Overview

SIMOCODE pro V with current/voltage measuring module, failsafe expansion module and operator panel with display

SIMOCODE pro is a flexible, modular motor management system for motors with constant speeds in the low-voltage performance range. It optimizes the connection between I&C and motor feeder, increases plant availability and allows significant savings to be made for startup, operation and maintenance of a system.

When SIMOCODE pro is installed in the low-voltage switchboard, it is the intelligent interface between the higher-level automation system and the motor feeder and includes the following:

- Multifunctional, solid-state full motor protection which is independent of the automation system
- Integrated control functions instead of hardware for the motor control
- Detailed operating, service and diagnostics data
- Open communication through PROFIBUS DP, the standard for fieldbus systems
- Safety relay function for the failsafe disconnection of motors up to SIL 3 (IEC 61508/62061) or PL e with Category 4 (ISO 13849-1)

SIMOCODE ES is the software package for SIMOCODE pro parameterization, start-up and diagnostics.

Two series

SIMOCODE pro is structured into two functionally tiered series:

- SIMOCODE pro C, as a compact system for direct-on-line starters and reversing starters or the actuation of a circuit breaker
- SIMOCODE pro V, as a variable system with all control functions and with the possibility of expanding the inputs, outputs and functions of the system at will using expansion modules

Expansion possibilities	SIMOCODE pro C, Basic Unit 1	SIMOCODE pro V, Basic Unit 2[1)]
Operator panel	✓	✓
Operator panels with display	--	✓
Current measuring modules	✓	✓
Current/voltage measuring modules	--	✓
Decoupling modules	--	✓
Expansion modules:		
• Digital modules (max. 2)	--	✓
• Failsafe digital module (max. 1)[2)]	--	✓
• Analog module (max. 1)	--	✓
• Ground-fault module (max. 1)	--	✓
• Temperature module (max. 1)	--	✓

✓ Available -- Not available

1) When an operator panel with display and/or a decoupling module is used, more restrictions on the number of expansion modules connectable per basic unit must be observed, see page 10/12.

2) The failsafe digital module can be used instead of one of the two digital modules.

Per feeder each system always comprises one basic unit and one separate current measuring module. The two modules are connected together electrically through the system interface with a connection cable and can be mounted mechanically connected as a unit (one behind the other) or separately (side by side). The motor current to be monitored is decisive only for the choice of the current measuring module.

An operator panel for mounting in the control cabinet door is optionally connectable through a second system interface on the basic unit. Both the current measuring module and the operator panel are electrically supplied by the basic unit through the connection cable. More inputs, outputs and functions can be added to basic unit 2 (SIMOCODE pro V) by means of optional expansion modules, thus supplementing the inputs and outputs already existing on the basic unit. With the DM-F Local and DM-F PROFIsafe failsafe digital modules it is also possible to integrate the failsafe disconnection of motors in the SIMOCODE pro V motor management system.

All modules are connected by connection cables. The connection cables are available in various lengths. The maximum distance between the modules (e.g. between the basic unit and the current measuring module) must not exceed 2.5m. The total length of all the connection cables in a single system must not be more than 3 m.

Order No. scheme

Digit of the Order No.	1st - 4th	5th	6th	7th		8th	9th	10th	11th	12th		13th
	□□□□	□	□	□	–	**1**	□	□	**0**	**0**	–	**0**
SIMOCODE pro motor management system	**3 U F 7**											
Type of unit/module		□										
Functional version of the unit/module			□	□								
Connection type of the current transformer							□					
Voltage version								□				
Example	**3 U F 7**	**0**	**1**	**0**	**–**	**1**	**A**	**A**	**0**	**0**	**–**	**0**

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quoted in the catalog in the Selection and ordering data.

General data

Benefits

General customer benefits

- Integrating the whole motor feeder into the process control by means of a bus significantly reduces the wiring outlay between the motor feeder and PLC
- Decentralization of the automated processes by means of configurable control and monitoring functions in the feeder saves resources in the automation system and ensures full functionality and protection of the feeder even if the I&C or bus system fails
- The acquisition and monitoring of operating, service and diagnostics data in the feeder and process control system increases plant availability as well as maintenance and service-friendliness
- The high degree of modularity allows users to perfectly implement their plant-specific requirements for each motor feeder
- The SIMOCODE pro system offers functionally graded and space-saving solutions for each customer application
- The replacement of the control circuit hardware with integrated control functions decreases the number of hardware components and wiring required and in this way limits stock keeping costs and potential wiring errors
- The use of solid-state full motor protection permits better utilization of the motors and ensures long-term stability of the tripping characteristic and reliable tripping even after years of service

Multifunctional, solid-state full motor protection for rated motor currents up to 820 A

SIMOCODE pro offers comprehensive protection of the motor feeder by means of a combination of different, multi-step and delayable protection and monitoring functions:

- Inverse-time delayed solid-state overload protection (CLASS 5 to 40)
- Thermistor motor protection
- Phase failure/unbalance protection
- Stall protection
- Monitoring of adjustable limit values for the motor current
- Voltage and power monitoring
- Monitoring of the power factor (motor idling/load shedding)
- Ground-fault monitoring
- Temperature monitoring, e.g. over PT100/PT1000
- Monitoring of operating hours, downtime and number of starts etc.

Recording of measuring curves

SIMOCODE pro can record measuring curves and therefore is able, for example, to present the progression of motor current during motor start-up.

Flexible motor control implemented with integrated control functions (instead of comprehensive hardware interlocks)

Many predefined motor control functions have already been integrated into SIMOCODE pro, including all necessary logic operations and interlocks:

- Overload relays
- Direct-on-line and reversing starters
- Wye/delta starters (also with direction reversal)
- Two speeds, motors with separate windings (pole-changing switch); also with direction reversal
- Two speeds, motors with separate Dahlander windings (also with direction reversal)
- Positioner actuation
- Solenoid valve actuation
- Actuation of a circuit breaker
- Soft starter actuation (also with direction reversal)

These control functions are predefined in SIMOCODE pro and can be freely assigned to the inputs and outputs of the device (including PROFIBUS DP).

These predefined control functions can also be flexibly adapted to each customized configuration of a motor feeder by means of freely configurable logic modules (truth tables, counters, timers, edge evaluation, etc.) and with the help of standard functions (power failure monitoring, emergency start, external faults, etc.), without additional auxiliary relays being necessary in the control circuit.

SIMOCODE pro makes a lot of additional hardware and wiring in the control circuit unnecessary which results in a high level of standardization of the motor feeder in terms of its design and circuit diagrams.

Detailed operating, service and diagnostics data

SIMOCODE pro makes different operating, service and diagnostics data available and helps to detect potential faults in time and to prevent them by means of preventative measures. In the event of a malfunction, a fault can be diagnosed, localized and rectified very quickly – there are no or very short downtimes.

Operating data

- Motor switching state derived from the current flow in the main circuit
- All phase currents
- All phase voltages and phase-to-phase voltages
- Active power, apparent power and power factor
- Phase unbalance and phase sequence
- Time to trip
- Motor temperature
- Remaining cooling time etc.

Service data

- Motor operating hours
- Motor stop times
- Number of motor starts
- Number of overload trips
- Interval for compulsory testing of the enabling circuits
- Energy consumed
- Internal comments stored in the device etc.

Diagnostics data

- Numerous detailed early warning and fault messages
- Internal device fault logging with time stamp
- Time stamping of freely selectable status, alarm or fault messages etc.

Easy operation and diagnostics

Operator panel

The operator panel is used to control the motor feeder and can replace all conventional pushbuttons and indicator lights to save space. It makes SIMOCODE pro or the feeder directly operable in the control cabinet. It features all the status LEDs available on the basic unit and externalizes the system interface for simple parameterization or diagnosis on a PC/PG.

Operator panels with display

As an alternative to the 3UF7 20 standard operator panel for SIMOCODE pro V there is also an operator panel with display: the 3UF7 21 is thus able in addition to indicate current measured values, operational and diagnostics data or status information of the motor feeder at the control cabinet. The pushbuttons of the operator panel can be used to control the motor while at the same time the display indicates current measured values, status information, fault messages or the device-internal fault protocol. Using the display settings each user can select for himself how the measured values are presented as standard and how the displayed unit is converted (e.g. °C -> °F).

Communications

SIMOCODE pro is equipped with an integral PROFIBUS DP interface (SUB-D or terminal connection) and can therefore replace all individual wiring (including marshalling racks), which would usually be required for exchanging data with the higher-level automation system, with a single 2-wire cable.

In conjunction with a failsafe controller (F-CPU), the DM-F PROFIsafe failsafe digital module also enables failsafe disconnection through the same PROFIBUS with the PROFIsafe profile.

SIMOCODE pro supports among other things:
- Baud rates up to 12 Mbit/s
- Automatic baud rate detection
- Communication with up to 3 masters
- Time synchronization over PROFIBUS (SIMATIC S7)
- Time stamp with high timing precision (SIMATIC S7)
- Cyclic services (DPV0) and acyclic services (DPV1)
- DPV1 communication after the Y-Link
- Failsafe communication through PROFIBUS/PROFIsafe in conjunction with the DM-F PROFIsafe (F-DO) failsafe digital module etc.

For SIMOCODE pro motor management and control devices with communication function see page 10/13 onwards.

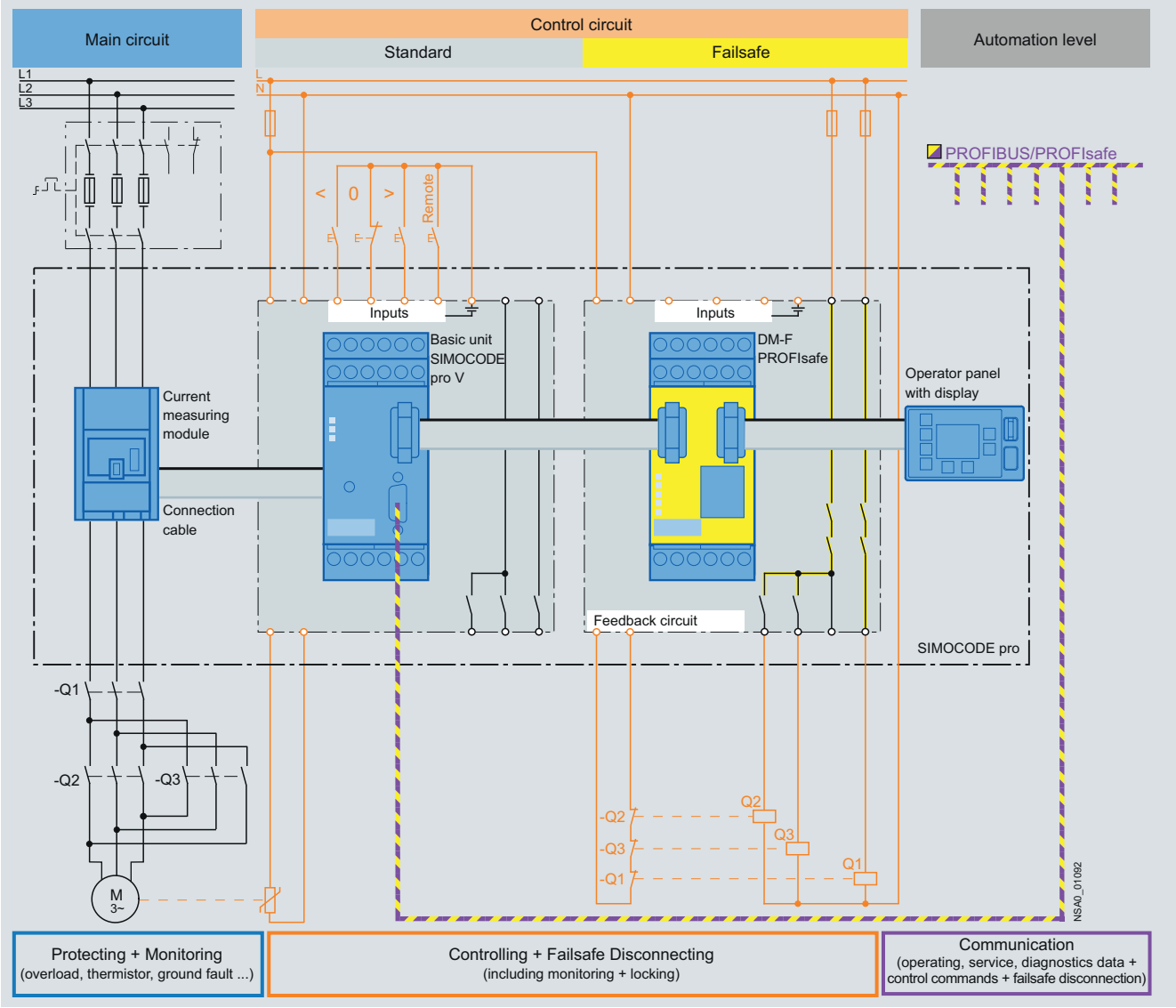
Accessories see page 10/16 onwards.
More information see Chapter 14 "Parametrization, Configuration and Visualization with SIRIUS".

Autonomous operation

An essential feature of SIMOCODE pro is independent execution of all protection and control functions even if communication with the I&C system breaks down. If the bus or automation system fails, the full functionality of the feeder is ensured or a pre-defined response can be initiated, e.g. the feeder can be shut down in a controlled manner or certain configured control mechanisms can be performed (e.g. the direction of rotation can be reversed).

SIMOCODE pro designed for mixed operation

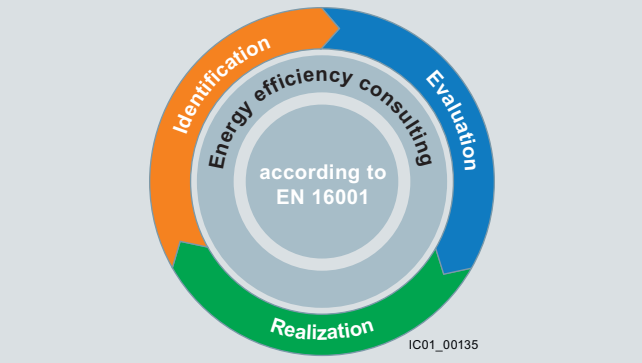
Depending on functional requirements, the two systems can be used simultaneously without any problems and without any additional outlay in a low-voltage system. SIMOCODE pro C is fully upward-compatible to SIMOCODE pro V. The same components are used. The parameterization of SIMOCODE pro C can be transferred without any problems. Both systems have the same removable terminals and the same terminal designations.



SIMOCODE pro combines all essential functions, including safety functions, through PROFIBUS/PROFIsafe for the motor feeder

General data

Advantages through energy efficiency



Overview of the energy management process

We offer you a unique portfolio for industrial energy management, using an energy management system that helps to optimally define your energy needs. We split up our industrial energy management into three phases – Identification, Evaluation and Realization – and we support you with the appropriate hardware and software solutions in every process phase.

The innovative products of the SIRIUS industrial controls portfolio can also make a substantial contribution to a plant's energy efficiency (www.siemens.com/sirius/energysaving).

The SIMOCODE pro 3UF7 motor management system contributes to energy efficiency throughout the plant as follows:

- Energy consumption:
  Clear display of the energy consumption of a motor feeder or process element by means of the acquisition and transmission of all operating and consumption date, such as current, voltage, active and reactive power, energy consumption, motor temperature etc.
- Energy management:
  Evaluation of energy measured values (e.g. limit value monitoring) with exporting of local or central actions (= forwarding to higher-level)

Application

SIMOCODE pro is often used for automated processes where plant downtimes are very expensive (e.g. steel or cement industry) and where it is important to prevent plant downtimes through detailed operating, service and diagnostics data or to localize the fault very quickly in the event of a fault.

SIMOCODE pro is modular and space-saving and suited especially for operation in motor control centers in the process industry and for power plant technology.

Applications

Protection and control of motors

In hazardous areas for types of protection EEx e/d according to ATEX directive 94/9/EC
see www.siemens.com/sirius/atex.

- With heavy starting (paper, cement, metal and water industries)
- In high-availability plants (chemical, oil, raw material processing industries, power plants)

Safety technology for SIMOCODE pro

The safe disconnection of motors, in the process industry in particular, is becoming increasingly important as a result of new and revised standards and requirements in the safety technology field.

With the DM-F Local and DM-F PROFIsafe failsafe expansion modules it is easy to integrate functions for failsafe disconnection into the SIMOCODE pro V motor management system while retaining service-proven concepts. The strict separation of safety functions and operational functions proves particularly advantageous for planning, configuring and construction. Seamless integration in the motor management system leads to greater transparency for diagnostics and during operation of the system.

Suitable components for this purpose are the DM-F Local and DM-F PROFIsafe failsafe expansion modules, depending on the requirements:

- the DM-F Local failsafe digital module for when direct assignment between a failsafe hardware shutdown signal and a motor feeder is required, or
- the DM-F PROFIsafe failsafe digital module for when a failsafe controller (F-CPU) creates the signal for the disconnection and transmits it in a failsafe manner through PROFIBUS/ PROFIsafe to the motor management system

Technical specifications

General data		
Permissible ambient temperature		
• During operation	°C	-25 ... +60 ; 3UF7 21: 0 ... +60
• During storage and transport	°C	-40 ... +80 ; 3UF7 21: -20 ... +70
Degree of protection (to IEC 60529)		
• Measuring modules with busbar connection		IP00
• Operator panel (front) and door adapter (front) with cover		IP54
• Other components		IP20
Shock resistance (sine pulse)	*g*/ms	15/11
Mounting position		Any
Frequency	Hz	50/60 ±5 %
EMC interference immunity (according to IEC 60947-1)		Corresponds to degree of severity 3
• Conductor-related interference, burst acc. to IEC 61000-4-4	kV	2 (power ports)
	kV	1 (signal ports)
• Conductor-related interference, high frequency acc. to IEC 61000-4-6	V	10
• Conductor-related interference, surge acc. to IEC 61000-4-5	kV	2 (line to earth); 3UF7 320-1AB, 3UF7 330-1AB: 1 (line to earth)
	kV	1 (line to line); 3UF7 320-1AB, 3UF7 330-1AB: 0.5 (line to line)
• Electrostatic discharge, ESD acc. to IEC 61000-4-2	kV	8 (air discharge)
	kV	6 (contact discharge); 3UF7 21: 4 (contact discharge)
• Field-related interference acc. to IEC 61000-4-3	V/m	10
Immunity to EMC (according to IEC 60947-1)		
• Conducted and radiated interference emission		EN 55011/ EN 55022 (CISPR 11/ CISPR 22) (corresponds to degree of severity A)
Protective separation (acc. to IEC 60947-1)		All circuits in SIMOCODE pro are safely separated from each other according to IEC 60947-1, i.e. they are designed with doubled creepage paths and clearances. In this context, compliance with the instructions in the test report "Safe Isolation" No.2668 is required.

Basic units				
Control circuits				
Rated control supply voltage U_s (according to IEC 61131-2)		110 ... 240 AC/DC; 50/60 Hz		24 V DC
Operating range		0.85 ... 1.1 x U_s		0.80 ... 1.2 x U_s
Power consumption				
• Basic Unit 1 (3UF7 000)		7 VA/5 W		5 W
• Basic Unit 2 (3UF7 010) incl. two expansion modules connected to Basic Unit 2		10 VA/7 W		7 W
Rated insulation voltage U_i	V	300 (at pollution degree 3)		
Rated impulse withstand voltage U_{imp}	kV	4		
Relay outputs				
• Number		3 monostable relay outputs		
• Specified short-circuit protection for auxiliary contacts (relay outputs)		• Fuse links, gG operational class 6 A, quick-response 10 A (IEC 60947-5-1) • Miniature circuit breaker 1.6 A, C characteristic (IEC 60947-5-1) • Miniature circuit breaker 6 A, C characteristic (I_K < 500 A)		
• Rated uninterrupted current	A	6		
• Rated switching capacity				
- AC-15		6 A/24 V AC	6 A/120 V AC	3 A/230 V AC
- DC-13		2 A/24 V DC	0.55 A/60 V DC	0.25 A/125 V DC
Inputs (binary)		4 inputs supplied internally by the device electronics (with 24 V DC) and connected to a common potential		
Thermistor motor protection (binary PTC)				
• Summation cold resistance	kΩ	≤ 1.5		
• Response value	kΩ	3.4 ... 3.8		
• Return value	kΩ	1.5 ... 1.65		

General data

Current measuring modules or current/voltage measuring modules

Main circuit

		3UF7 1.0	3UF7 1.1	3UF7 1.2	3UF7 1.3	3UF7 1.4
Current setting I_e	A	0.3 ... 3	2.4 ... 25	10 ... 100	20 ... 200	63 ... 630
Rated insulation voltage U_i	V	690; 3UF7 103 and 3UF7 104: 1 000 (at pollution degree 3)				
Rated operational voltage U_e	V	690				
Rated impulse withstand voltage U_{imp}	kV	6; 3UF7 103 and 3UF7 104: 8				
Rated frequency	Hz	50/60				
Type of current		Three-phase current				
Short circuit		Additional short-circuit protection is required in the main circuit				
Accuracy of current measurement (in the range of 1 x minimum current setting I_u to 8 x max. current setting I_o)	%	±3				
Typical voltage measuring range						
• Phase-to-phase voltage/line-to-line voltage (e.g. $U_{L1\,L2}$)	V	110 ... 690				
• Phase voltage (e.g. $U_{L1\,N}$)	V	65 ... 400				
Accuracy						
• Voltage measurement (phase voltage U_L in the range 230 ... 400 V)	%	±3 (typical)				
• Power factor measurement (in the rated load range power factor = 0.4 ... 0.8)	%	±5 (typical)				
• Apparent power measurement (in the rated load range)	%	±5 (typical)				
Notes on voltage measurement						
• In insulated, high-resistance or asymmetrically grounded forms of power supply system and for single-phase systems • Supply lines for voltage measurement		In these networks the current/voltage measuring module can be used only with an upstream decoupling module on the system interface. In the supply lines from the main circuit for voltage measurement of SIMOCODE pro it may be necessary to provide additional line protection!				

Digital modules

Control circuits

Rated insulation voltage U_i	V	300 (at pollution degree 3)		
Rated impulse withstand voltage U_{imp}	kV	4		
Relay outputs				
• Number • Specified short-circuit protection for auxiliary contacts (relay outputs)		2 monostable or bistable relay outputs (depending on the version) • Fuse links, gG operational class 6 A, quick-response 10 A (IEC 60947-5-1) • Miniature circuit breaker 1.6 A, C characteristic (IEC 60947-5-1) • Miniature circuit breaker 6 A, C characteristic (I_k < 500 A)		
• Rated uninterrupted current	A	6		
• Rated switching capacity				
- AC-15		6 A/24 V AC	6 A/120 V AC	3 A/230 V AC
- DC-13		2 A/24 V DC	0.55 A/60 V DC	0.25 A/125 V DC
Inputs (binary)		4 inputs, electrically isolated, supplied externally with 24 V DC or 110 ... 240 V AC/DC depending on the version, connected to a common potential		

Ground-fault modules

Control circuits

Connectable 3UL22 summation current transformer with rated fault currents I_N	A	0.3/0.5/1		
• $I_{Ground\ fault} \leq 50\ \%\ I_N$		No tripping		
• $I_{Ground\ fault} \geq 100\ \%\ I_N$		Tripping		
Response delay (conversion time)	ms	300 ... 500, additionally delayable		

Temperature modules

Sensor circuit

Typical sensor circuit					
• PT100	mA	1 (typical)			
• PT1000/KTY83/KTY84/NTC	mA	0.2 (typical)			
Open-circuit/short-circuit detection					
• Sensor type		PT100/PT1000	KTY83-110	KTY84	NTC
- Open circuit		✓	✓	✓	--
- Short circuit		✓	✓	✓	✓
- Measuring range	°C	-50 ... +500	-50 ... +175	-40 ... +300	80 ... 160
Measuring accuracy at 20 °C ambient temperature (T20)	K	< ±2			
Deviation due to ambient temperature (in % of measuring range)	%	0.05 per K deviation from T20			
Conversion time	ms	500			
Connection type		Two- or three-wire connection			

✓ Detection possible

-- Detection not possible

Analog modules

Control circuits

Inputs		
• Channels		2 (passive)
• Parameterizable measuring ranges	mA	0/4 ... 20
• Shielding		Up to 30 m shield recommended, from 30 m shield required
• Max. input current (destruction limit)	mA	40
• Accuracy	%	±1
• Input resistance	Ω	50
• Conversion time	ms	150
• Resolution	bit	12
• Open-circuit detection		With measuring range 4 ... 20 mA
Output		
• Channels		1
• Parameterizable output range	mA	0/4 ... 20
• Shielding		Up to 30 m shield recommended, from 30 m shield required
• Max. voltage at output		30 V DC
• Accuracy	%	±1
• Max. output load	Ω	500
• Conversion time	ms	25
• Resolution	bit	12
• Short-circuit proof		Yes
Connection type		Two-wire connection
Electrical separation of inputs/output to the device electronics		No

Failsafe digital modules

Control circuits

		3UF7 320-1AB00-0	3UF7 320-1AU00-0	3UF7 330-1AB00-0	3UF7 330-1AU00-0
Rated control supply voltage U_s	V	24 DC	110 ... 240 AC/DC; 50/60 Hz	24 DC	110 ... 240 AC/DC; 50/60 Hz
Power consumption		3 W	9.5 VA/4.5 W	4 W	11 VA/5.5 W
Rated insulation voltage	V	300			
Rated impulse withstand voltage U_{imp}	kV	4			
Relay outputs					
• Number		2 relay enabling circuits, 2 relay outputs			
Version of the fuse link for short-circuit protection of the relay enabling circuit	A	4, gG operational class			
Rated uninterrupted current	A	5			
Rated switching capacity					
• At AC-15					
- At 24 V	A	3			
- At 120 V	A	3			
- At 240 V	A	1.5			
• At DC-13					
- At 24 V	A	4			
- At 60 V	A	0.55			
- At 125 V	A	0.22			
Inputs (binary)		5 (with internal power supply from the device electronics)			
Cable length					
• Between sensor/start signal and evaluation electronics		1500 m			
• For further digital signals		300 m			
Safety data [1]					
SIL level max. according to IEC 61508		3			
Performance level PL according to ISO 13849-1		e			
Category according to IEC 13849-1		4			
Stop category according to EN 60204-1		0			
Probability of a dangerous failure (at 40 °C) for SIL 3 applications					
• Per hour (PFH_d) at a high demand rate according to EN 62061	1/h	4.5×10^{-9}	4.6×10^{-9}	4.4×10^{-9}	4.4×10^{-9}
• On demand (PFD_{avg}) at a low demand rate according to IEC 61508		5.4×10^{-6}	5.5×10^{-6}	5.1×10^{-6}	5.2×10^{-6}
T1 value for proof-test interval or service life according to IEC 61508	a	20			

[1] More safety data see system manual "SIMOCODE pro Safety Failsafe Digital Modules" on the Internet at www.siemens.com/simocode.

General data

More information

Configuration instructions when using an operator panel with display and/or a decoupling module

If you want to use an operator panel with display and/or a decoupling module in the SIMOCODE pro V system, then the following configuration instructions concerning the type and number of connectable expansion modules must be observed.

The following tables show the maximum possible configuration of the expansion modules for the various combinations.

The DM-F Local and DM-F PROFIsafe failsafe expansion modules behave in this connection like digital modules for standard applications.

Use of an operator panel with display

Digital modules	Digital modules	Analog modules	Temperature modules	Ground-fault modules
Only operator panel with display for basic unit 2 (24 V DC or 110 ... 240 V AC/DC)				
Max. 4 expansion modules can be used				
Operator panel with display and current/voltage measurement with basic unit 2 (110 ... 240 V AC/DC)				
Max. 3 expansion modules can be used or:				
--	--	✓	✓	--

✓ Available

-- Not available

Use of a decoupling module (voltage measurement in insulated networks)

Digital modules	Digital modules	Analog modules	Temperature modules	Ground-fault modules
Basic units 2 (24 V DC)				
✓[1)]	✓[1)]	✓	✓	✓
Basic unit 2 (110 ... 240 V AC/DC)				
✓	✓	--	✓	✓
✓[1)]	✓[1)]	✓	✓	--
✓	--	✓	✓	--
✓	--	✓	--	✓

✓ Available

-- Not available

1) No bistable relay outputs and no more than 5 of 7 relay outputs active simultaneously (> 3 s).

Use of a decoupling module (voltage measurement in insulated networks) in combination with an operator panel with display

Digital modules	Digital modules	Analog modules	Temperature modules	Ground-fault modules
Basic units 2 (24 V DC)				
✓	--	✓	✓	✓
✓	✓	--	✓	✓
Basic unit 2 (110 ... 240 V AC/DC)				
✓[2)]	--	✓	✓	✓
✓	✓	--	--	--
✓[1)]	✓[1)]	✓[3)]	--	--
✓	--	--	✓	✓

✓ Available

-- Not available

1) No bistable relay outputs and no more than 5 of 7 relay outputs active simultaneously (> 3 s).

2) No bistable relay outputs and no more than 3 of 5 relay outputs active simultaneously (> 3 s).

3) Analog module output is not used.

Protective separation

All circuits in SIMOCODE pro are safely separated from each other according to IEC 60947-1, Annex N. That is, they are designed with double creepages and clearances. In the event of a fault, therefore, no parasitic voltages can be formed in neighboring circuits. The instructions of Test Report No. 2668 must be complied with.

Types of protection EEx e and EEx d

The overload protection and the thermistor motor protection of the SIMOCODE pro system comply with the requirements for overload protection of explosion-protected motors to the type of protection:

- EEx d "flameproof enclosure" e. g. according to EN 50018 or EN 60079-1
- EEx e "increased safety" e.g. according to EN 50019 or EN 60079-7.

When using SIMOCODE pro devices with a 24 V DC control voltage, electrical separation must be ensured using a battery or a safety transformer according to EN 61558-2-6. EC type test certificate: BVS 06 ATEX F 001
Test report: BVS PP 05.2029 EG.

Selection data for type-tested assemblies/load feeders

Configuration tables according to type of coordination "1" or "2" can be found in the manual "SIRIUS Configuration", Order No.: 3ZX1012-0RA21-0AB0, the manual "Configuring SIRIUS Innovations", order no.: 3ZX1012-0RA21-1AB0 or the system manual SIMOCODE pro.

System manual

The SIMOCODE pro system manual describes the motor management system and its functions in detail. It provides information on configuration, start-up, servicing and maintenance.
A typical example of a reversing starter application is used to teach the user quickly and practically how to use the system. In addition to help on how to identify and rectify faults in the event of a malfunction, the manual also contains special information for servicing and maintenance. For selection of equipment and for configuration, it is recommended that the 3UF7 970-0AA0.-0 system manual is consulted.

A detailed description of the DM-F Local and DM-F PROFIsafe failsafe expansion modules is provided in the system manual "SIMOCODE pro Safety Failsafe Digital Modules", which can be downloaded from the Internet.

Internet

More information is available on the Internet at:
www.siemens.com/simocode.

Selection and ordering data

Version	Current setting	Width	DT	Screw terminals Order No.	PU (UNIT, SET, M) Price per PU	PS*	PG
	A	mm					
SIMOCODE pro							
 3UF7 000-1A.00-0	**SIMOCODE pro C, Basic Unit 1** PROFIBUS DP interface, 12 Mbit/s, RS 485 4 I/3 O freely assignable, input for thermistor connection, monostable relay outputs, rated control supply voltage U_s:						
	• 24 V DC		▶	**3UF7 000-1AB00-0**	1	1 unit	42J
	• 110 ... 240 V AC/DC		▶	**3UF7 000-1AU00-0**	1	1 unit	42J
 3UF7 010-1A.00-0	**SIMOCODE pro V, Basic Unit 2** PROFIBUS DP interface, 12 Mbit/s, RS 485 4 I/3 O freely assignable, input for thermistor connection, monostable relay outputs, can be expanded by expansion modules, rated control supply voltage U_s:						
	• 24 V DC		▶	**3UF7 010-1AB00-0**	1	1 unit	42J
	• 110 ... 240 V AC/DC		▶	**3UF7 010-1AU00-0**	1	1 unit	42J
 3UF7 100-1AA00-0	**Current measuring modules**						
	• Straight-through transformers	0.3 ... 3	45	▶	**3UF7 100-1AA00-0**	1	1 unit	42J
		2.4 ... 25	45	▶	**3UF7 101-1AA00-0**	1	1 unit	42J
		10 ... 100	55	▶	**3UF7 102-1AA00-0**	1	1 unit	42J
		20 ... 200	120	▶	**3UF7 103-1AA00-0**	1	1 unit	42J
	• Busbar connections	20 ... 200	120	▶	**3UF7 103-1BA00-0**	1	1 unit	42J
		63 ... 630	145	▶	**3UF7 104-1BA00-0**	1	1 unit	42J
 3UF7 110-1AA00-0	**Current/voltage measuring modules For SIMOCODE pro V** Voltage measuring up to 690 V if required in connection with a decoupling module						
	• Straight-through transformers	0.3 ... 3	45	▶	**3UF7 110-1AA00-0**	1	1 unit	42J
		2.4 ... 25	45	▶	**3UF7 111-1AA00-0**	1	1 unit	42J
		10 ... 100	55	▶	**3UF7 112-1AA00-0**	1	1 unit	42J
		20 ... 200	120	▶	**3UF7 113-1AA00-0**	1	1 unit	42J
	• Busbar connections	20 ... 200	120	▶	**3UF7 113-1BA00-0**	1	1 unit	42J
		63 ... 630	145	▶	**3UF7 114-1BA00-0**	1	1 unit	42J
 3UF7 150-1AA00-0	**Decoupling modules** For connecting upstream from a current/voltage measuring module on the system interface when using voltage detection in insulated, high-resistance or asymmetrically grounded systems and in single-phase systems			A	**3UF7 150-1AA00-0**	1	1 unit	42J
 3UF7 200-1AA00-0	**Operator panels** Installation in control cabinet door or front plate, for plugging into basic unit, 10 LEDs for status indication and user-assignable buttons for controlling the motor			▶	**3UF7 200-1AA00-0**	1	1 unit	42J
 3UF7 210-1AA00-0	**Operator panels with display for SIMOCODE pro V**[1] Installation in control cabinet door or front plate, for plugging into basic unit 2, 7 LEDs for status indication and user-assignable buttons for controlling the motor, multilingual display, e.g. for indication of measured values, status information or fault messages			▶	**3UF7 210-1AA00-0**	1	1 unit	42J

[1] Only possible with basic unit 2, product version E03 and higher (from 12/2006).

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Expansion modules

Selection and ordering data

Version	DT	Screw terminals Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Expansion modules for SIMOCODE pro V						
With SIMOCODE pro V, it is possible to expand the type and number of inputs and outputs in steps. Each expansion module has two system interfaces on the front. Through the one system interface the expansion module is connected to the system interface of the SIMOCODE pro V using a connection cable; through the second system interface, further expansion modules or the operator panel can be connected. The power supply for the expansion modules is provided by the connection cable through Basic Unit 2. Note: Please order connection cable separately, see page 10/16.						
Digital modules Up to two digital modules can be used to add additional binary inputs and relay outputs to basic unit. The input circuits of the digital modules are supplied from an external power supply. 4 binary inputs and 2 relay outputs, up to 2 digital modules can be connected per basic unit 2						
Relay outputs: Monostable; Input voltage: 24 V DC	►	**3UF7 300-1AB00-0**		1	1 unit	42J
Relay outputs: Monostable; Input voltage: 110 ... 240 V AC/DC	►	**3UF7 300-1AU00-0**		1	1 unit	42J
Relay outputs: Bistable; Input voltage: 24 V DC	►	**3UF7 310-1AB00-0**		1	1 unit	42J
Relay outputs: Bistable; Input voltage: 110 ... 240 V AC/DC	►	**3UF7 310-1AU00-0**		1	1 unit	42J
Analog modules Basic unit can be optionally expanded with analog inputs and outputs (0/4 ... 20 mA) by means of the analog module. 2 inputs (passive) for input and 1 output for output of 0/4 ... 20 mA signals, max. 1 analog module can be connected per Basic Unit 2.	►	**3UF7 400-1AA00-0**		1	1 unit	42J
Ground-fault modules Instead of ground-fault monitoring using the current measuring modules or current/voltage measuring modules, it may be necessary, especially in high-impedance grounded networks, to implement ground-fault monitoring for smaller ground fault currents using a summation current transformer. 1 input for connecting a summation current transformer 3UL22, up to 1 ground-fault module can be connected per Basic Unit 2 Note: For corresponding summation current transformers for rated fault currents of 0.3 A, 0.5 A or 1 A see page 10/84.	►	**3UF7 500-1AA00-0**		1	1 unit	42J
Temperature modules Independently of the thermistor motor protection of the basic units, up to 3 analog temperature sensors can be evaluated using a temperature module. Sensor types: PT100/PT1000, KTY83/KTY84 or NTC 3 inputs for connecting up to 3 analog temperature sensors, up to 1 temperature module can be connected per Basic Unit 2	►	**3UF7 700-1AA00-0**		1	1 unit	42J


3UF7 300-1AU00-0


3UF7 400-1AA00-0


3UF7 500-1AA00-0


3UF7 700-1AA00-0

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* You can order this quantity or a multiple thereof.
Illustrations are approximate

Selection and ordering data

Version	DT	Screw terminals Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Failsafe expansion modules for SIMOCODE pro V						
Thanks to the failsafe expansion modules, SIMOCODE pro V can be expanded with the function of a safety relay for the failsafe disconnection of motors. A maximum of 1 failsafe digital module can be connected; it can be used instead of a digital module. *The failsafe expansion modules are equipped likewise with two system interfaces at the front for making the connection to other system components. Unlike other expansion modules, power is supplied to the modules through a separate terminal connection.* Note: Please order connection cable separately, see page 10/16.						
 3UF7 320-1AB00-0 **DM-F Local failsafe digital modules** [1] For failsafe disconnection using a hardware signal 2 relay enabling circuits, joint switching; 2 relay outputs, common potential disconnected failsafe; inputs for sensor circuit, start signal, cascading and feedback circuit, safety function adjustable using DIP switches, rated control supply voltage U_s:						
• 24 V DC	►	**3UF7 320-1AB00-0**		1	1 unit	42J
• 110 ... 240 V AC/DC	►	**3UF7 320-1AU00-0**		1	1 unit	42J
 3UF7 330-1AB00-0 **DM-F PROFIsafe failsafe digital modules** [1] For failsafe disconnection using PROFIBUS/PROFIsafe 2 relay enabling circuits, joint switching; 2 relay outputs, common potential disconnected failsafe; 1 input for feedback circuit; 3 binary standard inputs, rated control supply voltage U_s:						
• 24 V DC	►	**3UF7 330-1AB00-0**		1	1 unit	42J
• 110 ... 240 V AC/DC	►	**3UF7 330-1AU00-0**		1	1 unit	42J

[1] Only possible with basic unit 2, product version E07 and higher (from 05/2011)

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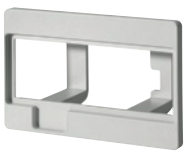
Accessories

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Connection cables (essential accessory)							
 3UF7 932-0AA00-0	**Connection cables** In different lengths for connecting basic unit, current measuring module, current/voltage measuring module, operator panel or expansion modules or decoupling module:						
	• Length 0.025 m (flat) Important: Only suitable for connecting basic unit 2 to its expansion modules or for connecting expansion modules to each other; only when the front plates finish at the same height!	►	**3UF7 930-0AA00-0**		1	1 unit	42J
	• Length 0.1 m (flat)	►	**3UF7 931-0AA00-0**		1	1 unit	42J
	• Length 0.3 m (flat)	►	**3UF7 935-0AA00-0**		1	1 unit	42J
	• Length 0.5 m (flat)	►	**3UF7 932-0AA00-0**		1	1 unit	42J
	• Length 0.5 m (round)	►	**3UF7 932-0BA00-0**		1	1 unit	42J
	• Length 1.0 m (round)	►	**3UF7 937-0BA00-0**		1	1 unit	42J
	• Length 2.5 m (round)	►	**3UF7 933-0BA00-0**		1	1 unit	42J
PC cables and adapters							
 3UF7 940-0AA00-0	**For PC/PG communication with SIMOCODE pro** Through the system interface, for connecting to the serial interface of the PC/PG	►	**3UF7 940-0AA00-0**		1	1 unit	42J
	USB/serial adapters To connect an RS 232 PC cable to the USB port of a PC, we recommend using 3RK3 modular safety system, 3RW44 soft starter, ET 200S/ECOFAST/ET 200pro motor starter, AS-i safety monitor, AS-i analyzer in conjunction with SIMOCODE pro 3UF7	B	**3UF7 946-0AA00-0**		1	1 unit	42J
Memory modules							
 3UF7 900-0AA00-0	The memory module enables the complete parameter assignment of a system to be saved and transferred to a new system, e.g. when a device is replaced, without the need for additional aids or detailed knowledge of the the system interface	►	**3UF7 900-0AA00-0**		1	1 unit	42J
Interface covers							
 3UF7 950-0AA00-0	**For system interface**	►	**3UF7 950-0AA00-0**		1	5 units	42J
Addressing plug							
 3UF7 910-0AA00-0	**For assigning the PROFIBUS addresses without using a PC or programming device** on SIMOCODE pro through the system interface	►	**3UF7 910-0AA00-0**		1	1 unit	42J
Door adapters							
 3UF7 920-0AA00-0	**For external connection of the system interface** Outside, for example, a control cabinet	►	**3UF7 920-0AA00-0**		1	1 unit	42J
Adapters for operator panel							
 3UF7 922-0AA00-0	The adapter enables the smaller 3UF7 20 operator panel from SIMOCODE pro to be used in a front panel cutout in which previously, e.g. after a change of system, a larger 3UF5 2 operator panel from SIMOCODE-DP had been used; degree of protection IP54	►	**3UF7 922-0AA00-0**		1	1 unit	42J

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Labeling strips						
 3UF7 925-0AA02-0						
• For pushbuttons of the 3UF7 20 operator panel	►	**3UF7 925-0AA00-0**		100	400 units	42J
• For pushbuttons of the 3UF7 21 operator panel with display	►	**3UF7 925-0AA01-0**		100	600 units	42J
• For LEDs of the 3UF7 20 operator panel	►	**3UF7 925-0AA02-0**		100	1 200 units	42J
Note:						
Pre-punched labeling strips for user-specific printing using the free inscription software "SIRIUS Label Designer" on a laser printer.						
Note the software version!						
Download from www.siemens.com/simocode.						
Push-in lugs						
 3RB19 00-0B						
For screw fixing e.g. on mounting plate, 2 units required per device						
• Can be used with 3UF7 1.0, 3UF7 1.1 and 3UF7 1.2	A	**3RB19 00-0B**		100	10 units	41F
• Can be used with 3UF7 0, 3UF7 3, 3UF7 4, 3UF7 5 and 3UF7 7	B	**3RP19 03**		1	10 units	41H
Terminal covers						
 3RT19 56-4EA1						
Covers for cable lugs and busbar connections						
• Length 100 mm, can be used for 3UF7 1.3-1BA00-0	►	**3RT19 56-4EA1**		1	1 unit	41B
• Length 120 mm, can be used for 3UF7 1.4-1BA00-0	►	**3RT19 66-4EA1**		1	1 unit	41B
Covers for box terminals						
• Length 25 mm, can be used for 3UF7 1.3-1BA00-0	►	**3RT19 56-4EA2**		1	1 unit	41B
• Length 30 mm, can be used for 3UF7 1.4-1BA00-0	►	**3RT19 66-4EA2**		1	1 unit	41B
 3RT19 56-4EA2						
Covers for screw terminals between contactor and current measuring module or current/voltage measuring module for direct mounting						
• Can be used for 3UF7 1.3-1BA00-0	►	**3RT19 56-4EA3**		1	1 unit	41B
• Can be used for 3UF7 1.4-1BA00-0	►	**3RT19 66-4EA3**		1	1 unit	41B
Box terminal blocks						
 3RT19 5.-4G						
For round and ribbon cables						
• Up to 70 mm^2, can be used for 3UF7 1.3-1BA00-0	►	**3RT19 55-4G**		1	1 unit	41B
• Up to 120 mm^2, can be used for 3UF7 1.3-1BA00-0	►	**3RT19 56-4G**		1	1 unit	41B
• Up to 240 mm^2, can be used for 3UF7 1.4-1BA00-0	►	**3RT19 66-4G**		1	1 unit	41B
Bus termination modules						
With separate control supply voltage for terminating the bus following the last unit on the bus line						
Supply voltage:						
• 115/230 V AC	C	**3UF1 900-1KA00**		1	1 unit	42J
• 24 V DC	C	**3UF1 900-1KB00**		1	1 unit	42J
System manuals						
 3UF7 970-0AA01-0						
SIMOCODE pro With token fee Languages:						
• German	►	**3UF7 970-0AA01-0**		1	1 unit	42J
• English	►	**3UF7 970-0AA00-0**		1	1 unit	42J
• French	►	**3UF7 970-0AA02-0**		1	1 unit	42J

Note:

System manual "SIMOCODE pro Safety Failsafe Digital Modules" see on the Internet at www.siemens.com/simocode.

Accessories

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
SIMOCODE ES 2007 Basic						
 3ZS1 312-4CC10-0YA5						
Floating license for one user						
Engineering software, type of delivery: on CD incl. electronic documentation, 3 languages (German/English/French), communication through system interface						
• License key on USB stick, Class A	►	**3ZS1 312-4CC10-0YA5**		1	1 unit	42J
• License key download, Class A	►	**3ZS1 312-4CE10-0YB5**		1	1 unit	42J
SIMOCODE ES 2007 Standard						
Floating license for one user						
Engineering software, type of delivery: on CD incl. electronic documentation, 3 languages (German/English/French), communication through system interface, integrated graphics editor						
• License key on USB stick, Class A	►	**3ZS1 312-5CC10-0YA5**		1	1 unit	42J
• License key download, Class A	►	**3ZS1 312-5CE10-0YB5**		1	1 unit	42J
Upgrade for SIMOCODE ES 2004 and later	A	**3ZS1 312-5CC10-0YE5**		1	1 unit	42J
Floating license for one user, engineering software, type of delivery: on CD incl. electronic documentation, 3 languages (German/English/French), license key on USB stick, Class A, communication through system interface, integrated graphics editor						
Powerpack for SIMOCODE ES 2007 Basic	A	**3ZS1 312-5CC10-0YD5**		1	1 unit	42J
Floating license for one user, engineering software, license key on USB stick, Class A, 3 languages (German/English/French), communication through the system interface, integrated graphics editor						
Software Update Service	►	**3ZS1 312-5CC10-0YL5**		1	1 unit	42J
For 1 year with automatic extension, assuming the current software version is in use, engineering software, type of delivery: on CD incl. electronic documentation, communication through system interface, integrated graphics editor						
SIMOCODE ES 2007 Premium						
Floating license for one user						
Engineering software, type of delivery: on CD incl. electronic documentation, 3 languages (German/English/French), communication through PROFIBUS or system interface, integrated graphics editor, STEP7 Object Manager						
• License key on USB stick, Class A	►	**3ZS1 312-6CC10-0YA5**		1	1 unit	42J
• License key download, Class A	►	**3ZS1 312-6CE10-0YB5**		1	1 unit	42J
Upgrade for SIMOCODE ES 2004 and later	A	**3ZS1 312-6CC10-0YE5**		1	1 unit	42J
Floating license for one user, engineering software, type of delivery: on CD incl. electronic documentation, 3 languages (German/English/French), license key on USB stick, Class A, communication through PROFIBUS or system interface, integrated graphics editor. STEP7 Object Manager						
Powerpack for SIMOCODE ES 2007 Standard	A	**3ZS1 312-6CC10-0YD5**		1	1 unit	42J
Floating license for one user, engineering software, license key on USB stick, Class A, 3 languages (German/English/French), communication through PROFIBUS or the system interface, integrated graphics editor, STEP7 Object Manager						
Software Update Service	►	**3ZS1 312-6CC10-0YL5**		1	1 unit	42J
For 1 year with automatic extension, assuming the current software version is in use, engineering software, type of delivery: on CD incl. electronic documentation, communication through PROFIBUS or system interface, integrated graphics editor, STEP7 Object Manager						

Please order PC cable separately, see page 10/16.

Note:

More information see Chapter 14 "Parametrization, Configuration and Visualization with SIRIUS".

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
SIMOCODE pro block library for SIMATIC PCS 7						
 3UF7 982-0AA00-0	Scope of supply: AS modules and faceplates for integrating SIMOCODE pro into the PCS 7 process control system					
	Engineering software for one engineering station (single license) including runtime software for execution of the AS module in an automation system (single license), German/English/French, Type of delivery: CD incl. electronic documentation					
	• For PCS 7 Version V 7.0/V 7.1	►	**3UF7 982-0AA10-0**	1	1 unit	42J
	Runtime software For execution of the AS module in an automation system (single license), Type of delivery: License without software and documentation					
	• For PCS 7 Version V 7.x	►	**3UF7 982-0AA11-0**	1	1 unit	42J
	Upgrade for the PCS 7 block library SIMOCODE pro, V 6.0 or V 6.1 to version SIMOCODE pro V 7.0/V 7.1 for integrating SIMOCODE pro into the PCS 7 process control system, for PCS 7 Version V 7.0/V 7.1 (single license), German/English/French, type of delivery: CD incl. electronic documentation	A	**3UF7 982-0AA13-0**	1	1 unit	42J

Note:

More information see Chapter 14 "Parametrization, Configuration and Visualization with SIRIUS".

3UF18 current transformers for overload protection

Overview

The 3UF18 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 3UF18 current transformers convert the maximum current of the corresponding operating range into the standard value of 1 A secondary.

Selection and ordering data

Mounting type	Operating range A	DT	Screw terminals Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
For stand-alone installation							
 3UF18 43							
Screw fixing and snap-on mounting onto 35 mm standard mounting rail	0.25 … 2.5[1]	C	**3UF18 43-1BA00**		1	1 unit	42J
	1.25 … 12.5[1]	C	**3UF18 43-2AA00**		1	1 unit	42J
	2.5 … 25[1]	C	**3UF18 43-2BA00**		1	1 unit	42J
	12.5 … 50	C	**3UF18 45-2CA00**		1	1 unit	42J
	16 … 65	C	**3UF18 47-2DA00**		1	1 unit	42J
	25 … 100	C	**3UF18 48-2EA00**		1	1 unit	42J
For mounting onto contactors and stand-alone installation							
 3UF18 68							
Screw fixing	32 … 130	C	**3UF18 50-3AA00**		1	1 unit	42J
	50 … 200	C	**3UF18 52-3BA00**		1	1 unit	42J
	63 … 250	C	**3UF18 54-3CA00**		1	1 unit	42J
	100 … 400	C	**3UF18 56-3DA00**		1	1 unit	42J
	125 … 500	C	**3UF18 57-3EA00**		1	1 unit	42J
	160 … 630	C	**3UF18 68-3FA00**		1	1 unit	42J
	205 … 820	C	**3UF18 68-3GA00**		1	1 unit	42J

[1] The following setting ranges for the protection of EEx e motors are applicable:
3UF18 43-1BA00, 0.25 ... 1.25 A;
3UF18 43-2AA00, 1.25 ... 6.3 A;
3UF18 43-2BA00, 2.5 ... 12.5 A.

Accessories

For contactor type	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Terminal covers						
 3TX7 466-0A						
For transformer/contactor combinations and stand-alone installation for transformer (cover required per connection side)						
3UF18 45	D	**3TX7 446-0A**		1	1 unit	41B
3UF18 48	D	**3TX7 466-0A**		1	1 unit	41B
3UF18 50, 3UF18 52	D	**3TX7 506-0A**		1	1 unit	41B
3UF18 54 to 3UF18 57	D	**3TX7 536-0A**		1	2 units	41B
3UF18 68-3FA00	B	**3TX7 686-0A**		1	1 unit	41B
3UF18 68-3GA00	B	**3TX7 696-0A**		1	1 unit	41B
For covering the screw terminal for direct mounting on contactor (cover required per contactor/transformer combination)						
3UF18 48	D	**3TX7 466-0B**		1	1 unit	41B
3UF18 50, 3UF18 52	D	**3TX7 506-0B**		1	1 unit	41B
3UF18 54 to 3UF18 57	D	**3TX7 536-0B**		1	1 unit	41B
3UF18 68-3FA00	D	**3TX7 686-0B**		1	1 unit	41B
3UF18 68-3GA00	D	**3TX7 696-0B**		1	1 unit	41B

* You can order this quantity or a multiple thereof.
Illustrations are approximate