RF23 4.-3A.26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36	- - -
Type current = **50 A**				
3RF23 5.-1A.02 **3RF23 5.-1A.04** **3RF23 5.-1A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16	- - -
3RF23 5.-1A.22 **3RF23 5.-1A.24** **3RF23 5.-1A.26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36	- - -
3RF23 5.-1B.02 **3RF23 5.-1B.04** **3RF23 5.-1B.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16	3RF29 50-0HA13 3RF29 50-0HA16 3RF29 50-0HA16
3RF23 5.-1B.22 **3RF23 5.-1B.24** **3RF23 5.-1B.26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36	3RF29 50-0HA33 3RF29 50-0HA36 3RF29 50-0HA36
3RF23 5.-3A.02 **3RF23 5.-3A.04** **3RF23 5.-3A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 50-0GA13 3RF29 50-0GA16 3RF29 50-0GA16	- - -
3RF23 5.-3A.22 **3RF23 5.-3A.24** **3RF23 5.-3A.26**	- - -	- - -	3RF29 50-0GA33 3RF29 50-0GA36 3RF29 50-0GA36	- - -
Type current = **70 A**				
3RF23 7.-1B.02 **3RF23 7.-1B.04** **3RF23 7.-1B.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 90-0GA13 3RF29 90-0GA16 3RF29 90-0GA16	3RF29 90-0HA13 3RF29 90-0HA16 3RF29 90-0HA16
3RF23 7.-1B.22 **3RF23 7.-1B.24** **3RF23 7.-1B.26**	- - -	- - -	3RF29 90-0GA33 3RF29 90-0GA36 3RF29 90-0GA36	3RF29 90-0HA33 3RF29 90-0HA36 3RF29 90-0HA36
3RF23 7.-3A.02 **3RF23 7.-3A.04** **3RF23 7.-3A.06**	3RF29 00-0EA18 3RF29 00-0EA18 3RF29 00-0EA18	- - -	3RF29 90-0GA13 3RF29 90-0GA16 3RF29 90-0GA16	- - -
3RF23 7.-3A.22 **3RF23 7.-3A.24** **3RF23 7.-3A.26**	- - -	- - -	3RF29 90-0GA33 3RF29 90-0GA36 3RF29 90-0GA36	- - -

Order No.	Accessories			
	Converters	Load monitors		Power controllers
		Basic	Extended	
Type current = **70 A**				
3RF23 7.-3B.02	3RF29 00-0EA18	-	3RF29 90-0GA13	3RF29 90-0HA13
3RF23 7.-3B.04	3RF29 00-0EA18	-	3RF29 90-0GA16	3RF29 90-0HA16
3RF23 7.-3B.06	3RF29 00-0EA18	-	3RF29 90-0GA16	3RF29 90-0HA16
3RF23 7.-3B.22	-	-	3RF29 90-0GA33	3RF29 90-0HA33
3RF23 7.-3B.24	-	-	3RF29 90-0GA36	3RF29 90-0HA36
3RF23 7.-3B.26	-	-	3RF29 90-0GA36	3RF29 90-0HA36
Type current = **90 A**				
3RF23 9.-1B.02	3RF29 00-0EA18	-	3RF29 90-0GA13	3RF29 90-0HA13
3RF23 9.-1B.04	3RF29 00-0EA18	-	3RF29 90-0GA16	3RF29 90-0HA16
3RF23 9.-1B.06	3RF29 00-0EA18	-	3RF29 90-0GA16	3RF29 90-0HA16
3RF23 9.-1B.22	-	-	3RF29 90-0GA33	3RF29 90-0HA33
3RF23 9.-1B.24	-	-	3RF29 90-0GA36	3RF29 90-0HA36
3RF23 9.-1B.26	-	-	3RF29 90-0GA36	3RF29 90-0HA36
3RF23 9.-3A.02	3RF29 00-0EA18	-	3RF29 90-0GA13	-
3RF23 9.-3A.04	3RF29 00-0EA18	-	3RF29 90-0GA16	-
3RF23 9.-3A.06	3RF29 00-0EA18	-	3RF29 90-0GA16	-
3RF23 9.-3A.22	-	-	3RF29 90-0GA33	-
3RF23 9.-3A.24	-	-	3RF29 90-0GA36	-
3RF23 9.-3A.26	-	-	3RF29 90-0GA36	-
3RF23 9.-3B.02	3RF29 00-0EA18	-	3RF29 90-0GA13	3RF29 90-0HA13
3RF23 9.-3B.04	3RF29 00-0EA18	-	3RF29 90-0GA16	3RF29 90-0HA16
3RF23 9.-3B.06	3RF29 00-0EA18	-	3RF29 90-0GA16	3RF29 90-0HA16
3RF23 9.-3B.22	-	-	3RF29 90-0GA33	3RF29 90-0HA33
3RF23 9.-3B.24	-	-	3RF29 90-0GA36	3RF29 90-0HA36
3RF23 9.-3B.26	-	-	3RF29 90-0GA36	3RF29 90-0HA36

Fused design with semiconductor protection (similar to type of coordination "2")[1)]

The semiconductor protection for the SIRIUS SC controlgear can be used with different protective devices. This allows protection by means of LV HRC fuses of operational class gL/gG or miniature circuit-breakers. Siemens recommends the use of special SITOR semiconductor fuses. The table below lists the maximum permissible fuses for each SIRIUS SC control gear.

If a fuse is used with a higher rated current than specified, semiconductor protection is no longer guaranteed. However, smaller fuses with a lower rated current for the load can be used without problems.
For protective devices with operational class gL/gG and for SITOR full range fuses 3NE1, the minimum cross-sections for the conductor to be connected must be taken into account.

Order No.	All-range fuse LV HRC design gR/SITOR 3NE1	Semiconductor protection fuse Cylindrical design			Cable and line protection fuse				
					LV HRC design gL/gG 3NA	Cylindrical design			DIAZED quick 5SB
		10 × 38 mm aR/SITOR 3NC1 0	14 × 51 mm aR/SITOR 3NC1 4	22 × 58 mm aR/SITOR 3NC2 2		10 × 38 mm gL/gG 3NW	14 × 51 mm gL/gG 3NW	22 × 58 mm gL/gG 3NW	
3RF23 1.-....2	3NE1 813-0	3NC1 010	3NC1 410	3NC2 220	3NA2 803	3NW6 001-1	3NW6 101-1	-	5SB1 41
3RF23 1.-....4	3NE1 813-0	3NC1 010	3NC1 410	3NC2 220	3NA2 801	3NW6 001-1	3NW6 101-1	-	5SB1 41
3RF23 1.-....6	3NE1 813-0	3NC1 010	3NC1 410	3NC2 220	3NA2 803-6	-	-	-	-
3RF23 2.-....2	3NE1 814-0	3NC1 020	3NC1 420	3NC2 220	3NA2 807	3NW6 007-1	3NW6 107-1	3NW6 207-1	5SB1 71
3RF23 2.-....4	3NE1 814-0	3NC1 020	3NC1 420	3NC2 220	3NA2 807	3NW6 005-1	3NW6 105-1	3NW6 205-1	5SB1 71
3RF23 2.-....6	3NE1 814-0	3NC1 020	3NC1 420	3NC2 220	3NA2 807-6	-	-	-	-
3RF23 3.-....2	3NE1 803-0	3NC1 032	3NC1 432	3NC2 232	3NA2 810	-	3NW6 107-1	3NW6 207-1	5SB3 11
3RF23 3.-....4	3NE1 803-0	3NC1 032	3NC1 432	3NC2 232	3NA2 807	-	3NW6 105-1	3NW6 205-1	5SB3 11
3RF23 3.-....6	3NE1 803-0	3NC1 032	3NC1 432	3NC2 232	3NA2 807-6	-	-	-	-
3RF23 4.-....2	3NE1 802-0	-	3NC1 440	3NC2 240	3NA2 817	-	3NW6 117-1	3NW6 217-1	5SB3 21
3RF23 4.-....4	3NE1 802-0	-	3NC1 440	3NC2 240	3NA2 812	-	3NW6 112-1	3NW6 212-1	5SB3 21
3RF23 4.-....6	3NE1 802-0	-	3NC1 440	3NC2 240	3NA2 812-6	-	-	-	-
3RF23 5.-....2	3NE1 817-0	-	3NC1 450	3NC2 250	3NA2 817	-	3NW6 117-1	3NW6 217-1	5SB3 21
3RF23 5.-....4	3NE1 817-0	-	3NC1 450	3NC2 250	3NA2 812	-	-	3NW6 210-1	5SB3 21
3RF23 5.-....6	3NE1 817-0	-	3NC1 450	3NC2 250	3NA2 812-6	-	-	-	-
3RF23 7.-....2	3NE1 820-0	-	-	3NC2 280	3NA2 817	-	-	3NW6 217-1	5SB3 31
3RF23 7.-....4	3NE1 020-2	-	-	3NC2 280	3NA2 812	-	-	3NW6 210-1	5SB3 21
3RF23 7.-....6	3NE1 020-2	-	-	3NC2 280	3NA2 812-6	-	-	-	-
3RF23 9.-....2	3NE1 021-2	-	-	3NC2 200	3NA2 817	-	-	3NW6 217-1	5SB3 31
3RF23 9.-....4	3NE1 021-2	-	-	3NC2 280	3NA2 812	-	-	3NW6 210-1	5SB3 21
3RF23 9.-....6	3NE1 020-2	-	-	3NC2 280	3NA2 812-6	-	-	-	-

1) Type of coordination "2" acc. to EN 60947-4-1:
In the event of a short-circuit, the controlgear in the load feeder must not endanger persons or the installation. They must be suitable for further operation. For fused configurations, the protective device must be replaced.

SIRIUS SC semiconductor contactors

Selection and ordering data


3RF23 10-1AA02


3RF23 30-1AA02


3RF23 40-1AA02


3RF23 50-3AA02


3RF23 70-3AA02


3RF23 90-3AA02

Type current 1) $I_{max.}$	Maximum achievable power for I_{max} and U_e = 115 V	230 V	400 V	DT	**Screw connection** Order No.	PS*	Weight per PU approx.	DT	**Spring-loaded connection** Order No.	PS*	Weight per PU approx.	DT	**Ring cable connection** Order No.	PS*	Weight per PU approx.
A	kW	kW	kW				kg				kg				kg
Zero-point switching, rated operational voltage U_e = 24 V to 230 V															
10.5	1.2	2.4	-	A	**3RF23 10-1AA□2**	1 unit	0.136	B	**3RF23 10-2AA□2**	1 unit	0.136	B	**3RF23 10-3AA□2**	1 unit	0.136
20	2.3	4.6	-	A	**3RF23 20-1AA□2**	1 unit	0.204	B	**3RF23 20-2AA□2**	1 unit	0.204	B	**3RF23 20-3AA□2**	1 unit	0.204
30	3.5	6.9	-	A	**3RF23 30-1AA□2**	1 unit	0.354		-			B	**3RF23 30-3AA□2**	1 unit	0.354
40	4.6	9.2	-	A	**3RF23 40-1AA□2**	1 unit	0.496		-			B	**3RF23 40-3AA□2**	1 unit	0.496
50	6	12	-	A	**3RF23 50-1AA□2**	1 unit	0.496		-			B	**3RF23 50-3AA□2**	1 unit	0.496
70	8	16	-		-				-			B	**3RF23 70-3AA□2**	1 unit	0.944
88	10	20	-		-				-			B	**3RF23 90-3AA□2**	1 unit	2.600
Zero-point switching, rated operational voltage U_e = 230 V to 460 V															
10.5	-	2.4	4.2	A	**3RF23 10-1AA□4**	1 unit	0.136	B	**3RF23 10-2AA□4**	1 unit	0.136	B	**3RF23 10-3AA□4**	1 unit	0.136
20	-	4.6	8	A	**3RF23 20-1AA□4**	1 unit	0.204	B	**3RF23 20-2AA□4**	1 unit	0.204	B	**3RF23 20-3AA□4**	1 unit	0.204
30	-	6.9	12	A	**3RF23 30-1AA□4**	1 unit	0.354		-			B	**3RF23 30-3AA□4**	1 unit	0.354
40	-	9.2	16	A	**3RF23 40-1AA□4**	1 unit	0.496		-			B	**3RF23 40-3AA□4**	1 unit	0.496
50	-	12	20	A	**3RF23 50-1AA□4**	1 unit	0.496		-			B	**3RF23 50-3AA□4**	1 unit	0.496
70	-	16	28		-				-			B	**3RF23 70-3AA□4**	1 unit	0.944
88	-	20	35		-				-			B	**3RF23 90-3AA□4**	1 unit	2.600
Zero-point switching, rated operational voltage U_e = 400 V to 600 V															
10.5	-	-	4.2	B	**3RF23 10-1AA□6**	1 unit	0.136	B	**3RF23 10-2AA□6**	1 unit	0.136	B	**3RF23 10-3AA□6**	1 unit	0.136
20	-	-	8	B	**3RF23 20-1AA□6**	1 unit	0.204	B	**3RF23 20-2AA□6**	1 unit	0.204	B	**3RF23 20-3AA□6**	1 unit	0.204
30	-	-	12	B	**3RF23 30-1AA□6**	1 unit	0.354		-			B	**3RF23 30-3AA□6**	1 unit	0.354
40	-	-	16	B	**3RF23 40-1AA□6**	1 unit	0.496		-			B	**3RF23 40-3AA□6**	1 unit	0.496
50	-	-	20	B	**3RF23 50-1AA□6**	1 unit	0.496		-			B	**3RF23 50-3AA□6**	1 unit	0.496
70	-	-	28		-				-			B	**3RF23 70-3AA□6**	1 unit	0.944
88	-	-	35		-				-			B	**3RF23 90-3AA□6**	1 unit	2.600

Order No. extension for rated control supply voltage U_s	Screw connection	Spring-loaded connection	Ring cable connection
DC 24 V acc. to EN 61131-2	**0**	**0**	**0**
AC 110 V ... 230 V	**2**	**2**	**2**

Other rated control supply voltages on request.

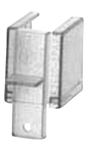
1) The type current provides information about the performance of the semiconductor contactor. The actual permitted operational current I_e can be smaller depending on the connection method and start-up conditions. Derating acc. to curves from page 3/30!

* This quantity or a multiple thereof can be ordered.

Type current 1) $I_{max.}$	Maximum achievable power for I_{max} and U_e = 115 V	230 V	400 V	DT	Screw connection	PS*	Weight per PU approx.	DT	Spring-loaded connection	PS*	Weight per PU approx.	DT	Ring cable connection	PS*	Weight per PU approx.
A	kW	kW	kW		Order No.		kg		Order No.		kg		Order No.		kg
Instantaneous switching, rated operational voltage U_e = 24 V to 230 V															
10.5	1.2	2.4	-	B	**3RF23 10-1BA□2**	1 unit	0.136		-				-		
20	2.3	4.6	-	B	**3RF23 20-1BA□2**	1 unit	0.204		-				-		
30	3.5	6.9	-	B	**3RF23 30-1BA□2**	1 unit	0.354		-				-		
40	4.6	9.2	-	B	**3RF23 40-1BA□2**	1 unit	0.496		-				-		
50	6	12	-	B	**3RF23 50-1BA□2**	1 unit	0.496		-				-		
70	8	16	-	B	**3RF23 70-1BA□2**	1 unit	0.944		-			B	**3RF23 70-3BA□2**	1 unit	0.944
88	10	20	-	B	**3RF23 90-1BA□2**	1 unit	2.600		-			B	**3RF23 90-3BA□2**	1 unit	2.600
Instantaneous switching, rated operational voltage U_e = 230 V to 460 V															
10.5	-	2.4	4.2	B	**3RF23 10-1BA□4**	1 unit	0.136		-				-		
20	-	4.6	8	B	**3RF23 20-1BA□4**	1 unit	0.204		-				-		
30	-	6.9	12	B	**3RF23 30-1BA□4**	1 unit	0.354		-				-		
40	-	9.2	16	B	**3RF23 40-1BA□4**	1 unit	0.496		-				-		
50	-	12	20	B	**3RF23 50-1BA□4**	1 unit	0.496		-				-		
70	-	16	28	B	**3RF23 70-1BA□4**	1 unit	0.944		-			B	**3RF23 70-3BA□4**	1 unit	0.944
88	-	20	35	B	**3RF23 90-1BA□4**	1 unit	2.600		-			B	**3RF23 90-3BA□4**	1 unit	2.600
Instantaneous switching, rated operational voltage U_e = 400 V to 600 V															
10.5	-	-	4.2	B	**3RF23 10-1BA□6**	1 unit	0.136		-				-		
20	-	-	8	B	**3RF23 20-1BA□6**	1 unit	0.204		-				-		
30	-	-	12	B	**3RF23 30-1BA□6**	1 unit	0.354		-				-		
40	-	-	16	B	**3RF23 40-1BA□6**	1 unit	0.496		-				-		
50	-	-	20	B	**3RF23 50-1BA□6**	1 unit	0.496		-				-		
70	-	-	28	B	**3RF23 70-1BA□6**	1 unit	0.944		-			B	**3RF23 70-3BA□6**	1 unit	0.944
88	-	-	35	B	**3RF23 90-1BA□6**	1 unit	2.600		-			B	**3RF23 90-3BA□6**	1 unit	2.600
Low noise, rated operational voltage U_e = 24 V to 230 V															
20	2.3	4.6	-	B	**3RF23 20-1CA□2**	1 unit	0.204	B	**3RF23 20-2CA□2**	1 unit	0.204		-		
Low noise, rated operational voltage U_e = 230 V to 460 V															
20	-	4.6	8	B	**3RF23 20-1CA□4**	1 unit	0.204	B	**3RF23 20-2CA□4**	1 unit	0.204		-		
Short-circuit resistant with B-automatic device, rated operational voltage U_e = 24 V to 230 V															
20	2.3	4.6	-	B	**3RF23 20-1DA□2**	1 unit	0.204	B	**3RF23 20-2DA22**	1 unit	0.204	B	**3RF23 20-3DA□2**	1 unit	0.204
Short-circuit resistant with B-automatic device, rated operational voltage U_e = 230 V to 460 V															
20	-	4.6	8	B	**3RF23 20-1DA□4**	1 unit	0.204	B	**3RF23 20-2DA24**	1 unit	0.204	B	**3RF23 20-3DA□4**	1 unit	0.204
Order No. extension for rated control supply voltage U_s															
DC 24 V acc. to EN 61131-2					0				0				0		
AC 110 V ... 230 V					2				2				2		

Other rated control supply voltages on request.

1) The type current provides information about the performance of the semiconductor contactor. The actual permitted operational current I_e can be smaller depending on the connection method and start-up conditions. Derating acc. to curves from page 3/30!

	Version	DT	Order No.	PS*	Weight per PU approx.
					kg
	Accessories				
	Screwdriver for spring-loaded connection system	A	**8WA2 880**	1 unit	0.034
 3RF29 00-3PA88	**Terminal cover** for 3RF21 semiconductor relays and 3RF23 semiconductor contactors with ring terminal end (after simple adaptation, this terminal cover can also be used for screw connection).	A	**3RF29 00-3PA88**	10 units	0.010

SIRIUS SC semiconductor contactors

Further information

Notes on selection

These notes are intended for general orientation and will no doubt be sufficient for most applications. If the installation conditions differ significantly from the examples described here, you can contact our Technical Assistance team for further help.

Telephone: +49 9131 7 43833
Fax: +49 9131 7 42899
e-mail: nst.technical-assistance@siemens.com

For more information on the Internet go to
www.siemens.com/lowvoltage/technical-assistance

Selecting semiconductor contactors

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

The following procedure is recommended:

- Determine the rated current of the load and the mains voltage
- Select a semiconductor contactor with the same or higher rated current than the load
- Check the correct contactor size with the aid of the rated current diagram, taking account of the design conditions

Overview

Function modules for SIRIUS SC semiconductor 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 semiconductor relay or contactor.

The plug-in connection to control the semiconductor switching devices can simply remain in use.

The following function modules are available:

- Converters
- Load monitors
- Power controllers

Technical specifications

Type		3RF29 ..-.E...	3RF29 ..-.F...	3RF29 ..-.G...	3RF29 ..-.H...
General data					
Ambient temperature during operation, derating at 40 °C when stored	 °C °C	 -25 ... +60 -55 ... +80			
Site altitude	m	0 ... 1000; derating from 1000			
Shock resistance acc. to IEC 60068-2-27	g/ms	15/11			
Vibration resistance acc. to IEC 60068-2-6	g	2			
Degree of protection		IP20			
Electromagnetic compatibility (EMC) Emitted interference • Conducted interference voltage acc. to IEC 60947-4-3 • Emitted, high-frequency interference voltage acc. to IEC 60947-4-3		 Class A for industrial applications 1) Class A for industrial applications			
Noise immunity • Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3) • Induced RF fields acc. to IEC 61000-4-6 • Burst acc. to IEC 61000-4-4 • Surge acc. to IEC 61000-4-5	 kV MHz kV	 Contact discharge 4; air discharge 8; behavior criterion 2 0.15 ... 80; 140 dBµV; behavior criterion 1 2 kV/5.0 kHz; behavior criterion 1 Conductor - ground 2; conductor - conductor 1; behavior criterion 2			
Connection, auxiliary/control contacts, screw connection Conductor cross-section • Insulation stripping length Terminal screw • Tightening torque	 mm^2 mm Nm	 1x (0.5 ... 2.5); 2x (0.5 ... 1) AWG 20 ... 12 7 M3 0.5 ... 0.6			
Converter diameter of hole	mm	-	7	17	

1) Note limitations for power controller function module on page 3/28.

Type		3RF29 ..-.E..8	3RF29 ..-.F..8	3RF29 ..-.G..3	3RF29 ..-.G..6	3RF29 ..-.H..3	3RF29 ..-.H..6
Main circuit							
Rated operational voltage U_e • Tolerance • Rated frequency	V % Hz	- 1) - -		110 ... 230 -15 / +10 50/60	400 ... 600	110 ... 230	400 ... 600
Rated insulation voltage U_i	V	-		600			
Voltage detection Measuring range	 V	 -		 93.5 ... 253	 340 ... 660	 93.5 ... 253	 340 ... 660
Mains voltage fluctuation compensation	%	-		20			

1) Versions do not depend on main circuit.

Type		3RF29 ..-...0.	3RF29 ..-...1.	3RF29 ..-...3.
Control circuit				
Method of operation		DC operation	AC/DC operation	AC operation
Rated control supply voltage U_s Rated operating current	V mA	24 15	24 15	110 15
Max. rated control voltage Rated control current at maximum voltage	V mA	30 15	30 15	121 15
Rated frequency of the control supply voltage	Hz	-	50/60	50/60
Response voltage for tripping current	V mA	15 2	15 2	90 2
Drop-out voltage	V	5	5	-

Type		3RF29 2.-.F...	3RF29 2.-.G...	3RF29 2.-.H...	3RF29 5.-.G...	3RF29 5.-.H...	3RF29 9.-.G...	3RF29 9.-.H...
Current detection								
Rated operational current I_e	A	20			50		90	
Measuring range	A	4 ... 22			4 ... 55		4 ... 99	
Number of partial loads		6	12	-	12	-	12	-

Converters

Overview

Converter for SIRIUS SC semiconductor switching devices

This module is used to convert analog drive signals, such as those output from many temperature controllers, for example, into a pulse-width-modulated digital signal. The connected semiconductor contactors and relays can therefore regulate the output of a load as a percentage.

Area of application

The device is used for conversion from an analog input signal to an on/off ratio. The function module can only be used in conjunction with a 3RF21 semiconductor relay or a 3RF23 semiconductor contactor.

Design

Mounting

Simply snapping onto the 3RF21 semiconductor relays or 3RF23 semiconductor contactors establishes the connections to the semiconductor switching devices. The connector on the semiconductor switching devices from the control circuit can be used on the converter without rewiring.

Functions

The analog value from a temperature controller is present at the 0–10 V terminals. This controls the on-to-off period, as a function of voltage. The period duration is predefined at one second. Conversion of the analog voltage is linear in the voltage range from 0.1 to 9.9 V. At voltages below 0.1 V the connected switching device is not activated, while at voltages above 9.9 V the connected switching device is always activated.

Technical specifications

Control input for converter und load monitoring

Type		3RF29 00-0EA18	3RF29 ..-0HA.
Control input			
Analog input Permissible range	V V	0 ... 10 -1 ... 11	0 ... 10 -1 ... 11
Input resistance	kΩ	100	8
Period duration	s	1	1

Selection and ordering data

	Rated operational current I_e	Rated operational voltage U_e	DT	**Rated control supply voltage U_s AC/DC 24 V**	PS*	Weight per PU approx.
	A	V		Order No.		kg
Converter						
 3RF29 00-0EA18	-	-	A	**3RF29 00-0EA18**	1 unit	0.025

*** This quantity or a multiple thereof can be ordered.**

Overview

Load monitoring for SIRIUS SC semiconductor switching devices

Many faults can be quickly detected by monitoring a load circuit connected to the semiconductor 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 via a PLC-compatible output.

The operating principle is based on permanent monitoring of the current intensity. This figure is continuously compared with the reference value stored once during commissioning 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, a contact (NC) is actuated and one or more LEDs indicate the fault.

Area of 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 semiconductor relay or a 3RF23 semiconductor contactor. The devices with spring-loaded connections in the load circuit are not suitable.

Design

Mounting

Simply snapping onto the 3RF21 semiconductor relays or 3RF23 semiconductor contactors establishes the connections to the semiconductor switching devices. Because of the special design, the straight-through transformer of the load monitoring module covers the lower main power connection. The cable to the load is simply pushed through and secured with the terminal screw.

Functions

The function module is activated when an "ON" signal is applied (IN terminal). The module constantly monitors the current level and compares this with the setpoint value.

Start-up

Pressing the "Teach" button switches the device on; the current through the semiconductor switching device is detected and is stored as the setpoint. During this process the two lower (red[1]) LEDs flash alternately; simultaneous maintained light from the 3 (red[1]) LEDs indicates the conclusion of the teaching process.

The "Teach" button can also be used to switch on the connected semiconductor switching device briefly for test purposes. In this case the "ON" LED is switched on.

Partial load faults, "basic" load monitoring

If a deviation of at least 1/6 of the stored setpoint value is detected, a fault is signaled. The fault is indicated via a "Fault" LED and by activation of the fault signaling output.

	OK	Fault		
LEDs		Partial load failure/ load short-circuit	Thyristor defect	Mains failure/ fuse rupture
ON/OFF	✔	✔	-	✔
Current flowing	✔	✔	✔	-
Group fault	-	✔	✔	✔

✔ Function is available
- Function not available

Partial load faults, "extended" load monitoring

Depending on the setting of the "response time" potentiometer, a deviation of at least 1/12 of the stored setpoint value after a response time of between 100 ms and 3 s is signaled as a fault. The fault is indicated via a "Load" LED and by activation of the fault signaling output.

The potentiometer can also be used to determine the response behavior of the fault signaling output. When delay values are set in the left-hand half, the fault signal is stored. This can only be reset by switching on and off by means of the control supply voltage.

When settings are made on the right-hand side, the fault output is automatically reset after the deviation has been corrected.

Voltage compensation, "extended" load monitoring

In addition to the current, the load voltage is also detected. This makes it possible to compensate for influences on the current strength resulting from voltage fluctuations.

Thyristor fault

If a current greater than the residual current of the switching device is measured in the deenergized state, the device triggers a thyristor fault after the set time delay. This means that the fault output is activated and the "Fault" ("Thyristor"[1]) LED lights up.

Supply fault

If no current is measured in the energized state, the device triggers a supply fault after the set time delay. This means that the fault output is activated and the "Fault" ("Supply"[1]) LED lights up.

1) "Extended" load monitoring

Selection and ordering data

Rated operational current I_e	Rated operational voltage U_e	DT	**Rated control supply voltage U_s AC 110 V**	PS*	Weight per PU approx.	DT	**Rated control supply voltage U_s AC/DC 24 V**	PS*	Weight per PU approx.	DT	**Rated control supply voltage U_s DC 24 V**	PS*	Weight per PU approx.
A	V		Order No.		kg		Order No.		kg		Order No.		kg
Basic load monitoring													
20	-		-				-			A	**3RF29 20-0FA08**	1 unit	0.050
Extended load monitoring													
20	110 ... 230	A	**3RF29 20-0GA33**	1 unit	0.120	A	**3RF29 20-0GA13**	1 unit	0.120		-		
20	400 ... 600	A	**3RF29 20-0GA36**	1 unit	0.120	A	**3RF29 20-0GA16**	1 unit	0.120		-		
50	110 ... 230	A	**3RF29 50-0GA33**	1 unit	0.120	A	**3RF29 50-0GA13**	1 unit	0.120		-		
50	400 ... 600	A	**3RF29 50-0GA36**	1 unit	0.120	A	**3RF29 50-0GA16**	1 unit	0.120		-		
90	110 ... 230	A	**3RF29 90-0GA33**	1 unit	0.120	A	**3RF29 90-0GA13**	1 unit	0.120		-		
90	400 ... 600	A	**3RF29 90-0GA36**	1 unit	0.120	A	**3RF29 90-0GA16**	1 unit	0.120		-		

*** This quantity or a multiple thereof can be ordered.**

Power controllers

3

Overview

Power controllers for SIRIUS SC semiconductor switching devices

This module provides similar functionality to a power control regulator.

The following functions are integrated:

Power control regulator with proportional-action control for adjusting the power of the connected load. Here, the setpoint is set with a rotary knob on the module as a percentage with reference to the 100% power stored as a setpoint. In this way the power is kept constant even in the event of voltage fluctuations or a change in load resistance.

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.

Area of application

The power controller adjusts the current in the connected load by means of a semiconductor switching device depending on a setpoint. This compensates for changes in the mains voltage or in the load resistance. The setpoint 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_R), 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 by 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 by changing the current flow angle. In order to observe the limit values of the conducted interference voltage for industrial power systems, a choke rated at at least 200 µH must be included in the load circuit.

Design

Mounting

Easy snapping onto the 3RF21 semiconductor relays or 3RF23 semiconductor contactors establishes the connections to the semiconductor switching devices. Because of the special design, the straight-through transformer of the power controller module covers the lower main power connection. The cable to the load is simply pushed through and secured with the terminal screw.

Functions

Start-up

Pressing the "Teach" button switches the device on; the current through the semiconductor switching device and the mains voltage are detected and stored. The resultant output is taken as the 100% output for the setpoint selection. During this process the two lower red LEDs flash alternately. Simultaneous maintained light from the three red LEDs indicates the completion of the "Teach" process.

The "Teach" button can also be used to switch on the connected semiconductor switching device briefly for test purposes. In this case the "ON" LED is switched on.

Setpoint selection

The setting on the setpoint potentiometer (P) determines how the setpoint selection is to be made:

External setpoint selection

At 0 % the setpoint selection is set via an external 0 – 10 V analog signal (terminals IN / 0 – 10 V). The device is switched on and off via the power supply (terminals A1 / A2).

Internal setpoint selection

Above 0 % the setpoint is set using the potentiometer. To allow this, the potential at terminal A1 must additionally be applied at the IN terminal. After removal of the "ON" signal, the switching module is switched off.

Inrush current limitation

The ramp time (t_R) for a voltage ramp on switching on is set with the potentiometer for the purpose of inrush current limitation. If a time longer than 0 s is set, the device operates according to the phase-angle principle. If 0 s is set, there is no voltage ramp and the device operates according to the principle of full-wave control.

Load fault

If upon switching on with voltage applied the current flowing is not greater than the residual current of the switching device, the device triggers a load fault. The fault relay is activated and the "Load" LED lights up.

Thyristor fault

If a current greater than the residual current of the switching device is measured in the deenergized state, the device triggers a thyristor fault. The fault relay is activated and the "Thyristor" LED lights up.

Supply fault

If no current is measured in the energized state, the device triggers a supply fault. The fault relay is activated and the "Supply" LED lights up.

Selection and ordering data

Rated operational current I_e	Rated operational voltage U_e	DT	Rated control supply voltage U_s AC 110 V	PS*	Weight per PU approx.	DT	Rated control supply voltage U_s AC/DC 24 V	PS*	Weight per PU approx.
A	V		Order No.		kg		Order No.		kg
Power controllers									
20	110 ... 230	A	**3RF29 20-0HA33**	1 unit	0.120	A	**3RF29 20-0HA13**	1 unit	0.120
20	400 ... 600	A	**3RF29 20-0HA36**	1 unit	0.120	A	**3RF29 20-0HA16**	1 unit	0.120
50	110 ... 230	A	**3RF29 50-0HA33**	1 unit	0.120	A	**3RF29 50-0HA13**	1 unit	0.120
50	400 ... 600	A	**3RF29 50-0HA36**	1 unit	0.120	A	**3RF29 50-0HA16**	1 unit	0.120
90	110 ... 230	A	**3RF29 90-0HA33**	1 unit	0.120	A	**3RF29 90-0HA13**	1 unit	0.120
90	400 ... 600	A	**3RF29 90-0HA36**	1 unit	0.120	A	**3RF29 90-0HA16**	1 unit	0.120

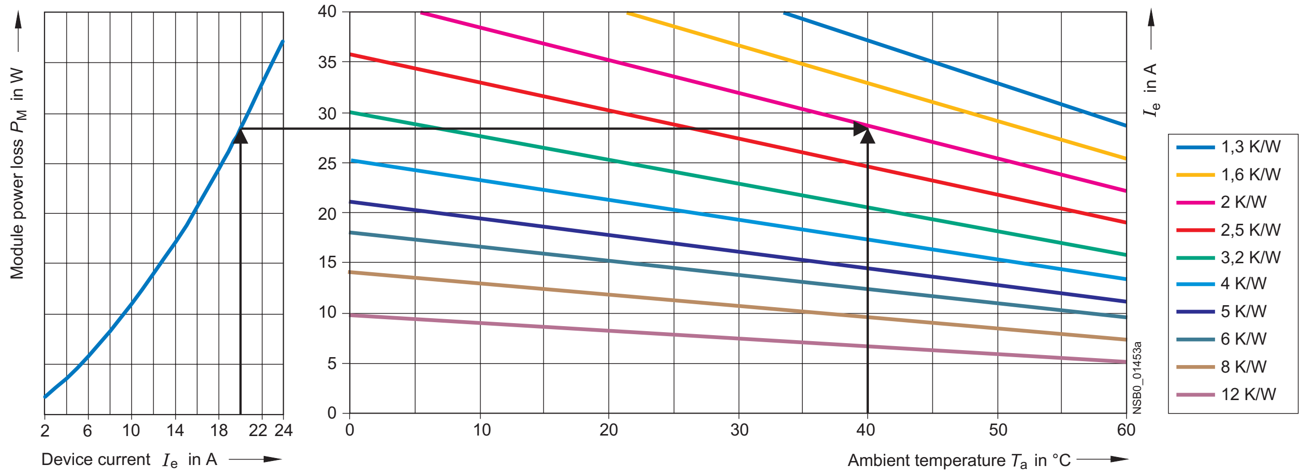
*** This quantity or a multiple thereof can be ordered.**

Characteristics

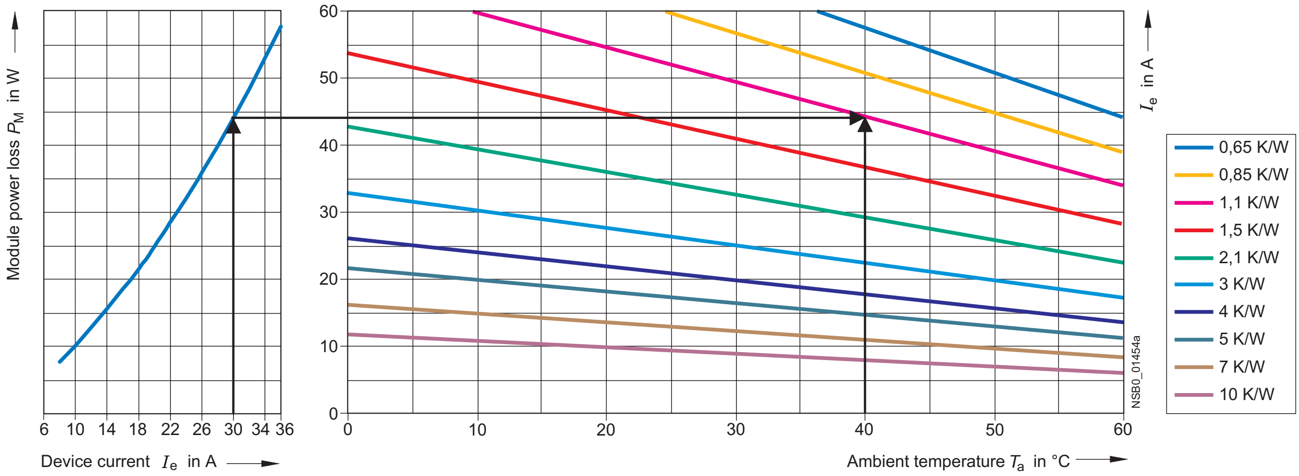
SIRIUS SC semiconductor relays

Dependence of the device current I_e on the ambient temperature T_a

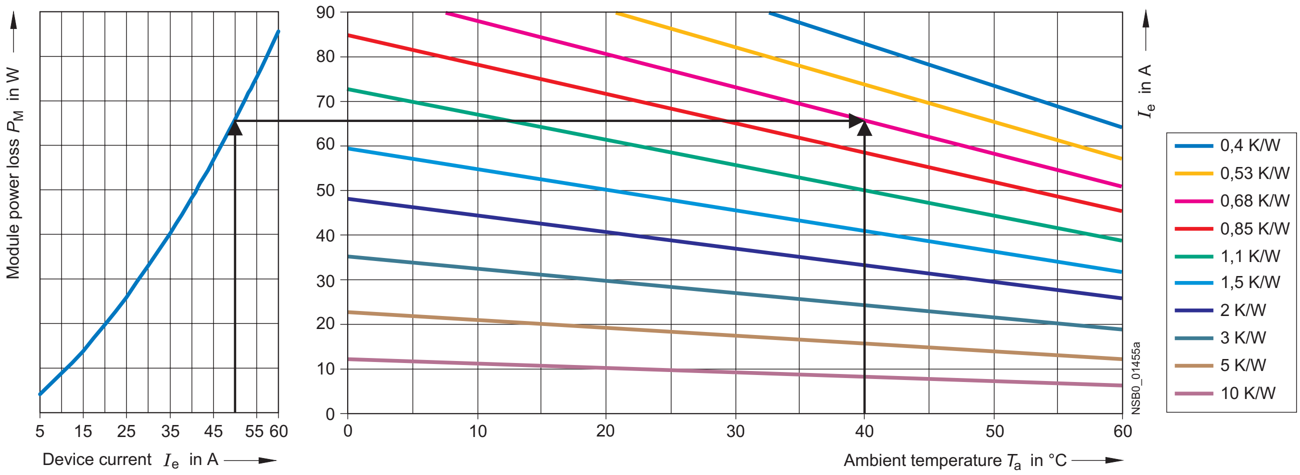
SIRIUS SC semiconductor relay with 20 A type current (3RF21 20/3RF20 20)[1)]



SIRIUS SC semiconductor relay with 30 A type current (3RF21 30/3RF20 30)



SIRIUS SC semiconductor relay with 50 A type current (3RF21 50/3RF20 50)



1) Arrangement example for I_e = 20 A and T_a = 40 C:
The task is to find the thermal resistance R_{thha} and the heat-sink overtemperature dT_{ha}. From the diagram on the left -> P_M = 28 W, from the diagram on the right -> R_{thha} = 1.7 K/W.

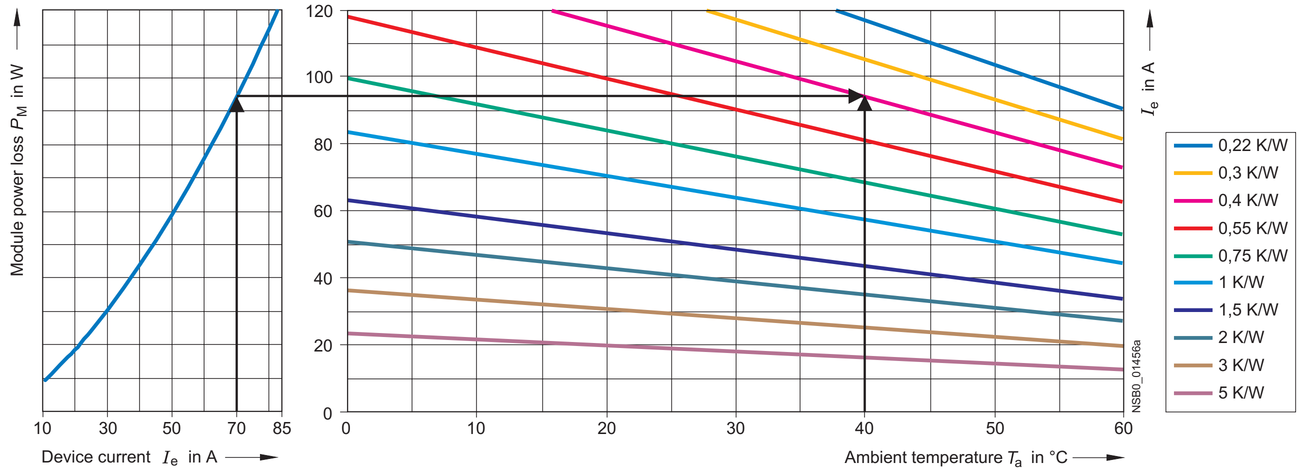
This results in: $dT_{ha} = R_{thha} \times P_M$ = 1.7 K/W × 28 W = 47.6 K. At $\boldsymbol{dT_{ha}}$ **= 47.6 K** the heat sink must therefore have an $\boldsymbol{R_{thha}}$ **= 1.7 K/W**.

Project planning aids

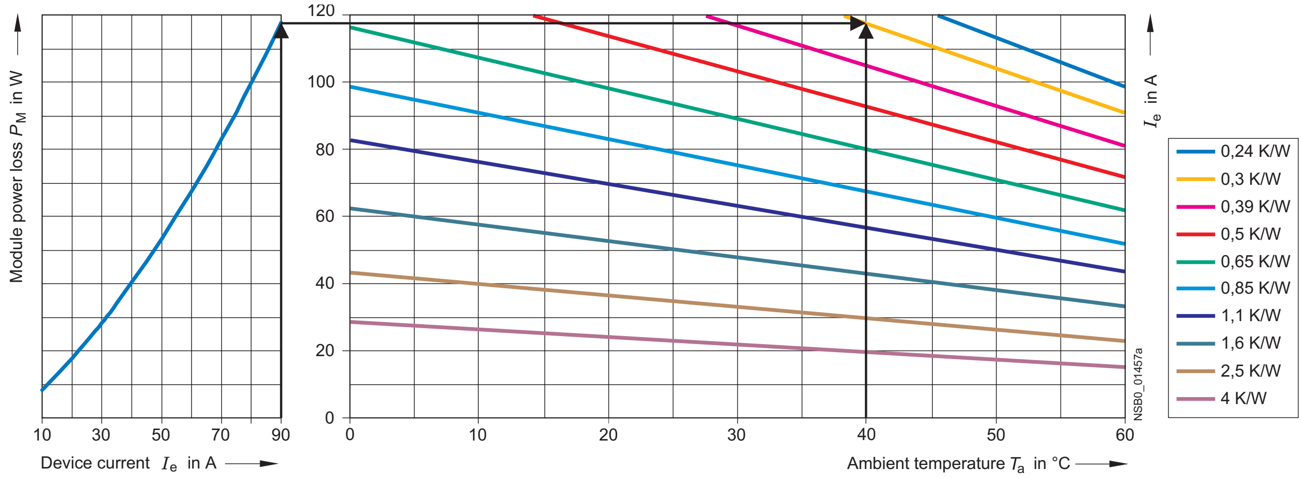
3

Dependence of the device current I_e on the ambient temperature T_a

SIRIUS SC semiconductor relay with 70 A type current (3RF21 70/3RF20 70)



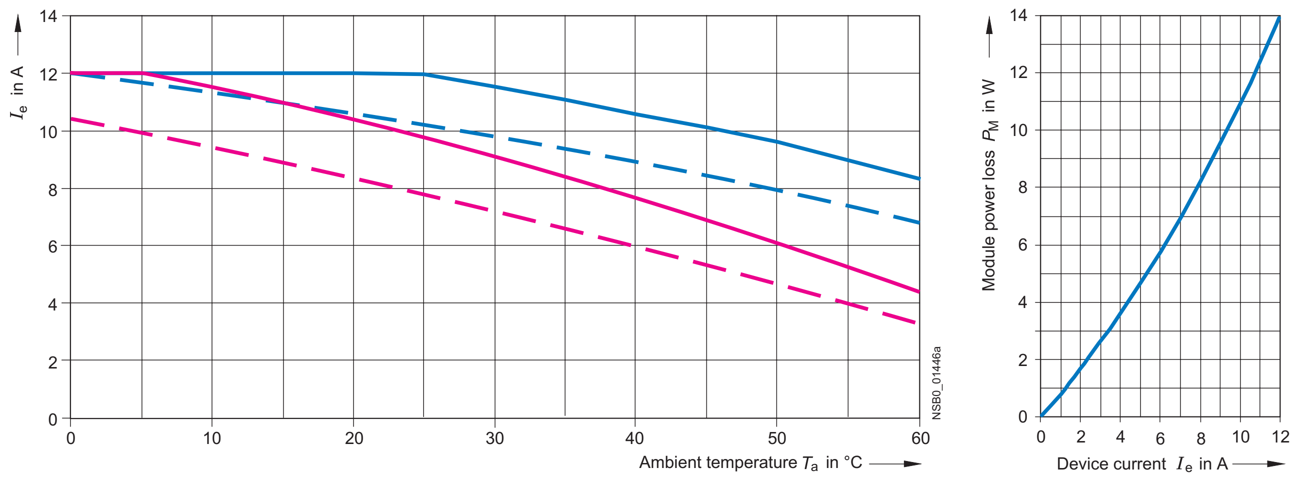
SIRIUS SC semiconductor relay with 88 A type current (3RF21 90/3RF20 90)



SIRIUS SC semiconductor contactors

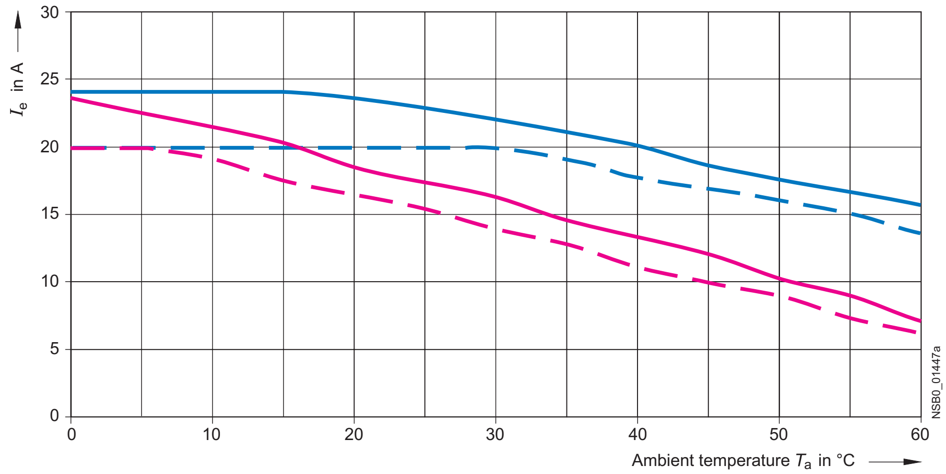
Derating curves

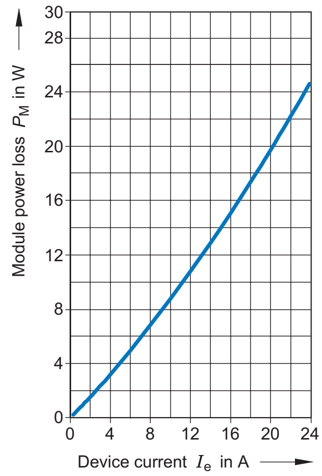
SIRIUS SC semiconductor contactor with 10 A type current (3RF23 10)



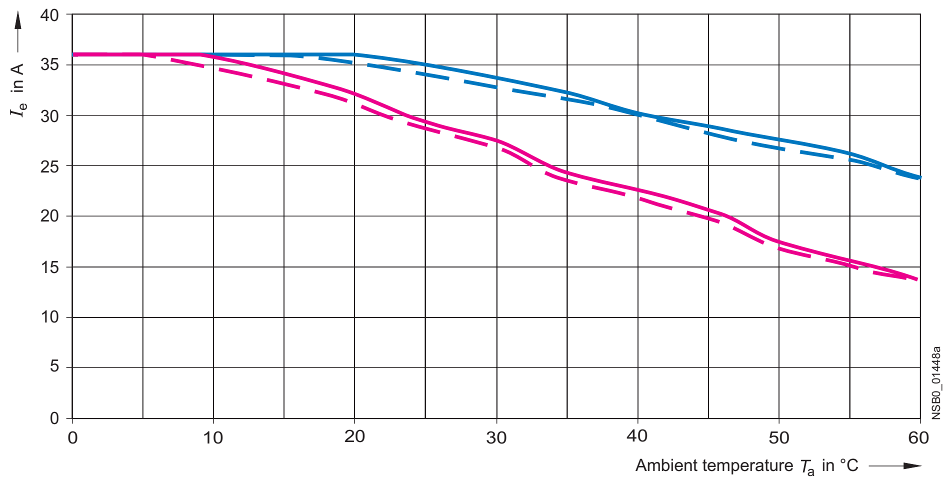
Derating curves

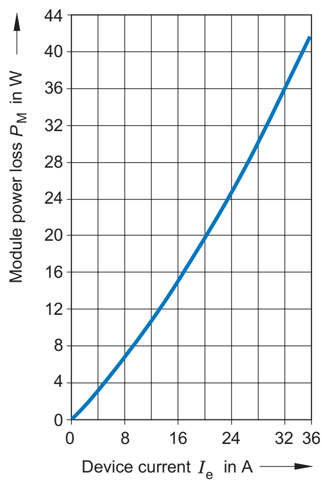
SIRIUS SC semiconductor contactor with 20 A type current (3RF23 20)



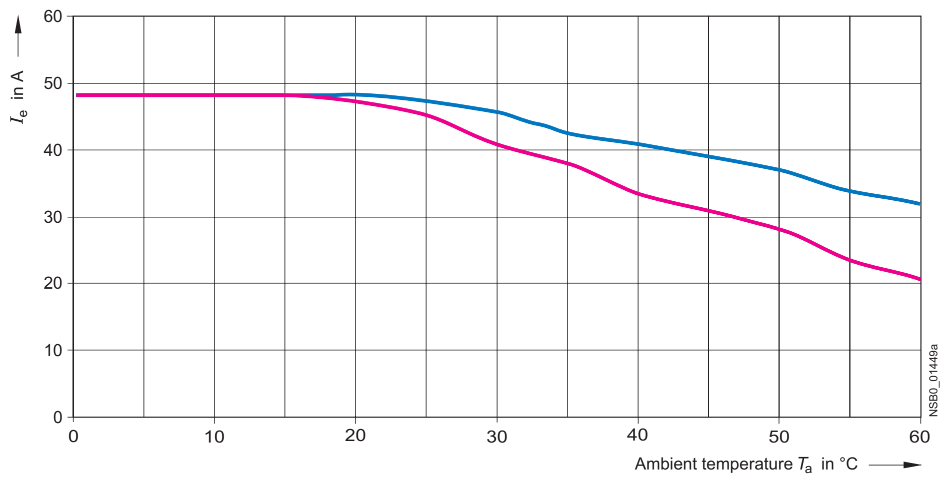


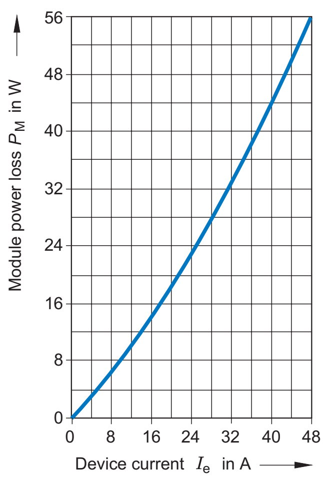
SIRIUS SC semiconductor contactor with 30 A type current (3RF23 30)





SIRIUS SC semiconductor contactor with 40 A type current (3RF23 40)1)





I_{max} Thermal limit current for individual mounting
I_{max} Thermal limit current for side-by-side mounting
I_{IEC} Current acc. to IEC 947-4-3 for individual mounting
I_{IEC} Current acc. to IEC 947-4-3 for side-by-side mounting

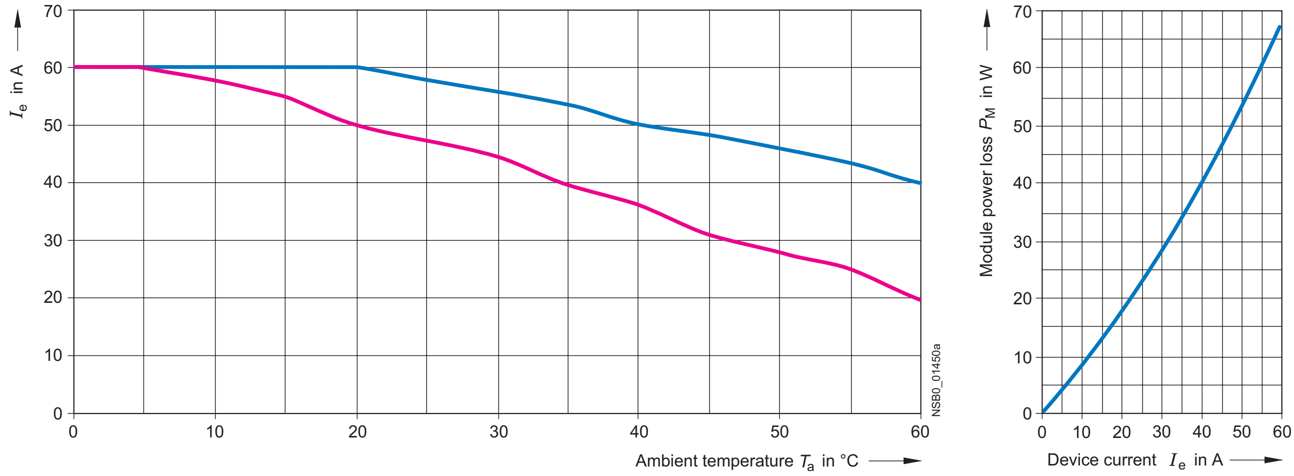
NSB0_01474

1) Identical current/temperature curves for individual and side-by-side mounting.

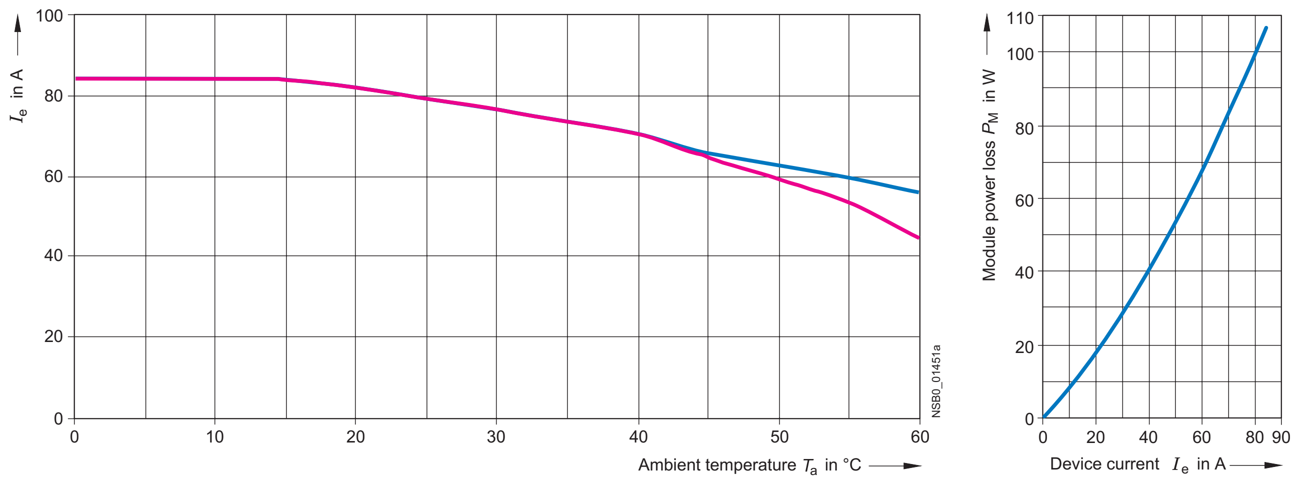
Project planning aids

Derating curves

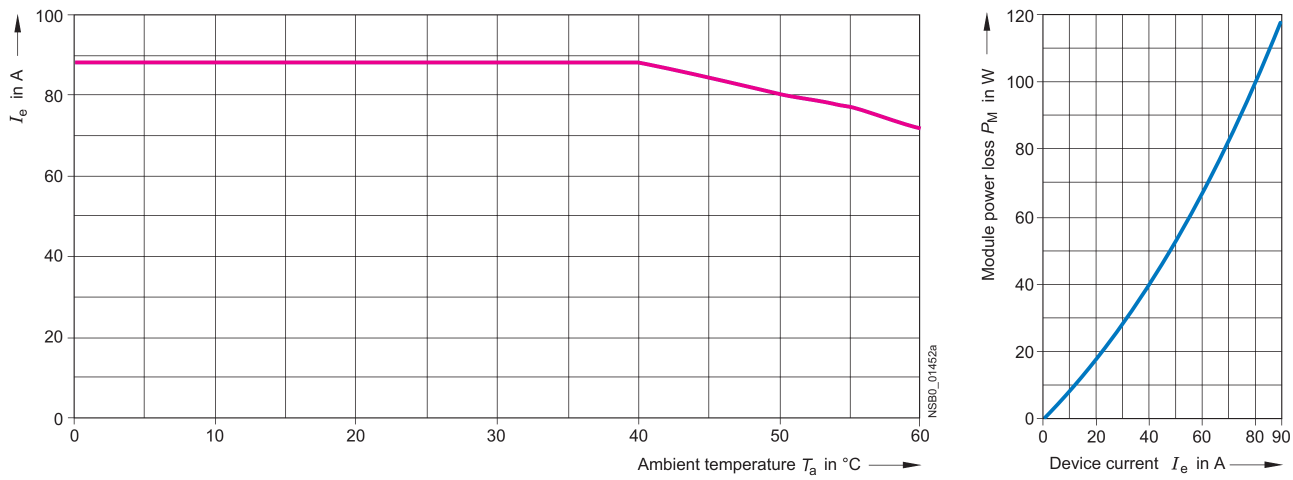
SIRIUS SC semiconductor contactor with 50 A type current (3RF23 50)[1)]



SIRIUS SC semiconductor contactor with 70 A type current (3RF23 70)[1)]



SIRIUS SC semiconductor contactor with 88 A type current (3RF23 90)[1)]



I_{max} Thermal limit current for individual mounting
I_{max} Thermal limit current for side-by-side mounting
I_{IEC} Current acc. to IEC 947-4-3 for individual mounting
I_{IEC} Current acc. to IEC 947-4-3 for side-by-side mounting

NSB0_01474

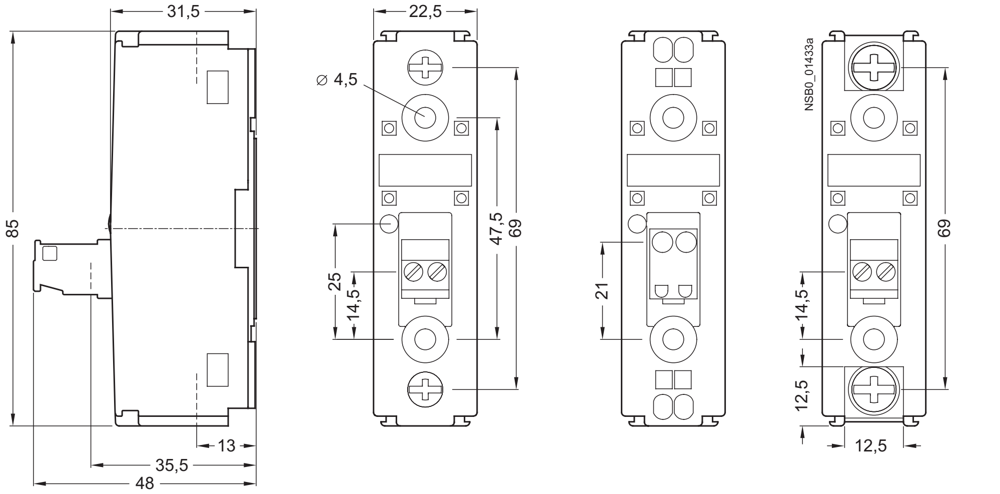
1) Identical current/temperature curves for individual and side-by-side mounting.

Dimension drawings

SIRIUS SC semiconductor relays

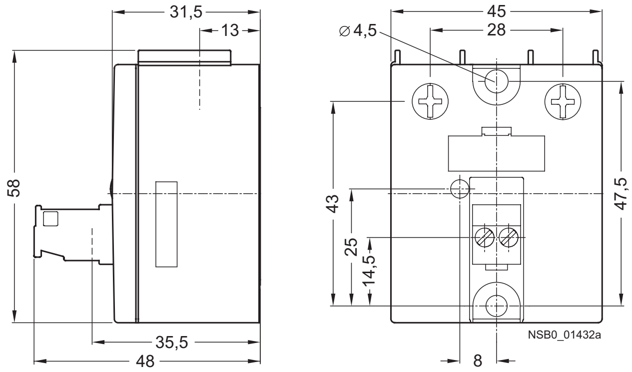
22.5 mm semiconductor relays

Screw connection 3RF21 .0-1AA.. **Spring-loaded connection 3RF21 .0-2AA..** **Ring connection 3RF21 .0-3AA..**



45 mm semiconductor relays

3RF20 .0-1AA.



Project planning aids

SIRIUS SC semiconductor contactors

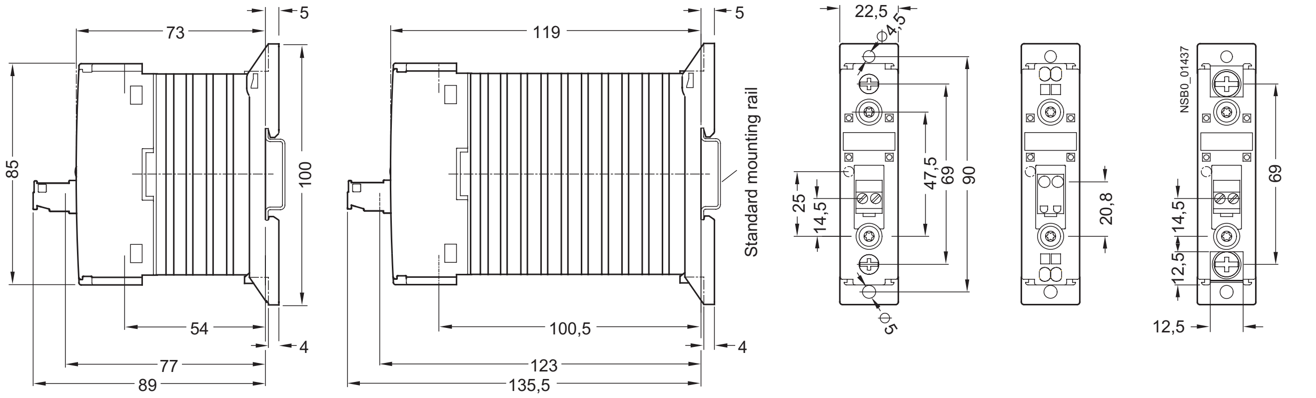
Semiconductor contactors with 10 A and 20 A type current

3RF23 10-..... **3RF23 20-.....**

Screw connection
3RF23 10-1....
3RF23 20-1....

Spring-loaded connection
3RF23 10-2....
3RF2320-2....

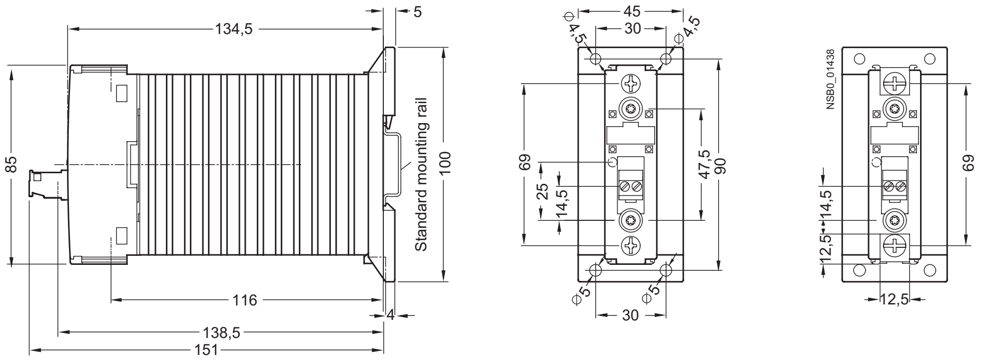
Ring connection
3RF23 10-3....
3RF23 20-3....



Semiconductor contactors with 30 A type current

Screw connection
3RF23 30-1....

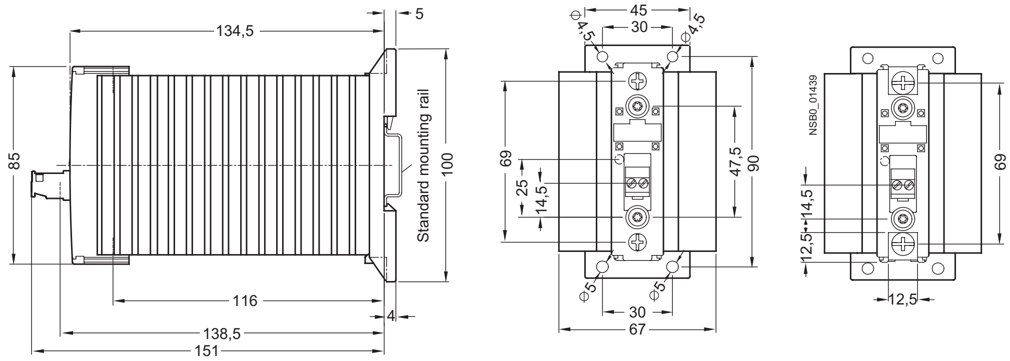
Ring connection
3RF23 30-3....



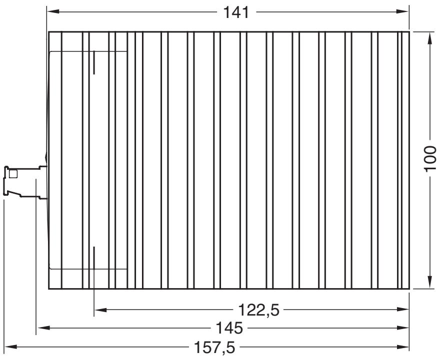
Semiconductor contactors with 40 A and 50 A type current

Screw connection
3RF23 40-1....
3RF23 50-1....

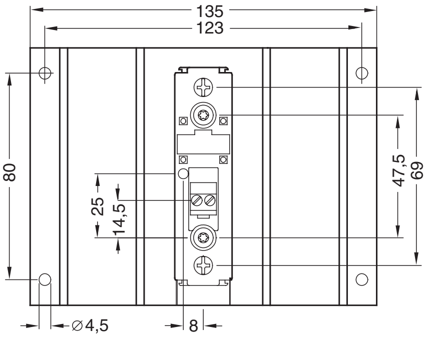
Ring connection
3RF23 40-3....
3RF23 50-3....



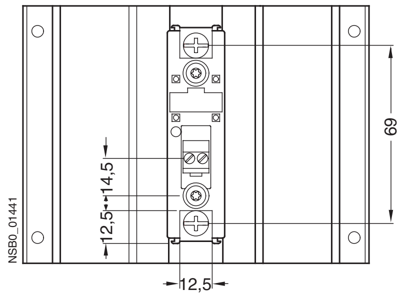
Semiconductor contactors with 70 A type current



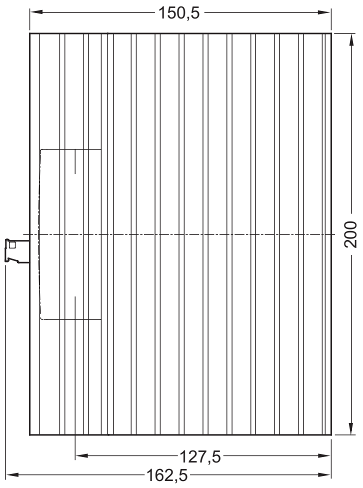
Screw connection
3RF23 70-1....



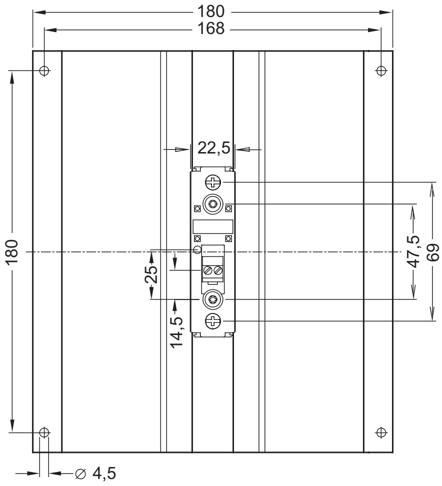
Ring connection
3RF23 70-3....



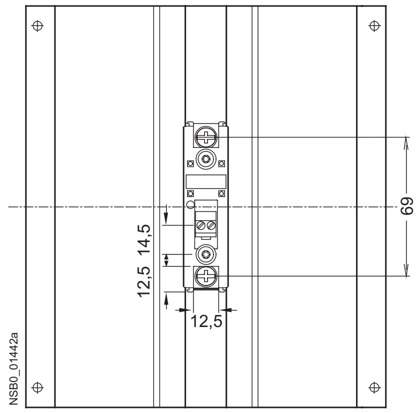
Semiconductor contactors with 88 A type current



Screw connection
3RF23 90-1....



Ring connection
3RF23 90-3....

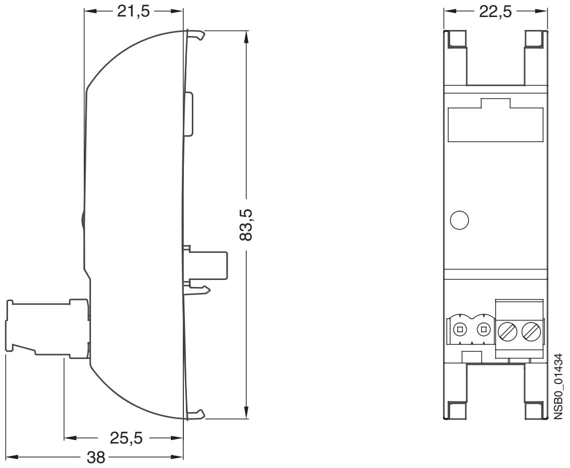


Project planning aids

Function modules for SIRIUS SC semiconductor switching devices

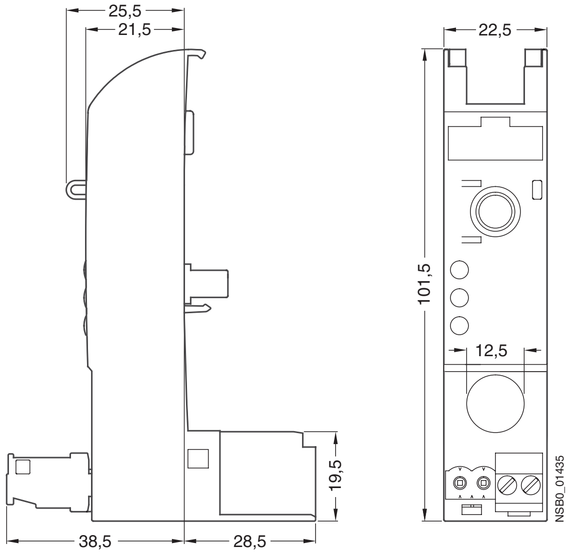
Converters

3RF29 00-0EA18



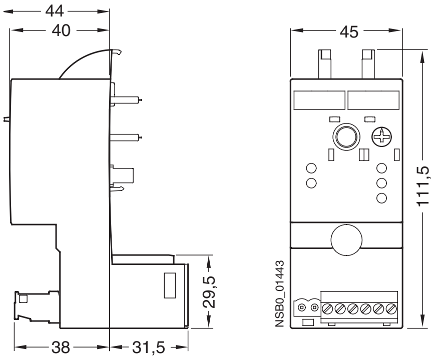
Basic load monitoring

3RF29 00-0FA08



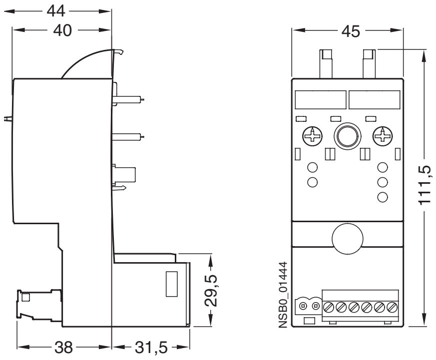
Extended load monitoring

3RF29 .0-0GA..



Power controllers

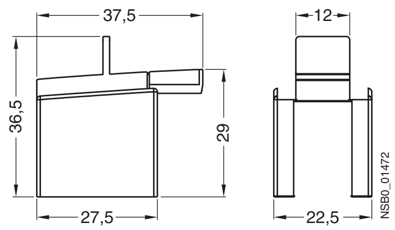
3RF29 .0-0HA..



Accessories for SIRIUS SC semiconductor switching devices

Terminal cover for SIRIUS semiconductor switching devices

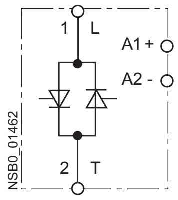
3RF29 00-3PA88



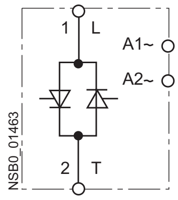
Circuit diagrams

SIRIUS SC semiconductor relays

DC version

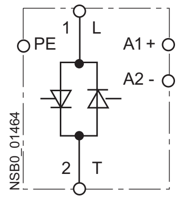


AC version

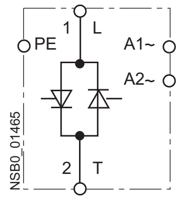


SIRIUS SC semiconductor contactors

DC version

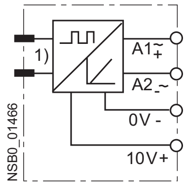


AC version

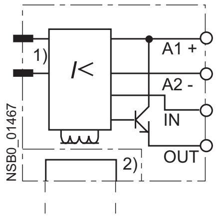


Function modules for SIRIUS SC semiconductor switching devices

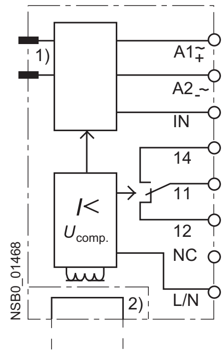
Converters



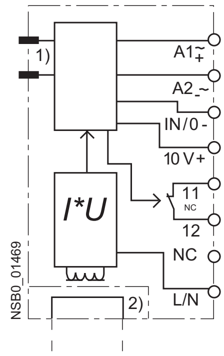
Basic load monitoring



Extended load monitoring



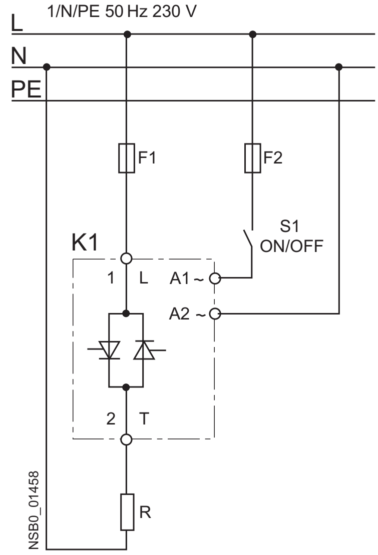
Power controllers



1) Internal connection.
2) Straight-through transformer.

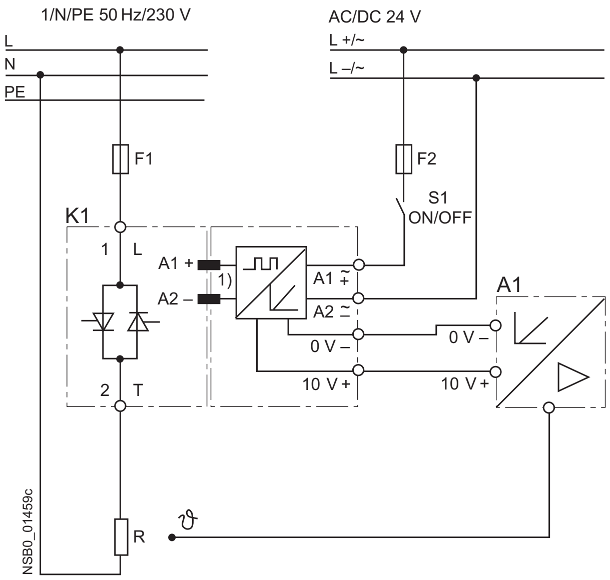
SIRIUS SC semiconductor relays

Typical circuit diagram

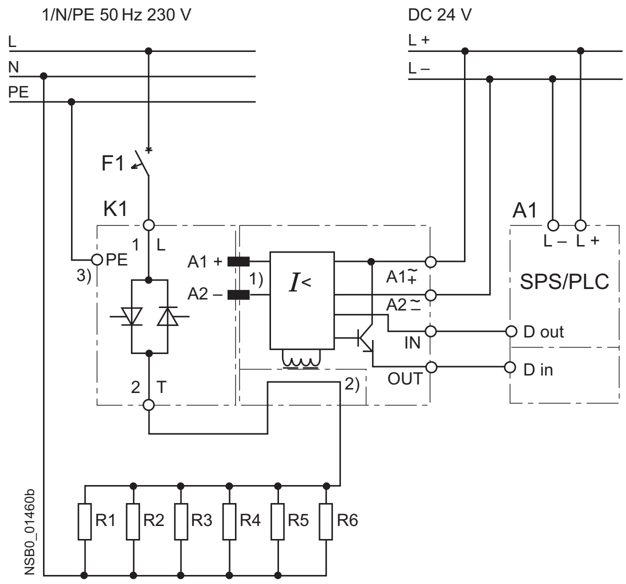


Function modules for SIRIUS SC semiconductor switching devices

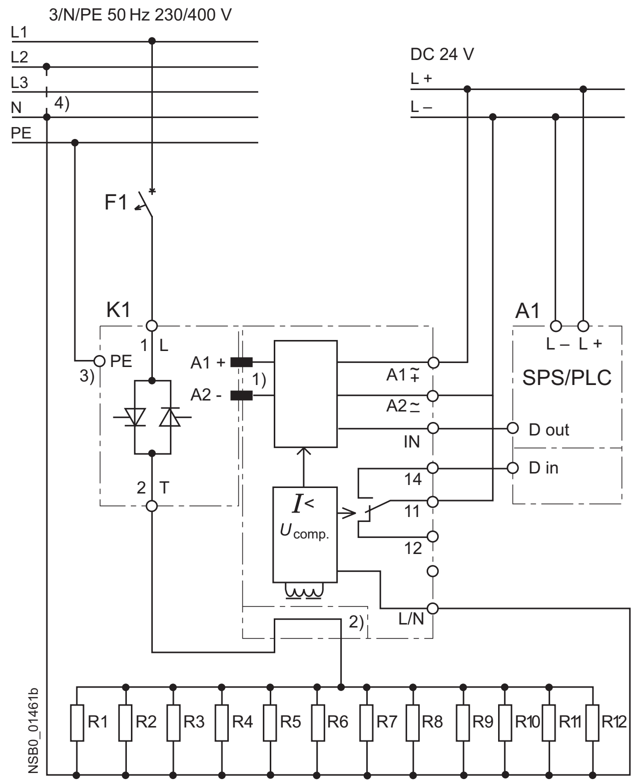
Converters Typical circuit diagram



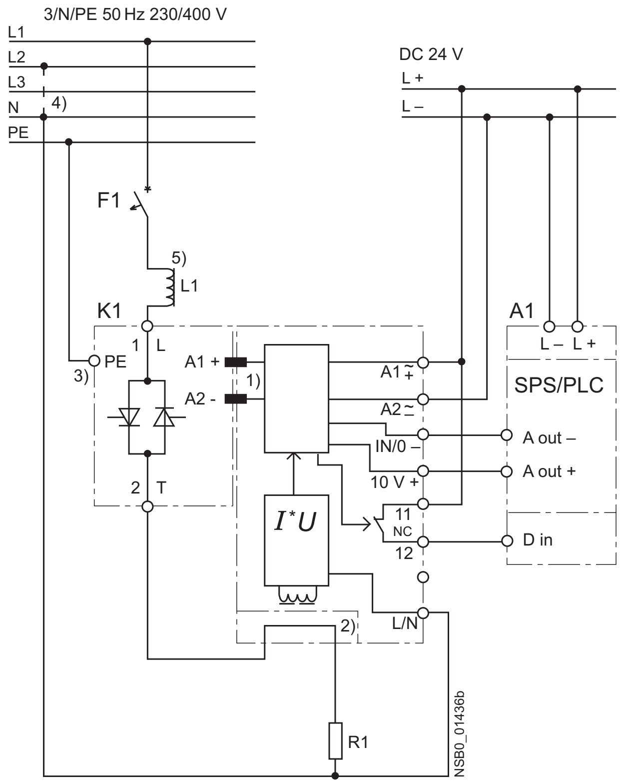
Basic load monitoring Typical circuit diagram



Extended load monitoring Typical circuit diagram



Power controllers Typical circuit diagram



1) Internal connection.
2) Straight-through transformer.
3) PE/ground connection for semiconductor contactors according to installation regulations.
4) Connection of contact L/N to N conductor or a second phase according to the rated operational voltage of the function module.
5) In order to observe the limit values of the conducted interference voltage for generalized phase control, a choke rated at at least 200 µH must be included in the load circuit.

3

Overview

These properties apply to all soft starters:

- Soft starting and smooth ramp-down[1)]
- Stepless starting
- Reduction of current peaks
- Avoidance of mains voltage fluctuations
- Reduced load on the power supply network
- Reduction of the mechanical load in the operating mechanism
- Considerable space savings and reduced wiring compared with conventional starters
- Maintenance-free switching
- Very easy handling

		3RW30 03	SIRIUS 3RW30/31	SIKOSTART 3RW34	SIKOSTART 3RW22
Rated current at 40 °C	A	3	6 ... 100	57 ... 1720	7 ... 1200
Rated operating voltage	V	200 ... 400	200 ... 575	200 ... 600	200 ... 1000
Motor rating at 400 V					
• Inline circuit	kW	0.1 ... 1.1	1.1 ... 55	30 ... 630	3 ... 710
• Inside-delta circuit	kW	-	-	45 ... 1000	-
Temperature range	°C	-25 ... +60	-25 ... +60	0 ... +60	0 ... +55
Starting voltage	%	40 ... 100	40 ... 100	30 ... 80	20 ... 100
Starting and ramp-down time	s	0.1 ... 20	0.1 ... 20	0.5 ... 60	0.3 ... 180 (0 ... 1000 with COM-SIKOSTART)
Number of parameter sets		1	1 (2 with 3RW31)	1	1 3 (with COM-SIKOSTART)
Power semiconductors: thyristors		in 2 phases	in 2 phases	in 3 phases	in 3 phases
Degree of protection		IP20	IP20	IP00	IP20/IP00 from 100 A
Built-in bypass contacts		-	✔	-	-
Optional inside-delta circuit		-	-	✔	-
Current limiting		-	-	-	✔
Voltage limiting		-	-	-	✔
Pump running down		-	-	-	✔
Energy saving		-	-	-	✔
DC braking		-	-	-	✔
Breakaway pulse		-	-	-	✔
Electronic overload protection		-	-	-	✔
Communication		-	with AS-Interface module	-	PC interface, combinable with SIMOCODE-DP
Calibration software		-	-	-	✔ (COM -SIKOSTART)
UL – CSA		(✔) up to 230 V	✔	✔	(✔) up to 70 A
CE marking		✔	✔	✔	✔
Approved for potentially explosive atmospheres		-	✔	-	✔
Soft starting under heavy starting conditions		-	-	✔	✔
Configuring support		Win-SIKOSTART, electronic selection slide			

✔ Function is available
\- Function not available

1) Smooth ramp-down not available for 3RW31.

For more information on the Internet go to
www.siemens.de/sanftstarter

SIRIUS soft starters

Overview

SIRIUS 3RW30/31

Various versions of the 3RW30/31 SIRUS soft starters are available:

- Standard version for fixed frequency three-phase motors, sizes S00, S0, S2 and S3
- Version for fixed-speed three-phase motors in a 22.5 mm enclosure
- Special-purpose version 3RW31 for Dahlander motors only in size S0
- Version for soft starting single-phase motors of sizes S0, S2 and S3.

SIRIUS 3RW30/31 for three-phase motors

Soft starters rated up to 55 kW (at 400 V) for standard applications in three-phase networks. Extremely small sizes, low power losses and simple commissioning are just a few of the many advantages of this soft starter. The special feature of the 3RW31 series is that it allows independent definition of two separate acceleration ramps (Dahlander motors).

SIRIUS 3RW30 for single-phase motors

The additional version for standard applications in single-phase networks. Its voltage edge function reduces the motor's inrush current and effectively lowers the torque at the point of starting up, which protects the load and the supplying network.

Area of application

The SIRIUS solid-state soft starters are suitable for soft starting and stopping of three-phase asynchronous machines.

Due to two-phase control, the current is kept at minimum values in all three phases throughout the entire starting time. Due to continuous voltage influencing, current and torque peaks, which are unavoidable in the case of star-delta starters, for instance, do not occur.

Service range
Pumps, compressors, conveyors, and much more.

Functions

- Soft starting with voltage ramp; the starting voltage adjustment range U_S is 40 % to 100 % and the ramp time t_R can be set from 0 s to 20 s.
- Smooth ramp-down with voltage ramp; the running down time t_{off} can be set between 0 s to 20 s. Whereby the switch-off voltage U_{off} is dependent on the selected starting voltage U_S.
- Setting with three potentiometers
- Simple mounting and commissioning
- Mains voltages at 50/60 Hz 200 V to 575 V
- Two control voltage versions are available: AC/DC 24 V and AC/DC 110 V to 230 V
- Wide temperature range from -25 °C to +60 °C
- Integrated bypass contacts to minimize dissipated power.
- Two built-in auxiliary contacts in sizes S0, S2 and S3 ensure user-friendly control and possible further processing within the system (for additional graphs, see page 3/52).

Technical specifications

Type		3RW30 03	3RW3 . ..-1.B0.	3RW3 . ..-1.B1.
Control electronics				
Rated control supply voltage	V	AC/DC 24 ... 230 (± 10 %)	AC/DC 24 (+10 %/-15 %)	AC/DC 110 ... 230 (+10 %/-15 %)
Rated control supply current without fan/with fan	mA	25 ... 4	approx. 50/approx. 180	approx. 25 ... 20/ approx. 85 ... 80
Rated frequency for AC	Hz	50/60 ± 10 %		
Starting time	s	0 ... 20 (variable)		
Starting voltage	%	40 ... 100 (variable)		
Ramp-down time	s	0 ... 20 (variable)		

Type			3RW30 03	3RW3 . ..-1.B.4	3RW3 . ..-1.B.5	3RW30 ..-1AA12
Power electronics						
Rated operating voltage		V	AC/DC 200 ... 400, 3-phase (± 10 %)	AC 200 ... 460 3-phase (± 10 %)	AC 460 ... 575 3-phase (± 10 %)	AC 115 ... 240 1-phase (± 10 %)
Rated frequency		Hz	50/60 ± 10 %			
Permissible installation altitude	Reduction of I_e					
	• up to 1000 m above sea level	%	100			
	• up to 2000 m above sea level	%	92			
	• up to 3000 m above sea level	%	85			
	• up to 4000 m above sea level[1]	%	78			
Mounting position	without auxiliary fan		The soft starters have been designed for operation on a vertical mounting surface (+10°/-10°).			
	with auxiliary fan		-	Any mounting position (except vertical, rotated by 180°)		

1) At an altitude from 3000 m, the max. permissible operating voltage for all 3RW30 is reduced to 460 V.

Type Size			3RW30 03	3RW30 1. S00	3RW30 2. S0	3RW30 3. S2	3RW30 4. S3
Continuous operation (% of I_e)		%	100				
Minimum load[1] (% of I_e); at 40 °C		%	9	4			
Permissible ambient temperature	Operation Storage	°C °C	-25 ... +60 (derating from 40 °C, see load rating) -25 ... +80				
Switching capacity of the auxiliary contacts	230 V/AC-15 230 V/DC-13 24 V/DC-13	A A A	No auxiliary contacts available		3 0.1 1	3 0.1 1	3 0.1 1

1) The rated motor current (specified on the motor's name plate) should at least amount to the specified percentage of the SIRIUS soft starter's rated operational current I_e.

Type			3RW30 03	3RW30 14	3RW30 16	3RW3. 24	3RW3. 25	3RW3. 26
Load rating								
Rated operating current I_e								
• Acc. to IEC for individual mounting	at 40/50/60 °C, AC-53b	A	-	6/5/4	9/8/7	12.5/11/9	16/14/12	25/21/18
• Acc. to UL/CSA for individual mounting	at 40/50/60 °C, AC-53b	A	-	4.8/4.8/4	7.8/7.8/7	11/11/9	17.5/14/12	25/21/18
• Acc. to IEC/UL/CSA for individual mounting	at 40/50/60 °C, AC-53a	A	3/2.6/2.2	-				
• acc. to IEC/UL/CSA for side-by-side mounting	at 40/50/60 °C, AC-53a	A	2.6/2.2/1.8	-				
Power loss								
at continuous rated operating current (40 °C) approx. at utilization of max. operating frequency (40 °C) approx.		W W	6.5 3	5 5	7 6	7 7	9 8	13 9
Permissible starts per hour without using a fan								
for intermittent duty S4, T_u = 40 °C, individual mounting vertical ON-period = 30 % ON-period = 70 %		1/h % I_e/s % I_e/s	1500 - 300/0.2	60 250/2 -	40	30 300/2		12
Permissible starts per hour when using a fan								
for intermittent duty S4, T_u = 40 °C, individual mounting, ON-period = 30 %		1/h	Fans cannot be fitted			54		21
Pause intervals after continuous duty								
with I_e before a new start		s	0					200
Degree of protection	acc. to IEC 60529		IP20 (IP00 terminal enclosure)					
Maximum conductor length between soft starter and motor		m	100[1]					
Conductor cross-sections								
Screw-type terminals	**Main conductors**							
(1 or 2 conductor connections) for standard screw driver size 2 and Pozidriv 2	• Solid	mm²	1 x (0.5 ... 4); 2 x (0.5 ... 2.5)	2 x (0.5 ... 1.5); 2 x (0.75 ... 2.5)		2 x (1 ... 2.5); 2 x (2.5 ... 6)		
	• Finely stranded with end sleeve	mm²	1 x (0.5 ... 2.5); 2 x (0.5 ... 1.5)	2 x (0.5 ... 2.5)		2 x (1 ... 2.5); 2 x (2.5 ... 6)		
	• Stranded	mm²	-	-		-		
	• AWG conductors, solid or stranded	AWG	2 x (20 ... 14)	2 x (18 ... 14)		2 x (14 ... 10)		
	• Terminal screws		M3, PZ2			M4, PZ2		
	- Tightening torque	Nm lb.in	0.8 ... 1.2 7.1 ... 8.9	7 ... 10.3		2 ... 2.2 18 ... 22		
	Auxiliary conductors							
	• Solid	mm²	1 x (0.5 ... 4); 2 x (0.5 ... 2.5)	2 x (0.5 ... 1.5); 2 x (0.75 ... 2.5) to IEC 60947; max. 2 x (0.75 ... 4)				
	• Finely stranded with end sleeve	mm²	1 x (0.5 ... 2.5); 2 x (0.5 ... 1.5)	2 x (0.5 ... 1.5); 2 x (0.75 ... 2.5)				
	• AWG conductors, solid or stranded	AWG	2 x (20 ... 14)	2 x (18 ... 14)				
	• Terminal screws		M3, PZ2					
	- Tightening torque	Nm lb.in	0.8 ... 1.2 7 ... 8.9	0.8 ... 1 7.1 ... 8.9				
Spring-loaded terminals	**Main and auxiliary conductors**							
	• Solid	mm²	2 x (0.25 ... 1.5)	-				
	• Finely stranded with end sleeve	mm²	2 x (0.25 ... 1)	-				
	• AWG conductors, solid or stranded	AWG	2 x (24 ... 16)	-				

1) If this value is exceeded, problems with line capacities may arise, which can result in false firing.

SIRIUS soft starters

Type			3RW30 34	3RW30 35	3RW30 36	3RW30 44	3RW30 45	3RW30 46
Power electronics								
Load rating								
Rated operating current I_e								
• Acc. to IEC for individual mounting	at 40/50/60 °C, AC-53b	A	32/27/23	38/32/27	45/38/32	63/54/46	75/64/54	100/85/72
• Acc. to UL/CSA for individual mounting	at 40/50/60 °C, AC-53b	A	27/27/23	34/32/27	42/38/32	62/54/46	68/64/54	99/85/72
Power loss								
at continuous rated operating current (40 °C) approx.		W	10	13	17	13	16	26
at utilization of max. operating frequency (40 °C) approx.		W	11	11	10	18	29	26
Permissible starts per hour when not using a fan								
for intermittent duty S4, T_u = 40 °C, individual mounting vertical		1/h	20	15	5	20	30	15
ON-period = 30 %		% I_e/s	300/3			300/4		
Permissible starts per hour when using a fan								
for intermittent duty S4, T_u = 40 °C, individual mounting, ON-period = 30 %		1/h	44	27	9	32	48	24
Pause intervals after continuous duty with I_e before a new start		s	0		400	0		
Protection	acc. to IEC 60529		IP20 (IP00 terminal enclosure)			IP20[1)]		
Maximum conductor length between soft starter and motor		m	100[2)]					
Conductor cross-sections								
Screw-type terminals	**Main conductors**							
(1 or 2 conductor connections) for standard screw driver size 2 and Pozidriv 2	• Solid	mm²	2 x (0.75 ... 16)					
	• Finely stranded with end sleeve	mm²	2 x (0.75 ... 16) 1 x (0.75 ... 25)					
	• Stranded	mm²	2 x (0.75 ... 25) 1 x (0.75 ... 35)			2 x (10 ... 50) 1 x (10 ... 70)		
	• AWG conductors, solid or stranded	AWG	2 x (18 ... 3); 1 x (18 ... 2)			2 x (10 ...1/0) 1 x (10 ... 2/0)		
	• Terminal screws		M6, box terminal, PZ2			M6 (Inbus)		
	- Tightening torque	Nm	3 ... 4.5			4 ... 6		
		lb.in	27 ... 40			35 ... 53		
	Auxiliary conductors							
	• Solid	mm²	2 x (0.5 ... 1.5); 2 x (0.75 ... 2.5) accord. to IEC 60947; max. 2 x (0.75 ... 4)					
	• Finely stranded with end sleeve	mm²	2 x (0.5 ... 1.5); 2 x (0.75 ... 2.5)					
	• AWG conductors, solid or stranded	AWG	2 x (18 ... 14)					
	• Terminal screws		M3					
	- Tightening torque	Nm	0.8 ... 1					
		lb.in	7.1 ... 8.9					

1) IP20 only with installed box terminal ('as-delivered').
Without box terminal IP00.

2) If this value is exceeded, problems with line capacities may arise, which can result in false firing.

	Standard	Parameters
Electromagnetic compatibility acc. to EN 60947-4-2		
EMC interference immunity		
Electrostatic discharge (ESD)	IEC 61000-4-2	Degree of severity 3: 6/8 kV
Electromagnetic RF fields	IEC 60947-4-2	Frequency range: 80 ... 1000 MHz with 80 % at 1 kHz Degree of severity 3, 10 V/m
Conducted RF interference	IEC 61000-4-6 IEC 60947-4-2 SN-IACS	Frequency range: 80 ... 1000 MHz with 80 % at 1 kHz 10 V at 0.15 ... 80 MHz 3 V at 10 kHz ... 80 MHz
Burst	IEC 61000-4-4	Degree of severity 3: 1/2 kV
Surge	IEC 61000-4-5	Degree of severity 3: 1/2 kV
EMC emitted interference		
EMC interference field strength	CISPR 11/09. 1990	Class B limit at 30 ... 1000 MHz
Radio interference voltage	CISPR 11/09. 1990 IEC 60 947-4-2	(0.15 ... 30 MHz): Device Class A (industrial)

Is an RI suppression filter necessary?

	24 V AC/DC control voltage		110 ... 240 V AC/DC control voltage	
	Main circuit	Control circuit	Main circuit	Control circuit
Degree of noise suppression A (industrial applications)	No	No	No	No
Degree of noise suppression B (applications for residential areas)	No	No	Yes 2)3) (see table of recommended filters)	Yes 1)2)3)

1) "No" only applies if the control voltage is taken from the main circuit downstream of the RI suppression filter.

2) It may be preferable to use a device with 24 V AC/DC control voltage here; in that case the control voltage must be adapted with a transformer.

3) No suppression filter is required for 3RW30 03.

Soft starter type	Rated current	Recommended filters					
	Soft starter	Voltage range 200 ... 460 V			Voltage range 460 ... 575 V		
		Filter type	Rated current filter	Connection terminals	Filter type	Rated current filter	Connection terminals
	A		A	mm^2		A	mm^2
3RW30 14	6	B84143-G8-R110	8	4	-	-	-
3RW30 16	9	B84143-G20-R110	20	4	-	-	-
3RW30 24	12.5	B84143-G20-R110	20	4	B8413-A25-R21	25	10
3RW30 25	16	B84143-G20-R110	20	4	B8413-A25-R21	25	10
3RW30 26	25	B84143-G36-R110	36	6	B8413-A25-R21	25	10
3RW30 34	32	B84143-G36-R110	36	6	B8413-A36-R21	36	10
3RW30 35	38	B84143-G36-R110	36	6	B8413-A36-R21	36	10
3RW30 36	45	B84143-G50-R110	50	6	B8413-A50-R21	50	10
3RW30 44	63	B84143-G66-R110	66	25	B8413-A80-R21	80	25
3RW30 45	75	B84143-G120-R110	120	50	B8413-A80-R21	80	25
3RW30 46	100	B84143-G120-R110	120	50	B8413-A120-R21	120	50

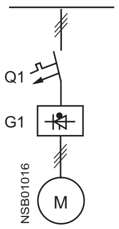
Contact address:
The suppression filters mentioned above can be ordered from EPCOS AG (see Appendix –> External Partners).

3

Fuse assignment

The coordination type to which the motor feeder with soft starter is mounted depends on the application-specific requirements. Normally, fuseless mounting (combination of circuit-breaker and soft starter) is sufficient. If type 2 coordination is to be fulfilled, semiconductor fuses must be fitted in the motor feeder.

Fuseless version



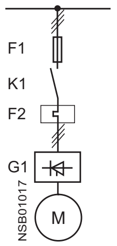
Soft starter Type G1	Circuit-breaker [1] Type Q1	Link module [2] Type
Type of coordination 1[3]: I_q = 50 kA at 400 V		
3RW30 03	3RV10 11	-
3RW30 14	3RV10 11	3RA19 11-1A
3RW30 16	3RV10 11	3RA19 11-1A
3RW30 24/3RW31 24	3RV10 21	3RA19 21-1A
3RW30 25/3RW31 25	3RV10 21	3RA19 21-1A
3RW30 26/3RW31 26	3RV10 21	3RA19 21-1A
3RW30 34	3RV10 31	3RA19 31-1A
3RW30 35	3RV10 31	3RA19 31-1A
3RW30 36	3RV10 31	3RA19 31-1A
3RW30 44	3RV10 41	3RA19 41-1A
3RW30 45	3RV10 41	3RA19 41-1A
3RW30 46	3RV10 41	3RA19 41-1A

1) The rated motor current defines the selection of units.

2) Pay attention to quantity units.

3) The types of coordination are explained in more detail under Load Feeders -> Fuseless Load Feeders.

Fused version (line protection only)



Soft starter Type G1	Line protection Type F1	Rated current A	Size	Overload relay Thermal type F2	Solid-state type	Contactor Type K1
Type of coordination 1[1]: I_q = 50 kA at 400 V						
3RW30 03	3NA3 805[2]	20	000	3RU11 16	3RB10 16	3RT10 15
3RW30 14	3NA3 807	20	000	3RU11 16[3]	3RB10 16[3]	3RT10 15
3RW30 16	3NA3 807	20	000	3RU11 16[3]	3RB10 16[3]	3RT10 16
3RW30 24/3RW31 24	3NA3 807	20	000	3RU11 26[4]	3RB10 26[4]	3RT10 24
3RW30 25/3RW31 25	3NA3 810	25	000	3RU11 26[4]	3RB10 26[4]	3RT10 25
3RW30 26/3RW31 26	3NA3 814	35	000	3RU11 26[4]	3RB10 26[4]	3RT10 26
3RW30 34	3NA3 822	63	000	3RU11 36[4]	3RB10 36	3RT10 34
3RW30 35	3NA3 822	63	000	3RU11 36[4]	3RB10 36	3RT10 35
3RW30 36	3NA3 824	80	000	3RU11 36[4]	3RB10 36	3RT10 36
3RW30 44	3NA3 830	100	000	3RU11 46[4]	3RB10 46	3RT10 44
3RW30 45	3NA3 132	125	1	3RU11 46[4]	3RB10 46	3RT10 45
3RW30 46	3NA3 140	200	1	3RU11 46[4]	3RB10 46	3RT10 46

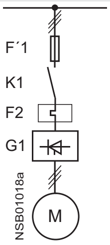
1) The types of coordination are explained in more detail under Load Feeders -> Fuseless Load Feeders.

2) 3NA38 05-1 (NH00), 5SB26 1 (DIAZED), 5SE22 01-06 (NEOZED).

3) I_q = 50 kA up to max. of 400 V.

4) I_q = 50 kA up to max. of 500 V.

Fused version with 3NE1 SITOR fuses (semiconductor and line protection[1])



Soft starter	All-range fuse		
Type	Type	Rated current	Size
G1	F'1	A	
Type of coordination 2[2]: I_q = 50 kA at 400 V/500 V			
3RW30 03	3NE1 813-0[3]	16	000
3RW30 14	3NE1 814-0[4]	20	000
3RW30 16	3NE1 815-0[5]	25	000
3RW30 24/3RW31 24	3NE1 815-0[5]	25	000
3RW30 25/3RW31 25	3NE1 815-0[5]	25	000
3RW30 26/3RW31 26	3NE1 802-0[5]	40	000
3RW30 34	3NE1 818-0[5]	63	000
3RW30 35	3NE1 820-0[5]	80	000
3RW30 36	3NE1 820-0[5]	80	000
3RW30 44	3NE1 820-0[5]	80	000
3RW30 45	3NE1 821-0[5]	100	00
3RW30 46	-[6]	-	-

1) Contactor and overload relay as in "Fused version (line protection only)" table.

2) The types of coordination are explained in more detail under Load Feeders -> Fuseless Load Feeders.

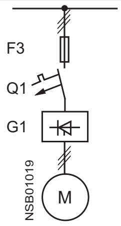
3) No SITOR fuse required!
Alternatively: 3NA38 03 (NH00), 5SB22 1 (DIAZED), 5SE22 06 (NEOZED).

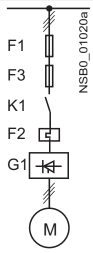
4) Fuse coordination for up to 400 V.

5) Fuse coordination for up to 500 V.

6) Fuse coordination with all-range fuses not possible; it may be necessary to use a pure semiconductor protection fuse plus a circuit-breaker.

Fused version with 3NE8 SITOR fuses[1] (semiconductor protection by fuse, lead and overload protection by circuit-breaker; alternatively, installation with contactor and overload relay possible)





Soft starter	Semiconductor protection fuse			Circuit-breaker [2]	Link module[3]
Type	Type	Rated current	Size	Type	Type
G1	F3	A		Q1	
Type of coordination 2[4]: I_q = 50 kA at 400 V					
3RW30 03	3NE8 015-1	25	00	3RV10 11[5]	3RA19 11-1A
3RW30 14	3NE8 003-1	35	00	3RV10 11	3RA19 11-1A
3RW30 16	3NE8 003-1	35	00	3RV10 11	3RA19 11-1A
3RW30 24/3RW31 24	3NE8 003-1	35	00	3RV10 21	3RA19 21-1A
3RW30 25/3RW31 25	3NE8 003-1	35	00	3RV10 21	3RA19 21-1A
3RW30 26/3RW31 26	-[6]	-	-	-	-
3RW30 34	3NE8 022-1	125	00	3RV10 31	3RA19 31-1A
3RW30 35	3NE8 024-1	160	00	3RV10 31	3RA19 31-1A
3RW30 36	3NE8 024-1	160	00	3RV10 31	3RA19 31-1A
3RW30 44	3NE8 024-1	160	00	3RV10 41	3RA19 41-1A
3RW30 45	3NE8 024-1	160	00	3RV10 41	3RA19 41-1A
3RW30 46	3NE8 024-1	160	00	3RV10 41	3RA19 41-1A

1) Contactor and overload relay as above.

2) The rated motor current defines the selection of units.

3) Pay attention to quantity units.

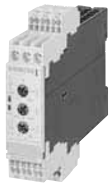
4) The types of coordination are explained in more detail under Load Feeders -> Fuseless Load Feeders.

5) No SITOR fuse required!
Alternatively: 3NA38 03 (NH00), 5SB22 1 (DIAZED), 5SE22 06 (NEOZED).

6) Fuse coordination with semiconductor protection fuses not possible; it may be necessary to use pure 3NE1..-0 all-range fuses or the next highest soft starter.

SIRIUS soft starters

Selection and ordering data


3RW30 03-2CB54


3RW30 25-1AB14


3RW30 35-1AB14


3RW30 35-1AA12

Rated operating voltage U_e	At ambient temperature 40 °C: Rated operating current I_e	Rated output of three-phase induction motors for rated operating voltage U_e				At ambient temperature 50 °C: Rated operating current I_e	Rated output of three-phase induction motors for rated operating voltage U_e					Size	DT	Order No.	PS*	Weight per PU approx.
		115 V	230 V	400 V	500 V		115 V	200 V	230 V	460 V	575 V					
V	A	kW	kW	kW	kW	A	hp	hp	hp	hp	hp					kg
Soft starters for easy starting conditions and high operating frequency																
200 ... 400	3	-	0.55	1.1	-	2.6	-	0.5	0.5	-	-		▶	**3RW30 03-☐CB54**	1 unit	0.200
	Order No. extension for connection method[1]															
	with screw-type terminals											22.5 mm		**1**		
	with spring-loaded terminals											22.5 mm		**2**		
Soft starters for three-phase asynchronous motors																
200 ... 460	6	-	1.5	3	-	4.8	-	1	1	3	-	**S00**	▶	**3RW30 14-1CB☐4**	1 unit	0.302
	9	-	2.2	4	-	7.8	-	2	2	5	-	**S00**	▶	**3RW30 16-1CB☐4**	1 unit	0.305
	12.5	-	3	5.5	-	11	-	3	3	7.5	-	**S0**	▶	**3RW30 24-1AB☐4**	1 unit	0.490
	16	-	4	7.5	-	14	-	3	3	10	-	**S0**	▶	**3RW30 25-1AB☐4**	1 unit	0.481
	25	-	5.5	11	-	21	-	5	5	15	-	**S0**	▶	**3RW30 26-1AB☐4**	1 unit	0.489
	32	-	7.5	15	-	27	-	7.5	7.5	20	-	**S2**	▶	**3RW30 34-1AB☐4**	1 unit	0.794
	38	-	11	18.5	-	32	-	10	10	25	-	**S2**	▶	**3RW30 35-1AB☐4**	1 unit	0.779
	45	-	11	22	-	38	-	10	15	30	-	**S2**	▶	**3RW30 36-1AB☐4**	1 unit	0.791
	63	-	18.5	30	-	54	-	15	20	40	-	**S3**	▶	**3RW30 44-1AB☐4**	1 unit	1.660
	75	-	22	37	-	64	-	20	25	50	-	**S3**	▶	**3RW30 45-1AB☐4**	1 unit	1.800
	100	-	30	55	-	85	-	25	30	60	-	**S3**	▶	**3RW30 46-1AB☐4**	1 unit	1.810
460 ... 575	12.5	-	-	-	7.5	11	-	-	-	7.5	10	**S0**	▶	**3RW30 24-1AB☐5**	1 unit	0.490
	16	-	-	-	11	14	-	-	-	10	10	**S0**	▶	**3RW30 25-1AB☐5**	1 unit	0.489
	25	-	-	-	15	21	-	-	-	15	20	**S0**	▶	**3RW30 26-1AB☐5**	1 unit	0.489
	32	-	-	-	18.5	27	-	-	-	20	25	**S2**	▶	**3RW30 34-1AB☐5**	1 unit	0.791
	38	-	-	-	22	32	-	-	-	25	30	**S2**	▶	**3RW30 35-1AB☐5**	1 unit	0.793
	45	-	-	-	30	38	-	-	-	30	40	**S2**	▶	**3RW30 36-1AB☐5**	1 unit	0.792
	63	-	-	-	37	54	-	-	-	40	50	**S3**	▶	**3RW30 44-1AB☐5**	1 unit	1.660
	75	-	-	-	55	64	-	-	-	50	60	**S3**	▶	**3RW30 45-1AB☐5**	1 unit	1.810
	100	-	-	-	70	85	-	-	-	60	75	**S3**	2) ▶	**3RW30 46-1AB☐5**	1 unit	1.800
	Order No. extension for rated control supply voltage U_s															
	AC/DC 24 V													**0**		
	AC/DC 110 ... 230 V													**1**		
Soft starters with two-ramp control for three-phase induction motors with two speeds (double pole-reversing)																
	Rated control supply voltage U_s AC 110 ... 230 V															
200 ... 460	12.5	-	3	5.5	-	11	-	3	3	7.5	-	**S0**	A	**3RW31 24-1CB14**	1 unit	0.468
	16	-	4	7.5	-	14	-	3	3	10	-	**S0**	A	**3RW31 25-1CB14**	1 unit	0.475
	25	-	5.5	11	-	21	-	5	5	15	-	**S0**	A	**3RW31 26-1CB14**	1 unit	0.464
460 ... 575	12.5	-	-	-	7.5	11	-	-	-	7.5	10	**S0**	A	**3RW31 24-1CB15**	1 unit	0.467
	16	-	-	-	7.5	14	-	-	-	10	10	**S0**	C	**3RW31 25-1CB15**	1 unit	0.476
	25	-	-	-	15	21	-	-	-	15	20	**S0**	A	**3RW31 26-1CB15**	1 unit	0.475
Soft starters for single-phase motors																
115 ... 240	25	2.2	4	-	-	21	1.5	3	3	-	-	**S0**	▶	**3RW30 26-1AA12**	1 unit	0.439
	38	3	5.5	-	-	32	2	5	5	-	-	**S2**	A	**3RW30 35-1AA12**	1 unit	0.729
	75	5.5	11	-	-	64	5	10	10	-	-	**S3**	A	**3RW30 45-1AA12**	1 unit	1.390

1) The units will be converted to "removable terminal" starting mid-2004.

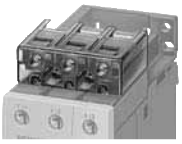
2) 3RW30 46-1AB05 soft starters (AC/DC 24 V version): Delivery time on request.

Selection of the soft starter depends on the motor's rated current.

The SIRIUS 3RW3 solid-state soft starters are designed for easy starting conditions. $J_{Load} < 10 \times J_{Motor}$. In the event of deviating conditions or increased switching frequency, it may be necessary to choose a larger unit. Siemens recommends the use of the selection and simulation program Win-SIKOSTART. See Technical specifications for information about rated currents for ambient temperatures >40 °C.

* This quantity or a multiple thereof can be ordered.

Accessories

	For soft starters Type	Size	Version	DT	Order No.	PS*	Weight per PU approx. kg
Fans[1]							
 3RW39 26-8A  3RW39 36-8A	3RW3. 2. 3RW30 3. and 3RW30 4.	**S0** **S2** **S3**	To increase switching frequency and for unit mounting in positions different from the normal position. The fan is snapped into the enclosure from below. During operation, (control signal input "IN" at potential A1), the fan is running. After a stop, the fan continues to run for about another 60 minutes.	▶ ▶	**3RW39 26-8A** **3RW39 36-8A**	1 unit 1 unit	0.008 0.030
Covers							
	Terminal cover for box terminals						
 3RT19 36-4EA2	3RW30 3. 3RW30 4.	**S2** **S3**	Additional shock-hazard protection for fitting to box terminals (2 units required per contactor)	▶ ▶	**3RT19 36-4EA2** **3RT19 46-4EA2**	1 unit 1 unit	0.020 0.017
	Terminal cover for cable lug and busbar connection						
 3RT19 46-4EA1	3RW30 4.	**S3**	For complying with the phase clearances and as shock-hazard protection in the case of a distant box terminal (2 units required per contactor)	▶	**3RT19 46-4EA1**	1 unit	0.037

1) With internal soft starter power supply.

	Version	Functionality Functions	Application	DT	Order No.	PS*	Weight per PU approx. kg
Covering cap and plug-in lug (only for 3RW30 03)							
	**Sealable cap**	for securing against unauthorized maladjustment of setting knobs	for units with 1 or 2 changeover contacts	▶	**3RP19 02**	5 units	0.019
	**Push-in lug** for screw fixing		for units with 1 or 2 changeover contacts	▶	**3RP19 03**	10 units	0.018

*** This quantity or a multiple thereof can be ordered.**

SIRIUS soft starters

Link modules


3RA19 11-1A


3RA19 21-1A

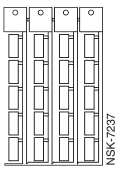

3RA19 31-1A

For soft starters Type	Size	Version	DT	Order No.	PS*	Weight per PU approx. kg
		Electrical and mechanical link between circuit-breaker and soft starter.				
Individually packaged						
3RW30 1..	**S00**		►	**3RA19 11-1AA00**	1 unit	0.027
3RW30 2..	**S0**		►	**3RA19 21-1AA00**	1 unit	0.037
3RW30 3..	**S2**		►	**3RA19 31-1AA00**	1 unit	0.042
3RW30 4..	**S3**		►	**3RA19 41-1AA00**	1 unit	0.090
Multi-pack						
3RW30 1..	**S00**		►	**3RA19 11-1A**	10 units	0.193
3RW30 2..	**S0**		►	**3RA19 21-1A**	10 units	0.276
3RW30 3..	**S2**		►	**3RA19 31-1A**	5 units	0.163
3RW30 4..	**S3**		►	**3RA19 41-1A**	5 units	0.366

Note:
The covers and connection modules listed here are also used for load feeders (3RV circuit-breaker + 3RT contactor).

For further technical specifications see Controlgear –> Contactors and contactor assemblies.
For fuseless load feeders with size S00 soft starter, the link module has an integrated conductor routing.

Blank labeling plates



Item code labels
1 frame = 20 labels

Designation	Labeling area/color W x H mm x mm	DT	Order No.	PS*	Weight per PU approx. kg
Item code labels for "SIRIUS" [1)]	20 x 7 pastel turquoise	A	**3RT19 00-1SB20**	340 units	0.067
"SIRIUS" labels for sticking	19 x 6 pastel turquoise	D	**3RT19 00-1SB60**	4700 units	0.003
	19 x 6 zinc yellow	C	**3RT19 00-1SD60**	4700 units	0.003

1) Computer labeling system for individual labeling of device labeling plates available from:
murrplastik Systemtechnik GmbH (see Appendix –> External Partners).

*** This quantity or a multiple thereof can be ordered.**

AS-Interface load feeder modules

3RK14 00-1KG01-0AA1
3RK14 00-1MG01-0AA1

Support with mounted power connector coupling

3RK19 01-0NA00
3RK19 01-0PA00

For soft starters Type	Version		DT	Order No.	PS*	Weight per PU approx. kg
	AS-Interface load feeder modules for mounting onto standard mounting rails Sizes S00 and S0 For mounting onto 40 mm or 60 mm busbar systems and SIRIUS standard rail adapters, the matching support is required (see 3RK1 901-3GA00) The AS-Interface connectors for the data and auxiliary power cable (yellow and black) must be ordered separately (see 3RK1 901-0.A00)					
	2 inputs/1 output/DC 24 V 1)		►	**3RK1 400-1KG01-0AA1**	1 unit	0.097
	4 inputs/2 outputs/DC 24 V 1)		►	**3RK1 400-1MG01-0AA1**	1 unit	0.100
	2 inputs/1 relay output/AC 120/230 V 2)		►	**3RK1 402-3KG02-0AA1**	1 unit	0.124
	3 inputs/2 relay outputs AC 120/230 V 2)		►	**3RK1 402-3LG02-0AA1**	1 unit	0.134
	Manual for AS-Interface load feeder module					
	German, English		►	**3RK1 701-2GB00-0AA0**	1 unit	0.197
	Italian, French		A	**3RK1 701-2HB00-0AA0**	1 unit	0.196
	Support for AS-Interface load feeder module					
	for mounting onto 3RA19 22-1A SIRIUS standard mounting rail adapter	45 mm	X	**3RK1 901-3GA00**	1 unit	0.048
	Power connector set 5-pin, 2.5 mm^2 (1 package = 5 connectors and 5 couplers)		A	**3RK1 901-0EA00**	5 units	0.111
	AS-Interface connector for data and auxiliary supply cables					
	with overlapping terminals for 2 x (0.5 to 0.75 mm^2) flexible lead	yellow	►	**3RK1 901-0NA00**	5 units	0.015
	with overlapping terminals for 2 x (0.5 to 0.75 mm^2) flexible lead	black	►	**3RK1 901-0PA00**	5 units	0.015

Standard mounting rail adapter

3RA19 22

For soft starters Type	Version		DT	Order No.	PS*	Weight per PU approx. kg
3RW30 1.	**Standard mounting rail adapter** for mechanical mounting of circuit-breaker and contactor; can be snapped onto standard rail or for screw mounting, suitable for size S00		►	**3RA19 22-1A**	5 units	0.474

Surge suppressor - RC element for PLC control

3TX7 462-3.

For soft starters Type	Version		DT	Order No.	PS*	Weight per PU approx. kg
	RC element For lateral snapping onto auxiliary switch or 35 mm standard mounting rail	AC 127 V ... 240 V	►	**3TX7 462-3T**	1 unit	0.080

1) Without connectors for data and auxiliary power (yellow and black).

2) With one connector each for data and auxiliary power (yellow and red).

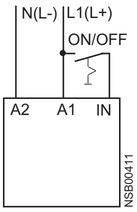
For busbar accessories, see Load feeders –> Busbar Adapter System.

3

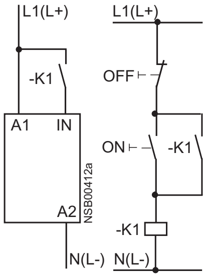
Circuit diagrams

Connection examples for actuation with switches or auxiliary contacts

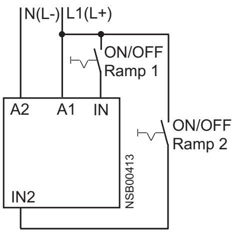
Control via switch



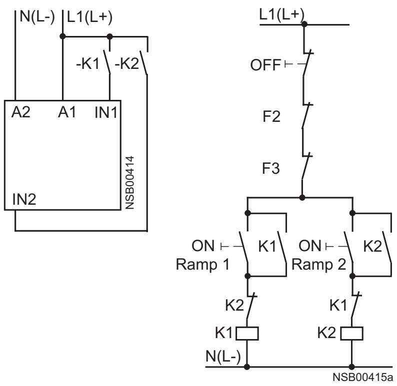
Control via contactor contacts (for control of size S00 with buttons)



Control via contacts in versions for pole-changing motors (for 3RW31 soft starters only)

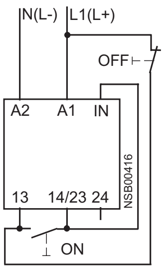


Control via contactor contacts in versions for pole-changing motors (for 3RW31 soft starters only)



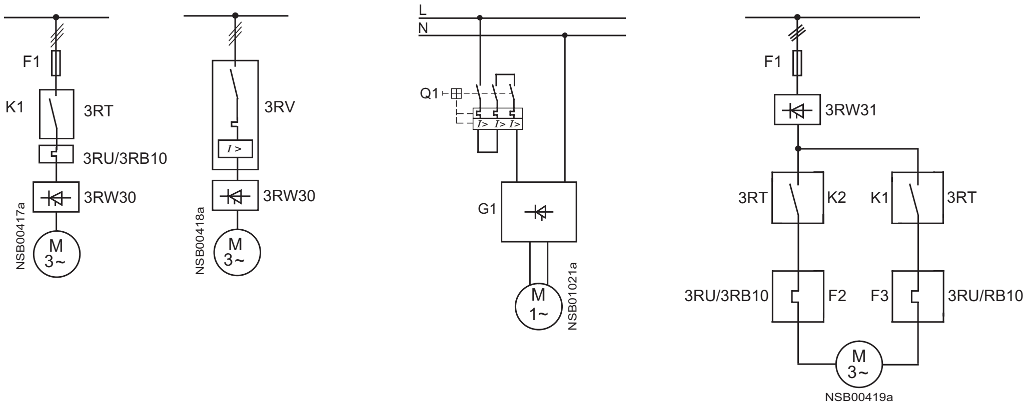
Connection example for control with pushbuttons

(sizes S0, S2, and S3 only)



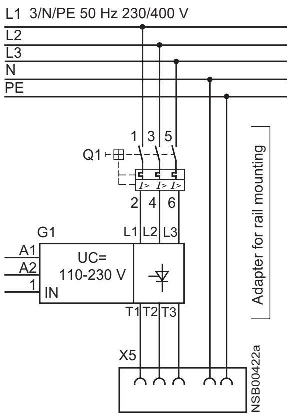
Connection examples for main circuit [1)]

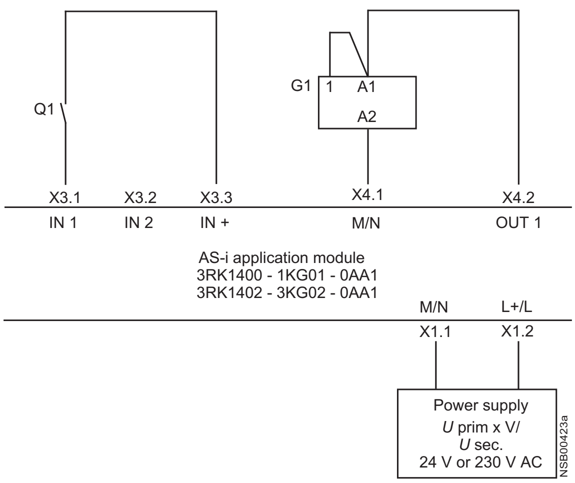
3RW30 – 3-ph. mot. with overload relay **3RW30 – 3-ph. mot. with circuit-breaker** **3RW30 – 1-ph. mot. with 3RV circuit-breaker** **3RW31**



Connection example for AS-Interface load feeder with SIRIUS soft starter

Main circuit **Control circuit**





Q1 = circuit-breaker
G1 = SIRIUS soft starter 3RW30 1.
X5 = power supply connector

1) As an alternative, the motor feeder can also be installed as a fuseless or as a fused version. For details of fuse and switching device coordination, see page 3/44 and 3/45. The wiring diagrams are provided only as examples.

3

Further information

Configuration

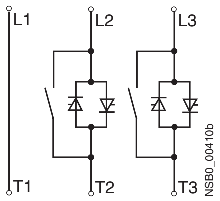
The 3RW solid-state soft starters are designed for easy starting conditions. In the event of deviating conditions or increased switching frequency, it may be necessary to choose a larger device. For accurate dimensioning, use the Win-SIKOSTART selection and simulation program.

If necessary, an overload relay for heavy-starting must be selected where long starting times are involved. PTC thermistor detectors are recommended. This also applies to smooth ramp-down. In this case an additional current load is effective compared with a free running down.

In the motor feeder between the SIRIUS 3RW3 soft starter and the motor, no capacitive elements are permitted (e.g. no compensation equipment).

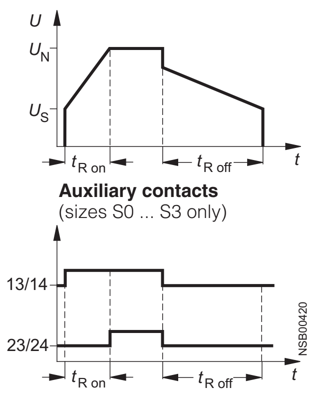
All elements of the main circuit (such as fuses, switching devices and overload relays) should be dimensioned for direct starting, following the local short-circuit conditions. Fuses, switching devices and overload relays must be ordered separately. Please observe the maximum switching frequencies specified in the technical specifications.

Power electronics circuit diagram[1)]

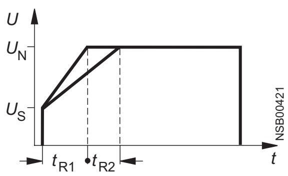


Status graphs

3RW30 – 3-ph. mot.



3RW31



1) Circuit diagram applies to sizes S0 and S2;
for size S00, phase L3 is bridged,
for size S3, phase L2 is bridged.

Control with a PLC

When a 3RW30 is operated with a Triac output or thyristor output, the residual current at the PLC output should be < 1 mA because otherwise the 3RW30 will interpret the resultant voltage drop at the input as an "On" command. As a corrective measure for PLC outputs with a higher residual current, an RC element with > 100 nF and 220 W can be connected in series between "IN1" and terminal "A2" of the 3RW30 (Order No.: 3TX7 462-3T see page 3/49).

Selection and simulation program Win-SIKOSTART

With this software, you can simulate and select all Siemens soft starters, taking into account various parameters such as mains properties, motor and load data, and special application requirements.

The software is a valuable tool, which makes complicated, lengthy manual calculations for determining the required soft starters superfluous.

You can order the CD-ROM under the following order number:

Order No.: E20001-D1020-P302-X-7400.

For more information on the Internet go to
www.siemens.de/sanftstarter

Overview

SIKOSTART 3RW34

Just as easily as with the SIRIUS soft starters, three-phase asynchronous motors with rated operating power of up to 1000 kW (at 400 V) can be controlled with SIKOSTART 3RW34. Soft starting and soft deceleration are standard functions of this device. Fast commissioning, small sizes and simple installation are the key benefits here.

The devices can be operated with two different contact sequences:

- Inline circuit
- Inside-delta circuit

Area of application

The 3RW34 solid-state soft starters are suitable for soft starting and stopping of three-phase asynchronous motor.

Service range

Pumps, compressors, conveyors, and much more.

Functions

- Soft starting with voltage ramp; the starting voltage adjustment range U_S is 30 % to 80 % and the ramp time t_R can be set from 0.5 s to 60 s.
- Smooth ramp-down with voltage ramp; the running down time t_{off} can be set between 0.5 s to 60 s. Whereby the switch-off voltage U_{off} is dependent on the selected starting voltage U_S.
- Setting with three potentiometers
- Simple mounting and commissioning
- Mains voltages at 50/60 Hz 200 V to 600 V
- Three control voltage variants for DC 24 V, AC 115 V and AC 230 V
- Extended temperature range: 0 ... +60 °C

Technical specifications

Type				3RW34 ..-0DC2.	3RW34 ..-0DC3.	3RW34 ..-0DC4.
Control electronics						
Rated control supply voltage		X1/X2	V	24 DC +10 %/-15 %	115 V AC +10 %/-15 %	230 V AC +10 %/-15 %
Rated frequency			Hz	-	Operating range 45 ... 66	
Operating indications (continuous light)		LED 1 LED 2		Ready Starting terminated		
Interference/status indication **Flash mode 1** (flashing frequency 2 ... 3 Hz)		LED 1 LED 2		Missing phase Starting/running down		
Fault indications **Flash mode 2** (flashing frequency 2 ... 3 Hz with 1 s pause)		LED 1 LED 2		EEPROM parity fault Thyristor fault or no load connected		
Control input	Input 1	A1/A2		ON		
Control outputs	Output 1 Output 2 Output 3	13/14 27/28 37/38		Status indication (NO) Starting end indication (NO) Group fault signal (parameterizable via SW1)		
Current-carrying capacity of the control outputs (solid-state)	230 V/AC-15 24 V/DC-13		A A	1.0 0.5		

Type			3RW34 ..-0DC.4	3RW34 ..-0DC.5
Power electronics				
Operating range for inline circuit Rated voltage		V	200 ... 460 (-15 %/+10%)	400 ... 600 (-15 %/+10%)
Operating range for inside-delta circuit Rated voltage		V	200 ... 400 (-15 %/+10%)	400 ... 600 (-15 %/+10%)
Rated frequency		Hz	Operating range 45 ... 66	
Continuous operation at 40° C (% of I_e)		%	115 100 (for 3RW34 84 and 3RW34 86)	
Max. starting time for starting current (% of I_e)			To determine the best contactor for your application, Siemens recommends use of Win-SIKOSTART. (Order No. E2001-D1020-P302-X7400). This program is also contained on the CA01.	
Minimum load[1] (% of I_e)		%	4	
Permissible ambient temperature	Operation Storage	°C °C	0 ... +60 (derating from 40 °C, see load rating) 0 ... +70	
Permissible installation altitude			up to 3 000 m above sea level over 1000 m above sea level linear reduction of I_e, thus at 2000 m above sea level 0.87 x I_e and at 3000 m above sea level 0.77 x I_e	
Mounting position			The soft starters have been designed for operation on a vertical mounting surface (+12°/-12°).	
Maximum conductor length between soft starter and motor		m	300[2]	
Degree of protection			IP20 (connection terminals IP00)	

1) The rated motor current (specified on the motor's name plate) should amount to at least 4 % of the SIKOSTART unit's rated current I_e.

2) If this value is exceeded, problems with line capacities may arise, which can result in false firing.

SIKOSTART soft starters

Type			3RW34 54	3RW34 55	3RW34 57	3RW34 58	3RW34 65	3RW34 66
Load rating								
Rated operating current I_e 1)	at 40/50/60 °C, AC-53a	A	57/42/35	70/57/42	110/81/57	135/110/81	162/135/110	195/162/135
Power loss at rated operating current (40 °C) approx.		W	158	190	306	358	493	515
Permissible starts per hour for intermittent duty S4 T_u = 40 °C ON-period = 30 % and 300 % x I_e for 10 s		1/h	20					
Conductor cross-sections								
Screw-type terminals (1 or 2 conductor connections) for standard screw driver size 2 and Pozidriv 2	**Main conductors**							
	• Stranded	mm²	95			120	150	240
	Auxiliary conductors							
	• Solid	mm²	2 x (0.5 ... 1.5); 2 x (0.75 ... 2.5) accord. to IEC 60947; max. 2 x (0.75 ... 4)					
	• Finely stranded with end sleeve	mm²	2 x (0.5 ... 1.5); 2 x (0.75 ... 2.5)					
	• AWG conductors, solid or stranded	AWG	2 x (18 ... 14)					
	• Terminal screws		M 3					
	- Tightening torque	Nm	0.8 ... 1.2 (7 ... 10.3 lb.in)					
Rated control supply currents								
Control inputs	DC 24 V	mA	approx. 45					
	AC 230 V	mA	approx. 13					
Fans	DC 24 V	mA		approx. 400			approx. 200	
	AC 230 V	mA		approx. 200			approx. 140	

1) The rated operating current in the inline circuit is specified.

Type			3RW34 67	3RW34 72	3RW34 83	3RW34 84	3RW34 86
Load rating							
Rated operating current I_e 1)	at 40/50/60 °C, AC-53a	A	235/195/162	352/285/235	500/450/352	700/608/500	1050/865/726
Power loss at rated operating current (40 °C) approx.		W	629	1023	1425	2020	2949
Permissible starts per hour for intermittent duty S4 T_u = 40 °C ON-period = 30 % and 300 % x I_e for 10 s		1/h	20				
Conductor cross-sections							
Screw-type terminals (1 or 2 conductor connections) for standard screw driver size 2 and Pozidriv 2	**Main conductors**						
	• Stranded	mm²	240				
	Auxiliary conductors						
	• Solid	mm²	2 x (0.5 ... 1.5); 2 x (0.75 ... 2.5) accord. to IEC 60947; max. 2 x (0.75 ... 4)				
	• Finely stranded with end sleeve	mm²	2 x (0.5 ... 1.5); 2 x (0.75 ... 2.5)				
	• AWG conductors, solid or stranded	AWG	2 x (18 ... 14)				
	• Terminal screws		M 3				
	- Tightening torque	Nm	0.8 ... 1.2 (7 ... 10.3 lb.in)				
	Connecting busbar 2)		-		40 x 10		50 x 20
Rated control supply currents							
Control inputs	DC 24 V	mA	approx. 45				
	AC 230 V	mA	approx. 13				
Fans	DC 24 V	mA	approx. 200	approx. 450	approx. 700		
	AC 230 V	mA	approx. 140	approx. 280	approx. 420		

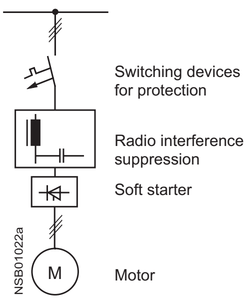
1) The rated operating current in the inline circuit is specified.

2) The busbars must not be connected directly to the soft starter. Flexible busbar connection pieces must be used for the connection.

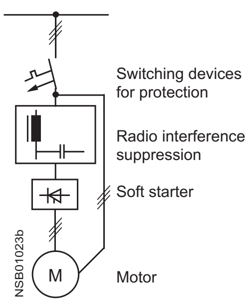
Radio interference suppression

	Standard	Parameters
Noise immunity		
Electrostatic discharge (ESD)	IEC 61000-4-2, EN 60947-4-2	Pulse shape: 1/60 ns Test severity 6 kV or 8 kV 4 kV charging voltage in the event of contact discharge 8 kV charging voltage in the event of air discharge
Electromagnetic RF fields	IEC 61000-4-3, EN 60647-4-2	Frequency range: 80 MHz ... 1000 MHz with 80 % at 1 kHz field strength 10 V/m
Conducted low-frequency interference (harmonics)	IEC 60 947-4-2	Frequency range: 50 Hz... 10 kHz
RF-voltages and RF-currents on conductors	IEC 61000-4-6, EN 60947-4-2	Frequency range: 80 MHz ...1000 MHz with 80 % at 1 kHz 10 V at 0.15 MHz ... 80 MHz
Burst	IEC 61000-4-4	Test severity: 2 kV or 1 kV
Surge	IEC 61000-4-5	Test severity: 2 kV or 1 kV
Emitted interference		
Radio interference field strength	CISPR 11/09.1990 EN 60947-4-2	H field: 150 kHz ... 30 MHz E field: 30 MHz ... 1000 MHz limit value of Class B at 30 MHz ... 1000 MHz
Radio interference voltage	CISPR 11/09.1990 EN 60947-4-2	Frequency range: 9 kHz ... 30 MHz (0.15 MHz ... 30 MHz): Unit Class A (industry) and unit Class B (public networks)

Example connections



Inline circuit



Inside-delta circuit

Is an RI suppression filter necessary?

	24 V DC control voltage		230 V AC control voltage	
	Main circuit	Control circuit	Main circuit	Control circuit
Degree of noise suppression A (industrial applications)	No	No	No	No
Degree of noise suppression B (applications for residential areas)	Yes (see table of recommended filters)	No	Yes (see table of recommended filters)	No

Soft starter type	Rated current soft starter	Recommended filters					
		Voltage range 200 ... 460 V			Voltage range 460 ... 600 V		
		Filter type	Rated current filter	Connection terminals	Filter type	Rated current filter	Connection terminals
	A		A	mm^2		A	mm^2
3RW34 54	57	B84143-G66-R110	66	25	B84143-A80-R21	80	25
3RW34 55	70	B84143-G66-R110	66	25	B84143-A80-R21	80	25
3RW34 57	110	B84143-G120-R110	120	50	B84143-A120-R21	120	50
3RW34 58	135	B84143-G150-R110	150	50	B84143-A150-R21	150	50
3RW34 65	162	B84143-G220-R110	220	95	B84143-A180-R21	180	95
3RW34 66	195	B84143-G220-R110	220	95	B84143-B250-S21	250	40 x 25 x 51)
3RW34 67	235	B84143-G220-R110	220	95	B84143-B250-S21	250	40 x 25 x 5[1)]
3RW34 72	352	B84143-B400-S20	400	40 x 25 x 5[1)]	B84143-B400-S21	400	40 x 25 x 5[1)]
3RW34 83	500	B84143-B600-S20	600	40 x 30 x 5[1)]	B84143-B600-S21	600	40 x 30 x 5[1)]
3RW34 84	700	B84143-B1000-S20	1000	50 x 40 x 8[1)]	B84143-B1000-S21	1000	50 x 40 x 8[1)]
3RW34 86	1050	B84143-B1000-S20	1000	50 x 40 x 8[1)]	B84143-B1000-S21	1000	50 x 40 x 8[1)]

1) Busbar connection: L x W x H

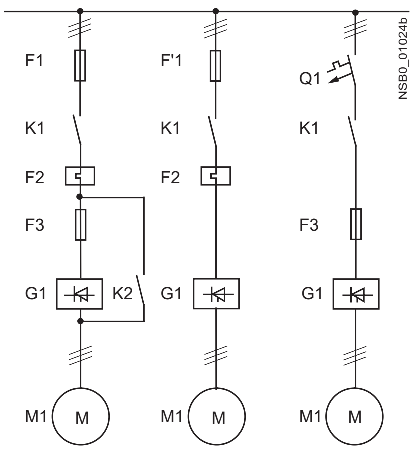
Contact address:
The suppression filters mentioned above can be ordered from EPCOS AG (see Appendix –> External Partners).

SIKOSTART soft starters

3

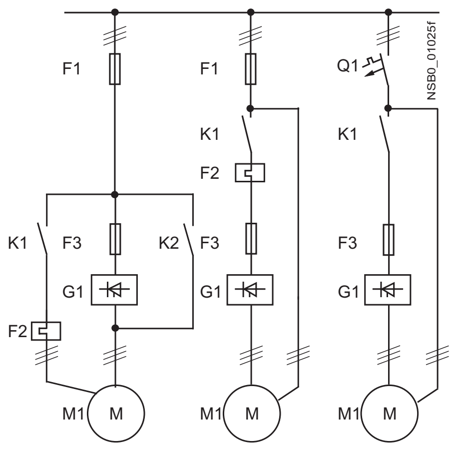
Circuit examples

Inline circuit



The all-range fuse F'1 (semiconductor and conductor protection) and semiconductor protection F3 must be selected with the aid of the fuse assignment table.

Inside-delta circuit



Important: When the inside-delta circuit is used, the sequence of the terminals must be precisely observed.

Soft starter type	Rated current A	Fuse, lead fuse F1 (type 1 coordination)	Line contactor acc. to AC-3[1] K1	Overload relay thermal F2	 electronic F2	Circuit-breaker for motor protection[2] Q1	Power electronics and bridging contactor acc. to AC-1[1] K2
Recommended motor feeders in inline circuit							
3RW34 54	57	3NA3 022	3RT10 36	3RU11 46	3RB10 46	3RV10 41	3RT10 35
3RW34 55	70	3NA3 024	3RT10 45	3RU11 46	3RB10 56	3RV10 41	3RT10 44
3RW34 57	110	3NA3 032	3RT10 54	-	3RB10 56	3VL27 16-. AP	3RT10 46
3RW34 58	135	3NA3 036	3RT10 55	-	3RB10 56	3VL27 16-. AP	3RT14 46
3RW34 65	162	3NA3 140	3RT10 56	-	3RB10 56	3VL37 20-. AP	3RT14 56
3RW34 66	195	3NA3 140	3RT10 64	-	3RB10 56	3VL37 25-. AP	3RT14 56
3RW34 67	235	3NA3 144	3RT10 65	-	3RB10 66	3VL37 25-. AP	3RT14 56
3RW34 72	352	3NA3 254[3]	3RT10 75	-	3RB10 66	3VL47 40-. AP	3RT14 66
3RW34 83	500	3NA3 365	3TF68	-	3RB10 66	3VL57 50-. AP	3RT14 76
3RW34 84	700	3NA3 475	3TF69	-	3RB12 62	3WL11 08-.EB	3RT14 76
3RW34 86	1050	3NA3 482	2 x 3TF68 (parallel)	-	-	3WL11 12-.EB	2 x 3TF68 (parallel)
Recommended motor feeders in inside-delta circuit							
3RW34 54	99	3NA3 032	3RT10 44	3RU11 46	3RB10 46	3VL27 16-.AP	3RT10 35
3RW34 55	121	3NA3 036	3RT10 45	3RU11 46	3RB10 46	3VL27 16-.AP	3RT10 44
3RW34 57	191	3NA3 142	3RT10 54	3UA6. 01	3RB12 53	3VL37 25-.AP	3RT10 46
3RW34 58	234	3NA3 144	3RT10 55	3UA61 01	3RB12 53	3VL37 25-.AP	3RT14 46
3RW34 65	281	3NA3 252	3RT10 56	3UA62 01	3RB12 53	3VL47 31-.AP	3RT14 56
3RW34 66	338	3NA3 254[3]	3RT10 64	3UA62 01	3RB12 53	3VL47 40-.AP	3RT14 56
3RW34 67	407	3NA3 365	3RT10 65	-	3RB12 57	3VL57 63-.AP	3RT14 56
3RW34 72	610	3NA3 472	3RT10 75	-	3RB12 57	3VL57 63-.AP	3RT14 66
3RW34 83	866	3NA3 480	3TF68	-	3RB12 57	3WL12 10-.EB	3RT14 76
3RW34 84	1212	3NA3 682	3TF69	-	3RB12 62	3WL12 12-.EB	3RT14 76
3RW34 86	1819	-	2 x 3TF68 (parallel)	-	-	3WL12 20-.EB	2 x 3TF68 (parallel)

1) Optional.

2) For SENTRON 3VL/3WL order number extension, see Circuit-breakers –> Circuit-breakers up to 500 A –> Compact (MCCB) SENTRON VL –> For motor/generator protection ETU.

3) See notes on low-voltage fuse links under Switch-disconnectors and fuses –> Fuses and fuse systems –> Low-voltage fuses.

Fuse assignment

Soft starter	Fuse design with 3NE1 SITOR fuses with full utilization[1] of the soft starter (semiconductor and lead protection)				Fuse design with 3NE3 SITOR fuses with full utilization[1] of the soft starter, lowest possible protection, age-free (semiconductor protection)			Fuse design with 3NE3 SITOR fuses with full utilization[1] of the soft starter, highest possible protection, age-free (semiconductor protection)		
	All-range fuse **F'1**				Semiconductor fuse **F3**			Semiconductor fuse **F3**		
Type	Type	Rated current A	Size	Required conductor cross-section for each fuse mm²	Type	Rated current A	Size	Type	Rated current A	Size
Type of coordination 2[3]: I_q = 50 kA at 400 V										
3RW34 54-0DC.4	3NE1 021-0	100	00	35	3NE3 222	125	1	3NE3 225	200	1
3RW34 55-0DC.4	3NE1 022-0	125	00	50	3NE3 224	160	1	3NE3 231	350	1
3RW34 57-0DC.4	3NE1 225-0	200	1	95	3NE3 225	200	1	3NE3 233	450	1
3RW34 58-0DC.4[2]	3NE1 227-0	250	1	120	3NE3 227	250	1	3NE3 333	450	2
3RW34 65-0DC.4	3NE1 230-0	315	1	2 x 70	3NE3 230-0B	315	1	3NE3 334-0B	500	2
3RW34 66-0DC.4	3NE1 230-0	315	1	2 x 70	3NE3 231	350	1	3NE3 336	630	2
3RW34 67-0DC.4	3NE1 332-0	400	2	2 x 95	3NE3 233	450	1	3NE3 340-8	900	2
3RW34 72-0DC.4	3NE1 435-0	560	3	2 x 150	3NE3 336	630	2	3NE3 340-8	900	2
3RW34 83-0DC.4	3NE1 438-0	800	3	2 x (50 x 5)[4]	3NE3 340-8	900	2	3NE3 340-8	900	2
3RW34 84-0DC.4	2 x 3NE1 435-0	2 x 560	3	2 x 150	2 x 3NE3 336	2 x 630	2	2 x 3NE3 340-8	2 x 900	2
3RW34 86-0DC.4[2]	2 x 3NE1 437-1	2 x 710	3	2 x (40 x 5)[4]	2 x 3NE3 340-8	2 x 900	2	2 x 3NE3 340-8	2 x 900	2

1) E.g. 3x I_e for 60 s.
2) E.g. 3x I_e for 30 s.
3) The types of coordination are explained in more detail under Load Feeders > Fuseless Load Feeders.
4) No direct connection to busbars.

Soft starter	Fuse design with 3NE1 SITOR fuses with full utilization[1] of the soft starter (semiconductor and lead protection)				Fuse design with 3NE3 SITOR fuses with full utilization[1] of the soft starter, lowest possible protection, age-free (semiconductor protection)			Fuse design with 3NE3 SITOR fuses with full utilization[1] of the soft starter, highest possible protection, age-free (semiconductor protection)		
	All-range fuse **F'1**				Semiconductor fuse **F3**			Semiconductor fuse **F3**		
Type	Type	Rated current A	Size	Required conductor cross-section for each fuse mm²	Type	Rated current A	Size	Type	Rated current A	Size
Type of coordination 2[3]: I_q = 50 kA at 575 V										
3RW34 54-0DC.5	3NE1 022-2	125	00	50	3NE3 222	125	1	3NE3 225	200	1
3RW34 55-0DC.5	3NE1 022-0	125	00	50	3NE3 224	160	1	3NE3 230-0B	315	1
3RW34 57-0DC.5	3NE1 225-0	200	1	95	3NE3 225	200	1	3NE3 233	415	1
3RW34 58-0DC.5[2]	3NE1 225-0	200	1	95	3NE3 227	250	1	3NE3 333	450	2
3RW34 65-0DC.5	3NE1 227-0	250	1	120	3NE3 230-0B	315	1	3NE3 334-0B	500	2
3RW34 66-0DC.5	3NE1 230-0	315	1	2 x 70	3NE3 231	350	1	3NE3 336	630	2
3RW34 67-0DC.5	3NE1 332-0	400	2	2 x 95	3NE3 233	450	1	3NE3 340-8	900	2
3RW34 72-0DC.5	3NE1 435-2	560	3	2 x 150	3NE3 336	630	2	3NE3 340-8	900	2
3RW34 83-0DC.5	3NE1 437-0	710	3	2 x (40 x 5)[4]	3NE3 340-8	900	2	3NE3 340-8	900	2
3RW34 84-0DC.5	2 x 3NE1 435-0	2 x 560	3	2 x 150	2 x 3NE3 336	2 x 630	2	2 x 3NE3 340-8	2 x 900	2
3RW34 86-0DC.5[2]	2 x 3NE1 437-2	2 x 710	3	2 x (40 x 5)[4]	2 x 3NE3 340-8	2 x 900	2	2 x 3NE3 340-8	2 x 900	2

1) E.g. 3x I_e for 60 s.
2) E.g. 3x I_e for 30 s.
3) The types of coordination are explained in more detail under Load Feeders > Fuseless Load Feeders.
4) No direct connection to busbars.

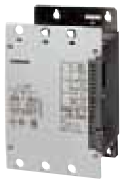
Note:
All selection data refer to inline circuits.
For selections for the inside-delta-circuit, please contact technical support.

Further information is available on the Internet at:
www.siemens.com/softstarter.

SIKOSTART soft starters

3

Selection and ordering data



Rated operating voltage U_e	At ambient temperature 40 °C Rated operating current I_e 1)	At ambient temperature 40 °C Rated output of three-phase motors for rated operating voltage U_e			At ambient temperature 50 °C Rated operating current I_e 1)	At ambient temperature 50 °C Rated output of three-phase motors for rated operating voltage U_e				DT 5)	Order No.	PS*	Weight per PU approx.
		230 V	400 V	500 V		200 V	230 V	460 V	575 V				
V	A	kW	kW	kW	A	hp	hp	hp	hp				kg
Inline circuit													
200 ... 460	57	15	30	-	42	10	15	30	-	A	**3RW34 54-0DC□4**	1 unit	8.460
	70	18.5	37	-	57	15	20	40	-	▶	**3RW34 55-0DC□4**	1 unit	10.000
	110	30	55	-	81	25	30	60	-	A	**3RW34 57-0DC□4**	1 unit	9.900
	135	37	75	-	110	30	40	75	-	A	**3RW34 58-0DC□4**	1 unit	9.870
	162	45	90	-	135	40	50	100	-	A	**3RW34 65-0DC□4**	1 unit	19.000
	195	55	110	-	162	50	60	125	-	A	**3RW34 66-0DC□4**	1 unit	19.100
	235	75	132	-	195	60	75	150	-	A	**3RW34 67-0DC□4**	1 unit	21.100
	352	110	200	-	285	100	100	200	-	A	**3RW34 72-0DC□4**	1 unit	36.300
	500	160	250	-	450	150	150	350	-	A	**3RW34 83-0DC□4**	1 unit	59.600
	700	200	400	-	608	200	250	500	-	A	**3RW34 84-0DC□4**	1 unit	59.600
	1050	315	560	-	865	300	350	750	-	D	**3RW34 86-0DC□4**	1 unit	95.100
400 ... 600	57	-	30	37	42	-	-	30	40	C	**3RW34 54-0DC□5**	1 unit	8.600
	70	-	37	45	57	-	-	40	50	C	**3RW34 55-0DC□5**	1 unit	10.000
	110	-	55	75	81	-	-	60	75	C	**3RW34 57-0DC□5**	1 unit	9.480
	135	-	75	90	110	-	-	75	100	C	**3RW34 58-0DC□5**	1 unit	7.650
	162	-	90	110	135	-	-	100	125	C	**3RW34 65-0DC□5**	1 unit	15.000
	195	-	110	132	162	-	-	125	150	C	**3RW34 66-0DC□5**	1 unit	15.000
	235	-	132	160	195	-	-	150	200	C	**3RW34 67-0DC□5**	1 unit	21.100
	352	-	200	250	285	-	-	200	300	C	**3RW34 72-0DC□5**	1 unit	37.000
	500	-	250	355	450	-	-	350	450	C	**3RW34 83-0DC□5**	1 unit	59.600
	700	-	400	500	608	-	-	500	700	C	**3RW34 84-0DC□5**	1 unit	59.600
	1050	-	560	710	865	-	-	750	1000	D	**3RW34 86-0DC□5**	1 unit	95.100
Inside-delta circuit													
200 ... 400	99	30	55	-	73	20	25	-	-	A	**3RW34 54-0DC□4**	1 unit	8.460
	121	37	55	-	99	30	30	-	-	▶	**3RW34 55-0DC□4**	1 unit	10.000
	191	55	110	-	140	40	50	-	-	A	**3RW34 57-0DC□4**	1 unit	9.900
	234	75	132	-	191	60	60	-	-	A	**3RW34 58-0DC□4**	1 unit	9.870
	281	90	160	-	234	75	75	-	-	A	**3RW34 65-0DC□4**	1 unit	19.000
	338	110	200	-	281	100	100	-	-	A	**3RW34 66-0DC□4**	1 unit	19.100
	407	132	250	-	338	100	125	-	-	A	**3RW34 67-0DC□4**	1 unit	21.100
	610	200	355	-	494	150	200	-	-	A	**3RW34 72-0DC□4**	1 unit	36.300
	866	250	500	-	779	250	300	-	-	A	**3RW34 83-0DC□4**	1 unit	59.600
	1212	400	710	-	1053	350	450	-	-	A	**3RW34 84-0DC□4**	1 unit	59.600
	1819	560	1000	-	1498	600	650	-	-	D	**3RW34 86-0DC□4**	1 unit	95.100
400 ... 600	99	-	55	55	73	-	-	50	75	C	**3RW34 54-0DC□5**	1 unit	8.600
	121	-	55	75	99	-	-	75	100	C	**3RW34 55-0DC□5**	1 unit	10.000
	191	-	110	132	140	-	-	100	150	C	**3RW34 57-0DC□5**	1 unit	9.480
	234	-	132	160	191	-	-	150	200	C	**3RW34 58-0DC□5**	1 unit	7.650
	281	-	160	200	234	-	-	200	250	C	**3RW34 65-0DC□5**	1 unit	15.000
	338	-	200	250	281	-	-	200	300	C	**3RW34 66-0DC□5**	1 unit	15.000
	407	-	250	315	338	-	-	250	350	C	**3RW34 67-0DC□5**	1 unit	21.100
	610	-	355	400	494	-	-	400	500	C	**3RW34 72-0DC□5**	1 unit	37.000
	866	-	500	630	779	-	-	700	850	C	**3RW34 83-0DC□5**	1 unit	59.600
	1212	-	710	800	1053	-	-	950	1200	C	**3RW34 84-0DC□5**	1 unit	59.600
	1819	-	1000	1200	1498	-	-	1300	1700	D	**3RW34 86-0DC□5**	1 unit	95.100

Order No. extension for rated control supply voltage U_s

DC 24 V 2)	2
AC 115 V 3)4)	3
AC 230 V	4

1) In the selection table, the unit rated operating current refers to the motor's rated operating current in the inside-delta circuit.
The actual current of the unit is approx. 58 % of this value.
2) SIKOSTART 3RW34 86-0DC..: not available as DC 24 V design.
3) SIKOSTART 3RW34 57-0DC.. and 3RW34 86-0DC..: not available as DC 115 V design.
4) The specified hp values apply to 50 Hz networks. In conjunction with 60 Hz networks, in the AC 115 V design, a higher motor hp is possible. Relevant values on request.
5) The delivery times apply to AC 230 V soft starters. Delivery times for the remaining designs on request.

Soft starter selection depends on the motor's rated current.

The 3RW34 solid-state starters are designed for normal starting. In the event of deviating conditions or increased switching frequency, it may be necessary to choose a larger unit. Siemens recommends the use of the selection and simulation program Win-SIKOSTART. See technical specifications for information about rated currents for ambient temperatures >40 °C.

*** This quantity or a multiple thereof can be ordered.**

Accessories

For soft starters	Version	DT	Order No.	PS*	Weight per PU approx. kg
Terminal covers					
3RW34 54 3RW34 55 3RW34 57 3RW34 58	**Terminal cover** (1 set = 6 units) M 6 terminal screws	►	**3KX3 552-3DA01**	1 set	0.077
Operating instructions					
	Instruction manuals for SIKOSTART 3RW34 .. in				
	- German - English - Italian - French - Spanish - Portuguese are available in Adobe Acrobat format free-of-charge on the Internet at www.siemens.de/automation/manuals. Enter “SIKOSTART manuals” or “3RW34 manuals” as search term.	B	**3ZX1012-0RW34-1AN1**	1 unit	0.010

3KX3 552–3DA01

Spare parts

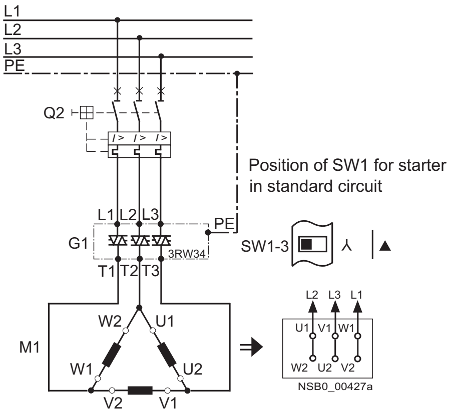
For soft starters Type	Maximum number required per device	DT	Order No.	PS*	Weight per PU approx. kg
Control unit					
3RW34 ..-0DC2.	1	►	**3RW39 50-6DC28**	1 unit	0.565
3RW34 ..-0DC3.	1	A	**3RW39 50-6DC38**	1 unit	0.324
3RW34 ..-0DC4.	1	A	**3RW39 50-6DC48**	1 unit	0.348
Fans					
3RW34 5.-0DC2.	2	X	**3RW39 50-8DC28**	1 unit	0.261
3RW34 5.-0DC4.	2	A	**3RW39 50-8DC48**	1 unit	0.648
3RW34 6.-0DC2.	1	X	**3RW39 60-8DC28**	1 unit	0.600
3RW34 6.-0DC4. 3RW34 72-0DC4. 3RW34 8.-0DC4.	1 2 3	►	**3RW39 60-8DC48**	1 unit	0.685
3RW34 72-0DC2.	2	X	**3RW39 70-8DC28**	1 unit	0.616
3RW34 83-0DC2. 3RW34 84-0DC2.	3 3	X	**3RW39 72-8DC28**	1 unit	0.558
3RW34 84-0DC2.	3	X	**3RW39 73-8DC28**	1 unit	0.600

3

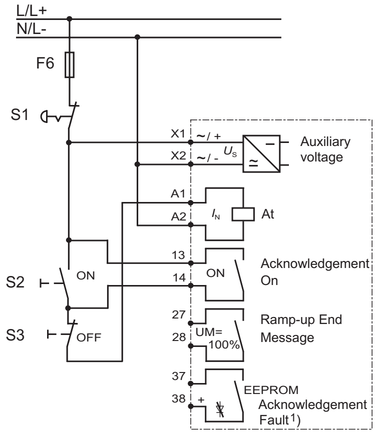
Circuit diagrams

Connection examples for main and control circuits

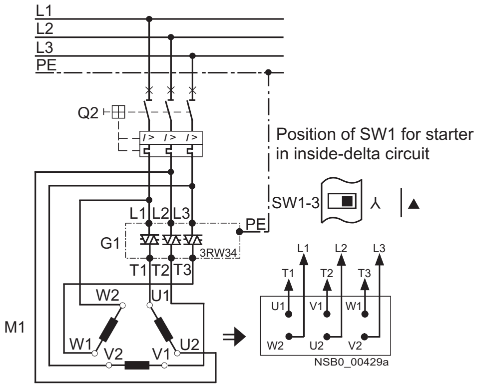
Main circuit
Possibility 1: inline circuit



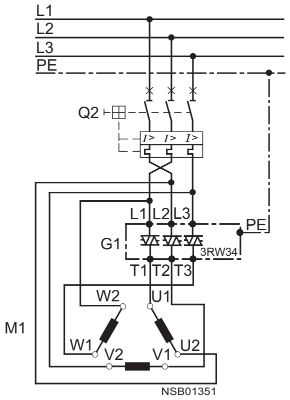
Control circuit
Possibility 1: control via pushbutton



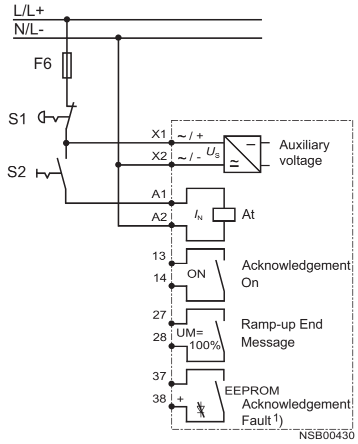
Main circuit
Possibility 2: inside-delta circuit



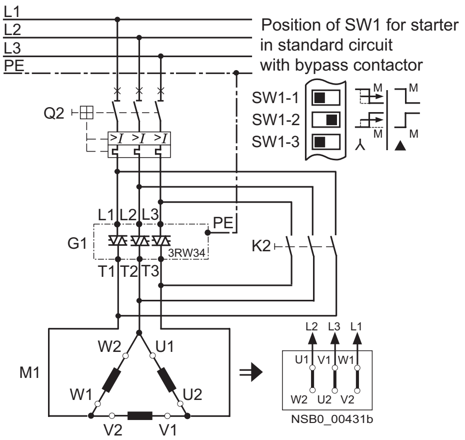
Phase switching
for inside-delta circuit



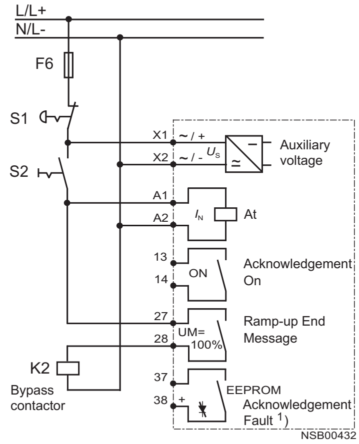
Control circuit
Possibility 2: control via switch



Main circuit
Possibility 3: inline circuit with bypass contactor



Control circuit
Possibility 3: control via switch plus bypass contactor



1) With SW1-4, the fault contact can be switched over between normally closed and normally open.

Further information

Configuration

The 3RW34 solid-state starters are designed for normal starting. In the event of deviating conditions or increased switching frequency, it may be necessary to choose a larger unit. For accurate dimensioning, use the Win-SIKOSTART selection and simulation program.

If necessary, an overload relay for heavy-starting must be selected where long starting times are involved. PTC thermistor detectors are recommended. This also applies to soft running down. In this case an additional current load is effective compared with a free ramp-down.

In the motor feeder between the SIKOSTART and the motor, no capacitive elements are permitted (e.g. no compensation equipment).

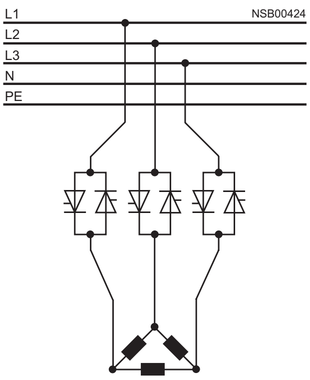
All elements of the main circuit (such as fuses, switching devices and overload relays) should be dimensioned for direct starting, following the local short-circuit conditions. Fuses, switching devices and overload relays must be ordered separately.

Circuit concept

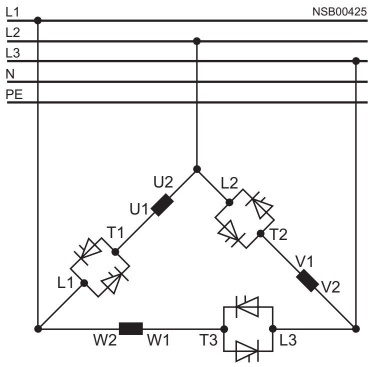
The SIKOSTART 3RW34 can be operated in two different types of circuit.

- Inline circuit
  The switching devices for isolating and protecting the motor are simply connected in series with the soft starter. The motor is connected to the soft starter with three leads.
- Inside-delta circuit
  The wiring is similar to that of star-delta starters. The phases of the soft starter are connected in series with the individual motor windings. The soft starter then only has to carry the phase current, amounting to about 58 % of the rated current of the motor (conductor current).

Comparison of the types of circuit



Inline circuit:
Rated current I_e corresponds to the rated motor current I_n,
3 conductors to motor



Inside-delta circuit:
Rated current I_e corresponds to approx. 58 % of the rated motor current I_n,
6 conductors to motor (as star delta starters)

Which circuit?

Using the inline circuit involves the lowest wiring complexity, which is twice as high when using the inside-delta circuit. If the soft starter to motor connections are short, this contact sequence is preferable.

Thanks to the possibility of switching between the inline circuit and inside-delta circuit, the most favorable solution can always be chosen.

Settings

DIP switches (SW1):

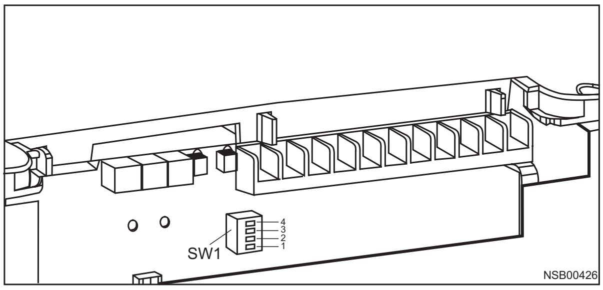
This switch is located on the main logic module. It is used for setting the soft starter software to the relevant application.

1) SW1-1: causes an OFF delay on the soft starter. The OFF delay is required when using a parallel contactor (bridging contactor). It initially enables the contactor to be deenergized, after which the soft starter switches 1.0 s later. This prevents damage to the thyristors from voltage peaks which arise when the bridging contactor interrupts the motor current.

2) SW1-2: Sets an ON delay signal for the soft starter. This function makes it possible for a contactor disconnector first to be switched on in the currentless state, with the soft starter then being switched 1.0 s later. This has the effect of increasing the life of the contacts of the contactor disconnector.

3) SW1-3: Sets the soft starter software for operation with thyristors in the inline circuit or within the inside-delta circuit.

4) SW1-4: Sets the fault contact as an NO contact or NC contact. This contact can be used for controlling a fault contactor, a shunt release or a fault alarm.



SIKOSTART soft starters

Overview

SIKOSTART 3RW22

In addition to soft starting and soft ramp-down, the solid-state SIKOSTART 3RW22 soft starters provide numerous functions for higher-level requirements They cover a rating range of up to 710 kW (at 400 V).

Combinations of various starting, operating and ramp-down possibilities ensure an optimum adaptation to the application-specific requirements. Operation and commissioning can be carried out either conventionally with switches and potentiometers or conveniently using a commercial PC and an RS232 interface.

Applicable standards

- IEC 60947-4-2
- UL/CSA for 3RW22 21 to 3RW22 31

Area of application

The SIKOSTART 3RW22 solid-state soft starters are suitable for the controlled soft starting and ramp-down, for the braking and the energy-saving operation of three-phase induction motors.

Applications

- Pumps, compressors
- Fans, blowers
- Conveyors
- Breakers, mills
- Agitators
- Sanding machines
- Wire drawing/textile machines
- Presses
- Machine tools

Functions

- Soft starting with breakaway pulse, voltage ramp, voltage or current limiting as well as any combination of these, depending on load type
- Varied setting facilities for the starting parameters as starting voltage, ramp time etc.
- Start-up detection
- Energy saving mode
- Four running-down modes selectable: free ramp-down, pump stopping, soft stop, DC braking
- Electronic overload protection
- Protection against temperature rise
- Parameters can be set via a potentiometer and sliding-dolly switch or using the PC program COM SIKOSTART
- Interface for communication with the PC for more accurate setting of the parameters as well as for control and monitoring
- Simple adaptation to the motor feeder
- Simple mounting and commissioning
- Display of 5 operating states and 5 fault signals
- System voltages from 200 V to 1000 V, 50/60Hz
- Integrated power supply unit for three control supply voltages
- Applicable up to 55 °C
- Higher load ratings by selecting low ambient temperatures.

3

Technical specifications

Control electronics			
Rated control supply voltage (terminal 12 - 15)		V	380 ... 415, 200 ... 240, 100 ... 120 (+10 %/-15 %)
Rated frequency		Hz	50/60, operating range 45 ... 66
Rated control supply current	at 380 V ... 415 V at 200 V ... 240 V at 100 V ... 120 V	mA mA mA	approx. 40 approx. 75 approx. 100
Short-circuit protection, control circuit			built-in fuse 250 mA slow, 6.3 mm x 32 mm
Operating times	ON-delay	ms	≤ 50 controlled separately when the control supply voltage is applied and voltage is present in the control circuit
	ON-delay	s	≤ 1 contactor operation, ON/OFF by switching the control supply voltage
	ON-delay	s	≤ 1.1 automatic mode
	Recovery time	ms	≤ 440 after DC braking
Power failure			
Bridging time	control supply voltage	ms	≤ 80
Response time	load current circuit	ms	≤ 100
Operating indications (continuous light)	LED 1 LED 2 LED 3 LED 4 LED 5		Ready starting or slowing down starting ended energy save mode active braking
Fault indications (flashing light)	LED 1 LED 2 LED 3 LED 4 LED 5		Mains fault (phase failure, missing voltage/load, control supply voltage too low) Thyristor defective (one or several thyristor(s) alloyed) Excess temperature or overload deactivation Unit malfunction Unit gets too hot; new starting is inhibited; however, unit continues to operate
Control inputs on versions with serial interface, the input assignments are dependent on the number of parameter sets selected via the COM-SIKOSTART PC communication program (up to 3 parameter sets can be selected)	• Standard application: with one motor		
	Input 1		ON
	Input 2		OFF
	Input 3		Reset
	• Serial starting of several motors or of reversible pole motors		
	Input 1		ON/OFF parameter set 1
	Input 2		ON/OFF parameter set 2
	Input 3		Reset or ON/OFF parameter set 3
	Rated operating current	mA	approx. 10 according to DIN 19 240
	Rated voltage	V	DC 24 V from built-in power supply unit via DC +24 V terminal
Relay outputs	Output 1 Output 2 Output 3		Group fault signal (changeover contact) Starting terminated; motor connected to full mains voltage (NO contact) DC brakes active; for control of the braking contactor (NO contact)
	Rated operating current	A A A	3 AC-15/AC-14 at 240 V 0.1 DC-13 at 240 V 0.5 DC-13 at 24 V
	Short-circuit protection		4 A utilization category gL/gG; 6 A fast (fuse is not included in scope of supply)
Max. conductor cross-sections	• Solid • Finely stranded with end sleeve • Tightening torque	mm^2 mm^2 Nm	0.5 ... 2.5 0.5 ... 1.5 0.8 ... 1.4

SIKOSTART soft starters

Power electronics			
Continuous operation (% of I_e)		%	115
Max. starting time			
• cold (40 °C or 55 °C)/warm	Starting current		
	600 % I_e	s	2/1
	450 % I_e	s	10/5
	300 % I_e	s	60/30
	250 % I_e	s	120/60
	200 % I_e	s	200/100
Minimum load 1) (% of I_e)		%	20
Permissible ambient temperature			
• in operation		°C	0 ... +40 or +55 (switchable)
• when stored		°C	-25 ... +80
Operating range			
	• Rated operating voltage	V	200 (-15 %) ... 500 (+10 %) for 3RW22 ..-0DB15,
		V	200 (-15 %) ... 415 (+10 %) for 3RW22 ..-0DB14,
		V	500 (-15 %) ... 690 (+10 %) for 3RW22 ..-0DB16,
		V	1000 (-20 %; +25 %) for 3RW22 ..-0DB18
	• Frequency	Hz	45 ... 66
Degree of protection	RW22 21 ... RW22 31		IP20
acc. to IEC 60947-1/IEC 60529	RW22 34 ... RW22 50		IP00
Overload protection			Thermal sensor on the heatsink, solid-state protection with thermal image
Permissible installation altitude			up to 3 000 m above sea level; over 1000 m above sea level linear reduction of I_e, thus at 2 000 m above sea level 0.87 x I_e and at 3 000 m above sea level 0.77 x I_e
Fans			
	• Rated control supply voltage	V	230 ±10%
	• Frequency	Hz	45 ... 66
Maximum conductor length between soft starter and motor		m	200 2)

1) The rated motor current (specified on the motor's rating plate) should amount to at least 20 % of the SIKOSTART unit's rated current I_e.

2) If this value is exceeded, problems with line capacities may arise, which can result in false firing.

Power electronics						
Type (200 ... 500 V)			**3RW22 21-1AB15**	**3RW22 23-1AB15**	**3RW22 25-1AB15**	**3RW22 26-1AB15**
Load rating						
Rated operating current I_e	at 40/55 °C, AC-3	A	7/5.5	10.5/9	22/16	28/22
Motor output (400 V) approx.	at 40/55 °C, AC-3	kW	3/2.2	4/4	11/7.5	15/11
Permissible starts per hour	350 % x I_e for 5 s	1/h	80	90	30	20
for intermittent duty S4, T_u = 40 °C	300 % x I_e for 10 s	1/h	50	60	20	10
ON-period = 30 %	250 % x I_e for 15 s	1/h	50	50	20	10
Power loss at rated operating current (40 °C) approx.		W	30	40	70	80
Max. conductor cross-sections	• Solid	mm²	1 ... 16	1 ... 16	1 ... 16	1 ... 16
	• Finely stranded without end sleeve	mm²	2.5 ... 16	2.5 ... 16	2.5 ... 16	2.5 ... 16
	• Finely stranded with end sleeve	mm²	1 ... 16	1 ... 16	1 ... 16	1 ... 16
	• Stranded	mm²	2.5 ... 25	2.5 ... 25	2.5 ... 25	2.5 ... 25
Bridging contactor	for AC-1		3RT10 15	3RT10 15	3RT10 24	3RT10 24
(if required, as a main contactor to AC-3)			3RT10 16	3RT10 17	3RT10 26	3RT10 34
Recommended braking contactor			3RT15 1.	3RT15 26	3RT15 26	3RT15 26

Type (200 ... 500 V)			**3RW22 27-1AB15**	**3RW22 28-1AB15**	**3RW22 30-1AB15**	**3RW22 31-1AB15**
Load rating						
Rated operating current I_e	at 40/55 °C, AC-3	A	35/32	45/37	50/45	70/63
Motor output (400 V)	at 40/55 °C, AC-3	kW	18.5/15	22/18.5	25/22	37/30
Permissible starts per hour	350 % x I_e for 5 s	1/h	50	30	20	40
for intermittent duty S4, T_u = 40 °C	300 % x I_e for 10 s	1/h	30	20	20	30
ON-period = 30 %	250 % x I_e for 15 s	1/h	30	20	20	30
Power loss at rated operating current (40 °C) approx.		W	105	130	140	220
Max. conductor cross-sections	• Solid	mm²	1/16	1/16	1/16	1/16
	• Finely stranded without end sleeve	mm²	2.5 ... 16	2.5 ... 16	2.5 ... 16	2.5 ... 16
	• Finely stranded with end sleeve	mm²	1/16	1/16	1/16	1/16
	• Stranded	mm²	2.5/25	2.5/25	2.5/25	2.5/25
Bridging contactor	for AC-1		3RT10 24	3RT10 34	3RT10 35	3RT10 44
(if required, as a main contactor to AC-3)			3RT10 35	3RT10 36	3RT10 44	3RT10 45
Recommended braking contactor			3RT15 26	3RT15 26	3RT15 35	3RT15 35

Power electronics

Type (200 ... 500 V)			3RW22 34-0DB15	3RW22 35-0DB15	3RW22 36-0DB15	3RW22 38-0DB15
Load rating						
Rated operating current I_e	at 40/55 °C, AC-3	A	100/85	135/110	160/140	235/205
Motor output (400 V)	at 40/55 °C, AC-3	kW	55/45	75/55	90/75	132/110
Permissible starts per hour	350 % x I_e for 5 s	1/h	120	100	90	90
for intermittent duty S4, T_u = 40 °C,	300 % x I_e for 10 s	1/h	80	60	60	60
ON-period = 30 %	250 % x I_e for 15 s	1/h	70	50	50	50
Power loss at rated operating current (40 °C) approx.		W	260	370	435	640
Fans	Number		1	1	1	1
	Ratings	W	18	18	18	18
Max. conductor cross-sections	Stranded	mm²	95	120	150	240
Bridging contactor	for AC-1		3RT10 45	3RT14 46	3RT14 56	3RT14 56
(if required, as a main contactor to AC-3)			3RT10 54	3RT10 55	3RT10 56	3RT10 65
Recommended braking contactor combination (opening + closing contactor)			3RT10 34 + 3RT10 34	3RT10 35 + 3RT10 44	3RT10 44 + 3RT10 44	3RT10 44 + 3RT10 46

Type (200 ... 500 V)			3RW22 40-0DB15	3RW22 41-0DB15	3RW22 42-0DB15
Load rating					
Rated operating current I_e	at 40/55 °C, AC-3	A	300/250	355/300	430/355
Motor output (400 V)	at 40/55 °C, AC-3	kW	160/132	200/160	250/200
Permissible starts per hour	350 % x I_e for 5 s	1/h	20	40	180
for intermittent duty S4, T_u = 40 °C,	300 % x I_e for 10 s	1/h	10	20	100
ON-period = 30 %	250 % x I_e for 15 s	1/h	10	20	70
Power loss at rated operating current (40 °C) approx.		W	810	970	1560
Fans	Number		2	2	3
	Ratings	W	36	36	54
Max. conductor cross-sections	Stranded	mm²	240	240	-
	Connecting bar	mm	-	-	40 x 10
Bridging contactor	for AC-1		3RT14 56	3RT14 66	3RT14 76
(if required, as a main contactor to AC-3)			3RT10 66	3RT10 75	3RT14 76
Recommended braking contactor combination (opening + closing contactor)			3RT10 54 + 3RT10 55	3RT10 56 + 3RT10 65	3RT10 56 + 3RT10 65

Type (200 ... 500 V)			3RW22 43-0DB15	3RW22 45-0DB15	3RW22 47-0DB15	3RW22 50-0DB15
Load rating						
Rated operating current I_e	at 40/55 °C, AC-3	A	560/450	700/500	865/700	1200/1000
Motor output (400 V)	at 40/55 °C, AC-3	kW	315/250	400/315	500/400	710/560
Permissible starts per hour	350 % x I_e for 5 s	1/h	90	100	120	60
for intermittent duty S4, T_u = 40 °C,	300 % x I_e for 10 s	1/h	60	60	80	40
individual mounting,	250 % x I_e for 15 s	1/h	50	60	70	40
ON-period = 30 %						
Power loss at rated operating current (40 °C) approx.		W	1950	2060	2440	3550
Fans	Number		3	3	3	3
	Ratings	W	135	135	78	78
Max. conductor cross-sections 1)	Connecting bar	mm	40 x 10		50 x 20	60 x 20
Bridging contactor	for AC-1		3RT14 76	3TF68	3TF69	2 x 3TF68
(if required, also suitable for occasional direct start at $I_a \leq 6 \times I_e$)			3TF68	3TF68	3TF69	2 x 3TF68 2)
Recommended braking contactor (opening + closing contactor)			3RT10 65 + 3RT10 66	3RT10 65 + 3RT10 75	3RT10 75 + 3RT10 76	3RT14 76 + 3TF68

1) Due to thermal expansion of the bars, flexible links must be used for connecting the busbars.

2) Suitable as emergency contactor in occasional starts with $I_a \leq 6 \times I_e$.

Power electronics

Type (500 ... 690 V)			3RW22 36-0DB16	3RW22 38-0DB16	3RW22 40-0DB16	3RW22 42-0DB16
Load rating						
Rated operating current I_e Motor output (690 V)	at 40/55 °C, AC-3 at 40/55 °C, AC-3	A kW	160/140 160/132	235/205 250/200	300/250 315/250	450/355 450/355
Permissible starts per hour Intermittent duty S4, T_u = 40 °C ON-period = 30 %	350 % x I_e for 5 s 300 % x I_e for 10 s 250 % x I_e for 15 s	1/h 1/h 1/h	90 60 50	90 60 50	20 10 10	180 100 70
Short-circuit protection	SITOR Fuse links	A Type	500 3NE3 334-0B	630 3NE3 336	2 x 500 2 x 3NE3 334-0B	2 x 560 2 x 3NE3 335
	Fuse switch disconnector	Type	3NP44 7 3NP54 (3NP44 76)	3NP44 7 3NP54 (3NP44 76)	2 x 3NP44 7 2 x 3NP54 (2 x 3NP44 76)	2 x 3NP44 7 2 x 3NP54 (2 x 3NP44 76)
	Switch disconnector for fuses	Type	3KL61 3KM57	3KL61 3KM57	2 x 3KL61 2 x 3KM57	2 x 3KL61 2 x 3KM57
Power loss at rated operating current (40 °C) approx.		W	490	700	810	1550
Fans	Number Ratings	 W	1 18	1 18	2 36	3 54
Max. conductor cross-sections 1)	Stranded Connecting bar	mm^2 mm	150 –	240 –	240 –	– 40 x 10
Bridging contactor	for AC-1		3RT14 56	3RT10 56	3RT14 56	3RT10 75
Recommended braking contactor combination (opening + closing contactor)			3RT10 36 + 3RT10 54	3RT10 44 + 3RT10 46	3RT10 54 + 3RT10 56	3RT10 56 + 3RT10 65

1) Due to thermal expansion of the bars, flexible links must be used for connecting the busbars.

Type (500 ... 690 V)			3RW22 43-0DB16	3RW22 47-0DB16	3RW22 50-0DB16
Load rating					
Rated operating current I_e Motor output (690 V)	at 40/55 °C, AC-3 at 40/55 °C, AC-3	A kW	560/450 560/450	865/700 850/710	1200/1000 1200/1000
Permissible starts per hour for intermittent duty S4, T_u = 40 °C, ON-period = 30 %	350 % x I_e for 5 s 300 % x I_e for 10 s 250 % x I_e for 15 s	1/h 1/h 1/h	90 60 50	100 80 70	60 40 40
Short-circuit protection	SITOR Fuse links Fuse switch disconnector	A Type Type	2 x 560 2 x 3NE3 335 2 x 3NP44 7 2 x 3NP54 2 x (3NP44 76)	3 x 800 3 x 3NE3 338-8 3 x 3NP44 7 3 x 3NP54 3 x (3NP44 76)	4 x 800 4 x 3NE3 338-8 4 x 3NP44 7 4 x 3NP54 4 x (3NP44 76)
	Switch disconnector for fuses	Type	2 x 3KL61 2 x 3KM57	3 x 3KL61 3 x 3KM57	4 x 3KL61 4 x 3KM57
Power loss at rated operating current (40 °C) approx.		W	1950	2660	3560
Fans	Number Ratings	 W	3 135	3 78	3 78
Max. conductor cross-sections 1)	Connecting bar	mm	40 x 10	60 x 20	60 x 20
Bridging contactor	for AC-1		3RT14 76	3TF69	2 x 3TF68 2)
Recommended braking contactor combination (opening + closing contactor)			3RT10 65 + 3RT10 75	3RT10 75 + 3RT10 76	3RT14 76 + 3TF68

1) Due to thermal expansion of the bars, flexible links must be used for connecting the busbars.

2) Suitable as emergency contactor in occasional starts with $I_a \leq 6 \times I_e$.

Type (1000 V)			3RW22 36-0DB18	3RW22 40-0DB18	3RW22 42-0DB18
Load rating					
Rated operating current I_e Motor output (1000 V)	at 40/55 °C, AC-3 at 40/55 °C, AC-3	A kW	160/140 200/160	300/250 400/315	450/355 630/450
Permissible starts per hour for intermittent duty S4, T_u = 40 °C, ON-period = 30 %	350 % x I_e for 5 s 300 % x I_e for 10 s 250 % x I_e for 15 s	1/h 1/h 1/h	60 40 40	120 80 70	110 70 70
Short-circuit protection	SITOR Fuse links	A Type	 3NE3230-0B	 3NE3335	 2 x 3NE3233
Power loss at rated operating current (40 °C) approx.		W	550	1100	1190
Fans	Number Ratings	 W	1 36	3 54	3 135
Max. conductor cross-sections 1)	Connecting bar	mm	150	40 x 10	40 x 10
Bridging contactor	for AC-1 for AC-3		3RT10 65 3RT10 75	3TF68 3TF68	3TF68 3TF68

1) Due to thermal expansion of the bars, flexible links must be used for connecting the busbars.

3

Short-circuit protection for semiconductors and leads with SITOR all-range fuses, type 3NE1

SIKOSTART (T_u = 40 °C) (200 ... 500 V)	Rated current I_N of motor at 400 V	Rated output P_N of motor at 400 V	Protection for **full utilization** of the SIKOSTART parameters e.g. starting current 3 x I_n for 60 s				
			SITOR fuse (operational class gR)	Rated current	Conductor protection per fuse [1] for Cu cable	3NP fuse switch disconnector	Switch disconnectors for fuses 3KL, 3KM
	A	kW	Quantity per phase/type	A	≥ mm^2		
3RW22 21-1AB15	6.8	3	1 x 3NE1 814-0	20	2.5	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL50 30, 3KM50 30
3RW22 23-1AB15[2]	11.4	5.5	1 x 3NE1 815-0	25	4	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL50 30, 3KM50 30
3RW22 25-1AB15	21.4	11	1 x 3NE1 817-0	50	10	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL50 30, 3KM50 30
3RW22 26-1AB15	28.5	15	1 x 3NE1 818-0	63	16	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL50 30, 3KM50 30
3RW22 27-1AB15	35	18.5	1 x 3NE1 820-0	80	25	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL52 30, 3KM52 30
3RW22 28-1AB15	41	22	1 x 3NE1 820-0	80	25	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL52 30, 3KM52 30
3RW22 30-1AB15[2]	55	30	1 x 3NE1 820-0	80	25	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL52 30, 3KM52 30
3RW22 31-1AB15[2]	80	45	1 x 3NE1 022-0	125	-	3NP50, 3NP40 7	3KL52 30, 3KM52 30
3RW22 34-0DB15	97	55	1 x 3NE1 225-0	200	95	3NP52, 3NP42 7	3KL55 30, 3KM55 30
3RW22 35-0DB15	134	75	1 x 3NE1 227-0[3]	250	120	3NP52, 3NP42 7	3KL55 30, 3KM55 30
3RW22 36-0DB15	160	90	1 x 3NE1 230-0	315	2 x 70	3NP53, 3NP43 7	3KL57 30, 3KM57 30
3RW22 38-0DB15	194	110	1 x 3NE1 333-0	450	2 x 120	3NP54, 3NP44 7, 3NP4 76	3KL61 30, 3KM57 30
3RW22 38-0DB15	228	132	1 x 3NE1 334-0	500	2 x 120	3NP54, 3NP44 7, 3NP4 76	3KL61 30, 3KM57 30
3RW22 40-0DB15	280	160	1 x 3NE1 334-0	500	2 x 120	3NP54, 3NP44 7, 3NP4 76	3KL61 30, 3KM57 30
3RW22 41-0DB15	345	200	1 x 3NE1 436-0	630	2 x 185	3NP54, 3NP44 70, 3NP4 76	3KL61 30
3RW22 42-0DB1.[4]	430	250	2 x 3NE1 331-0	350	(2 x) 2 x 95	2 x 3NP53, 2 x 3NP43 7	2 x 3KL57 30, 2 x 3KL61 30
3RW22 43-0DB1.[2][4]	610	355	2 x 3NE1 334-0	500	(2 x) 2 x 120	2 x 3NP54, 2 x 3NP44 7, 2 x 3NP4 76	2 x 3KM57 30
3RW22 45-0DB1.[4]	690	400	2 x 3NE1 435-0[3]	560	(2 x) 2 x 150	2 x 3NP54, 2 x 3NP44 70, 2 x 3NP4 76	2 x 3KL61 30
3RW22 47-0DB1.[4]	850	500	2 x 3NE1 436-0[3]	630	(2 x) 2 x 185	2 x 3NP54, 2 x 3NP44 70, 2 x 3NP4 76	2 x 3KL61 30
3RW22 50-0DB1.[4]	1060	630	3 x 3NE1 436-0[3]	630	(3 x) 2 x 185	3 x 3NP54, 3 x 3NP44 70, 3 x 3NP4 76	2 x 3KL61 30

1) The minimum conductor cross-section applies to 40 °C ambient temperature, 79 °C limit temperature. Single laying at a distance and with one fuse per phase. If there is more than one fuse per phase, a larger cross-section must be selected (see factors in parentheses). It may be necessary to lay different cross-sections in the event of deviating conditions (see DIN VDE 0298-4).

2) For these units, the service factor (I_e x 1.15) was used!

3) These fuses do not provide semiconductor protection for voltages > 450 V.

4) All-range fuses can only be used for the 415 V and 500 V types (-0DB14 and -0DB15). For the 600 V and 1000 V types (-0DB16 and -0DB18), conductor protection and semiconductor protection fuses must be used, otherwise the soft starter is not sufficiently protected.

Short-circuit protection for semiconductors and leads with SITOR all-range fuses, type 3NE1

SIKOSTART (T_u = 40 °C) (200 ... 500 V)	Rated current I_N for the motor at 400 V	Rated output P_N of motor at 400 V	Fuse for **reduced load**: Starting current 3 x I_n for 5 s and 2 starts/h				
			SITOR fuse (operational class gR)	Rated current	Conductor protection per fuse [1] for Cu cable	3NP fuse switch disconnector	Switch disconnectors for 3KL, 3KM fuses
	A	kW	Quantity per phase/type	A	≥ mm^2		
3RW22 21-1AB15	6.8	3	1 x 3NE1 813-0	16	1.5	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL50 30, 3KM50 30
3RW22 23-1AB15[2]	11.4	5.5	1 x 3NE1 814-0	20	2.5	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL50 30, 3KM50 30
3RW22 25-1AB15	15.4	7.5	1 x 3NE1 815-0	25	4	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL50 30, 3KM50 30
3RW22 25-1AB15	21.4	11	1 x 3NE1 803-0	35	6	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL50 30, 3KM50 30
3RW22 26-1AB155	28.5	15	1 x 3NE1 817-0	50	10	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL50 30, 3KM50 30
3RW22 27-1AB15	35	18.5	1 x 3NE1 818-0	63	16	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL50 30, 3KM50 30
3RW22 28-1AB15	41	22	1 x 3NE1 818-0	63	16	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL52 30, 3KM50 30
3RW22 30-1AB15[2]	55	30	1 x 3NE1 820-0	80	25	3NP35, 3NP50, 3NP40 1, 3NP40 7	3KL52 30, 3KM52 30
3RW22 31-1AB15	67	37	1 x 3NE1 821-0	100	35[3]	3NP50, 3NP40 7	3KL52 30, 3KM52 30
3RW23 31-1AB15[2]	80	45	1 x 3NE1 821-0	100	35[3]	3NP50, 3NP40 7	3KL52 30, 3KM52 30
3RW22 34-0DB15	97	55	1 x 3NE1 022-0	125	50	3NP50, 3NP40 7	3KL52 30, 3KM52 30
3RW22 35-0DB15	134	75	1 x 3NE1 224-0	160	70	3NP52, 3NP42 7	3KL55 30, 3KM55 30
3RW22 36-0DB15	160	90	1 x 3NE1 225-0	200	95	3NP52, 3NP42 7	3KL55 30, 3KM55 30
3RW22 38-0DB15	194	110	1 x 3NE1 227-0	250	120	3NP52, 3NP42 7	3KL55 30, 3KM55 30
3RW22 38-0DB15	228	132	1 x 3NE1 230-0	315	2 x 70	3NP53, 3NP43 7	3KL57 30, 3KM57 30
3RW22 40-0DB15	280	160	1 x 3NE1 331-0	350	2 x 95	3NP53, 3NP43 7	3KL57, 3KL61 30, 3KM57 30
3RW22 41-0DB15	345	200	1 x 3NE1 332-0	400	2 x 95	3NP53, 3NP43 7	3KL57, 3KL61 30, 3KM57 30
3RW22 42-0DB1.[4]	430	250	1 x 3NE1 334-0	500	2 x 120	3NP54, 3NP44 7, 3NP4 76	3KL61 30, 3KM57 30, 2 x 3KL57, 2 x 3KL61 30
3RW22 43-0DB1.[2][4]	610	355	2 x 3NE1 331-0	350	(2 x) 2 x 95	2 x 3NP53, 2 x 3NP43 7	2 x 3KM57 30, 2 x 3KL57, 2 x 3KL61 30
3RW22 45-0DB1.[4]	690	400	2 x 3NE1 332-0	400	(2 x) 2 x 95	2 x 3NP53, 2 x 3NP43 7	2 x 3KM57 30
3RW22 47-0DB1.[4]	850	500	2 x 3NE1 334-0	500	(2 x) 2 x 120	2 x 3NP54, 2 x 3NP44 7, 2 x 3NP4 76	2 x 3KL61 30, 2 x 3KM57 30
3RW22 50-0DB1.[4]	1060	630	2 x 3NE1 436-0	630	(2 x) 2 x 185	2 x 3NP54, 2 x 3NP44 70, 2 x 3NP4 76	2 x 3KL61 30

1) The minimum conductor cross-section applies to 40 °C ambient temperature, 79 °C limit temperature. Single laying at a distance and with one fuse per phase. If there is more than one fuse per phase, these fuses must be connected in parallel and a larger cross-section must be selected (see factors in parentheses). It may be necessary to lay different cross-sections in the event of deviating conditions (see DIN VDE 0298-4).

2) For these units, the service factor (I_e x 1.15) was used!

3) To connect the unit to 35 mm^2 cables, they must be converted to 2 x 16 mm^2 using a terminal block.

4) All-range fuses can only be used for the 415 V and 500 V types (-0DB14 and -0DB15). For the 600 V and 1000 V types (-0DB16 and -0DB18), conductor protection and semiconductor protection fuses must be used otherwise the soft starter is not sufficiently protected.

SIKOSTART soft starters

Radio interference suppression

The 3RW22.. units fulfill the requirements for limit value Class A (industrial applications) as standard.
To achieve limit value Class B, a radio interference filter is required.

Climatic conditions			SN 29 070 Part 1, climate CLASS J2
Mechanical conditions	Vibration resistance Shock resistance		SN 29 010, severity 13 acc. to IEC 60068-2-27
Noise immunity			
Electrostatic discharge acc. to IEC 60801-2	Test severity Air discharge Contact discharge (direct and indirect)	 kV kV	III ± 8 ± 4
Noise immunity Induced RF fields acc. to IEC 60801-6		V	10 V; 0.15 MHz ... 230 MHz; 80 % AM modulated: 1 kHz
Burst acc. to IEC 60801-4	Test severity	 kV	IV 4
Surge acc. to IEC 60801-5	Load and supply voltage Control circuit	kV kV	4/2 2/1
Voltage dips acc. to IEC 60947-4-2	Test		A, B, C
Emitted interference			
Conducted interference voltage acc. to IEC 60947-4-2	Limit CLASS Limit CLASS with single-stage filter		A B
Noise field intensity acc. to IEC 60947-4-2	Limit curve		A

To reach limit value class B, the following filters[1] are required:

Soft starter type	Rated operating current	Voltage range 200 ... 500 V			Voltage range 200 ... 415 V			Voltage range 500 ... 690 V		
	Soft starter A	Filter type B84143	Rated current filter A	Connection terminals mm^2	Filter type B84143	Rated current filter A	Connection terminals mm^2	Filter type B84143	Rated current filter A	Connection terminals mm^2
3RW22 21	7	G8-R112	8	4						
3RW22 23	10.5	G20-R112	20	4						
3RW22 25	22	G36-R112	36	6						
3RW22 26	28	G36-R112	36	6						
3RW22 27	35	G36-R112	36	6						
3RW22 28	45	G50-R112	50	16						
3RW22 30	50	G50-R112	50	16						
3RW22 31	70	G66-R112	66	25						
3RW22 34	100	G120-R112	120	50						
3RW22 35	135	G150-R112	150	50						
3RW22 36	160	G150-R112	150	50				A180-R21	180	95
3RW22 38	235	G220-R112	220	95				B250-S21	250	40 x 25 x 5[2]
3RW22 40	300	B320-S20	320	40 x 25 x 5[1]				B320-S21	320	40 x 25 x 5[2]
3RW22 41	355	B400-S20	400	40 x 25 x 5[1]						
3RW22 42	450	B600-S20	600	40 x 30 x 5[1]	B600-S20	600	40 x 25 x 5[1]	B600-S21	600	40 x 25 x 5[2]
3RW22 43	560	B600-S20	600	40 x 30 x 5[1]	B600-S20	600	40 x 25 x 5[1]	B600-S21	600	40 x 25 x 5[2]
3RW22 45	700	B1000-S20	1000	50 x 40 x 8[1]	B1000-S20	1000	40 x 25 x 5[1]			
3RW22 47	865	B1000-S20	1000	50 x 40 x 8[1]	B1000-S20	1000	40 x 25 x 5[1]	B1000-S21	1000	40 x 25 x 5[2]
3RW22 50	1200	B1600-S20	1600	50 x 40 x 8[1]	B1600-S20	1600	40 x 25 x 5[1]	B1600-S21	1600	40 x 25 x 5[2]

1) Contact address: The suppression filters mentioned above can be ordered from EPCOS AG (see Appendix –> External Partners).

2) Busbar connection: L x W x H.

Type				**3RW22 ..-..B1.**	
Version				With solid-state device protection and RS 232 serial PC interface	
Adjustability of functions in the various device versions				on the unit, with potentiometers	via a PC, with COM SIKOSTART
Start-up	Breakaway pulse	Amplitude	%	20 ... 100 x U_n	21 ... 100 x U_n
		Duration	ms	50 ... 1000	100 ... 1000
	Start ramp	Starting voltage	%	20 ... 100 x U_n	
		Duration	s	0.3 ... 180	0 ... 1000
	Current limiting	Amplitude		50 % ... 600 % x I_e (I_e: rated operating current)	Numerical value in ampere, from 1 A to max. 6553 A or max. 6 x I_e (I_e: rated operating current)
		Duration		until starting is detected	
	Voltage limiting	Amplitude	%	-	20 ... 100 x U_n
		Duration	s	-	0 ... 1000
	Start-up detection	Function		Automatic increase of the motor terminal voltage to 100 % x U_n on reaching the rated speed through p.f. and current detection.	
		p.f. detection can be deactivated		x	
	Emergency start (only start ramp active)			x	
Operation	Energy saving mode			x	
	Bridging contactor operation			x	
	Continuous operation at max. 115 % I_e (full control of the thyristors)			x	
Starting	Ramp-down			x	
	Smooth ramp-down	Starting voltage of the stop ramp	%	fixed 90 x U_n	20 ... 100 x U_n
		Switch-off voltage of the stop ramp	%	85 of the starting voltage of the start ramp	20 ... 100 x U_n
		Ramp-down time	s	1 ... 20	0 ... 1000
	Pump ramp-down	Switch-off voltage of pump ramp-down	%	-	20 ... 90 x U_n
		Ramp-down time	s	5 ... 90	5 ... 200
	DC braking	Braking torque		Inversely proportional to the braking time, 20 % ... 85 % of the max. possible braking torque	20 % ... 100 % of the max. possible braking torque, regardless of braking time
		Braking time	s	3 ... 18	1 ... 18

U_n = mains voltage

SIKOSTART soft starters

Selection and ordering data


3RW22 21


3RW22 23 and 3RW22 25


3RW22 26 ... 3RW22 31


3RW22 34 ... 3RW22 41

Rated operating voltage U_e	At ambient temperature 40 °C: Rated operating current I_e	Rated output of three-phase induction motors for rated operating voltage U_e					At ambient temperature 55 °C: Rated operating current I_e	Rated output of three-phase induction motors for rated operating voltage U_e				DT	Order No.	PS*	Weight per PU approx.
		230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V				
V	A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp				kg
Soft starters for three-phase asynchronous motors with electronic protection and serial RS 232 interface															
200 ... 500	7	1.5	3	4	-	-	5.5	1	1	3	-	▶	**3RW22 21-1AB15**	1 unit	2.210
	10.5	2.2	4	5.5	-	-	9	2	2	5	-	▶	**3RW22 23-1AB15**	1 unit	3.560
	22	5.5	11	15	-	-	16	3	5	10	-	▶	**3RW22 25-1AB15**	1 unit	3.710
	28	7.5	15	18.5	-	-	22	5	7.5	15	-	▶	**3RW22 26-1AB15**	1 unit	4.910
	35	7.5	18.5	22	-	-	32	10	10	20	-	▶	**3RW22 27-1AB15**	1 unit	5.460
	45	11	22	30	-	-	37	10	10	25	-	▶	**3RW22 28-1AB15**	1 unit	5.460
	50	15	22	30	-	-	45	10	15	30	-	▶	**3RW22 30-1AB15**	1 unit	8.500
	70	18.5	37	45	-	-	63	20	20	40	-	▶	**3RW22 31-1AB15**	1 unit	8.920
	100	30	55	75	-	-	85	25	30	60	-	▶	**3RW22 34-0DB15**	1 unit	16.000
	135	37	75	90	-	-	110	30	40	75	-	▶	**3RW22 35-0DB15**	1 unit	17.100
	160	45	90	110	-	-	140	40	50	100	-	▶	**3RW22 36-0DB15**	1 unit	16.500
	235	75	132	160	-	-	205	60	75	150	-	▶	**3RW22 38-0DB15**	1 unit	20.600
	300	90	160	200	-	-	250	75	100	200	-	▶	**3RW22 40-0DB15**	1 unit	20.600
	355	110	200	250	-	-	300	100	100	250	-	▶	**3RW22 41-0DB15**	1 unit	20.700
	450	132	250	315	-	-	355	100	125	300	-	A	**3RW22 42-0DB15**	1 unit	62.000
	560	160	315	400	-	-	450	150	150	350	-	A	**3RW22 43-0DB15**	1 unit	64.100
	700	200	400	500	-	-	560	200	200	450	-	A	**3RW22 45-0DB15**	1 unit	40.000
	865	250	500	630	-	-	700	250	250	600	-	A	**3RW22 47-0DB15**	1 unit	103.000
	1200	400	710	900	-	-	1000	350	400	850	-	A	**3RW22 50-0DB15**	1 unit	131.000
200 ... 415	450	132	250	-	-	-	355	100	125	-	-	A	**3RW22 42-0DB14**	1 unit	57.400
	560	160	315	-	-	-	450	150	150	-	-	A	**3RW22 43-0DB14**	1 unit	58.600
	700	200	400	-	-	-	560	200	200	-	-	A	**3RW22 45-0DB14**	1 unit	52.000
	865	250	500	-	-	-	700	250	250	-	-	A	**3RW22 47-0DB14**	1 unit	96.400
	1200	400	710	-	-	-	1000	350	400	-	-	A	**3RW22 50-0DB14**	1 unit	70.000
500 ... 690	160	-	-	110	160	-	140	-	-	-	125	C	**3RW22 36-0DB16**	1 unit	17.500
	235	-	-	160	200	-	205	-	-	-	200	C	**3RW22 38-0DB16**	1 unit	20.600
	300	-	-	200	315	-	250	-	-	-	250	C	**3RW22 40-0DB16**	1 unit	21.100
	450	-	-	315	450	-	355	-	-	-	350	A	**3RW22 42-0DB16**	1 unit	57.300
	560	-	-	400	560	-	450	-	-	-	450	C	**3RW22 43-0DB16**	1 unit	16.200
	865	-	-	630	900	-	700	-	-	-	700	C	**3RW22 47-0DB16**	1 unit	130.000
	1200	-	-	900	1200	-	1000	-	-	-	1000	X	**3RW22 50-0DB16**	1 unit	130.000
1000	160	-	-	-	-	200	140	-	-	-	-	C	**3RW22 36-0DB18**	1 unit	20.900
	300	-	-	-	-	400	250	-	-	-	-	C	**3RW22 40-0DB18**	1 unit	63.600
	450	-	-	-	-	630	355	-	-	-	-	C	**3RW22 42-0DB18**	1 unit	45.000

The 3RW22 solid-state soft starters are designed for normal operation (inertia load of the overall operating mechanism $J_{load} < 10 \times J_{motor}$; starting current 300 % for 30 s or similar load, e.g. large fans). For any other conditions of use, the devices should be selected using the Win-SIKOSTART selection and simulation program. See Technical specifications for information about rated currents for ambient temperatures >40 °C.

Soft starter selection depends on the motor's rated current.

* This quantity or a multiple thereof can be ordered.

Accessories

	DT	Order No.	PS*	Weight per PU approx. kg
Planning, Commissioning & Installation manual				
German	X	**E20001-P285-A484-V3**	1 unit	on req.
English	B	**E20001-P285-A484-V2-7600**	1 unit	on req.
Spanish	B	**E20001-P285-A484-V2-7800**	1 unit	on req.
COM SIKOSTART PC communication program 1)				
User interface for PC communication via RS 232 serial interface in English, French, German, Italian and Spanish. Disk format 3 1/2"	►	**3RW27 01-0AA00**	1 unit	0.078
Cable				
for PC communication (modified RS 232 cable) 5 m long	►	**3RW29 20-1DA00**	1 unit	0.176
Enclosure				
for IP54 degree of protection for 3RW22 23 ... 3RW22 31	►	**3RW29 20-0AB00**	1 unit	8.590
Operating instructions				
Operating manuals in English, French, German, Italian, Portuguese and Spanish (supplied with the unit as standard) can be downloaded free of charge as an Acrobat Reader file from the Internet at www.siemens.com/automation/manuals. Enter "SIKOSTART manuals" as a search term or "3RW22 manuals" as the search term.	B	**3ZX1012-0RW22-1AN1**	1 unit	0.263

1) The program can also be downloaded free of charge from the Internet at www.siemens.de/sanftstarter. Simply enter the search term "COM SIKOSTART" at this address.

Spare parts

For solid-state soft starters	Maximum number required per device	DT	Order No.	PS*	Weight per PU approx. kg
Control unit with solid-state device protection and RS 232 serial interface					
3RW22 ..-0DB14, 3RW22 ..-0DB15	1	►	**3RW29 20-1BC05**	1 unit	1.190
3RW22 ..-0DB16	1	A	**3RW29 20-1BC06**	1 unit	1.210
3RW22 ..-0DB18	1	A	**3RW29 20-1BC08**	1 unit	1.220
Thyristor assembly					
3RW22 42-0DB14, 3RW22 43-0DB14	3	A	**3RW29 20-6KC00**	1 unit	8.500
3RW22 45-0DB14	3	A	**3RW29 20-6KD00**	1 unit	7.140
3RW22 47-0DB14	3	D	**3RW29 20-6KE00**	1 unit	9.870
3RW22 50-0DB14	3	D	**3RW29 20-6KH00**	1 unit	26.700
3RW22 42-0DB15, 3RW22 43-0DB15	3	A	**3RW29 20-6LC00**	1 unit	4.780
3RW22 45-0DB15	3	A	**3RW29 20-6LD00**	1 unit	5.630
3RW22 47-0DB15	3	A	**3RW29 20-6LE00**	1 unit	17.500
3RW22 50-0DB15	3	A	**3RW29 20-6LH00**	1 unit	25.500
3RW22 42-0DB16, 3RW22 43-0DB16	3	A	**3RW29 20-6MC00**	1 unit	9.330
3RW22 47-0DB16	3	D	**3RW29 20-6ME00**	1 unit	30.000
Current transformers					
3RW22 34-0DB1., 3RW22 35-0DB1., 3RW22 36-0DB1., 3RW22 37-0DB1.	1	A	**3RW29 20-2AD00**	1 unit	0.336
3RW22 38-0DB1., 3RW22 40-0DB1.	1	A	**3RW29 20-2AE00**	1 unit	0.273
3RW22 41-0DB1.	1	A	**3RW29 20-2AK00**	1 unit	0.282
3RW22 42-0DB1., 3RW22 43-0DB1.	1	A	**3RW29 20-2AH00**	1 unit	0.515
3RW22 45-0DB1.		A	**3RW29 20-2AL00**	1 unit	0.440
3RW22 47-0DB1., 3RW22 50-0DB1.	1	A	**3RW29 20-2AJ00**	1 unit	0.945
Fans					
3RW22 34-0DB1., 3RW22 35-0DB1., 3RW22 36-0DB1.1), 3RW22 37-0DB1., 3RW22 38-0DB1.	1	A	**3RW29 20-3AC00**	1 unit	0.619
3RW22 36-0DB18, 3RW22 40-0DB1.1), 3RW22 41-0DB1	2	A	**3RW29 20-3AC00**	1 unit	0.619
3RW22 42-0DB1.1), 3RW22 40-0DB18	3	A	**3RW29 20-3AF00**	1 unit	0.718
3RW22 43-0DB1., 3RW22 42-0DB18, 3RW22 45-0DB1.	3	A	**3RW29 20-3AD00**	1 unit	1.250
3RW22 47-0DB1., 3RW22 50-0DB1.	3	A	**3RW29 20-3AE00**	1 unit	0.985
Surge suppressor circuit					
3RW22 34-0DB1., 3RW22 35-0DB1., 3RW22 36-0DB1.	1	A	**3RW29 20-4AC00**	1 unit	0.219
3RW22 37-0DB1., 3RW22 38-0DB1., 3RW22 40-0DB1., 3RW22 41-0DB1.	1	A	**3RW29 20-4AD00**	1 unit	0.285
3RW22 42-0DB1., 3RW22 43-0DB1., 3RW22 47-0DB1., 3RW22 50-0DB1.	2	A	**3RW29 20-4AD00**	1 unit	0.285
Temperature sensors					
3RW22 21-1AB1. to 3RW22 31-1AB1.	1	A	**3RW29 00-3AA00**	1 unit	0.007
3RW22 34-0DB1. to 3RW22 50-0DB1.	1	A	**3RW29 00-3BA00**	1 unit	0.008
Covers					
3RW22 34-0DB1. to 3RW22 41-0DB1.1)	1	A	**3RW29 20-0BA00**	1 unit	0.392
3RW22 42-0DB1. to 3RW22 45-0DB1., 3RW22 40-0DB18	1	A	**3RW29 20-0BB00**	1 unit	2.120
3RW22 47-0DB14, 3RW22 47-0DB15	1	A	**3RW29 20-0BC00**	1 unit	1.700
3RW22 47-0DB16, 3RW22 50-0DB1.	1	D	**3RW29 20-0BD00**	1 unit	3.300

1) Does not apply to 3RW22 ..-0DB18

*** This quantity or a multiple thereof can be ordered.**

SIKOSTART soft starters

Further information

Configuration

The 3RW22 solid-state starters are designed for normal starting. In case of heavy starting or increased starting frequency, a larger unit must be selected.

If necessary, an overload relay for heavy-starting must be selected where long starting times are involved. PTC thermistor detectors are recommended. This also applies for the ramp-down modes soft ramp-down, pump ramp-down and DC braking, because during the ramp-down time in these modes, an additional current loading applies in contrast to free ramp-down.

In the motor feeder between the SIKOSTART and the motor, no capacitive elements are permitted (e.g. compensation equipment).

All elements of the main circuit (such as fuses, switching devices and overload relays) should be dimensioned for direct starting, following the local short-circuit conditions. Fuses, switching devices and overload relays must be ordered separately.

The harmonic component load for starting currents must be taken into consideration for the selection of circuit-breakers (selection of release).

Use with EEx-protected motors

The units are suitable for starting EEx-protected motors with types of protection "d", "p" and "n", insofar as the relevant mode does not give rise to any expected noteworthy influence of starting behavior on heat development.

Explanation:
Type of protection

- "d" = flameproof enclosure
- "p" = overpressure enclosure
- "n" = designed for Zone 2

SIEMENS has received a confirmation from the German national standards laboratory (PTB) in Brunswick that, in relation to motors with the type of protection "d", there are no objections to including starting with SIKOSTART within the scope of the conditions upon which the general conformity certificates are based, and that there is no need to expressly mention this.

Express mention of this in the conformity certificate of the motors will also not be necessary in the future.

The devices are suitable for starting EEx-protected motors with types of protection "e" provided heavy starting is not involved. The ramp time on the unit must be set to a value that is at most equal to the T_E time of the machine. A test report with the PTB No. 3.53-542/96 is available.

Manual for SIKOSTART 3RW22

Besides containing all important information on planning, commissioning and servicing, the manual also contains suggested circuits and the technical data for all devices.

Electronic overload protection, serial RS 232 PC interface and COM SIKOSTART PC communication program

In addition to the electronic device protection, the 3RW22 electronic motor controllers feature a PC communication interface.

Together with the PC program COM SIKOSTART, it enables simple parameter definition, control and observation of SIKOSTART 3RW22 via a PC or a notebook.

Once entered, a parameter set can be stored in the PC and then retrieved when defining the parameters of a unit with the same kind of drive.

Parameters can be entered more precisely and independently of one another than when using the potentiometers.

It is also possible to store two or three parameter sets in the SIKOSTART 3RW22. Thus, the units are excellently suitable for use with Dahlander and reversible-pole motors, wind energy systems and for serial starting of motors with different outputs or loads.

Win-SIKOSTART selection and simulation program

With this software, you can simulate and select all Siemens soft starters, taking into account various parameters such as mains properties, motor and load data, and special application requirements.

The software is a valuable tool, which makes complicated, lengthy manual calculations for determining the required soft starters superfluous.

You can order the CD-ROM under the following order number:
Order No.: E20001-D1020-P302-X-7400.

SIKOSTART training course (D91/D92)

Siemens offers a 2-day training course on the SIKOSTART solid-state motor controllers to keep customers and own personnel up-to-date on configuring, commissioning and servicing issues.

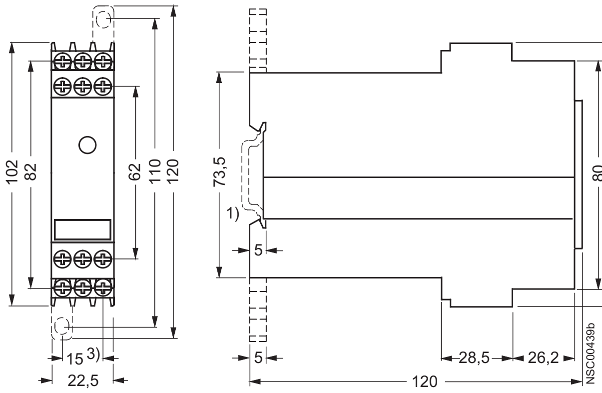
Please direct enquiries and applications to:

Training Center
I&S IS E&C TC
Werner-von-Siemens-Str. 65
D-91052 Erlangen
Telephone: ++49 (9131) 72 92 62
Telefax: ++49 (9131) 72 81 72
sibrain@erlg.siemens.de
www.siemens.com/sibrain

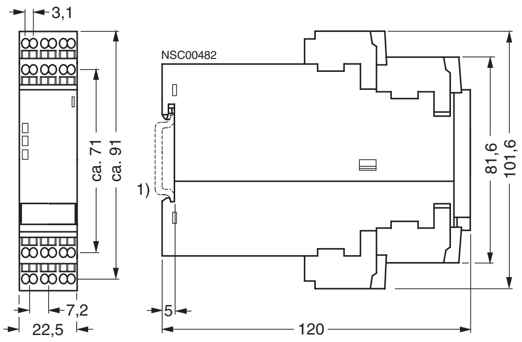
Dimension drawings

for standard applications

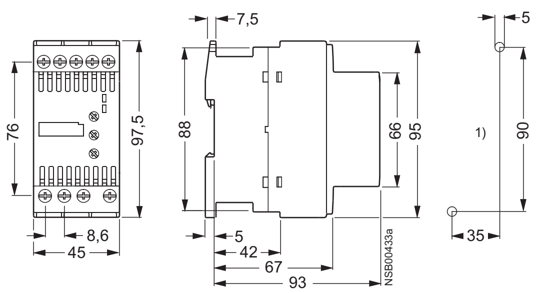
3RW30 03-1.... (screw-type terminals)



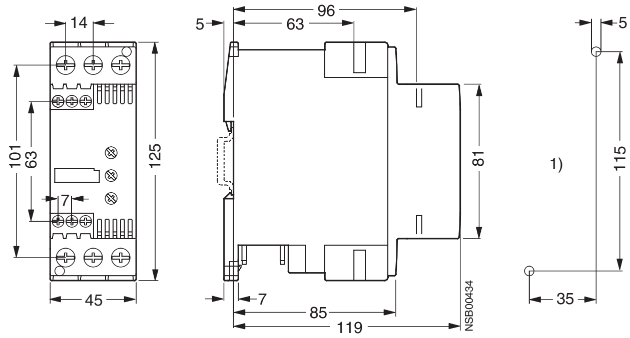
3RW30 03-2.... (spring-type terminals)



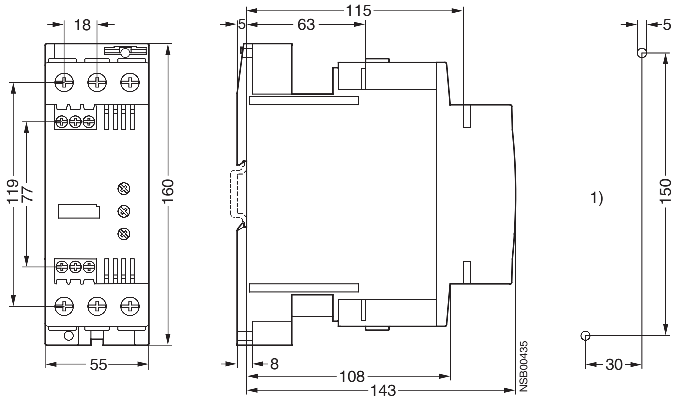
3RW30 1.



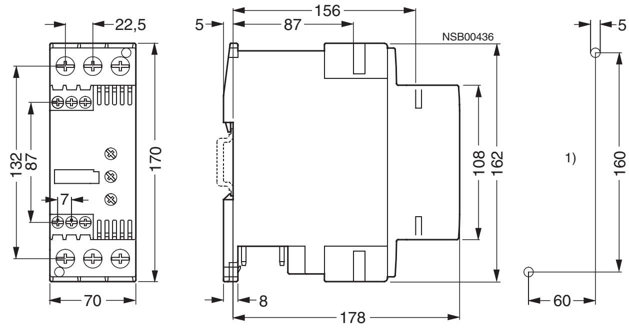
3RW30 2. and 3RW31 2.



3RW30 3.



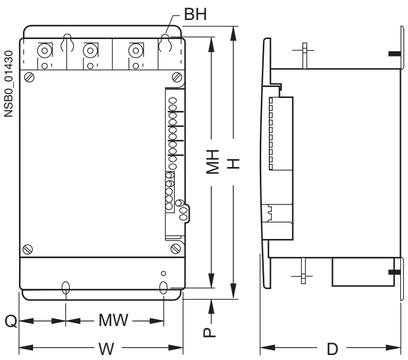
3RW30 4.

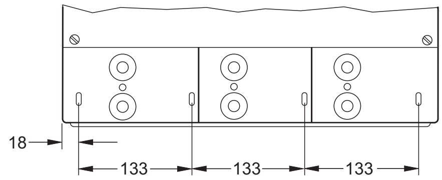


1) Drilling template

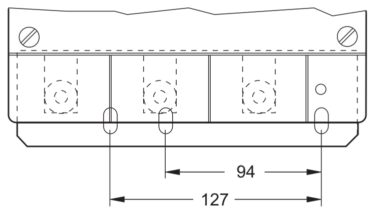
Project planning aids

3RW34

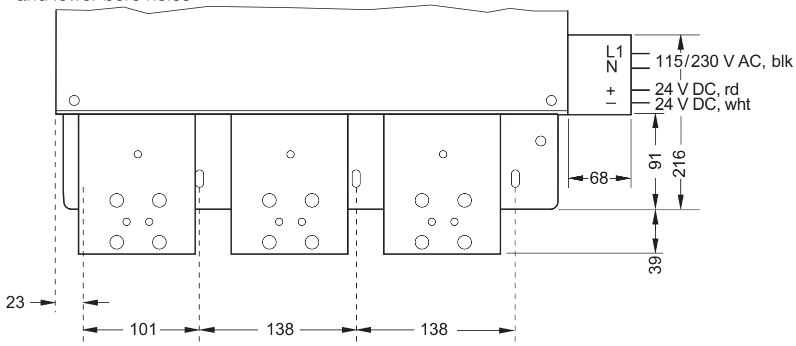




3RW34 83/3RW34 84: position of the upper and lower bore holes



3RW34 5.:
position of the lower bore holes



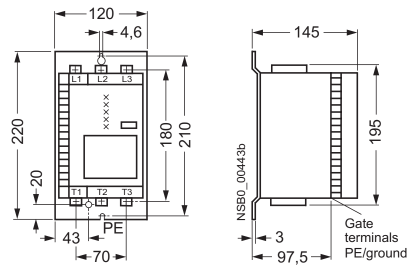
3RW34 86: position of the upper and lower bore holes and of the power supply

Type	I_e 1) [Ampere]	Width (W)	Height (H)	Depth (D)	Mounting width (MW)	Width offset (Q)	Mounting height (MH)	Height offset (P)	Bore holes (BH)
3RW34 5.	57 ... 135	216	356	187	127/94	61	327	16	6 (4)
3RW34 6.	162 ... 235	292	381	189	248	22	332	27	6 (4)
3RW34 72	352	344	417	224	286	29	336	45	6 (4)
3RW34 83, 3RW34 84	500, 700	442	517	231	133 (3)	18	450	32	6 (8)
3RW34 86	1050	448	719	325	101/138/138	23	653	29	6 (8)

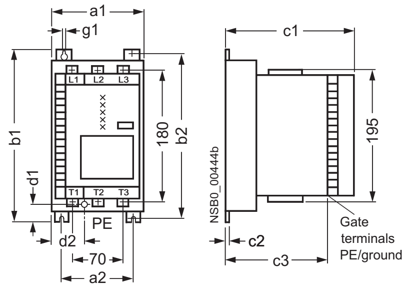
1) The current values refer to the standard circuit.

for advanced applications

3RW22 21



3RW22 23 to 3RW22 31



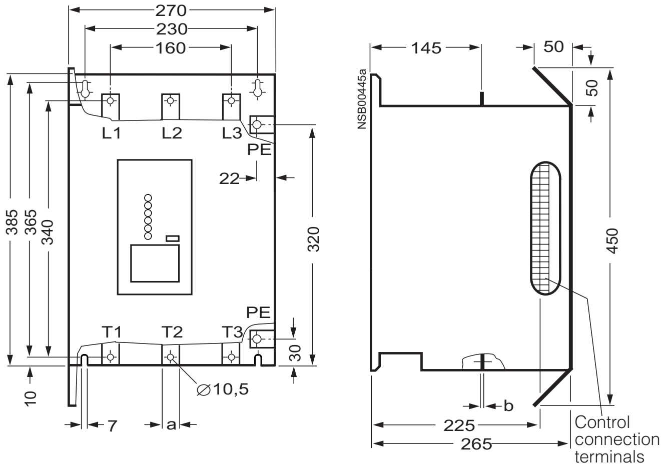
- Distance to other devices:
  For unobstructed supply and extraction of cooling air, the vertical distance to other devices must not be less than the following values:

  3RW22 21 to 3RW22 31: 200 mm

  Horizontal distance for connection of the control leads only necessary for 3RW22 21 to 3RW22 26.

Type	a_1	a_2	b_1	b_2	c_1	c_2	c_3	d_1	d_2	g_1
3RW22 23	125	95	240	230	177.5	2	130	30	45	4.6
3RW22 25	125	95	240	230	177.5	2	130	30	45	4.6
3RW22 26	165	135	240	230	180	2	132.5	30	65	4.6
3RW22 27	205	175	280	270	180	2	132.5	50	85	4.6
3RW22 28	205	175	280	270	180	2	132.5	50	85	4.6
3RW22 30	222.5	185	290	275	225	2.5	175	55	94	6.6
3RW22 31	222.5	185	290	275	225	2.5	175	55	94	6.6

3RW22 34 to 3RW22 41



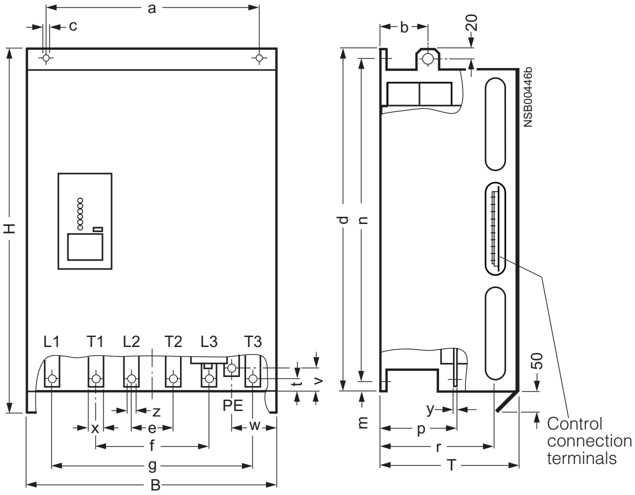
Type	a	b
3RW22 34 to 3RW22 36	20	3
3RW22 38 to 3RW22 41[1)]	25	5

- Distance to other devices:
  For unobstructed supply and extraction of cooling air, the vertical distance to other devices must not be less than the following values:

  3RW22 34 to 3RW22 45: 200 mm
  3RW22 47 and 3RW22 50: 400 mm

1) 3RW22 40-0DB18 has identical dimensions to 3RW22 **42**-0DB15!

3RW22 42 to 3RW22 50

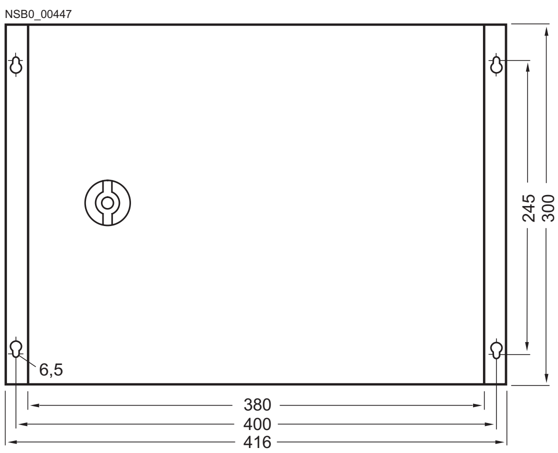


Type	H	B	T	a	b	c	d	e	f	g
3RW22 42, 3RW22 43, 3RW22 45	655	465	255	400	90	11	605	80	210	370
3RW22 47	730	560	340	480	115	11	680	100	260	460
3RW22 50, 3RW22 47-0DB16	875	600	330	520	115	13	825	105	275	485

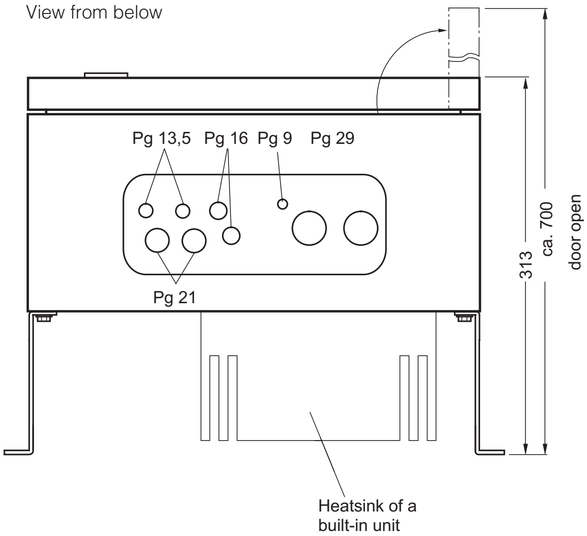
Type	m	n	p	r	t	v	w	x	y	z
3RW22 42, 3RW22 43, 3RW22 45	15	570	145	215	20	25	87.5	30	5	11
3RW22 47	20	645	230	295	25	27	100	40	8	13
3RW22 50, 3RW22 47-0DB16	20	790	220	285	25	29	110	50	10	13

3RW29 20-0AB00

Top view



View from below



SIMOCODE-DP motor protection and control devices

Overview

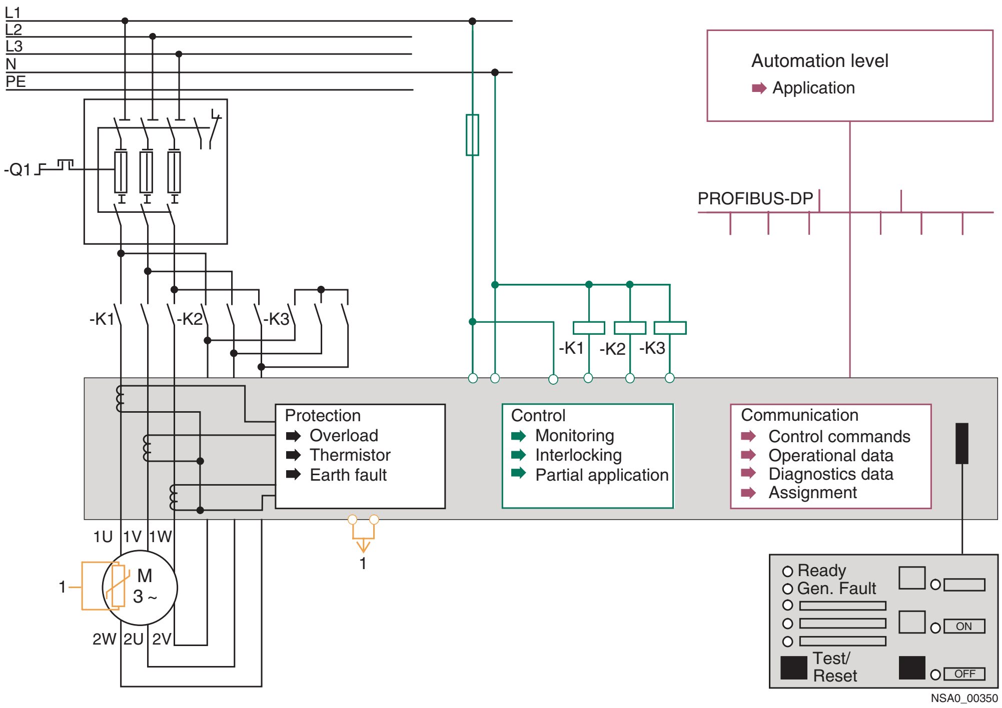
SIMOCODE-DP Basic Unit, Expansion Module and Operator Module

The communication-capable SIMOCODE-DP 3UF5 Motor Protection and Control Unit is used, in particular, in low-voltage controlgear for motor control centers in the process engineering-industry and forms the intelligent connection between the motor feeder (motors with constant speed) and the process control system.

With this technology, plant availability can be increased and at the same time, cost savings are achieved for construction, commissioning and during operation of a plant.

SIMOCODE-DP offers the solution for a wide range of different tasks in a single unit:

- Multifunctional, electronic motor protection and plant monitoring
- Comprehensive motor and plant diagnostics
- Integrated control programs (instead of extensive hardware wiring)
- Open communication via PROFIBUS DP, the standard for fieldbus systems.



Easy construction of a motor feeder with SIMOCODE-DP

Multifunctional, electronic motor protection and plant monitoring

SIMOCODE-DP features a combination of numerous protective mechanisms such as

- Current-sensitive motor protection (CLASS 5-30)
- Thermistor motor protection
- Rotor locking protection
- Ground-fault monitoring, as well as
- Monitoring adjustable current limits

to ensure problem-free processes.

The current transformer for measuring the motor current is already built into SIMOCODE-DP.

Rated motor currents from 0.25 to 820 A are supported by just six variants.

Comprehensive motor and plant diagnostics

SIMOCODE-DP provides a variety of operating, service and diagnostic data, such as

- The currently flowing phase current
- Switching state of the motor
- Motor operating hours
- Number of switching cycles of the motor
- Number of overload tripping operations, as well as
- Detailed early warning messages or error messages.

The following advantages result:

- Faults can be prevented
- The plant electrician or process operator is comprehensively informed about the operational status of the load feeder
- Errors can be diagnosed and rectified quickly.

Integrated control programs (instead of extensive hardware wiring)

In SIMOCODE-DP, many predefined motor control functions can be called up, such as

- Direct on-line starter
- Reversing starter
- Star-delta starter
- Two speeds, motors with a separate winding
- Two speeds, motors with a separate Dahlander winding
- Gate valve control
- Solenoid valve or
- Soft starter.

All the interlocks and logic operations necessary for operation of the required motor controls are included in their software and switch the motor contactors on or off directly by means of the SIMOCODE-DP relay outputs.

These ready-to-use control functions can also be adapted to each customized variant of a motor feeder by means of freely-parameterizable elements, such as timers, counters, logic operations (AND, OR, NOR, etc.).

Wiring overhead for the control circuit is reduced considerably and a high level of standardization is achieved for the motor feeder in terms of hardware structure and circuit diagrams.

Open communication via PROFIBUS DP, the standard for fieldbus systems

SIMOCODE-DP with its integrated PROFIBUS DP interface replaces the complete system of single wires including marshalling racks, which would otherwise be necessary for data transfer to and from the higher-level automation system.

The otherwise complex and expensive cabling is thus reduced to a single 2-wire cable.

SIMOCODE-DP supports the communication functions of

- DP-V0 (cyclic data transfer, GSD configuration, diagnostics) and
- DP-V1 (non-cyclic data transfer, integration into engineering tools with EDD, interrupts).

With SIMOCODE-DP, the following baud rates (Kbits/s) are possible:

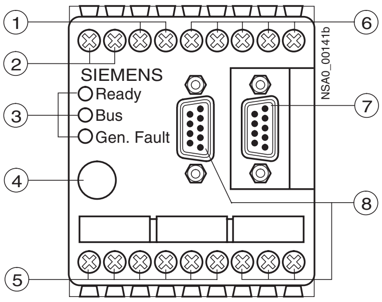
- 9.6
- 45.45
- 93.75
- 187.5
- 500
- 1500

SIMOCODE-DP motor protection and control devices

Design

The SIMOCODE-DP system hardware comprises
- Basic unit
- Expansion module and
- Control module.

Basic unit



① Connection of thermistor or summation transformer
② Connection of control supply voltage
③ Three LEDs
④ Test/reset button for device test or manual reset
⑤ Four relay outputs, floating
⑥ Four inputs (24 V)
⑦ PC/system interface
⑧ PROFIBUS-DP interface

Front view of the basic unit

The following variants are available for the basic unit:
- Six different types of construction due to the integrated current transformer for currents up to 820 A;
  for devices with operating ranges up to 100 A, the current transformers are designed as straight-through current transformers, for higher currents, the current transformers have rail connections
- Three control voltage variants for DC 24 V, AC 115 V and AC 230 V
- Two variants of sensor input:
  - Connection of a thermistor sensor (PTC/NTC/KTY) for direct temperature sensing in the motor winding or
  - Connection of a separate summation transformer (3UL2 20.-.A) for detecting small ground-fault currents; this form of "external" ground-fault detection is normally used for networks that are grounded with a high impedance
- Two possible designs of relay outputs: Monostable response (tripping on failure of the control supply voltage) or bistable response (no tripping on failure of the control supply voltage).

All basic units have four optically decoupled inputs that are supplied via a system-internal DC 24 V voltage. The inputs are freely programmable, i.e. any digital, floating signals can be applied to them for control/monitoring of the motor feeder.

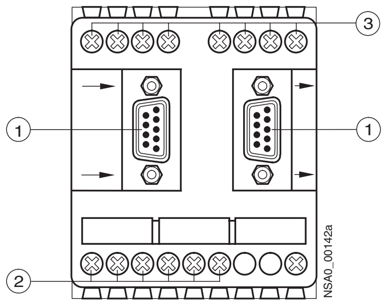
There are also four floating, freely-programmable relay outputs with which any actuators can be controlled (e.g. the motor contactors).

The communication interfaces that are available on the basic unit are the PROFIBUS DP interface as well as an RS232 system interface. PROFIBUS DP can either be connected via a standard Sub-D connector or via terminals (optimal for installation in l.v. switchgear in draw-out design).

The RS232 system interface can be used either to connect additional system components, such as
- an expansion module
- a control module

or a PC complete with WIN-SIMOCODE-DP software.

Expansion module



① PC/system interface
② Four relay outputs, floating
③ Eight inputs (24 V, 115 V, 230 V)

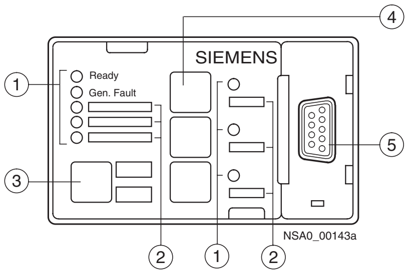
Front view of expansion module

The expansion module with an additional eight freely programmable inputs and four relay outputs is only necessary when the number of inputs and outputs in the basic unit are not sufficient (approximately 10 % of applications).

The control voltage is supplied to the expansion module via the basic unit. The inputs must be supplied from an external supply voltage, alternatively DC 24 V, AC 115 V or AC 230 V.

The left-hand RS232 system interface establishes the connection to the basic unit, the control module or a PC with the appropriate Win-SIMOCODE-DP software can be connected to the right-hand system interface.

Control module



① Eight LEDs
② Labelling strips
③ Test/reset button for device test or manual reset
④ Three control keys
⑤ PC/system interface, with cover

Front view of control module

The control module is used to control the motor feeder from the door of the control cabinet and therefore replaces all the conventional pushbuttons and indicator lights that would otherwise be necessary for monitoring and controlling the motor.

Via the RS232 system interface on the rear, the control module can be connected to the basic unit or the expansion module. Power is supplied from the basic unit.

The three pushbuttons are freely programmable, but it is appropriate to use them for controlling the motor feeder.

A total of eight LEDs are available, six of which are freely programmable. Depending on the application, various different signals can be indicated.

A PC with the Win-SIMOCODE-DP software can be connected via the front RS232 system interface (with cover for IP54).

Safe isolation

All electric circuits in SIMOCODE-DP (from product version 12, start of delivery 01/2000) are safely isolated from each other according to

- DIN VDE 0100 (similar to IEC 60364),
- DIN VDE 0106 (or new standard EN 50274),
- EN 50178.

That is, they are designed with double leakage paths and clearances. In the event of a fault, therefore, no parasitic voltages can be formed in neighboring circuits. In this context, compliance with the instructions in the test report *Safe isolation* No. 1610a is required.

Connection and mounting

Devices with current adjustment ranges from 1.25 to 100 A (overall width 70 mm) are designed for installation as a single unit due to the straight-through current transformer, i.e. they are either snapped onto a 35 mm standard rail to EN 50022 or screwed onto a mounting plate using push-in lugs that are available as accessories.

The main conductors are simply passed through the straight-through current transformer integrated into the enclosure, using multiple loops, loads with rated motor currents of less than 1.25 A can also be protected.

With current adjustment ranges greater than 100 A to 820 A (overall widths: 120 mm, 145 mm and 230 mm), the devices can be directly fitted to the contactor via the connecting rails of the current transformer.

A screw fastening for these devices is integrated in the enclosure.

For the basic units (overall width:120 mm), a baseplate for snap-on attachment on a 75 mm standard mounting rail is available.

Functions

Protective and monitoring functions

For the protection of loads against impermissible high temperature rises

Types of overload protection:

- *Current-sensitive, electronic overload protection with adjustable tripping characteristics (class times)*
  SIMOCODE-DP protects three-phase or AC motors from overloading in accordance with the requirements of IEC 60947-4-1. The class (trip class) indicates the maximum tripping time during which SIMOCODE-DP must trip at 7.2 times the operational current from cold. The trip class can be set in six stages from CLASS 5 to CLASS 30. The switch-off time can therefore be extremely finely adjusted to the load torque of the motor – to optimize utilization of the motor (see also the section *Characteristics*).
- *Phase failure / unbalance monitoring*
  A signal is output for a phase unbalance greater than 40 %. The tripping times of the overload characteristic are reduced, because the heat generated in the motor rises under unbalanced conditions (additional eddy-current losses).
- *Thermistor motor protection*
  Temperature-dependent motor protection is based on direct temperature measurements in the motor. These protective functions should be used, in particular, in motors with high operating frequencies, heavy-duty starting, intermittent and/or braking operation, but also in the case of a blocked air supply or speeds lower than the rated speed. For this reason, a wide range of different temperature sensors are available that are installed in the stator winding or in the motor enclosure.
  SIMOCODE-DP can evaluate the following sensor types:
  - Binary PTC sensors whose resistance rises sharply when the temperature limit is reached
  - Analog temperature sensors, such as NTC, KTY83/84, which have an almost linear characteristic and can therefore be set to any warning or switch-off temperatures.

EEx e type of protection

The SIMOCODE-DP system is in accordance with the regulations for overload protection of explosion-protected motors of the EEx e "Increased safety" type of protection to

- EN 50019, IEC 60079-7 (increased safety e),
- EN 60079-14, IEC 60079-14 (explosive gas atmospheres),
- EN 50281 (presence of combustible dust),
- and the ATEX/PTB test regulations.

In the case of SIMOCODE-DP units with DC 24 V control infeed, isolation by battery or safety transformer in accordance with EN 61558-2-6 must be assured.

EU prototype test certificate No.: PTB01 ATEX 3219

Test report: PTB EX 01-30013

SIMOCODE-DP motor protection and control devices

Rotor locking protection

When the motor current rises above a rotor locking threshold that can be set, SIMOCODE-DP does not trip in accordance with the overload characteristic, but switches off immediately instead. The prevention of unnecessary thermal loads prevents premature aging of the motor. The rotor locking protection is not active for start-up monitoring until the class time has elapsed, e.g. for *CLASS 10* after 10 seconds.

Ground-fault monitoring

Two qualitatively different ground-fault monitoring functions are offered:

- "*Internal*" *ground-fault monitoring by means of calculation*
  The internal ground-fault monitoring is only suitable for motors with 3-wire connection and for networks that are grounded directly or with a low impedance. In this case, the ground-fault current is calculated by vector addition of the phase currents of the SIMOCODE-DP current transformer. An additional summation current transformer is not necessary. In fault-free systems, the vectorial summation current of the three phases is zero; if this is not the case, an ground-fault is signaled. Ground-fault currents that are more than 30 % of the operating current I_e are detected.
- *External ground-fault monitoring by means of measurement*
  The external ground-fault detection is normally used in supply systems that have a high impedance ground. An additional summation current transformer (3UL2 20.-.A) is required for this method that is also suitable for extremely low ground-fault currents. Detected fault current, depending on the summation current transformer: 0.3/0.5/1 A.

Current limit monitoring I>, I<

Current limit monitoring is not used for motor protection, but for process monitoring.

It is used to detect developing irregularities in the plant early, e.g. motor bearings becoming tight (consequence: upper limit responds) or the belt coupling to the drive machine tears (consequence: lower limit responds).

Comprehensive motor and plant diagnostics

SIMOCODE-DP provides a variety of measuring, operating and diagnostics data concerning the load feeder:

- *Up-to-date information during operation*, e.g.
  - The currently flowing phase current in %
  - The switching state of the motor (On, Off, clockwise, counter-clockwise, fast, slow) derived from the current flow
  - Manual/automatic mode
  - Test mode
  - Cooling time activated after an overload tripping operation
- *Detection of incipient faults*, e.g.
  - Overload warning
  - Current limit overshoot
  - Phase unbalance
  - Thermistor warning
- *Rapid diagnosis in the event of an alarm* (up to 30 individual messages), e.g.
  - Overload
  - Thermistor motor protection
  - Rotor locking
  - Current limit overshoot
  - Checkback error (e.g. no current following On command)
- *Preventive maintenance by means of statistical data*, e.g.:
  - Number of starts
  - Number of overload trips
  - Tripping currents
  - Operating hours.

Integrated standard programs for motor control

In SIMOCODE-DP, a number of different opportunities for controlling the motor have been predefined and can be called up in the form of control functions:

- Overload relay
- Direct on-line starter
- Reversing starter
- Star-delta starter
- Two speeds, Dahlander winding
- Two speeds, separate winding
- Valve
- Actuator
- Soft starter (SIKOSTART).

These control programs already include all the software interlocks and logic operations required for operation of the required motor functions.

It is also monitored whether the checkback for current from the motor feeder is compatible with the control command. If not, SIMOCODE-DP opens the motor contactor and generates an alarm indication.

The motor can be controlled by any equipment in accordance with the application:

- From the process control system of the PC via PROFIBUS DP
- From the control cabinet door via the operator module
- From a local control point on the motor, whereby the pushbuttons/switches are wired to the SIMOCODE-DP inputs.

The standard control functions can also be adapted to each customized variant of a motor feeder by means of freely-parameterizable elements, such as timers, counters, logic operations (AND, OR, NOR, etc.).

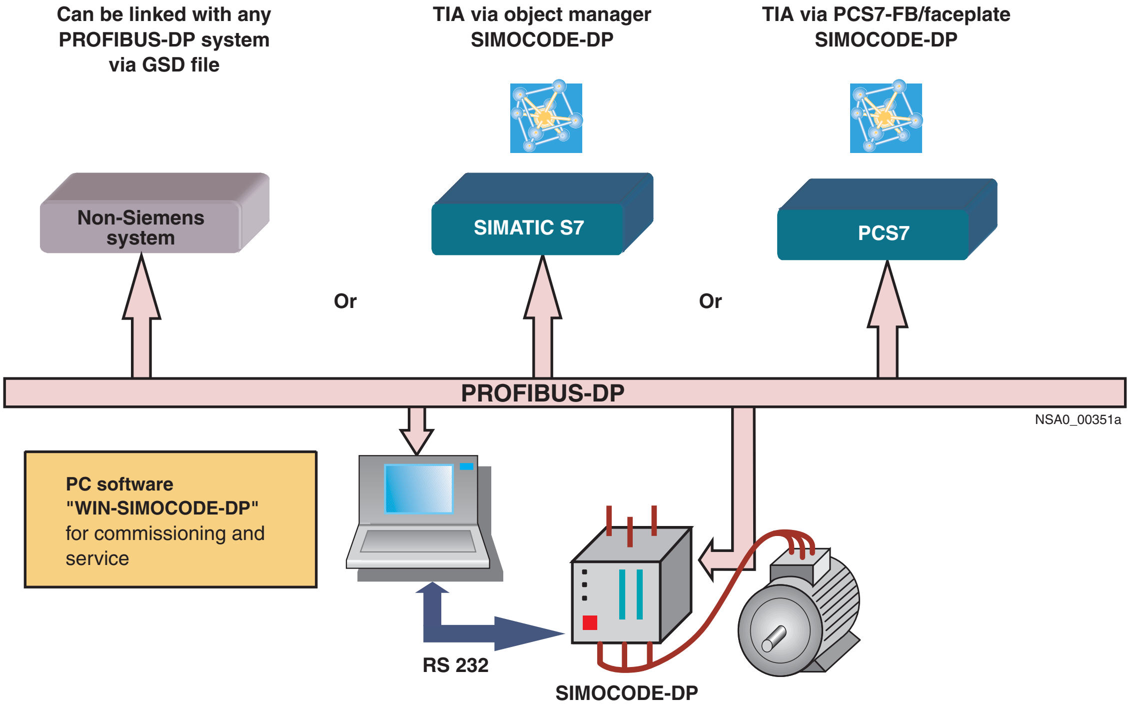
Furthermore, special standard function blocks are stored in SIMOCODE-DP:

- *Automatic, time-discrete reactivation of motors following mains failure*
  The prerequisites are as follows:
  - Failure of the three-phase supply must take place via a separate voltage relay
  - The supply voltage of SIMOCODE-DP must not be interrupted
- *Different error signaling modules with and without acknowledgement*
  These allow SIMOCODE-DP to trip as a result of external events (e.g. overspeed governor has tripped)
- *The emergency start function*
  This resets the thermal memory of SIMOCODE-DP immediately after overload tripping, i.e. immediate restarting is possible (important, for example, for a fire-extinguisher pump)
- *The test function for the load feeder*
  This can be activated by switching off the main switch Q1 (see the section Circuit Diagrams) and allows the control circuit to be checked with the motor branch at zero current.

Autonomous operation

A significant feature of SIMOCODE-DP is autonomous processing of all integral protection and control mechanisms, i.e. even in the event of failure of the bus system or automation system, correct functioning of the motor feeder is guaranteed.

Integration



Universal application of SIMOCODE-DP in any automation system

In communication-capable controlgear, over and above the device function and hardware design a great deal of emphasis is placed on system integration, i.e. optimal integration capability in various different system configurations and process automation systems.

For this reason, the SIMOCODE-DP modular system offers as options a wide range of software packages for system-wide and time-saving configuring and diagnostics:

- PC software Win-SIMOCODE-DP for start-up and service
- Object manager OM-SIMOCODE for "totally integrated" in SIMATIC S7
- Function block FB-SIMOCODE for "totally integrated" in PCS7.

PC software Win-SIMOCODE-DP for start-up and service

Win-SIMOCODE-DP is "Plug and Play"-capable, process independent standard PC software for start-up and service.

It offers a user-friendly and convenient user-interface for

- Parameterization
- Display and diagnostics
- Test functions
- Motor control

Win-SIMOCODE-DP is available in two versions:

- *Win-SIMOCODE-DP / Smart*
  Interfacing to SIMOCODE-DP via the RS232 interface, i.e. point-to-point
- *Win-SIMOCODE-DP / Professional*
  Interfacing to SIMOCODE-DP selectable
  - Distributed via RS232
  - Centrally via PROFIBUS DP (V1).

SIMOCODE-DP motor protection and control devices

Object manager OM-SIMOCODE for "totally integrated" in SIMATIC S7

SIMOCODE-DP can be integrated into SIMATIC S7 in two different ways:

- *Conventionally via GSD files*
  i.e. integration in SIMATIC S7 is identical to integration in any other DP standard master system
- V*ia the OM-SIMOCODE-DP object manager*
  i.e. SIMOCODE-DP becomes an integral component of STEP 7, the object manager OM-SIMOCODE-DP should, in this case, always be combined with the start-up and service software Win-SIMOCODE-DP/Professional.

Both software packages must be installed on the PG/PC on which the hardware configuration of SIMATIC S7 is performed.

This ensures that Win-SIMOCODE-DP/Professional can be called up directly from HW-Config.

Parameter sets created with Win-SIMOCODE-DP/Professional are loaded into the STEP 7 data storage by means of OM and automatically transferred to SIMOCODE-DP during start-up.

Functions specific to SIMATIC S7, such as diagnostic and hardware interrupts are supported, which means easier S7-wide configuration as well as optimal performance in the transfer of diagnostic data.

Function block FB-SIMOCODE for "totally integrated" in PCS7

System-compatible integration into the PCS7 process control system requires the appropriate function blocks and faceplates for the respective field device.

The PCS7-FB SIMOCODE-DP supports standard processing of the SIMOCODE-DP-specific data in the application program of the automation system.

The faceplate (picture block) SIMOCODE-DP offers a standardized user interface for SIMOCODE-DP on the Operator Station of PCS7.

It is then easy to integrate SIMOCODE-DP into PCS7 and time-savings are achieved during configuration.

The Process Device Manager "PDM" supports centralized parameterization and diagnosis of all field devices on PROFIBUS DP or using the Hart protocol from the PC S7 Engineering Station.

SIMOCODE-DP is integrated into PDM via an appropriate device description. The functional scope corresponds to that of Win-SIMOCODE-DP, the user-interface is, however, uniform for all the different types of field devices.

Technical specifications

Shared data of basic unit, expansion module and operator module	
Permissible ambient temperature in °C	-25 ... +60
Permissible storage temperature in °C	-40 ... +80
Installation altitude above sea-level in m	≤ 2000
Degree of protection acc. to IEC 60529	IP20 max. current setting $I_e \leq 100$ A; IP00 max. current setting $I_e > 100$ A
Shock resistance (sine pulse)	10 g/5 ms
Mounting position	Any
Mounting • max. current setting $I_e \leq 100$ A • max. current setting $I_e > 100$ A	 Snap-on mounting onto 35 mm standard rail or screw mounting with push-in lugs. Screw mounting directly onto contactor or screw mounting
EMC interference immunity • Line-induced interference, burst to IEC 61000-4-4 • Line-induced interference, surge to IEC 61000-4-5 • Electrostatic discharge to IEC 61000-4-2 • Field-related interference to IEC 61000-4-3	 2 kV (corresponds to degree of severity 3) 2 kV (corresponds to degree of severity 3) 8 kV (corresponds to degree of severity 3) 10 V/m (corresponds to degree of severity 3)
EMC emitted interference	Emission limit class B to EN 55011
Safe isolation acc. to DIN VDE 0100 (IEC 60364), DIN VDE 0106, EN 50178 (product version 12 upwards, start of delivery 01/2000)	All circuits in SIMOCODE-DP are safely isolated from each other, they are designed with doubled creepage paths and clearances Power circuit from the control/electronic circuits: Safe isolation up to 690 V or 1000 V between control and electronic circuits One below the other: Safe isolation up to 300 V Observe notes of test report “Safe Isolation” No. 1610a.
Basic unit	
Displays • green LED "Ready" • green LED "Bus" • red LED "General Fault"	 Continuous light: Ready Off: No control supply voltage" or "Function test not OK; device is disabled" Continuous light: “Bus operation" Continuous light/steady light: “Feeder fault”, e.g. overload tripping
Test/Reset button	By pressing the Test/Reset button, the device can be reset following a trip or its functions can be tested
System interface	RS 232 for connecting the expansion module, control module or PC
PROFIBUS DP interface	RS 485 for connecting the PROFIBUS DP line via terminals (conductor cross-sections as for auxiliary contacts) or 9-pole SUB D socket

Main circuit			
Rated insulation voltage U_i (for pollution severity 3) in V • For uninsulated conductors (3UF5 001 to 3UF5 021) • For insulated conductors (3UF5 001 to 3UF5 021) • For uninsulated and insulated conductors (3UF5 031 to 3UF5 051)	 690 1000 1000		
Rated impulse withstand voltage U_{imp} in kV • 3UF5 001 ... 3UF5 021 • 3UF5 031 ... 3UF5 051	 6 8		
Rated frequency in Hz	50/60		
Type of current	Three-phase		
Short-circuit protection	See table Short-circuit protection with fuses for motor feeders		
Diameter of feed-through openings (max. I_e = 100 A) in mm • Devices with max. operational current I_e = 25 A • Devices with max. operational current I_e = 100 A • Devices with max. operational current I_e > 100 A	 10 15 Construction with connecting bars		
Bar connection • Current range in A • Tightening torque in Nm • Solid with cable lug in mm^2 • Stranded with cable lug in mm^2	 50 ... 205 M 8: 10 ... 14 35 ... 95 50 ... 120	 125 ... 500 M 10: 14 ... 24 50 ... 240 70 ... 240	 200 ... 820 M 10: 14 ... 24 M 12: 20 ... 35 50 ... 240 70 ... 240
Auxiliary circuit/control circuit			
Rated control supply voltage U_s	AC 50/60 Hz; 115 V and 230 V	24 V DC	
Operating range	AC 50/60 Hz; 0.85 to 1.1 x U_s	DC 24 V; 0.85 ... 1.2 × U_s (DIN 19240)	
Power consumption	AC 50/60 Hz; 5 VA	DC 24 V; 5 W	
Rated insulation voltage U_i in V	300 (at pollution degree 3)		
Rated impulse withstand voltage U_{imp} in kV	4		
Outputs • Number • Auxiliary contacts of the 4 outputs • Specified short-circuit protection for auxiliary contacts (outputs)	 4 monostable/bistable outputs depending on the variant NC contact response can be parameterized with internal signal conditioning, 3 outputs are jointly and 1 is separately connected to a common potential; they can be freely assigned to the control functions (e.g. for activating mains, star and delta contactors and for signaling the operating status) Fuse links, operational class gL/gA 6 A, quick-acting 10 A; circuit-breaker 1.6 A, C characteristic		
Continuous rated current in A	5		
Rated operating current (switching capacity)	AC-15; 6 A/24 V; 6 A/120 V; 3 A/230 V DC-13; 2 A/24 V; 0.55 A/60 V; 0.25 A/125 V		
Inputs	4 inputs, supplied by the device electronics (DC 24 V), jointly connected to a common potential, for injecting process signals such as local control points, key-operated switches or limit switches		
Thermistor motor protection (binary PTC thermistor) • Total cold resistance in kΩ • Response threshold in kΩ • Return value in kΩ	 1.5 2.7 ... 3.1 1.5 ... 1.65		
Conductor cross-sections • Tightening torque in Nm • Solid and stranded in mm^2 • Solid with/without end sleeve in mm^2	 0.8 ... 1.2 1 × (0.5 ... 4.0); 2 × (0.5 ... 2.5) 1 × (0.5 ... 2.5); 2 × (0.5 ... 1.5)		
Expansion module			
System interface	RS 232 as connection to the basic unit and for connecting the control module or PC		
Rated insulation voltage U_i in V	300 (at pollution degree 3)		
Rated impulse withstand voltage U_{imp} in kV	4		
Outputs • Number • Auxiliary contacts of the 4 outputs • Specified short-circuit protection for auxiliary contacts (outputs)	 4 bistable outputs Each with 1 floating NO contact, NC contact response can be parameterized via internal signal conditioning; 3 outputs jointly and 1 separately connected to common potential; they can be freely assigned to the control functions (e.g. for activating mains, star and delta contactors and signaling the operating status) Fuse links, operational class gL/gA 6 A, quick-acting 10 A; Circuit-breaker 1.6 A, C characteristic		
Continuous rated current in A	5		
Rated operating current (switching capacity)	AC-15; 6 A/24 V; 6 A/120 V; 3 A/230 V DC-13; 2 A/24 V; 0.55 A/60 V; 0.25 A/125 V		
Inputs	8 externally supplied DC 24 V, AC 115 V, AC 230 V jointly connected to a common potential, for injecting process signals such as local control points, key-operated switches or limit switches		
Conductor cross-sections • Tightening torque in Nm • Solid and stranded in mm^2 • Finely stranded with/without end sleeve in mm^2	 0.8 ... 1.2 1 × (0.5 ... 4.0); 2 × (0.5 ... 2.5) 1 × (0.5 ... 2.5); 2 × (0.5 ... 1.5)		

SIMOCODE-DP motor protection and control devices

3

Control module	
Displays	
• green LED "Ready"	Continuous light: "Ready" Off: "No control supply voltage" or "Function test not OK; device is disabled"
• red LED "General Fault"	Continuous light/steady light: "Feeder fault", e.g. overload tripping
• 3 green and 3 yellow LEDs	Feeder-specific displays, freely-assignable, e.g. manual/automatic mode, tripping of thermistor protection, clockwise/counterclockwise rotation etc.
Buttons	
• Test/Reset	By pressing the Test/Reset button, the device can be reset following a trip or its functions can be tested
• Control keys	For controlling the motor feeder, freely programmable
• System interface	RS 232 as connection to the basic unit or expansion module and for connection to a PC

Short-circuit protection with fuses for motor feeders with short-circuit currents up to 50 kA at 690 V for 3RB1 2 and 3UF5 0, Part 1

Overload relay	Contactor	CLASS														
		5 and 10			15			20			25			30		
		Rated operational current I_e AC-3 in A at ... V														
		400	500	690	400	500	690	400	500	690	400	500	690	400	500	690
Adjustment range 1.25 to 6.3 A																
3UF5 00	3RT1 015	6.3	5	4	6.3	5	4	6.3	5	4	6.3	5	4	6.3	5	4
	3RT1 016	6.3	6.3	5.2	6.3	6.3	5.2	6.3	6.3	5.2	6.3	6.3	5.2	6.3	6.3	5.2
	3RT1 017	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Adjustment range 6.3 to 25 A																
3UF5 01	3RT1 015	7			7			7			7			7		
	3RT1 016	9	6.5		9	6.5		9	6.5		9	6.5		9	6.5	
	3RT1 017	12	9	6.3	11	9	6.3	10	9	6.3	9.5	9	6.3	9	9	6.3
	3RT10 24	12	12	9	12	12	9	12	12	9	12	12	9	12	12	9
	3RT10 25	17	17	13	17	17	13	16	16	13	15	15	13	14	14	13
	3RT10 26	25	18	13	18	18	13	16	16	13	15	15	13	14	14	13
	3RT10 34	25	25	20	25	25	20	22.3	22.3	20	20.3	20.3	20.3	19.1	19.1	19.1
	3RT10 35	25	25	24	25	25	24	25	25	24	25	25	24	25	25	24
Adjustment range 25 to 100 A																
3UF5 02	3RT10 34	32	32	20	25.5	25.5	20	22.3	22.3	20	20.3	20.3	20	19.1	19.1	19.1
	3RT10 35	40	40	24	33	33	24	29.4	29.4	24	28	28	24	26.5	26.5	24
	3RT10 36	50	50	24	38.5	38.5	24	32.7	32.7	24	29.4	29.4	24	26.5	26.5	24
	3RT10 44	65	65	47	56	56	47	49	49	47	45	45	45	41.7	41.7	41.7
	3RT10 45	80	80	58	61	61	58	53	53	53	47	47	47	45	45	45
	3RT10 46	95	95	58	69	69	58	59	59	58	53	53	53	50	50	50
Adjustment range 50 to 205 A																
3UF5 03	3RT10 54	115	115	115	93	93	93	82	82	82	75	75	75	69	69	69
	3RT10 55	150	150	150	122	122	122	107	107	107	98	98	98	90	90	90
	3RT10 56	185	185	170	150	150	150	131	131	131	120	120	120	111	111	111
Adjustment range 125 to 500 A																
3UF5 04	3RT10 64	225	225	225	182	182	182	160	160	160	146	146	146	135	135	135
	3RT10 65	265	265	265	215	215	215	188	188	188	172	172	172	159	159	159
	3RT10 66	300	300	280	243	243	243	213	213	213	195	195	195	180	180	180
	3RT10 75	400	400	400	324	324	324	284	284	284	260	260	260	240	240	240
	3RT10 76	500	500	450	405	405	405	355	355	355	325	325	325	300	300	300
	3RT12 64	225	225	225	225	225	225	225	225	225	194	194	194	173	173	173
	3RT12 65	265	265	265	265	265	265	265	265	265	228	228	228	204	204	204
	3RT12 66	300	300	300	300	300	300	300	300	300	258	258	258	231	231	231
	3RT12 75	400	400	400	400	400	400	400	400	400	344	344	344	308	308	308
	3RT12 76	500	500	500	500	500	500	500	500	500	430	430	430	385	385	385
Adjustment range 200 to 820 A																
3UF5 05	3TF68 1)	630	630	630	502	502	502	440	440	440	408	408	408	376	376	376
	3TF69 1)	820	820	820	662	662	662	572	572	572	531	531	531	500	500	500

1) Contactors mountable.

2) Pay attention to operating voltage.

3) Type of coordination and short-circuit protection devices according to IEC 60947-4-1/DIN VDE 660 Part 102:
• Type of coordination "1": In the event of a short-circuit, the contactor or starter must not endanger persons or the installation. They do not have to be suitable for further operation without repair and the renewal of parts.

Short-circuit protection with fuses for motor feeders with short-circuit currents up to 50 kA at 690 V for 3RB1 2 and 3UF5 0, Part 2

Overload relay	Contactor	Fuse links[2]				
		690 V			415 V	600 V
		NH, DIAZED, NEOZED operational class gL (gG)	Type 3NA, Type 5SB, Type 5SE	Type 3ND aM	British Standards BS88 fuses	UL-listed fuses RK5/L
		Type of coordination[3]				
		1	2			500
Adjustment range 1.25 to 6.3 A						
3UF5 00	3RT1 015	35	20		20	25
	3RT1 016	35	20		20	25
	3RT1 017	35	20		20	25
Adjustment range 6.3 to 25 A						
3UF5 01	3RT1 015	35	20		20	60
	3RT1 016	35	20		20	60
	3RT1 017	35	20		20	60
	3RT10 24	63	25	20	25	70
	3RT10 25	63	25	20	25	70
	3RT10 26	100	35	20	25	100
	3RT10 34	125	63	50	63	100
	3RT10 35	125	63	50	63	100
Adjustment range 25 to 100 A						
3UF5 02	3RT10 34	125	63	50	63	125
	3RT10 35	125	63	50	80	160
	3RT10 36	160	80	50	80	200
	3RT10 44	250	125	63	125	250
	3RT10 45	250	160	80	160	250
	3RT10 46	250	160	100	160	350
Adjustment range 50 to 205 A						
3UF5 03	3RT10 54	355	315	160	250	450
	3RT10 55	355	315	200	315	500
	3RT10 56	355	315	200	315	500
Adjustment range 125 to 500 A						
3UF5 04	3RT10 64	500	400	250	400	700
	3RT10 65	500	400	315	400	700
	3RT10 66	500	400	315	400	700
	3RT10 75	630	400	400	450	1000
	3RT10 76	630	500	500	500	1200
	3RT12 64	500	500	400	450	800
	3RT12 65	500	500	400	450	800
	3RT12 66	500	500	400	450	800
	3RT12 75	800	800	630	800	1200
	3RT12 76	800	800	630	800	1200
Adjustment range 200 to 820 A						
3UF5 05	3TF68[1]	1000	500[4]	630	500	1200
	3TF69[1]	1250	630[4]	630	630	2000 CLASS L

- Type of coordination "2": In the event of a short-circuit, the contactor or starter must not endanger persons or the installation. They must be suitable for further operation. There is a danger of contact welding.

4) Ensure that the maximum AC-3 operating current is sufficiently different from the rated fuse current.

SIMOCODE-DP motor protection and control devices

Selection and ordering data

Version			DT	Order No.	PS*	Weight per PU approx. kg
Basic unit						
4 inputs, 4 outputs for snap-on mounting onto 35 mm standard mounting rail to EN 50022						
Contactors that can be mounted externally Type	Width mm	Adjustment range A				
-	70	1.25 [1] ... 6.3	C	**3UF5 001-3□□□0-1**	1 unit	0.800
-	70	6.3 ... 25	C	**3UF5 011-3□□□0-1**	1 unit	0.800
-	70	25 ... 100	C	**3UF5 021-3□□□0-1**	1 unit	0.800
3RT1 05	120	50 ... 205	C	**3UF5 031-3□□□0-1**	1 unit	1.640
3RT1 06, 3RT1 07 3RT1 26, 3RT1 27	145	125 ... 500	C	**3UF5 041-3□□□0-1**	1 unit	2.420
3TF6 8, 3TF6 9	230	200 ... 820	C	**3UF5 051-3□□□0-1**	1 unit	4.330
Inputs						
Input for thermistor motor protection				**A**		
Ground-fault detection input (external) (sensing of ground fault currents of sizes 0.3 A, 0.5 A and 1 A with summation current transformers 3UL2 20.-A, see Section 5, Protective Devices: Overload Relays –> SIRIUS Overload Relays –> SIRIUS Solid-State Overload Relays –> Accessories)				**B**		
Rated control voltage						
24 V DC				**B**		
115 V AC				**J**		
230 V AC				**N**		
Behavior of the outputs in case of control supply voltage failure						
Monostable				**0**		
Bistable				**1**		

3UF5 001 ... 021

3UF5 031 ... 051

1) The current adjustment range from 0.25 to 1.25 A is attained by looping the main conducting paths.

* This quantity or a multiple thereof can be ordered.

Expansion module


Expansion module

Version	DT	Order No.	PS*	Weight per PU approx. kg
8 inputs, 4 outputs for snap-on mounting on 35 mm standard mounting rail to EN 50022, external supply voltage for the inputs				
AC 230 V	A	**3UF5 100-0AN00**	1 unit	0.445
AC 115 V	C	**3UF5 100-0AJ00**	1 unit	0.442
DC 24 V	A	**3UF5 100-0AB00**	1 unit	0.422

Control module


Control module

Version	DT	Order No.	PS*	Weight per PU approx. kg
For installation in the control cabinet door can be snapped onto basic unit or expansion module	A	**3UF5 202-1AA00-1**	1 unit	0.137

Configuration software

3UF57 710-0AA00-0

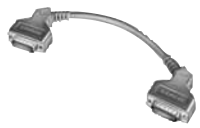
3UF57 711-0AA00-0

Version	DT	Order No.	PS*	Weight per PU approx. kg
Win-SIMOCODE-DP/Professional • Parameterization, control, visualization and testing: Via PROFIBUS DPV1 or via RS 232 • PC/PG requirement: Windows 95/98/2000/NT/ME or Windows XP • PC/PG interface requirement: PROFIBUS system interface from Siemens or RS 232 with compatible 3RW2 920-1DA00 interface cable • SIMOCODE-DP requirement: Delivery stage E10 (as of June 1998) • Type of delivery: CD, English/German (selectable) incl. online Help and example parameter files, single license	A	**3UF5 710-0AA00-0**	1 unit	0.230
Win-SIMOCODE-DP/Smart • Parameterization, control, visualization and testing: Via RS 232 • PC/PG requirement: Windows 95/98/2000/NT/ME or Windows XP • PC/PG interface requirement: RS 232 with compatible 3RW29 920-1DA00 interface cable • Type of delivery: CD, English/German (selectable) incl. online Help and example parameter files, single license	A	**3UF5 711-0AA00-0**	1 unit	0.231
OM-SIMOCODE-DP STEP 7 Object Manager for integrating SIMOCODE-DP as S7 slave and for call of Win-SIMOCODE-DP/Professional from STEP 7 • Requirements: STEP 7, Version 4.0 or higher • SIMOCODE-DP requirement: Delivery stage E10 (as of June 1998) • Type of delivery: CD-ROM, English/German (selectable) incl. online Help, single license	A	**3UF5 712-0AA00-0**	1 unit	0.231
PCS 7 SIMOCODE-DP function modules Function module for integrating SIMOCODE-DP in the PCS 7 user program and for visualizing SIMOCODE-DP-specific data in a faceplate. • SIMOCODE-DP requirement: Delivery stage E10 and higher (since June 1998) • Type of delivery: CD-ROM, English/German, single user license • PCS 7 prerequisites:				
- PCS7 Version 4.2 to 5.2	A	**3UF5 720-0AA00-0**	1 unit	0.240
- PCS 7 Version 6.0 1)	A	**3UF5 720-0AA10-0**	1 unit	0.240

1) Start of delivery, please enquire.

SIMOCODE-DP motor protection and control devices

Version	DT	Order No.	PS*	Weight per PU approx. kg
Documentation				
System manual with description of communication via PROFIBUS DP and configuration example with token fee				
• German	A	**3UF5 700-0AA00-0**	1 unit	0.841
• English	D	**3UF5 700-0AA00-1**	1 unit	0.842
Connecting cable, installation material				
Connecting cable for PC communication via the RS 232 system interface, 5 m long	►	**3RW2 920-1DA00**	1 unit	0.176
Connecting plug/connecting lead with 3UF5 9/3UF1 9 connectors				
• For connecting the basic unit to the expansion unit, 9-pole, 0.03 m tab connector shielded	A	**3UF5 900-1AA00**	1 unit	0.020
• For connecting the basic unit to the expansion unit or operator module, 9-pole				
- 0.5 m long, shielded plug 45° angular	A	**3UF1 900-1AA00**	1 unit	0.076
- 2.0 m long, shielded plug 45° angular	A	**3UF1 900-1BA00**	1 unit	0.161
- 2.5 m long, shielded plug 45° angular	A	**3UF1 900-1CA00**	1 unit	0.190
- 0.5 m long, with flat plug, shielded	A	**3UF1 900-1DA00**	1 unit	0.063
- 1.0 m long, with flat plug, shielded	A	**3UF1 900-1EA00**	1 unit	0.092
• For connecting basic unit/expansion module to the control cabinet door It is possible to set parameters, operate and monitor using the PC from the control cabinet door, 9-pole				
- 0.5 m long, with tab connector and socket, shielded	A	**3UF5 900-0AA00**	1 unit	0.066
- 1.0 m long, with tab connector and socket, shielded	A	**3UF5 900-0BA00**	1 unit	0.093
T-shaped terminal Terminal for bus connection to PROFIBUS DP - RS 485	A	**3UF5 900-1GA00**	1 unit	0.045
Bus termination Bus termination module with separate supply voltage for terminating the bus following the last unit on the bus line. Supply voltage:				
AC 115/230 V	A	**3UF1 900-1KA00**	1 unit	0.286
DC 24 V	A	**3UF1 900-1KB00**	1 unit	0.192



3UF1 900-1A
3UF1 900-1B
3UF1 900-1C

3UF1 900-1D
3UF1 900-1E

* This quantity or a multiple thereof can be ordered.

Base plate

3UF1 900-0J00

Version	DT	Order No.	PS*	Weight per PU approx. kg
For snap-on mounting onto 75 mm standard rail. Only for 3UF5 0 with 120 mm overall width	A	**3UF1 900-0JA00**	1 unit	0.200

Push-in lugs

3RB1 900-0B

Version	DT	Order No.	PS*	Weight per PU approx. kg
For screw mounting on mounting plate 2 units are required for each 3UF5 0	►	**3RB1 900-0B**	10 units	2.000

Terminal cover

3TX7 506-0A

3TX7 506-0B

Version	DT	Order No.	PS*	Weight per PU approx. kg
• For individual mounting or on the outgoing side with direct mounting				
- 3UF5 031	B	**3TX7 506-0A**	1 unit	0.044
- 3UF5 041	B	**3TX7 536-0A**	2 units	0.112
- 3UF5 051 with 3TF6 8	B	**3TX7 686-0A**	1 set	0.410
- 3UF5 051 with 3TF6 9	B	**3TX7 696-0A**	1 set	0.402
• Between contactor and overload relay for direct mounting				
- 3UF5 031	B	**3TX7 506-0B**	1 unit	0.019
- 3UF5 041	B	**3TX7 536-0B**	1 unit	0.055
- 3UF5 051 with 3TF6 8	B	**3TX7 686-0B**	1 unit	0.085
- 3UF5 051 with 3TF6 9	B	**3TX7 696-0B**	1 unit	0.103

Communications processors for SIMATIC S7

See ST 70 Catalog

Bus lines for PROFIBUS

See IK PI Catalog

9-pin bus connectors with bus termination resistor

See IK PI Catalog

Components for optical-fiber connection

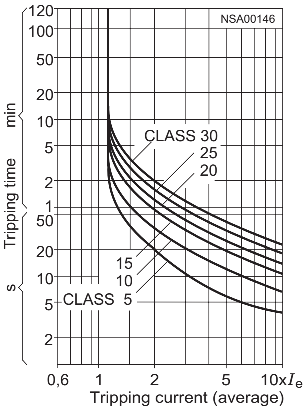
See IK PI Catalog

*** This quantity or a multiple thereof can be ordered.**

SIMOCODE-DP motor protection and control devices

Characteristics

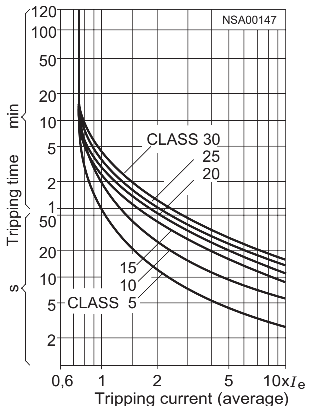
Tripping characteristic for 3-pole loading



The current-time curves for 3-pole symmetrical load show the relationship between the release time from cold and multiples of the operational current.

If the device is pre-loaded with 100 % of the current setting, the tripping times are reduced.

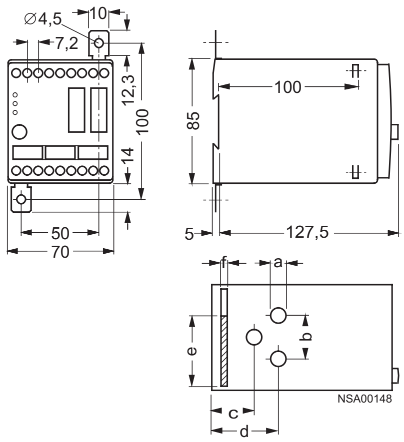
Tripping characteristic for 2-pole loading



In the case of 2-pole loading (failure of one phase) or current unbalance > 40 % of the current setting, the tripping times are reduced, because the heat generated due to the unbalanced loading of the motor rises.

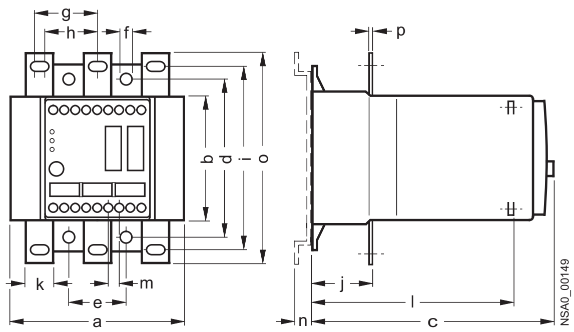
Dimension drawings

3UF5 001, 3UF5 011 and 3UF5 021 basic units



	a	b	c	d	e	f
3UF50 01	10	34	29	46	-	-
3UF50 11	10	34	29	46	48	4
3UF50 21	15	29	24	47	48	4

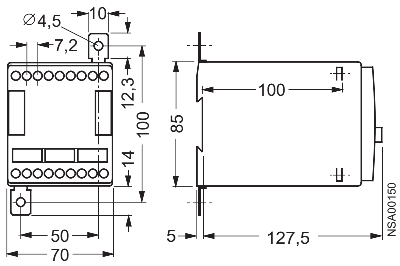
3UF5 031, 3UF5 041 and 3UF5 051 basic units



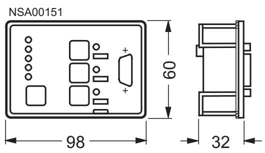
	a	b	c	d	e	f	g	h
3UF5 031	120	85	155	110	40	Ø 7	42	37
3UF5 041	145	85	175	105	50	Ø 9	52	48
3UF5 051	230	85	190	120	70	Ø 11	70	–

	i	j	k	l	m	n	o	p
3UF5 031	125	41	20	131	7,2	13	145	4
3UF5 041	130	46	30	151	7,2	–	160	6
3UF5 051	135	55	40	166	7,2	–	175	8

3UF5 1 expansion module

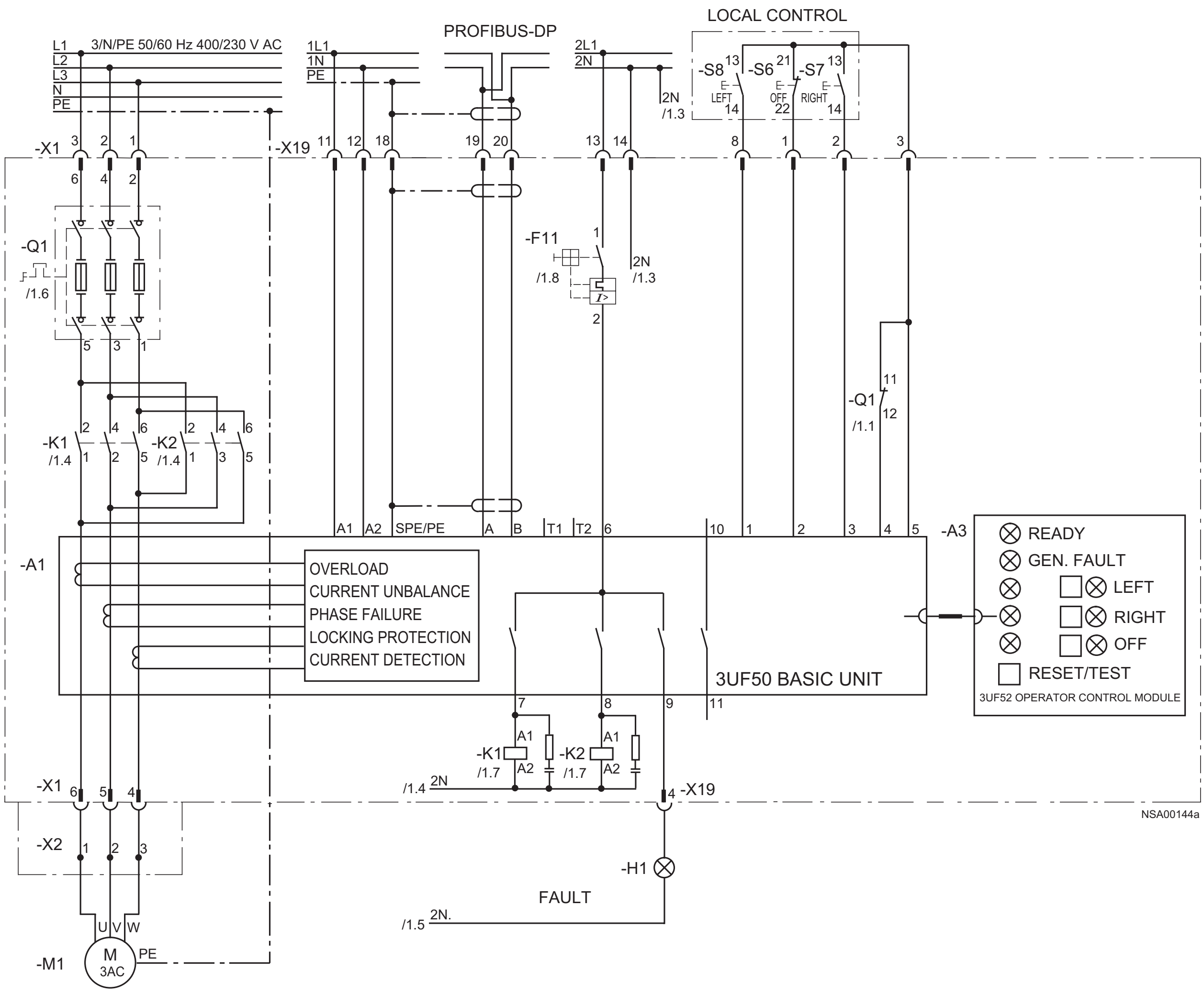


3UF5 2 control module



Circuit diagrams

Reversing starter circuit with SIMOCODE-DP



Further circuit diagrams for the control functions overload, direct online starter, star-delta starter, pole reversing, Dahlander pole-changing circuit, solenoid valve, gate valve (servo drive) and SIKOSTART 3RW2 2 and a configuration example are included in the 3UF5 7 system manual.

SIMOCODE-DP motor protection and control devices

Further information

System manual

For selection of equipment and for planning, it is recommended that the 3UF5 7 system manual is consulted (see Selection and ordering data page 3/88).

CD-ROM "SIMOCODE-DP, Intelligence at the Field Level"

Concise introduction to the system landscape of SIMOCODE-DP, including 3UF57 manual, Win-SIMOCODE-DP/Smart demo parameterization software, example circuit diagrams, etc. (Order No. E2001-D1140-P21S-X-7400)

Configuration course

Two-day configuration course for SIMOCODE-DP (device spectrum, functions, communications capability, practical exercises). For further details and registration, please contact:

- Tel: +49 (9131) 7-2 79 72
- Fax:+49 (9131) 7-2 81 72

Internet

You can find further information on the Internet at:

www.siemens.de/simocode-dp

Overview

The 3UF1 8 current transformers are protection transformers and are used for actuating overload relays. Protection transformers are designed to ensure proportional current transfer up to a multiple of the primary rated current.

The 3UF1 8 current transformers convert the maximum current of the corresponding operating range into the standard signal 1 A secondary.

Technical specifications

Climatic environmental conditions	
Ambient temperature in °C	
• Operation	-25 ... +60
• Storage/transport	-40 ... +85
Temperature change in °C/h	
• Operation	max. 10
• Storage/transport	max. 20
Relative humidity in %	15 ... 95 (indoor, acc. to DIN 40040, no condensation)
Air pressure in hPa	
• Operation	860 ... 1060
• Storage/transport	650 ... 1060
Contaminants in ppm	
• SO_2	0.5 (relative humidity ≤ 60 %, no condensation)
• H_2S	0.1 (relative humidity ≤ 60 %, no condensation)
Mechanical environmental conditions	
Vibrations in Hz acc. to IEC 60068-2-6	10 ... 57 (for constant amplitude 0.15 nm) 57 ... 150 (for constant acceleration 2 g)
Shock to IEC 60068-2-27	12 shocks (half sine 15 g/11 ms)
Requirements acc. to IEC, DIN and VDE	
Degree of protection to IEC 60529	IP20
Rated insulation voltage in V acc.to IEC 60664	690/1000 (type-dependent)
Rating of the insulation in V (to UL/CSA)	600
Trip class acc. to IEC 60947-4-1	suitable from CLASS 5 to CLASS 30

Power loss per conducting path of the transformers	Operating range	for setting ...	
		to the lower limit	to the upper limit
	A	mW (mVA)	mW (mVA)
• 3UF1 845	12.5 ... 50	33 (38)	570 (650)
• 3UF1 848	25 ... 100	110 (120)	1700 (1900)
• 3UF1 850	32 ... 130	135 (150)	2400 (2700)
• 3UF1 852	50 ... 200	170 (190)	2600 (2900)
• 3UF1 856	100 ... 400	450 (500)	6500 (7000)
• 3UF1 857	125 ... 500	850 (940)	13000 (15000)
• 3UF1 868-3F	160 ... 630	900 (1000)	17000 (19000)
• 3UF1 868-3G	205 ... 820	1400 (1600)	22000 (25000)

Conductor cross-sections (one or two conductors connectable)	Current transformers							
	on secondary side	on primary side						
		3UF1 845	3UF1 848[1]	3UF1 850[1]	3UF1 852	3UF1 856 3UF1 857	3UF1 868-3FA00[2]	3UF1 868-3GA00[2]
• Terminal screw	M 3.5	For con. data see 3RT contactors in Part 2	For con. data see 3RT contactors in Part 2	For con. data see 3RT contactors in Part 2	M 8	M 10	M 10	M 12
• Solid in mm^2	2 × 1.5 ... 2.5				-	-	-	-
• Stranded in mm^2	2 × 1.5 ... 2.5				-	-	-	-
• Finely stranded without end sleeve in mm^2	-				-	-	-	-
• Finely stranded with end sleeve in mm^2	2 × 1.5				-	-	-	-
• Finely stranded with cable lug in mm^2	-				35 ... 95	50 ... 240[3]	50 ... 240	185 ... 240
• Stranded with cable lug in mm^2	-				50 ... 120	70 ... 240[3]	70 ... 240	185 ... 240
• Connecting bars in mm	-				20 × 4	25 × 6.30 × 6	30 × 5	50 × 5
• Tightening torque in Nm	0.8 ... 1.4				10 ... 14	14 ... 24	14 ... 24	14 ... 24
• Tightening torque in lb.in	7 ... 12				89 ... 124	124 ... 210	124 ... 210	124 ... 210

1) With or without box terminal.

2) Conductor cross-sections for box terminals, see 3TF68 and 3TF69 contactors in section contactors and contactor combinations.

3) With max. conductor cross-section, a terminal cover for maintaining the phase spacing is required.

3

Current transformers for overload protection

Short-circuit protection with fuses for motor feeders for short-circuit currents up to 50 kA at 690 V[4]), 50/60 Hz

Overload relay	Contactor	Rated operational current AC-3 in A at 400 V and CLASS ...					Type of coordination [2)]			
		5 and 10	**15**	**20**	**25**	**30**	**1**	**2**		
							Fuse links in A[1)]			
							NH, Type 3NA DIAZED, Type 5SB NEOZED, Type 5SE gL/gG		**Type 3ND, aM**	**British Standards** BS88 fuses
Operating range 0.25 to 2.5 A										
3UF1 843-1BA00	3RT1 015	2.5	2.5	2.5	2.5	2.5	25	10	-	-
Operating range 1.25 to 12.5 A										
3UF1 843-1AA00	3RT1 015	7	7	7	7	7	25	10	-	-
	3RT1 016	9	9	9	9	9	25	10	-	-
	3RT1 017	12	11	10	9.5	9	25	10	-	-
	3RT1 024	12	12	12	12	12	35	16	20	35
	3RT1 025	12.5	12.5	12.5	12.5	12.5	35	16	20	35
Operating range 2.5 to 25 A										
3UF1 843-2BA00	3RT1 015	7	7	7	7	7	25	10	-	-
	3RT1 016	9	9	9	9	9	25	10	-	-
	3RT1 017	12	11	10	9.5	9	25	10	-	-
	3RT1 024	12	12	12	12	12	63	25	20	35
	3RT1 025	17	17	16	15	14	63	25	20	35
	3RT1 026	25	18	16	15	14	63	25	35	50
	3RT1 034	-	25	22.3	20.3	19.1	63	25	-	-
	3RT1 035	-	-	25	25	25	63	25	-	-
Operating range 12.5 to 50 A										
3UF1 845-2CA00	3RT1 025	17	17	16	15	14	63	25	20	35
	3RT1 026	25	18	16	15	14	100	35	35	50
	3RT1 034	32	25.5	22.3	20.3	19.1	100	63	-	-
	3RT1 035	40	33	29.4	28	26.5	100	63	-	-
	3RT1 036	50	38.5	32.7	29.4	26.5	100	80	-	-
	3RT1 044	-	50	49	45	41.7	100	80	-	-
	3RT1 045	-	-	50	47	45	100	80	-	-
	3RT1 046	-	-	-	50	50	100	80	-	-
Operating range 16 to 65 A										
3UF1 847-2DA00	3RT1 034	32	25.5	22.3	20.3	19.1	125	63	-	-
	3RT1 035	40	33	29.4	28	26.5	125	63	-	-
	3RT1 036	50	38.5	32.7	29.4	26.5	160	80	-	-
	3RT1 044	65	56	49	45	41.7	160	125	-	-
	3RT1 045	65	61	53	47	45	160	125	-	-
	3RT1 046	-	65	59	53	50	160	125	-	-
	3TF5 0	65	65	65	65	65	160	125	80	100

1) Pay attention to operating voltage.

2) Type of coordination and short-circuit protection devices according to IEC 60947-4-1/VDE 660 Part 102:
- Type of coordination 1
  In the event of a short-circuit, persons and equipment must not be endangered by the contactor or starter.
  They do not have to be suitable for further operation without repair and the renewal of parts.
- Type of coordination 2
  In the event of a short-circuit, persons and equipment must not be in danger from the contactor or starter.
  These must be suitable for subsequent operation.
  There is a danger of contact welding.

3) Operating range +5 %.

Overload relay	Contactor	Rated operating current AC-3 in A at 400 V and CLASS ...					Type of coordination 2)			
		5 and 10	**15**	**20**	**25**	**30**	**1**	**2**		
							Fuse links in A 1)			
							NH, Type 3NA DIAZED, Type 5SB NEOZED, Type 5SE gL/gG		**Type 3ND, aM**	**British Standards BS88 fuses**
Operating range 25 to 100 A										
3UF1 848 -2EA00	3RT1 044	65	65	49	45	41.7	250	125	-	-
	3RT1 045	80	61	53	47	45	250	160	-	-
	3RT1 046	95	69	59	53	50	250	160	-	-
	3RT1 054	100	93	82	75	69	250	160	125	125
	3RT1 055	-	100	100	98	90	250	160	125	125
	3RT1 056	-	-	-	100	100	250	160	125	125
Operating range 32 to 130 A										
3UF1 850-3AA00	3RT1 044	65	56	49	45	41.7	250	125	-	-
	3RT1 045	80	61	53	47	45	250	160	-	-
	3RT1 046	95	69	59	53	50	250	160	-	-
	3RT1 054	115	93	82	75	69	315	224	160	160
	3RT1 055	130	122	107	98	90	315	224	160	160
	3RT1 056	-	130	130	120	111	315	224	160	160
	3RT1 064	-	-	-	130	130	315	224	160	160
Operating range 50 to 200 A										
3UF1 852-3BA00	3RT1 054	115	93	82	75	69	355	224	160	160
	3RT1 055	150	122	107	98	90	355	224	160	200
	3RT1 056	185	150	131	120	111	355	224	160	200
	3RT1 064	200	182	160	146	135	355	224	160	200
	3RT1 065	-	200	188	172	159	355	224	160	200
	3RT1 066	-	-	200	195	180	355	224	160	200
	3RT1 075	-	-	-	200	200	355	224	160	200

1) Pay attention to operating voltage.

2) Type of coordination and short-circuit protection devices according to IEC 60947-4-1/VDE 660 Part 102:

- Type of coordination 1
  In the event of a short-circuit, persons and equipment must not be in danger from the contactor or starter.
  They do not have to be suitable for further operation without repair and the renewal of parts.
- Type of coordination 2
  In the event of a short-circuit, persons and equipment must not be in danger from the contactor or starter.
  These must be suitable for subsequent operation.
  There is a danger of contact welding.

3

Current transformers for overload protection

Overload relay	Contactor	Rated operating current AC-3 in A at 400 V and CLASS ...					Type of coordination [2]			
		5 and 10	**15**	**20**	**25**	**30**	**1**	**2**		
							Fuse links in A [1]			
							NH, Type 3NA DIAZED, Type 5SB NEOZED, Type 5SE gL/gG		**Type 3ND, aM**	**British Standards BS88 fuses**
Operating range 63 to 250 A										
3UF1 854-3CA00	3RT1 056	185	150	131	120	111	355	250	160	200
	3RT1 064	225	182	160	146	135	400	250	250	355
	3RT1 065	250	215	188	172	159	500	400	315	355
	3RT1 066	-	243	213	195	180	500	400	315	355
	3RT1 075	-	250	250	250	240	500	400	400	355
	3RT1 076	-	-	-	-	250	500	400	400	355
Operating range 100 to 400 A										
3UF1 856-3DA00	3RT1 065	265	215	188	172	159	500	400	315	400
	3RT1 066	300	243	213	195	180	500	400	315	400
	3RT1 075	400	324	284	260	240	630	500	400	450
	3RT1 076	-	400	355	325	300	630	500	500	450
	3TF6 8	-	-	400	400	400	800	500	630	450
Operating range 125 to 500 A										
3UF1 857-3EA00	3RT1 066	300	243	213	195	180	500	400	315	400
	3RT1 075	400	324	284	260	240	800	500	400	450
	3RT1 076	500	405	355	325	300	800	500	500	450
	3TF6 8	-	500	500	479	441	800	500	630	450
	3TF6 9	-	-	-	500	500	800	500	630	450
Operating range 160 to 630 A										
3UF1 868-3FA00	3RT1 075	400	324	284	260	240	800	500	400	450
	3RT1 076	500	405	355	325	300	800	500	500	450
	3TF6 8	630	630	536	479	441	1000	500	630	450
	3TF6 9	-	-	-	531	500	1000	500	630	450
Operating range 200 to 820 A										
3UF1 869-3GA00	3TF6 8	630	630	536	479	441	1000	500	630	450
	3TF6 9	820	662	572	531	500	1000	500	630	450

1) Pay attention to operating voltage.

2) Type of coordination and short-circuit protection devices according to IEC 60947-4-1/VDE 660 Part 102:
- Type of coordination 1
  In the event of a short-circuit, persons and equipment must not be in danger from the contactor or starter.
  They do not have to be suitable for further operation without repair and the renewal of parts.
- Type of coordination 2
  In the event of a short-circuit, persons and equipment must not be in danger from the contactor or starter.
  These must be suitable for subsequent operation.
  There is a danger of contact welding.

Selection and ordering data

	Version	DT	Order No.	PS*	Weight per PU approx. kg
Current transformers for stand-alone installation					
	for snap-on and screw mounting, suitable for snapping on to 35 mm standard mounting rails accord. to EN 50022				
	Operating range				
	A				
	0.25 ... 2.5 1)	A	**3UF1 843-1BA00**	1 unit	0.488
	1.25 ... 12.5 1)	D	**3UF1 843-2AA00**	1 unit	0.485
	2.5 ... 25 1)	D	**3UF1 843-2BA00**	1 unit	0.490
	12.5 ... 50	D	**3UF1 845-2CA00**	1 unit	0.694
	16 ... 65	D	**3UF1 847-2DA00**	1 unit	1.180
3UF1 843	25 ... 100	D	**3UF1 848-2EA00**	1 unit	1.230
Current transformers for mounting on contactors and stand-alone installation					
	for screw mounting				
	Operating range				
	A				
	32 ... 130	D	**3UF1 850-3AA00**	1 unit	1.740
	50 ... 200	D	**3UF1 852-3BA00**	1 unit	1.890
	63 ... 250	D	**3UF1 854-3CA00**	1 unit	3.610
3UF1 868	100 ... 400	D	**3UF1 856-3DA00**	1 unit	3.850
	125 ... 500	D	**3UF1 857-3EA00**	1 unit	4.130
	160 ... 630	D	**3UF1 868-3FA00**	1 unit	7.780
	205 ... 820	D	**3UF1 868-3GA00**	1 unit	8.920
Terminal covers					
	for converter/contactor combinations and stand-alone mounting for converters with and without box terminals (cover required per connection side)				
	3UF1 845	B	**3TX7 446-0A**	1 unit	0.006
	3UF1 848	B	**3TX7 466-0A**	1 unit	0.035
	3UF1 850, 3UF1 852	B	**3TX7 506-0A**	1 unit	0.044
	3UF1 854 ... 3UF1 857	B	**3TX7 536-0A**	2 units	0.112
	3UF1 868-3FA00	B	**3TX7 686-0A**	1 set	0.410
	3UF1 868-3GA00	B	**3TX7 696-0A**	1 set	0.402
3TX7 466-0A	for covering the screw connection for direct mounting on contactor (one cover required per contactor/converter combination)				
	3UF1 848	C	**3TX7 466-0B**	1 unit	0.013
	3UF1 850, 3UF1 852	B	**3TX7 506-0B**	1 unit	0.019
	3UF1 854 ... 3UF1 857	B	**3TX7 536-0B**	1 unit	0.055
	3UF1 868-3FA00	B	**3TX7 686-0B**	1 unit	0.085
	3UF1 868-3GA00	B	**3TX7 696-0B**	1 unit	0.103
Box terminal blocks					
	for stand-alone installation				
	3UF1 847, 3UF1 848	B	**3TX7 460-0E**	1 unit	0.093
	3UF1 850	B	**3TX7 500-0E**	1 unit	0.187

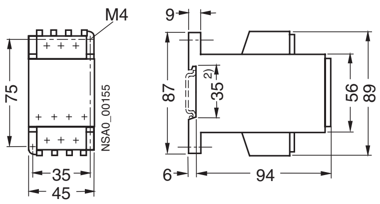
1) The following adjustment ranges for the protection of EEx e motors are applicable:
3UF1 843-1BA00, 0.25 ... 1.25 A
3UF1 843-2AA00, 1.25 ... 6.3 A
3UF1 843-2BA00, 2.5 ... 12.5 A

Note: Application in the SIMOCODE-DP system when using the control functions pole reversal and Dahlander circuit. Please note the configuring aids in the 3UF5 7 system manual.

Current transformers for overload protection

Dimension drawings

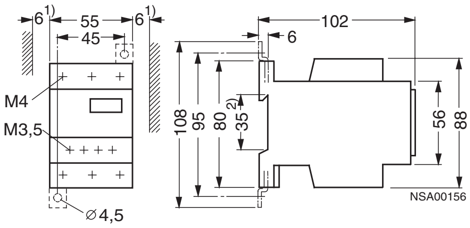
3UF1 843 current transformer



2) For snap-on mounting onto standard rails to DIN EN 50 022-35 x 7,5 or DIN EN 50 022-35 x 15.

3UF1 845 current transformer

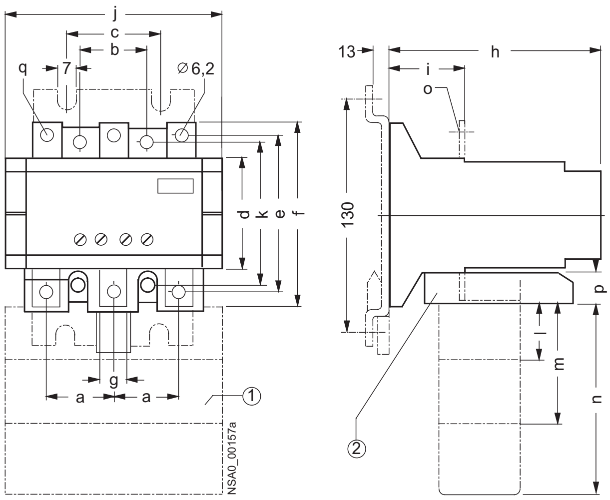
for individual mounting: for snap-on and screw mounting, suitable for snapping on to 35 mm standard mounting rails acc. to EN 50022



1) Clearance to earthed parts.
2) For snap-on mounting onto standard rails to DIN EN 50 022-35 x 7,5 or DIN EN 50 022-35 x 15.

3UF1 847 to 3UF1 852 current transformers

for snap-on mounting on 75 mm standard mounting rails acc. to EN 50023 with base plate

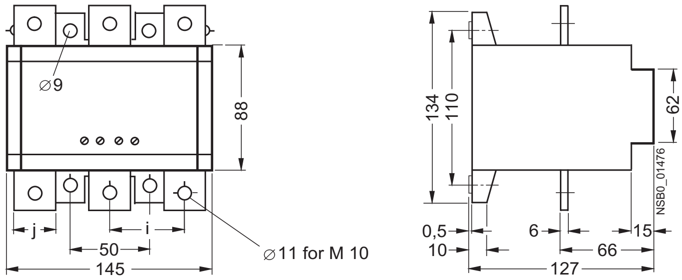


Current transformers	3UF1 847, 3UF1 848	3UF1 850-0JA00	3UF1 852-0JA00
Base plate	3UF1 900-0KA00	3UF1 900-0JA00 (for snap-on mounting only)	3UF1 900-0JA00 (for snap-on mounting only)
Box terminal block	3TX7 460-0E	3TX7 500-0E	–
Additional cover	3TX7 466-0A	3TX7 506-0A	3TX7 506-0A

① Additional cover, can be shortened
② Box terminal block

Transformers	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
3UF1847, 3UF1848	26,5	25	50	82	111	122	10,5	90	46	90	105	35	62	89	-	19	Ø 6,2	Ø 5,8 (M5)
3UF1850	37	37,5	-	71,5	99	114	15	110	41	120	95	33	67	98	-	23	Ø 6,6	Ø 7 (M6)
3UF1852	42	37,5	-	71,5	102	122	20	110	42	120	95	33	67	98	M8x25	23	Ø 9	Ø 7 (M6)

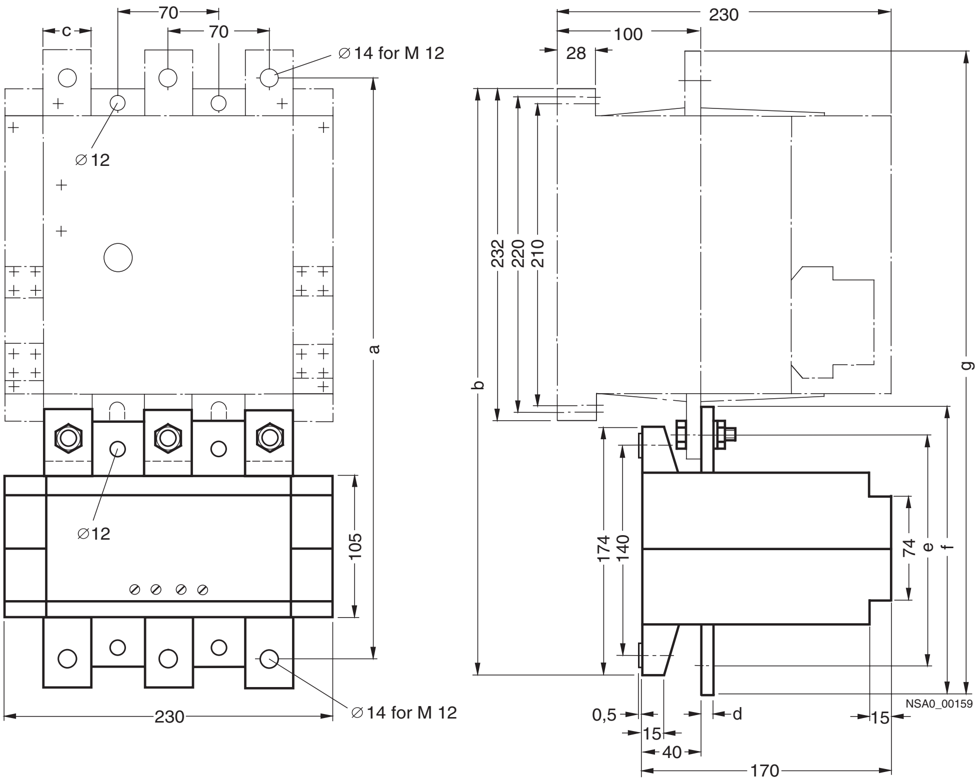
3UF1 854 to 3UF1 857 current transformers



Transformers	i	j
3UF18 54	48	25
3UF18 56		
3UF18 57	52	30

Current transformers for overload protection

3UF1 868-3FA00, 3UF1 868-3GA00 current transformers
for 3TF6 8 contactors



Transformers	Contactors	a	b	c	d	e	f	g
3UF18 68-3FA00	3TF68	390	398	30	5	145	175	420
3UF18 68-3GA00	3TF68	410	408	40	8	155	195	450

Overview

The compact, user-friendly, and low-cost solution for simple control tasks

- Compact, user-friendly, can be used universally without accessories.
- "All in one": the display and operator panel are integrated.
- 34 different functions can be linked at a press of a button or with PC software; up to 130 times in total
- Functions can be changed simply via buttons; no complicated rewiring

Area of application

The LOGO! logic module is the user-friendly, low-cost solution for simple control tasks.

LOGO! is universally applicable, e.g.:

- Building installation and wiring (lighting, shutters, awnings, doors, access control, barriers, ventilation systems, etc.)
- Controlgear cubicle installation
- Machine and device construction (pumps, small presses, compressors, hydraulic lifts, conveyors ...)
- Special controls for conservatories and greenhouses
- Signal preprocessing for other controllers

The LOGO! Modular logic modules can be expanded easily for each application.

Marine approvals

American Bureau of Shipping, Bureau Veritas, Det Norske Veritas, Germanischer Lloyd, Lloyds Register of Shipping, Polski Rejestr Statków

Design

LOGO! The modular design is available in different variants for different supply voltages (DC 12 V, DC 24 V; AC 24 V, DC 115/230 V, AC 115/230 V):

- Basic variants
- Low-cost pure variants without operator control and display panels

The LOGO! variants have the following distinguishing characteristics:

- R: Relay output
- C: Clock/time switch
- o: Without display

LOGO! is simple

- Operator control panel and front panel in one unit; no other tools are necessary
- Non-volatile storage of control program and setpoints (e.g. times) in integrated EEPROM

LOGO! is space-saving

- e. g. LOGO! 230RC: 72 x 90 x 55 mm (W x H x D)
- Fitted mounting in the distribution box (same mounting dimensions as the ground-fault circuit interrupter)

LOGO! offers maximum flexibility and is universal

- Expandability;
  depending on the application, additional expansion modules can be connected.

LOGO! is communication-capable

- Optional communication modules support interfacing to AS-Interface and *instabus EIB* networks

Functions

LOGO! is "All in one"

The display and operator panel are integrated. It is compact, easy to use, low cost and can be used universally without the need for any accessories. 34 different functions can be used in each LOGO! They are simply linked by pressing a button or by means of PC software. It is therefore possible to adapt it to changes quickly in the future without the need for expensive rewiring.

LOGO! is simple

- Integrated basic functions (e.g. AND, OR) and special functions (e.g. timers, counters, latching relay) of the electronics
- Program generation simply by combining stored functions at the press of a key or PC software
- Easy-to-use and simple duplication of the control program with an optional program module

LOGO! offers maximum flexibility and is universal

- Easy modification by reconnecting the functions at a press of a key; no need for time-consuming rewiring
- Optional operation from the PC; For creating, simulating, online testing, and archiving the control program on the PC, including documentation facility

LOGO! modular basic variants

3

Overview

The space-saving basic variants

- With interface for connecting extension modules

Design

- Relay outputs with up to 10 A output current (not LOGO! 24)
- Integrated front panel with background illumination (4 x 12 characters)
- Integrated operator control panel
- Integrated basic and special functions
- Integrated EEPROM for storing control program and setpoints
- Optional programming module
- Integrated clock with automatic summertime/wintertime changeover (not LOGO! 24)
- 130 function blocks can be combined
- 8 digital inputs, 4 digital outputs
- 2 inputs as analog inputs for DC 12/24 V versions (0 to 10 V); inputs can also be used as digitally
- 2 inputs for counting up to 2 kHz can be used (for DC variants only)
- Interface for connecting expansion modules, max. 24 digital inputs, 16 digital outputs and 8 analog inputs can be addressed

Functions

- Basic functions:
  - AND, OR, NOT, NAND, NOR, XOR
  - Positive/negative edge evaluation
- Special functions:
  - ON delay
  - Latching ON delay
  - OFF delay
  - Pulse relay
  - Latching relay
  - Clock-pulse relay
  - Counter (forward/backward)
  - Time switch
  - Interval time-delay relay
  - Working hour meter
  - Threshold switch
  - Asynchronous pulse encoder
  - Yearly timer switch
  - Easy-to-use switch function
  - Random generator
  - Staircase lighting function acc. to DIN 18015-2
  - Edge-triggered interval time-delay relay
  - Combined ON/OFF delay
  - Analog comparator
  - Analog threshold switch
  - Analog delta threshold switch
  - Analog watchdog
  - Analog amplifier
  - Text and variable display
  - Shift register
  - Softkey function
- 24 flags (including start-up flag)
- Integrated retentivity
- Password protection

Optional functions

- Additional know-how protection with the optional program module

Selection and ordering data

Version	DT	Order No.	PS*	Weight per PU approx.
				kg
LOGO! logic module 24 Supply voltage DC 24 V 8 digital inputs DC 24 V, of which 2 can be used as analog inputs (0 to 10 V), 4 digital outputs DC 24 V, 0.3 A; 130 function blocks can be combined, modular expandability	A	**6ED1 052-1CC00-0BA4**	1 unit	0.189
LOGO! logic module 12/24RC Supply voltage DC 12/24 V, 8 digital inputs DC 12/ 24 V, of which 2 can be used as analog inputs (0 to 10 V), 4 relay outputs 10 A, Integrated time switch; 130 function blocks can be combined, modular expandability	A	**6ED1 052-1MD00-0BA4**	1 unit	0.220
LOGO! logic module 24RC Supply voltage AC/DC 24 V, 8 digital inputs AC/DC 24 V, 4 relay outputs 10 A, Integrated time switch; 130 function blocks can be combined, modular expandability	A	**6ED1 052-1HB00-0BA4**	1 unit	0.228
LOGO! logic module 230RC Supply voltage AC/DC 115/230 V, 8 digital inputs AC/DC 115/230 V, 4 relay outputs 10 A, integrated time switch; 130 function blocks can be combined, modular expandability	A	**6ED1 052-1FB00-0BA4**	1 unit	0.232
Accessories				
LOGO! Manual				
• German	A	**6ED1 050-1AA00-0AE5**	1 unit	0.353
• English	A	**6ED1 050-1AA00-0BE5**	1 unit	0.359
• French	X	**6ED1 050-1AA00-0CE5**	1 unit	0.353
• Spanish	X	**6ED1 050-1AA00-0DE5**	1 unit	0.353
• Italian	X	**6ED1 050-1AA00-0EE5**	1 unit	0.353
LOGO! Memory card for copying with know-how protection	A	**6ED1 056-5CA00-0BA0**	1 unit	0.003
LOGO! Soft Comfort V4.0 for programming on the PC in LAD/FBD; runs on Windows 95, Linux, MAC OSX; on CD-ROM	A	**6ED1 058-0BA00-0YA0**	1 unit	0.100
LOGO! Soft Comfort Upgrade for V1.0 and higher on V4.0	A	**6ED1 058-0CA00-0YE0**	1 unit	0.100
LOGO! PC cable for transferring programs between LOGO! and PC	A	**6ED1 057-1AA00-0BA0**	1 unit	0.168
LOGO! News Box, 12/24 V contains LOGO! 12/24RC, LOGO! PC cable, LOGO!Soft Comfort, Tips&Tricks manual, screw driver, information material				
• German	A	**6ED1 057-3BA00-0AA3**	1 unit	2.200
• English	A	**6ED1 057-3BA00-0BA3**	1 unit	2.200
LOGO! News Box, 230V contains LOGO! 230RC, LOGO! PC cable, LOGO!Soft Comfort, Tips&Tricks manual, screw driver, information material				
• German	A	**6ED1 057-3AA00-0AA8**	1 unit	2.200
• English	A	**6ED1 057-3AA00-0BA8**	1 unit	2.340

*** This quantity or a multiple thereof can be ordered.**

LOGO! modular pure variants

3

Overview

The cost-effective pure variants

- With integrated interface for connecting extension modules

Design

- Relay outputs with up to 10 A output signal
- Integrated basic and special functions
- Integrated EEPROM for storing control program and setpoints
- Optional programming module
- Integrated clock with automatic summertime/wintertime changeover
- 130 function blocks can be combined
- 8 digital inputs, 4 digital outputs
- 2 inputs as analog inputs for DC 12/24 V versions (0 to 10 V); can also be used as digital inputs
- 2 inputs for counting up to 2 kHz can be used (for DC variants only)
- Interface for connecting expansion modules, max. 24 digital inputs, 16 digital outputs and 8 analog inputs can be addressed

Functions

- Basic functions:
  - AND, OR, NOT, NAND, NOR, XOR
  - Positive/negative edge evaluation
- Special functions:
  - ON delay
  - Latching ON delay
  - OFF delay
  - Pulse relay
  - Latching relay
  - Clock-pulse relay
  - Counter (forwards/backwards)
  - Time switch
  - Interval time-delay relay
  - Working hour meter
  - Threshold switch
  - Asynchronous pulse encoder
  - Twelve-month time switch
  - Easy-to-use switch function
  - Random generator
  - Staircase lighting function acc. to DIN 18015-2
  - Edge-triggered interval time-delay relay
  - Combined ON/OFF delay
  - Analog comparator
  - Analog threshold switch
  - Analog delta threshold switch
  - Analog watchdog
  - Analog amplifier
  - Text and variable display
  - Shift register
  - Softkey function
- 24 flags (including start-up flag)
- Integrated retentivity
- Password protection

Optional functions

- Additional know-how protection with the optional program module

Selection and ordering data

Version	DT	Order No.	PS*	Weight per PU approx. kg
LOGO! logic module 24o Supply voltage DC 24 V, 8 digital inputs DC 24 V, of which 2 can be used as analog inputs (0 to 10 V), 4 digital outputs DC 24 V, 0.3 A; Without display and keyboard; 130 function blocks can be combined, modular expandability	A	**6ED1 052-2CC00-0BA4**	1 unit	0.172
LOGO! logic module 12/24RCo Supply voltage DC 12/24 V, 8 digital inputs DC12/ 24 V, of which 2 can be used as analog inputs (0 to 10 V), 4 relay outputs 10 A, Integrated time switch; Without display and keyboard; 130 function blocks can be combined, modular expandability	A	**6ED1 052-2MD00-0BA4**	1 unit	0.216
LOGO! logic module 24RCo Supply voltage AC/DC 24 V, 8 digital inputs AC/DC 24 V, 4 relay outputs 10 A, Integrated time switch; Without display and keyboard; 130 function blocks can be combined, modular expandability	A	**6ED1 052-2HB00-0BA4**	1 unit	0.218
LOGO! logic module 230RCo Supply voltage AC/DC 115/230 V, 8 digital inputs AC/DC 115/230 V, 4 relay outputs 10 A, integrated time switch; Without display and keyboard; 130 function blocks can be combined, modular expandability	A	**6ED1 052-2FB00-0BA4**	1 unit	0.221
Accessories				
LOGO! Manual				
• German	A	**6ED1 050-1AA00-0AE5**	1 unit	0.353
• English	A	**6ED1 050-1AA00-0BE5**	1 unit	0.359
• French	X	**6ED1 050-1AA00-0CE5**	1 unit	0.353
• Spanish	X	**6ED1 050-1AA00-0DE5**	1 unit	0.353
• Italian	X	**6ED1 050-1AA00-0EE5**	1 unit	0.353
LOGO! Memory card for copying with know-how protection	A	**6ED1 056-5CA00-0BA0**	1 unit	0.003
LOGO! Soft Comfort V4.0 for programming on the PC in LAD/FBD; runs on Windows 95, Linux, MAC OSX; on CD-ROM	A	**6ED1 058-0BA00-0YA0**	1 unit	0.100
LOGO! Soft Comfort Upgrade for V1.0 and higher on V4.0	A	**6ED1 058-0CA00-0YE0**	1 unit	0.100
LOGO! PC cable for transferring programs between LOGO! and PC	A	**6ED1 057-1AA00-0BA0**	1 unit	0.168
LOGO! News Box, 12/24 V contains LOGO! 12/24RC, LOGO! PC cable, LOGO!Soft Comfort, Tips&Tricks manual, screw driver, information material				
• German	A	**6ED1 057-3BA00-0AA3**	1 unit	2.200
• English	A	**6ED1 057-3BA00-0BA3**	1 unit	2.200
LOGO! News Box, 230 V contains LOGO! 230RC, LOGO! PC cable, LOGO!Soft Comfort, Tips&Tricks manual, screw driver, information material				
• German	A	**6ED1 057-3AA00-0AA8**	1 unit	2.200
• English	A	**6ED1 057-3AA00-0BA8**	1 unit	2.340

*** This quantity or a multiple thereof can be ordered.**

LOGO! modular extension modules

3

Overview

Expansion modules for connection of LOGO! Modular

- With digital inputs and outputs or analog inputs

Design

- Relay outputs with up to 5 A output signal
- 4 digital inputs, 4 digital outputs or 2 analog inputs
- Interface for connection of LOGO! Modular logic modules

Selection and ordering data

Version	DT	Order No.	PS*	Weight per PU approx. kg
LOGO! DM8 24 Supply voltage DC 24 V, 4 digital inputs DC 24 V, 4 digital outputs DC 24 V, 0.3 A	A	**6ED1 055-1CB00-0BA0**	1 unit	0.120
LOGO! DM8 12/24R Supply voltage DC 12/24 V, 4 digital inputs DC 12/24 V, 4 relay outputs 5 A	A	**6ED1 055-1MB00-0BA1**	1 unit	0.157
LOGO! DM8 24R Supply voltage AC/DC 24 V, 4 digital inputs AC/DC 24 V, 4 relay outputs 5 A	A	**6ED1 055-1HB00-0BA0**	1 unit	0.157
LOGO! DM8 230R Supply voltage AC/DC 115/230 V, 4 digital inputs AC/DC 115/230 V, 4 relay outputs 5 A	A	**6ED1 055-1FB00-0BA1**	1 unit	0.160
LOGO! AM2 Supply voltage DC 12/24 V, 2 analog inputs 0 to 10 V or 0 to 20 mA, 10-bit resolution	A	**6ED1 055-1MA00-0BA0**	1 unit	0.112
LOGO! AM2 PT 100 Supply voltage DC 12/24 V, 2 analog inputs Pt100, temperature range -50 °C to 200 °C	A	**6ED1 055-1MD00-0BA0**	1 unit	0.123
Accessories				
LOGO! Manual				
• German	A	**6ED1 050-1AA00-0AE5**	1 unit	0.353
• English	A	**6ED1 050-1AA00-0BE5**	1 unit	0.359
• French	X	**6ED1 050-1AA00-0CE5**	1 unit	0.353
• Spanish	X	**6ED1 050-1AA00-0DE5**	1 unit	0.353
• Italian	X	**6ED1 050-1AA00-0EE5**	1 unit	0.353
LOGO! Memory card for copying with know-how protection	A	**6ED1 056-5CA00-0BA0**	1 unit	0.003
LOGO!Soft Comfort V4.0 for programming on the PC in LAD/FBD; runs on Windows 95, Linux, MAC OSX; on CD-ROM	A	**6ED1 058-0BA00-0YA0**	1 unit	0.100
LOGO!Soft Comfort Upgrade for V1.0 and higher on V4.0	A	**6ED1 058-0CA00-0YE0**	1 unit	0.100
LOGO! PC cable for transferring programs between LOGO! and PC	A	**6ED1 057-1AA00-0BA0**	1 unit	0.168
LOGO! News Box, 12/24 V contains LOGO! 12/24RC, LOGO! PC cable, LOGO!Soft Comfort, Tips&Tricks manual, screw driver, information material				
• German	A	**6ED1 057-3BA00-0AA3**	1 unit	2.200
• English	A	**6ED1 057-3BA00-0BA3**	1 unit	2.200
LOGO! News Box, 230V contains LOGO! 230RC, LOGO! PC cable, LOGO!Soft Comfort, Tips&Tricks manual, screw driver, information material				
• German	A	**6ED1 057-3AA00-0AA8**	1 unit	2.200
• English	A	**6ED1 057-3AA00-0BA8**	1 unit	2.340

*** This quantity or a multiple thereof can be ordered.**

Overview

Expansion module for the LOGO! basic variants

- For communication between the LOGO! master and external *EIB* components via *EIB*

Area of application

The CM EIB/KNX communication module allows communication between the LOGO! master and external *EIB* components via *EIB*. The module can be used to integrate LOGO! into an *EIB* system.

The module is connected to the LOGO! basic variants as an expansion module.

Design

- Up to 16 digital inputs (virtual)
- Up to 12 digital outputs (virtual)
- Up to 8 analog inputs (virtual)
- For mounting onto 35 mm standard rail
- Width: 2 modular widths

Functions

- For communication between the LOGO! master and external *EIB* components via *EIB*
- Stations on the *EIB*;
  allow LOGO! to communicate with other *EIB* components by exchanging *EIB* message frames
- Output of the current states of the configured *EIB* stations for LOGO!;
  the control can combine these with the help of its logical functions and timers.
- Parameters can be set, changed or combined quickly an easily using LOGO! without the need for a programming device.

Selection and ordering data

Version	DT	Order No.	PS*	Weight per PU approx.
				kg
LOGO! communication module CM EIB KNX for connection to *EIB*, supply voltage DC 24 V	B	**6BK1 700-0BA00-0AA0**	1 unit	0.050

**** This quantity or a multiple thereof can be ordered.***

LOGO!Contact

Overview

Switching module for switching resistive loads and motors directly

Area of application

LOGO!Contact is a switching module for direct switching of resistive loads up (to 20 A) and motors (up to 4 kW). LOGO!Contact operates hum-free without noise pollution.

LOGO!Contact is universal

- Buildings/electrical installations
- Industry and commerce

Design

LOGO!Contact is available in two variants:

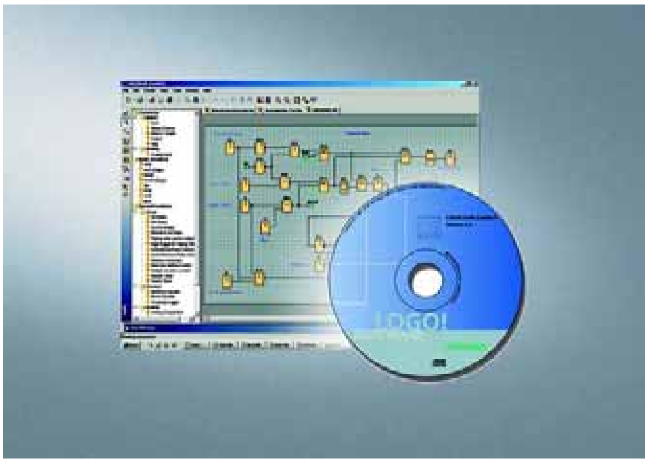
- Operating voltage DC 24 V
- Operating voltage AC 230 V, 50/60 Hz

Selection and ordering data

Version	DT	Order No.	PS*	Weight per PU approx. kg
LOGO!Contact Switching module for direct switching of resistive loads up to 20 A and motors up to 4 kW				
• Operating voltage 24 V	A	**6ED1 057-4CA00-0AA0**	1 unit	0.160
• Operating voltage 230 V	A	**6ED1 057-4EA00-0AA0**	1 unit	0.160

*** This quantity or a multiple thereof can be ordered.**

Overview



The user-friendly software for switchgear program generation on the PC

- Switchgear program generation for function diagrams (FBD) or contact diagrams (LAD)
- Additional testing, simulation, online testing and archiving of the switchgear programs
- Professional documentation with the help of various comment and print functions

Area of application

LOGO!Soft Comfort is the multilingual software for switchgear program generation with LOGO! on the PC. How to place the functions on the drawing board by means of "Drag and Drop" is almost self-explanatory. The integrated offline simulation allows the switchgear programs to be tested on the PC beforehand. During the online test the current values for LOGO! are displayed on screen.
Various print options permit professional documentation.

LOGO!Soft Comfort V4.0 can be used to program all components of the LOGO! family.

Design

The connection between LOGO! and the PC is established with the help of the LOGO! PC cable (serial interface)

Minimum system requirements:

Windows 95/98, NT 4.0, ME, 2000 or XP

- Pentium PC
- 90 MB free on hard disk
- 64 MB RAM
- SVGA graphics card with minimum 800 x 600 resolution (256 colors)

Mac OS X

- PowerMac G3, G4, G4 Cube, IMac, PowerBook G3, G4 or iBook

Linux (tested with Caldera OpenLinux 2.4)

- Runs on all Linux releases on which Java 2 SDK Version 1.3.1 runs
- Please consult your Linux release for hardware requirements.

Functions

- Control program generation with the programming languages FBD and LAD (switchable)
- Comprehensive documentation functions
- Program simulation (offline)
- Program test (online)
- Comprehensive, context-sensitive online help functions

The following functions are available:

- Basic functions (AND, OR, NOT, NAND, NOR, XOR, positive edge evaluation, negative edge evaluation)
- ON delay
- OFF delay
- Current impulse relay
- Latching
- Clock-pulse relay
- Latching ON delay
- Working hour meter
- Interval time-delay relay/pulse output mode
- Up/down counter
- Threshold switch
- Pulse encoder
- Twelve-month time switch
- Time switch
- ON/OFF delay
- Random generator
- Edge-triggered interval time-delay relay
- Analog threshold switch
- Analog comparator
- Analog delta threshold switch
- Analog watchdog
- Analog amplifier
- Staircase lighting switch
- Easy-to-use switch
- Message texts
- Shift register
- Softkey

Selection and ordering data

Version	DT	Order No.	PS*	Weight per PU approx. kg
LOGO!Soft Comfort V4.0 for programming on the PC in LAD/FBD; runs on Windows 95, Linux, MAC OSX; on CD-ROM	A	**6ED1 058-0BA00-0YA0**	1 unit	0.100
LOGO!Soft Comfort Upgrade for V1.0 and higher on V4.0	A	**6ED1 058-0CA00-0YE0**	1 unit	0.100

*** This quantity or a multiple thereof can be ordered.**

System overview

Overview

AS-Interface - The System

AS-Interface - Just another bus system?

AS-Interface has been available since 1994. It allows digital and analog signals generated by processes or machines to be transferred in binary form. AS interface is the universal interface between the higher-level control level and simple binary actuators and sensors.

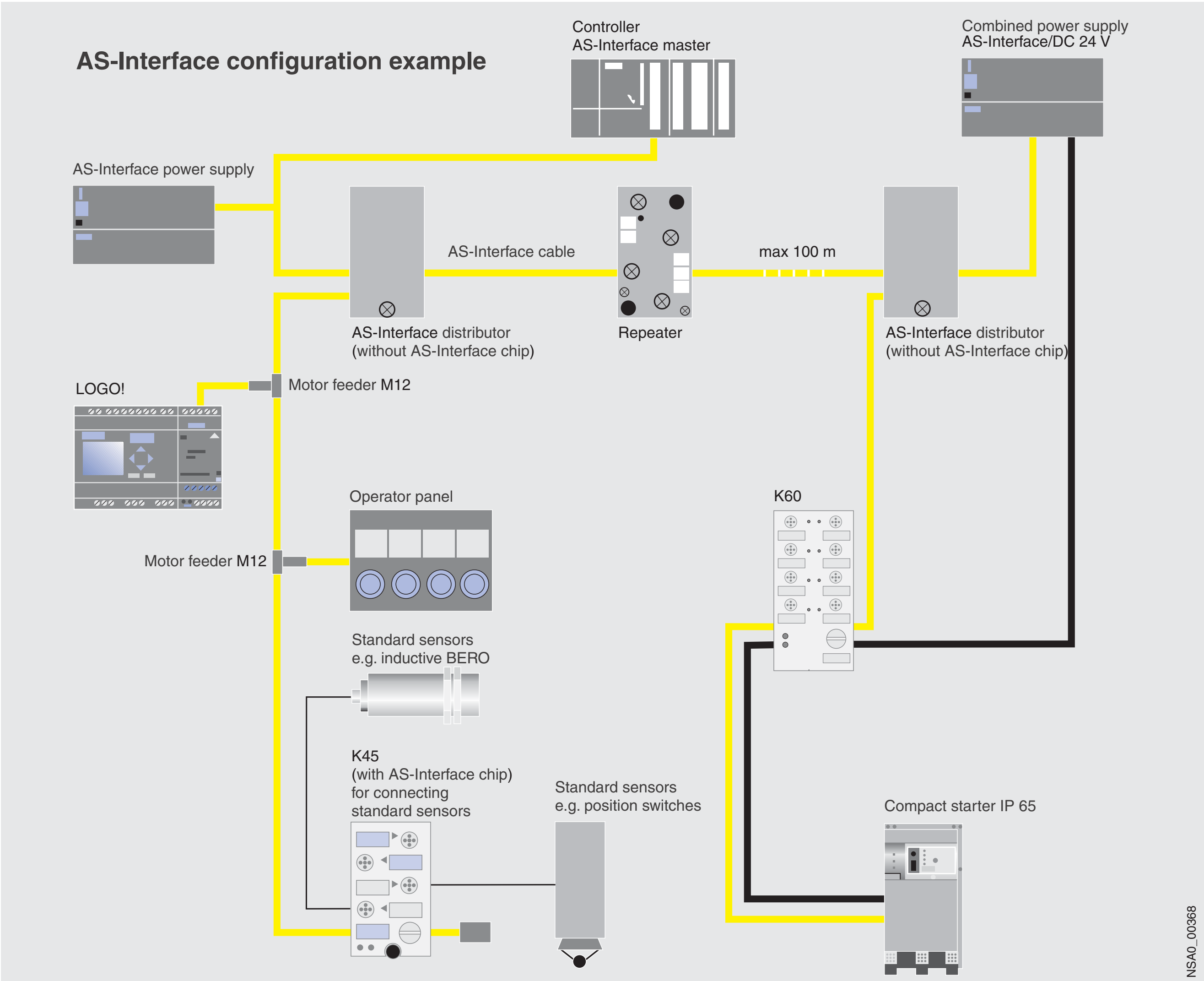
Why was AS-Interface developed?

High costs due to immense wiring outlays, which resulted from connecting the field level to the PLCs, demanded a structural change in automation technology:

Every single actuator or sensor had to be connected to the control unit and a power supply.
This not only resulted in significant material and wiring costs, but also increased the number of possible causes for faults. Until 1997, 36 % of all machine and plant downtimes were due to installation faults.

The solution is distributed technology -
first in automation technology, but also in drive and control technology.

What does this mean? It's very simple: conventional, high-cost parallel wiring has been replaced with a serial fieldbus i.e. a two-wire conductor with which all automation stations are connected.



AS-Interface configuration example

Benefits

Your advantages at a glance

	Rating	Your advantages
Minimal wiring overhead	A single cable is sufficient for wiring up sensors, actuators, and operator panels. Simple serial connection to the control unit via AS-Interface instead of a parallel connection with many cables!	• Material savings • No thick cable harnesses • Less space required in the control cabinets
Fast installation	Sensors and actuators are easily installed with modules connected to the AS-Interface cable. Contact blades in the modules penetrate the insulation of the cable and make contact with the copper conductor.	Minimum time required for installation.
Safe installation	Reversed polarity is virtually impossible due to the geometry of the cable and the insulation piercing method used during installation.	No wasted time or money due to wrong installation or plant downtimes.
Flexible engineering	Distributed and modular installation allows partial solutions to be tested in parallel before the overall solution has been implemented. Changes and expansions can be implemented flexibly.	Saves time for new installations and allows flexibility for existing plants.
Open system	AS-Interface is an open system according to international standard EN 50295.	AS-Interface is a multi-vendor, future-oriented system. Siemens offers the complete system with all products for complete solutions with AS-Interface.

Technical specifications

Up to 31 slaves can be connected to a single standard AS-Interface system. Each slave can have up to 4 inputs and 4 outputs (in total therefore up to 124 inputs and 124 outputs).

According to extended AS-Interface specification 2.1, up to 62 A/B slaves can be connected to a single AS-Interface system. These have up to 4 inputs and 3 outputs (i.e. up to 248 inputs and 186 outputs within a single AS-Interface system).

Intelligent sensors with integrated AS-Interface chips are given their own slave address and behave like "normal" slaves with-respect to the master.

General data	
Number of slaves	31/up to 62
Number of inputs/outputs	248 inputs + 186 outputs
Signals	Data and supply up to 7 A
Medium	Non-shielded cable 2 x 1.5 mm²
Maximum cycle time	5/10 ms
Analog value transfer	Integrated into the master
Number of analog values	124 analog values per 16 bits
Access control	Master/slave
Cable length	100 m, with repeater up to 500 m
Safety at Work safety technology	Up to Category 4 acc. to EN 954-1

3

Further information

We have adapted our catalog structure to current developments. This has resulted in several changes.
Our AS-Interface core products can now be found in Catalog IK PI (Order No. E86060-K6710-A101-B3-7600).

The table below lists in detail in which catalog our AS-Interface products can be found.

	AS-Interface products (AS-Interface acc. to EN 50295)	**Catalog**	**Section**
	AS-Interface Safety at work • AS-Interface safety monitors • AS-Interface safe compact modules • AS-Interface position switches • AS-Interface cable-operated switches • AS-Interface light curtains and light arrays Category 4 • AS-Interface LS4 laser scanners • AS-Interface EMERGENCY OFF pushbuttons	Catalog IK PI 2004, Order No. E86060-K6710-A101-B3-7600	Section 6, AS-Interface acc. to EN 50295
	AS-Interface master		
	AS-Interface network transitions		
	AS-Interface slaves • I/O modules for operation in the field • I/O modules for operation in the control cabinet IP20 • Special integrated solutions • Modules with special functions • SIGNUM pushbuttons and indicator lights • AS-Interface connection for LOGO!		
	AS-Interface power supply units		
	Transmission media • AS-Interface shaped cable		
	System components and accessories		
	AS-Interface motor starters and load feeders IP65/67 AS-Interface motor starters and load feeders IP20	Catalog LV 10 2004 and Catalog IK PI 2004, Order No. E86060-K6710-A101-B3-7600	Section 6, Load feeders –> Communication-capable load feeders and Section 6, AS-Interface to EN 50295
	Communication-capable contactors	Catalog LV 10 2004	Section 2, Controlgear: Contactors and contactor assemblies –> Contactors for switching motors –> SIRIUS contactors, 3-pole, 3 ... 250 kW
	SIGUARD safety systems with integrated AS-Interface	Catalog LV 10 2004	Section 11, SIGUARD safety systems –> SIGUARD signal columns
	Opto-BERO photoelectrical proximity switches, K 80 type of construction	Catalog LV 20, Order No. E86060-K1803-A101-A3-7600	Section 4, Opto-BERO –> K 80 type of construction

To order our catalogs, please use a fax ordering form[1] or contact your local Siemens representative.

1) See Appendix –> Fax Order – Simply copy it, fill it in, and fax it