Overview

Protection

Thermal overloading can be caused by unbalanced current input, failure of a phase or excessive mechanical loads. The 3UF50 motor protection and control devices counteract this danger with two protective mechanisms:

- Monitoring of the three phase currents by means of integrated current transformers
- Thermistor motor protection by means of evaluation of a PTC or NTC or KTY thermistor circuit

Furthermore, it is possible to activate an earth-fault protection feature integrated into the device. The differential current is calculated via the three phase currents. If the limit value (30 % I_e) is exceeded, the load branch can be disconnected or a signal can be sent to the control level. This earth-fault protection system, however, can only be used with loads with a neutral point which is not tapped. In order to detect an earth fault with absolute precision (0.3; 0.5 and 1 A), an external summation current transformer (3UL2 20.-.A) can be connected as an alternative (unit variant).

For further details on overload protection, see the Section *Overload relays and protective devices*. These characteristics correspond to those of the 3RB1 2 electronic overload relay.

EEx e type of protection

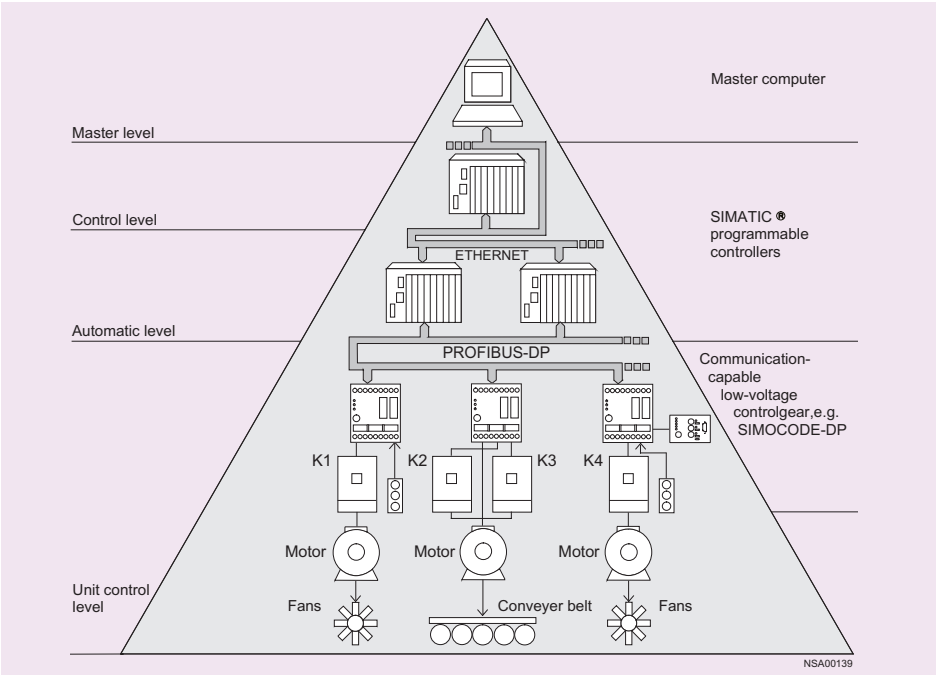
The SIMOCODE-DP 3UF5 system is in accordance with the regulations for overload protection of explosion-protected motors of the EEx e "Increased safety" type of protection to EN 50 019/DIN VDE 0165, DIN VDE 0170/0171 and the PTB test regulations.

In the case of tripping devices with DC control, isolation by battery or safety transformer in accordance with DIN VDE 0551 must be assured.

It is recommended to separately monitor the control supply voltage if the SIMOCODE-DP 3UF5 system that has a parameterizable bistable characteristic of the output relay (Order No. 3UF5 0 ..-3..10-1) is used to protect motors of the "increased safety" type.

PTB test report No. 3.53-14605/96.

System concept



Control

Complete, branch-related control functions can be created via the control unit integrated in the device and the four DC 24 V inputs and four floating outputs. In this way, for example, star-delta or reversing contactor circuits can be created without the labor and equipment usually required (auxiliary contactors, time relays, input/output modules of the programmable controllers, etc.).

An expansion module makes it possible to link in an additional 8 outputs and 4 floating outputs to the motor protection and control device. In this way more complex control functions can be created autonomously without involving the automation level.

Safe isolation

All electric circuits in SIMOCODE-DP (from product ver-sion 12, start of delivery 01/ 2000) are safely isolated from each other according to DIN VDE 0100/0106/ 0160, 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 necessary.

Communication – PROFIBUS-DP standard

The 3UF5 0 motor protection and control devices are fitted with an integrated PROFIBUS-DP interface.

Connection to the widely implemented fieldbus system PROFIBUS-DP, rapid and reliable transmission of control commands, operational status as well as diagnostic, service, statistical and parameter data to and from the higher-level bus interface is guaranteed. This can be a component of a programmable controller or a process control system. SIMOCODE is easily integrated into a PROFIBUS-DP network via the parameterizing and service programme of the SIMATIC S5: COM PROFIBUS or SIMATIC S7: STEP 7.

Communication – PROFIBUS-DPV1 standard expansion

PROFIBUS-DP has been extended with the instruction set for non-cyclic reading and writing (PROFIBUS-DPV1). This PROFIBUS-DP extension is integrated into the SIMOCODE-DP 3UF5 0 system from delivery stage E10 (June 98) onwards.

This facilitates online parameterization, operation, monitoring and testing with Win-SIMOCODE-DP/Professional via PROFIBUS-DP.

Autonomous operation

If system faults occur on the communication path, SIMOCODE-DP automatically switches to manual mode.

In this case, either the load feeder is shut down or the operating status is retained. Further control is then effected manually.

This enables the non-productive times due to faults at the automation and communication level to be considerably reduced. The autonomous structure of the system permits the process to be reliably continued with local control through the intelligence integrated in the SIMOCODE-DP.

3UF5

Overview

Parameterization and configuration software

Specific software packages are available for the different parameter setting areas and interfacing possibilities:

COM-PROFIBUS

COM-PROFIBUS can be used to integrate SIMOCODE-DP into SIMATIC S5 as a standard slave. The parameterization can be created with COM-PROFIBUS and written to SIMOCODE-DP when the automation system starts up.

STEP 7

STEP 7 allows SIMOCODE-DP to be integrated into SIMATIC S7 as a standard slave. The parameterization can be created with STEP 7 and written to SIMOCODE-DP when the automation system starts up.

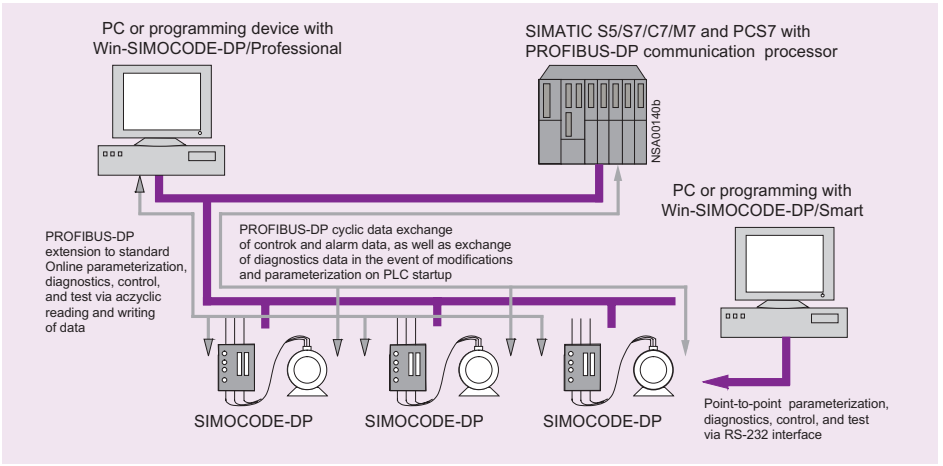
Win-SIMOCODE-DP/Professional

Software for online parameterization, operation, monitoring and testing via PROFIBUS-DP or point-to-point via the RS-232 system interface. Online means that, apart from the normal cyclic transfer of data to the PLC, non-cyclic parameter, control, alarm and statistical data can be read/written from/to SIMOCODE-DP via a communications processor of Class 2, e. g. CP5511 that is plugged into the PC or programming device. This means no more running from switchgear room to switchgear room to parameterize the motor branches.

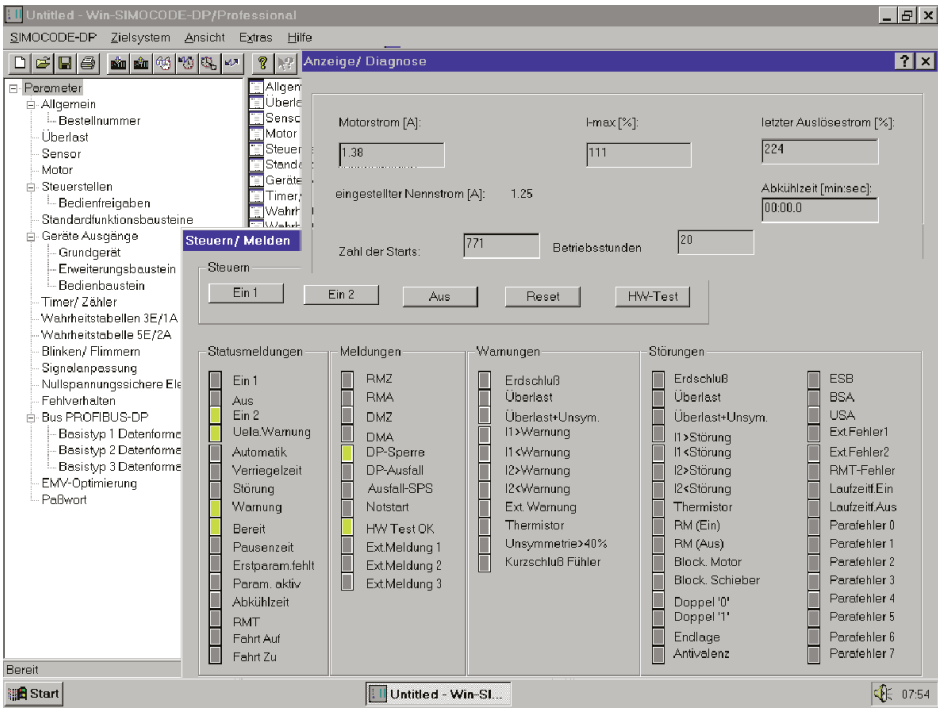
To modify parameters via PROFIBUS-DP, it used to be necessary to bring the plant to a standstill. If Win-SIMOCODE-DP/Professional is used, parameters can now be modified during operation.

Unplanned standstill times for maintaining the switching devices are also a thing of the past. The plant operator is able to read all statistical data such as the number of starts and operating hours at the press of a button from a central point via PROFIBUS-DP.

SIMOCODE-DP parameterizing locations



Parameterization, operation, monitoring, and testing with Win-SIMOCODE-DP/Professional



Win-SIMOCODE-DP/Smart

Software for point-to-point parameterization, operation, monitoring and testing of SIMOCODE-DP via the RS-232 system interface.

OM-SIMOCODE-DP

The SIMOCODE-DP object manager (OM) allows SIMOCODE-DP to be integrated as an S7 slave into SIMATIC S7. This means that parameter data created with Win-SIMOCODE-DP/Professional can be loaded offline into the SIMATIC S7 system data blocks (SDB) and can be written to SIMOCODE-DP when the automation system starts up. The user now only has to operate a single parameterization interface: Win-SIMOCODE-DP/Professional.

PCS7-FB SIMOCODE-DP

The PCS7 function block SIMOCODE-DP allows standard integration of SIMOCODE-DP into the PCS7 application programme as well as visualization of SIMOCODE-DP-specific operating, diagnostics and statistical data in a PCS7 faceplate.

Overview

Installation

The current transformers are already integrated into the housing of all versions of the 3UF5 0 motor protection and control devices.

The units with current setting ranges ≤100 A (mounting width: 70 mm) are designed for installation as single units due to the push-through installation technique.

Here, the main current conductors with rated motor currents of 1.25 A to 100 A are pushed through the current converters integrated in the housing. By means of multiple loops, loads with motor rated currents between 0.25 A and 1.25 A can also be protected.

With the help of this push-through technique, additional installation work is reduced and power losses at the transfer resistors of the terminal points that would otherwise be necessary are avoided.

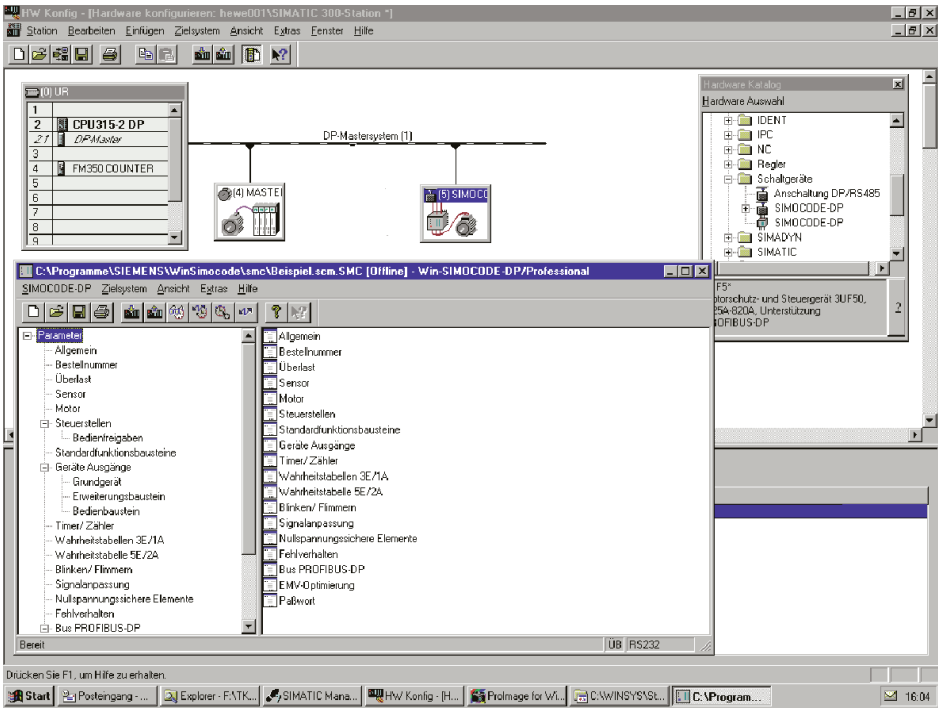
The 70 mm wide devices are either snapped onto a 35 mm standard mounting rail in accordance with EN 50 022 or screwed onto a mounting plate by means of plug-in clips which can be supplied as accessories.

With current setting ranges between 100 A and 820 A (mounting widths:120 mm,145 mm and 230 mm), the devices can be directly fitted to the contactor via connecting bars.

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

For the 3UF5 0 devices (overall width:120 mm), a baseplate for snap-on attachment on a 75 mm standard mounting rail is available.

Win-SIMOCODE-DP/Professional "Totally Integrated" in STEP 7 via the OM-SIMOCODE-DP



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).

Further information is available on the Internet at:

http://www.siemens.de/simocode-dp

Standards

IEC 60 947-4-1/DIN VDE 0660 Part 102;IEC 60 947-5-1/ DIN VDE 0680 Part 200

3UF5

Overview

Intelligent motor protection	Communication with a programmable controller (automatic level)	Acquisition of operating data	Evaluation of statistical data	Controlling a load feeder
SIMOCODE-DP protects electrical equipment such as single-phase, three-phase motors and transformers	SIMOCODE-DP offers powerful communication between individual control level and automatic level via PROFIBUS-DP and the PROFIBUS-DP extension to the standard (DPV1)	SIMOCODE-DP collects operating data and makes them available for the user via the bus, via the hand-held terminal or by means of the Win-SIMOCODE-DP/ Smart or Professional software	SIMOCODE-DP evaluates statistical data and makes them available for the user via the bus, via the hand-held terminal or by means of the Win-SIMOCODE-DP/ Smart or Professional software	SIMOCODE-DP makes it possible to control a motor via the bus, manually (3UF5 2 control module or locally) via the hand-held terminal or be means of the Win-SIMOCODE-DP/Smart or Professional software
For rated currents from 0.25 A to 820 A Release classes CLASS 5/10/15/20/25/30 Overload, phase failure, current unbalance and earth-fault detection as well as locked-rotor protection and PTC, KTY or NTC thermistor motor protection Protection of EEx e motors Two overload setting ranges for two-speed motors Programmable current limit value for process protection Recovery time 5 min fixed-setting, extension up to 60 min possible Emergency start Combined Test/Reset button Manual/automatic RESET Remote Reset via the bus or external button High tripping precision Self monitoring Temperature range –25 to +60 °C	Data volume: 4/12 bytes I/O cyclic 20 bytes diagnostics 213 bytes of parameter data Parameterization of the device via the bus. Transfer rate, address and basic type must always be set with Win-SIMOCODE-DP/ Smart or Professional via the system interface (RS 232). All operating and diagnostic data are available for the superordinated automatic level. In case of a bus failure, failure of the communication processor or failure of the programmable controller CPU, SIMOCODE-DP switches off or retains its operational status (programmable). Manual control is enabled! Control commands can be given from the automatic level.	Maximum phase current in % of the current setting I_e Alarm/tripping • Overload • Current unbalance • Threshold thermistor motor protection overrange • Earth fault • Current limit value out of range	Maximum motor current of the last overload trip in % of the current setting I_e Cause of the last tripping Operating hours Number of starts Number of overload trippings	Parameterizable control Features: • Direct on-line starter • Reversing starters • Start-delta starting • Dahlander circuit • Pole reversal • Solenoid valve control • Gate valve control • SIKOSTART 3RW22 • Individual control functions by means of logic blocks such as: 4 truth tables, 2 timers, 2 counters and, 4 signal matching blocks Monitoring of process signals: • Running time monitoring when starting and stopping • Interlocking, e.g. in reversing motors between clockwise and counterclockwise rotation • Current-dependent changeover switching from star to delta with star-delta starting Control commands with manual operation: • From the switchboard using the 3UF5 2 • Locally e.g. with enclosed pushbuttons • Via the system interface by using the Win-SIMOCODE-DP/Smart or Professional software Control commands with automatic operation: • Via the bus from the application programme • whereby operator enables can be issued and a key switch for Manual/Automatic changeover can be integrated.

Function blocks	Communication interface	Transfer rate	Transmission media max. distance	Number of stations
• Time-graded starting after failure of the voltage in the main circuit • System protection OFF • Ready to close • Test mode (cold startup) • Evaluation of external error • Watchdog for undervoltage OFF • Evaluation of external alarm • Emergency start	PROFIBUS-DP PROFIBUS-DPV1 DIN (E) 19 245 Part 3/ EN 50 170 Version 1.0 RS 485 interface type Connection via terminals (conductor cross-sections as for auxiliary contacts or 9-pole SUB-D socket	9.6; 45.45; 93.75; 187.5; 500; 1500 kbit/s	• twisted, shielded two-wire cable • via optical link modules with plastic or glass-fiber optic cables • 9.6 km with two-wire cables • 425 m with plastic fibers • 93 km with glass fibers	• per segment 32 • when using an RS 485 repeater up to 122

Operation

The motor current flowing at any particular time is detected in each phase via current transformers and continuously checked by a microprocessor.

If there is an overload of > 110 % of the set current Ie, a current imbalance of > 40 % I_e or a phase failure, the unit is tripped in accordance with the set tripping characteristic (CLASS 5/10/15/20/25/30 see Section *Characteristics*)

Resetting, either by pressing the TEST/RESET button on the unit or by remote or automatic RESET, is only possible when the recovery time of 5 minutes has elapsed. An extension of the recovery time and an emergency start are possible.

If the thermistor sensor responds or an earth-fault occurs, the unit is tripped without any delay.

If the thermistor is tripped, resetting is only possible when the temperature in the motor coil has fallen to 5 K below the response temperature of the thermistor.

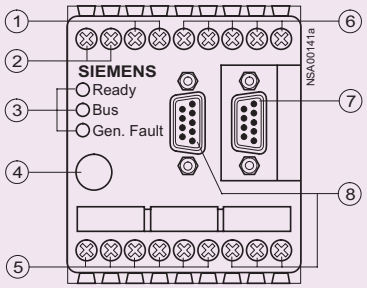
When an earth-fault causes tripping, the unit can be reset immediately after clearing the fault.

A test of the current detection function of the unit, the thermistor and earth-fault inputs and the tripping function of the auxiliary contacts can be initiated by pressing the TEST/ RESET button (> 5 s).

The integrated self-monitoring system ensures that the unit is also tripped when an internal fault occurs.

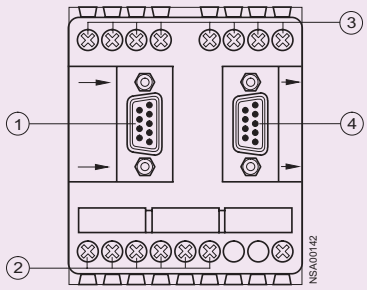
A 3UF50 unit is operated (e. g. switched on and off) either from the local control points connected to the inputs, the automatic level via the bus, the 3UF5 2 control unit, or a personal computer.

3UF5 0 basic unit, front view



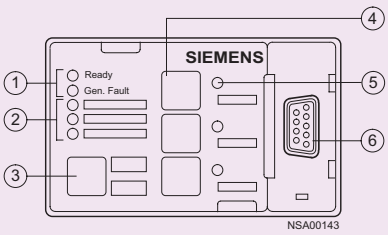
① Connection of a thermistor detector circuit for full motor protection
Optimal: Connection of a summation current transformer for earth fault monitoring
② Connection of the control supply voltage DC 24 V/ AC 115 V /AC 230 V
③ 3 LED displays
④ Unit test, manual reset:
Automatic reset parameterizable
Remote reset via bus or input
⑤ 3 + 1 relay outputs: Function assignment parameterizable
⑥ 4 optocoupler inputs:
DC 24 V internally supplied, function assignment parameterizable
⑦ System interface: Connection of expansion module, control module, hand-held terminal or PC
⑧ Bus connection PROFIBUS-DP:
standard 9-pole SUB-D socket,
terminal for withdrawable units

3UF5 1 expansion module, front view



① System interface:
Connection to the basic unit
Supply from the basic unit
② 3 + 1 relay outputs: Function assignment parameterizable
③ 8 optocoupler inputs:
DC 24 V/AC 115 V /AC 230 V externally supplied
④ System interface: Connection of control module or PC

3UF5 2 control module, front view



① 2 status LEDs
② 3 LED displays: Function assignment parameterizable
③ Unit test, manual reset
④ Control buttons, function assignment parameterizable
⑤ 3 LED displays: Function assignment parameterizable
⑥ System interface: Connection of control module or PC

3UF5

Selection and ordering data

Design				Order No.	Price 1 unit	Pack Unit
3UF5 0 basic unit						
3UF5 001 to 021 	**4 inputs, 4 outputs** for snap-on mounting onto 35 mm standard mounting rail to EN 50 022					
Rated control supply voltage V	Mountable contactors Type	Width mm	Current setting range A			
AC 230	–	70	1.25[1])...6.3	**3UF5 001-3☐N☐0-1**		1
AC 230	–	70	6.3 ... 25	**3UF5 011-3☐N☐0-1**		1
AC 230	–	70	25 ... 100	**3UF5 021-3☐N☐0-1**		1
AC 230	3RT1 05	120	50 ... 205	**3UF5 031-3☐N☐0-1**		1
AC 230	3RT1 06, 3RT1 07 3RT1 26, 3RT1 27	145	125 ... 500	**3UF5 041-3☐N☐0-1**		1
AC 230	3TF6 8, 3TF6 9	230	200 ... 820	**3UF5 051-3☐N☐0-1**		1
AC 115	–	70	1.25[1])...6.3	**3UF5 001-3☐J☐0-1**		1
AC 115	–	70	6.3 ... 25	**3UF5 011-3☐J☐0-1**		1
AC 115	–	70	25 ... 100	**3UF5 021-3☐J☐0-1**		1
AC 115	3RT1 05	120	50 ... 205	**3UF5 031-3☐J☐0-1**		1
AC 115	3RT1 06, 3RT1 07 3RT1 26, 3RT1 27	145	125 ... 500	**3UF5 041-3☐J☐0-1**		1
AC 115	3TF6 8, 3TF6 9	230	200 ... 820	**3UF5 051-3☐J☐0-1**		1
DC 24	-	70	1.25[1])...6.3	**3UF5 001-3☐B☐0-1**		1
DC 24	-	70	6.3 ... 25	**3UF5 011-3☐B☐0-1**		1
DC 24	-	70	25 ... 100	**3UF5 021-3☐B☐0-1**		1
DC 24	3RT1 05	120	50 ... 205	**3UF5 031-3☐B☐0-1**		1
DC 24	3RT1 06, 3RT1 07 3RT1 26, 3RT1 27	145	125 ... 500	**3UF5 041-3☐B☐0-1**		1
DC 24	3TF6 8, 3TF6 9	230	200 ... 820	**3UF5 051-3☐B☐0-1**		1
Additional price						
Input for thermistor motor protection				**A**		
Input for earth fault detection (external) (sensing of earth fault currents of sizes 0.3 A, 0.5 A and 1 A with summation current transformers 3UL2 20.-A, see Section *Switchgear and controlgear for load feeders*				**B**		
Behaviour of the outputs in case of control supply voltage failure						
monostable				**0**		
bistable				**1**		
3UF5 1 expansion module						
	**8 inputs, 4 outputs** for snap-on mounting onto 35 mm standard mounting rail to EN 50 022 External supply voltage for inputs					
• AC 230				**3UF5100-0AN00**		1
• AC 115 V				**3UF5100-0AJ00**		1
• DC 24 V				**3UF5100-0AB00**		1
3UF5 2 control module						
	**Control module for installation in the control cabinet door** only to be plugged in to 3UF5 0 basic unit or 3UF5 1 expansion module			**3UF5202-1AA00-1**		1

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

Selection and ordering data

	Design		Order No.	Price 1 unit	Pack Unit
Accessories configuring software					
3UF57 710-0AA00-0 	**Win-SIMOCODE-DP/Professional**		**3UF5710-0AA00-0**		1
	Parameterization, control, visualization and testing	via PROFIBUS DPV1[1]) or via RS 232			
	Target system:	SIMATIC S5 SIMATIC S7/M7/C7/PCS7			
	PC/programming device requirement:	Windows 95, Windows NT 4.0, Windows 2000			
	Free space required on hard disk:	10 MB or more			
3UF57 711-0AA00-0 	PC/PG interface requirements:	PG with integrated MSI-SS or MPI board CP 5411, CP 5412 (A2), CP 5511 or CP 5611; RS 232 with compatible interface cable 3RW2 920-1DA00			
	STEP 7 requirement:	STEP 7 is not necessarily required. If installed, however, version 4.0 or higher is required. (Includes the software for support of DPV1)			
	SIMOCODE-DP requirement:	DPV1 delivery stage E10 (as of June 1998)			
	Supply media:	CD-ROM, English/German (selectable) incl. online Help and example parameter files, single licence			
	Win-SIMOCODE-DP/Smart		**3UF5711-0AA00-0**		1
	Parameterization, control, visualization and testing:	via RS 232			
	PC/programming device requirement:	Windows 95 or Windows NT 4.0, Windows 2000			
	Free space required on hard disk:	10 MB or more			
	PC/PG interface requirements:	RS 232 with compatible 3RW29 920-1DA00 interface cable			
	Supply media:	3.5" diskettes, English/German (selectable) incl. online Help and example parameter files, single licence			
	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		**3UF5712-0AA00-0**		1
	Requirements:	SIMATIC S7, M7, C7, PCS7 STEP 7, Version 4.0 or higher			
	PC/programming device requirement:	see PC/PG requirement, software STEP 7			
	SIMOCODE-DP requirement:	DPV1 delivery stage E10 (as of June 1998)			
	Supply media:	3.5" discs, English/ German (selectable) incl. online help, single license			
	PCS7 function block SIMOCODE-DP Function block for integrating SIMOCODE-DP in the PCS7 user programme and for visualising SIMOCODE-DP-specific data in a faceplate. The FB supports the following SIMOCODE-DP settings: • Cyclic message frame basic type 2 (= 4 bytes inputs, 4 bytes outputs) • Motor control functions, direct online starter, reversing starter, star-delta circuit, pole-reversing circuit and Dahlander circuit		**3UF5720-0AA00-0**		1
	PCS7 requirements:	PCS7 Toolset Version 4.2 or from Version 5.0 or higher			
	SIMOCODE-DP requirement:	DPV1 delivery stage E10 and higher (since June 1998)			
	Supply media:	CD-ROM, German/English,Single-user license			

1) DPV1 can read acyclic data and write via PROFIBUS-DP extension to the standard.

3UF5

Selection and ordering data

	Design	Order No.	Price 1 unit	Pack Unit
Accessories parameterization software				
	Integration on SIMATIC-S5 basis SIMOCODE-DP is integrated into a PROFIBUS-DP network on SIMATIC S5 basis via the parameterizing and service programme COM PROFIBUS You will find the appropriate GSD files on the Internet under: http://www.siemens.de/automation/ans/2/support/download	**see ST 50 Catalog,**		
	Integration on SIMATIC-S7 basis SIMOCODE-DP is integrated into a PROFIBUS-DP network on SIMATIC S7 basis via STEP 7 You will find the appropriate GSD files on the Internet under: http://www.siemens.de/automation/ans/2/support/download	**see ST 70 Catalogue**		
Miscellaneous accessories				
3UF1 900-1A 3UF1 900-1B 3UF1 900-1C	**3RW2 9 connecting cable** for PC communication via the RS 232 system interface Length 5 m	**3RW2920-1DA00**		1
	**3UF5 7 system manual** with description of communication via PROFIBUS-DP and configuration example Token fee			
	• German	**3UF5700-0AA00-0**		1
	• English	**3UF5700-0AA00-1**		1
3UF1 900-1D 3UF1 900-1E	**Connecting plug/connecting lead** with connectors 3UF5 9 / 3UF1 9			
	• for connecting the basic unit to the expansion unit, 9-pole, 0.03 tab connector, shielded	**3UF5900-1AA00**		1
	• for connection from the basic unit to the expansion module or to control module			
	– 9-pole, 0.5 m long, shielded plug 45° angular	**3UF1900-1AA00**		1
	– 9-pole, 2.0 m long, shielded plug 45° angular	**3UF1900-1BA00**		1
	– 9-pole, 2.5 m long, shielded plug 45° angular	**3UF1900-1CA00**		1
3UF19 900-0J	– 9-pole, 0.5 m long, with flat plug, shielded	**3UF1900-1DA00**		1
	– 9-pole, 1.0 m long, with flat plug, shielded	**3UF1900-1EA00**		1
	• for connecting the basic unit/expansion module to the cabinet door. Parameterization, operator control and monitoring can be performed wusing the hand-held terminal or PC from the cabinet door.			
	– 9-pole, 0.5 m long, with flat plug and socket, shielded	**3UF5900-0AA00**		1
	– 9-pole, 1.0 m long, with flat plug and socket, shielded	**3UF5900-0BA00**		1
	T-shaped terminal Terminal for bus connection to PROFIBUS-DP-RS 485	**3UF5900-1GA00**		1
3RB19 900-0B	**3UF1 900 bus termination module** Bus termination module with separate supply for terminating the bus after the final unit in the bus line Supply voltage:			
	• AC 115/230 V	**3UF1900-1KA00**		1
	• DC 24 V	**3UF1900-1KB00**		1
	Base plate for snap-on mounting onto 75 mm standard mounting rail for 3UF5 0 with 120 mm width only	**3UF1900-0JA00**		1
	Push-in lugs for screw fixing on mounting plate 2 units required per 3UF5 0 (1 packg. = 10 units)	**3RB1900-0B**	1 packg.	10

Selection and ordering data

	Design	Order No.	Price 1 unit	Pack Unit
Miscellaneous accessories				
3TX7 506-0A 	**Terminal cover**			
	• for individual mounting or on the outgoing side with direct mounting			
	– 3UF5 031 (1 packg. = 10 units)	**3TX7 506-0A**	1 packg.	10
	– 3UF5 041 (1 packg. = 2 units)	**3TX7 536-0A**	1 packg.	2
3TX7 506-0B 	– 3UF5 051 with 3TF6 8 (1 packg. = 2 units)	**3TX7 686-0A**	1 packg.	2
	– 3UF5 051 with 3TF6 9 (1 packg. = 2 units)	**3TX7 696-0A**	1 packg.	2
	• between contactor and overload relay for direct mounting			
	– 3UF5 031 (1 packg. = 5 units)	**3TX7 506-0B**	1 packg.	5
	– 3UF5 041	**3TX7 536-0B**		1
	– 3UF5 051 with 3TF6 8	**3TX7 686-0B**		1
	– 3UF5 051 with 3TF6 9	**3TX7 696-0B**		1

3UF5

Technical data

3UF5 0 basic unit 3UF5 1 expansion unit 3UF5 2 control module	
Permissible ambient temperature in °C	–25 ... +60
Permissible storage temperature in °C	–40 ... +80
Installation altitude above sea-level in m	up to 2000
Degree of protection (to IEC 60 529)	IP 20 max. operational current $I_e \leq 100$ A; IP 00 max. operational current $I_e > 100$ A
Shock resistance (sine pulse)	10 g/5 ms
Mounting position	any
Mounting	
• max. operational current $I_e \leq 100$ A	Snapping onto 35 mm standard rail or screw mounting with push-in lugs.
• max. operational current $I_e > 100$ A	screw mounting directly onto contactor or screw mounting
EMC interference immunity	
• Line-induced interference, burst to IEC 61 000-4-4	2 kV (corresponds to degree of severity 3)
• Line-induced interference, surge to IEC 61 000-4-5	2 kV (corresponds to degree of severity 3)
• Electrostatic discharge to IEC 61 000-4-2	8 kV (corresponds to degree of severity 3)
• Field-related interference to IEC 61 000-4-3	10 V/m (corresponds to degree of severity 3)
EMC emitted interference	Emission limit class B to DIN VDE 0875 Part 11/ EN 55 011
Safe isolation to DIN VDE 0100 / 0106 / 0160 (from product version 12, start of delivery: 01/2000)	All circuits in SIMOCODE-DP are safely isolated from each other, i.e. implemented with double leakage and clearance paths. Power circuit from the control/electronic circuits:safe isolation up to 690 V or 1000 V between control and electronic circuits: safe isolation up to 300 V Observe notes of test report, 'Safe Isolation' No. 1610a.

Technical data

3UF5 0 basic unit			
Displays			
• green LED "Ready"	steady light: "Operational" Off: "No control supply voltage" or "Function test was negative; device is locked"		
• green LED "Bus"	steady light: "Bus operation"		
• red LED "General Fault"	steady light/flashing light "Branch fault", e.g. overload tripping		
ButtonsTest/Reset	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			
Insulation rating U_i (at pollution degree 3) in V			
• for uninsulated conductors (3UF5 001 to 3UF5 021)	690		
• for insulated conductors (3UF5 001 to 3UF5 021)	1000		
• for uninsulated and insulated conductors (3UF5 031 to 3UF5 051)	1000		
Rated impulse withstand voltage U_{imp} in kV			
• 3UF50 001 to 3UF50 021	6		
• 3UF5 031 to 3UF5 051	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 through-openings (max. I_e = 100 A) in mm			
• Devices with max. operational current $I_e \leq 25$ A	10		
• Devices with max. operational current $I_e \leq 100$ A	15		
• Devices with max. operational current I_e >100 A	Construction with connecting bars		
Bar connection			
• Current range in A	50 ... 205	125 ... 500	200 ...820
• Tightening torque in Nm	M 8: 10 ... 14	M 10: 14 ... 24	M 10: 14 ... 24 M 12: 20 ... 35
• finely stranded cable lug in mm²	35 ... 95	50 ... 240	50 ... 240
• stranded with cable lug in mm²	50 ... 120	70 ... 240	70 ... 240

3UF5

Technical data

Auxiliary circuit/control circuit		
Rated control supply voltage U_s	AC 50/60 Hz 115 V and 230 V	DC 24 V
Operating range	AC 50/60 Hz 0.85 ... 1.1 × U_s	DC 24 V 0.85 ... 1.2 × U_s (DIN 19 240)
Power consumption	50/60 Hz AC, 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	4 monostable/bistable outputs depending on the variant	
• Auxiliary contacts of the 4 outputs	NC response can be parameterized by means of internal signal conditioning, whereby 3 outputs are connected to a common potential and 1 is connected to a separate potential; they can be freely assigned to the control functions (e.g. for activating the mains, star and delta contactors and sigalling the operational status)	
• Specified short-circuit protection for auxiliary contacts (outputs)	Fuse inserts for utilization category gL/gA 6A, quick 10 A; miniature circuit breaker 1.6 A, C characteristic	
Continuous rated current in A	5	
Rated operational 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 (PTC temperature sensor)		
• Total cold resistance in kΩ	1.5	
• Response threshold in kΩ	2.7 ... 3.1	
• Return value in kΩ	1.5 ... 1.65	
Conductor cross-sections		
• Tightening torque in Nm	0.8 ... 1.2	
• solid and stranded in mm²	1 × (0.5 ... 4.0); 2 × (0.5 ... 2.5)	
• finely stranded with/without end sleeve in mm²	1 × (0.5 ... 2.5); 2 × (0.5 ... 1.5)	
3UF5 1 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	4 bistable outputs	
• Auxiliary contacts of the 4 outputs	each with 1 floating NO contact, NC response can be parameterized by means of internal signal conditioning, whereby 3 outputs are connected to a common potential and 1 is connected to a separate potential; they can be freely assigned to the control functions (e.g. for activating the mains, star and delta contactors and sigalling the operational status)	
• Specified short-circuit protection for auxiliary contacts (outputs)	Fuse links, utilisation category gL/gA 6 A, quick-acting 10 A; Circuit-breaker, 1.6 A, C characteristic	
Continuous rated current in A	5	
Rated operational 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	0.8 ... 1.2	
• solid and stranded in mm²	1 × (0.5 ... 4.0); 2 × (0.5 ... 2.5)	
• finely stranded with/without end sleeve in mm²	1 × (0.5 ... 2.5); 2 × (0.5 ... 1.5)	
3UF5 2 control module		
Displays		
• green LED "Ready"	steady light: "Operational" Off: "No control supply voltage" or "Function test was negative; device is locked"	
• red LED "General Fault"	steady light/flashing light "Branch fault", e.g. overload tripping	
• 3 green and 3 yellow LEDs	branch-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	

Technical data

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

Overload relay	Contactor	CLASS																Fuse links [3]					
		5 and 10 Rated operational current I_e AC-3 in A at ... V			15			20			25			30			LV HRC DIAZED NEOZED Utilization category gL (gG)	Type 3NA Type 5SB Type 5SE	LV HRC Type 3ND aM	British Standard fuses BS88 Type T	U_L-listed fuses RK5	
		400	500	690	400	500	690	400	500	690	400	500	690	400	500	690	Type of coordination [2]					
																	1	2	2	2	acc. to UL508	2
Setting range 1.25 to 6.3 A																							
3UF5 00	3RT1 015	6.3	5.0	4.0	6.3	5.0	4.0	6.3	5.0	4.0	6.3	5.0	4.0	6.3	5.0	4.0	35	20		20	25	–
	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	35	20		20	25	–
	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	35	20		20	25	–
Setting range 6.3 to 25 A																							
3UF5 01	3RT1 015	7.0			7.0			7.0			7.0			7.0			35	20		20	60	–
	3RT1 016	9.0	6.5		9.0	6.5		9.0	6.5		9.0	6.5		9.0	6.5		35	20		20	60	–
	3RT1 017	12.0	9.0	6.3	11.0	9.0	6.3	10.0	9.0	6.3	9.5	9.0	6.3	9.0	9.0	6.3	35	20		20	60	–
	3RT1 024	12.0	12.0	9.0	12.0	12.0	9.0	12.0	12.0	9.0	12.0	12.0	9.0	12.0	12.0	9.0	63	25	20	25	70	–
	3RT1 025	17.0	17.0	13.0	17.0	17.0	13.0	16.0	16.0	13.0	15.0	15.0	13.0	14.0	14.0	13.0	63	25	20	25	70	–
	3RT1 026	25.0	18.0	13.0	18.0	18.0	13.0	16.0	16.0	13.0	15.0	15.0	13.0	14.0	14.0	13.0	100	35	20	35	100	–
	3RT1 034	25.0	25.0	25.0	25.0	25.0	25.0	22.3	22.3	22.3	20.3	20.3	20.3	19.1	19.1	19.1	125	63	50	63	100	–
	3RT1 035							25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	125	63	50	63	100	–
Setting range 25 to 100 A																							
3UF5 02	3RT1 034	32.0	32.0		25.5	25.5											125	63	50	63	125	–
	3RT1 035	40.0	40.0		33.0	33.0		29.4	29.4		28.0	28.0		26.5	26.5		125	63	50	63	150	–
	3RT1 036	50.0	50.0		38.5	38.5		32.7	32.7		29.4	29.4		26.5	26.5		160	80	50	80	200	–
	3RT1 044	65.0	65.0	47.0	56.0	56.0	47.0	49.0	49.0	47.0	45.0	45.0	45.0	41.7	41.7	41.7	250	125	63	125	250	–
	3RT1 045	80	80	58	61	61	58	53	53	58	47	47	47	45	45	45	250	160	80	160	250	–
	3RT1 046	95	95	58	69	69	58	59	59	58	53	53	53	50	50	50	250	160	100	160	350	–
	3RT1 054	115	115	115	93	93	93	82	82	82	75	75	75	69	69	69	355	315	160	160	–	175
	3RT1 055	150	150	150	122	122	122	107	107	107	98	98	98	90	90	90	355	315	200	200	–	200
	3RT1 056	185	185	170	150	150	150	131	131	131	120	120	120	111	111	111	355	315	200	250	–	200
Setting range 50 to 205 A																							
3UF5 03	3RT1 054	115	115	115	93	93	93	82	82	82	75	75	75	69	69	69	355	315	160	160	-	175
	3RT1 055	150	150	150	122	122	122	107	107	107	98	98	98	90	90	90	355	315	200	200	-	200
	3RT1 056	185	185	170	150	150	150	131	131	131	120	120	120	111	111	111	355	315	200	250	-	200
	3RT1 064	225	225	225	182	182	182	160	160	160	146	146	146	135	135	135	500	400	250	250	-	300
	3RT1 065	265	265	265	215	215	215	188	188	188	172	172	172	159	159	159	500	400	315	355	-	300
	3RT1 066	300	300	280	243	243	243	213	213	213	195	195	195	180	180	180	500	400	315	400	-	300
	3RT1 075	400	400	400	324	324	324	284	284	284	260	260	260	240	240	240	630	400	400	450	-	400
	3RT1 264	225	225	225	225	225	225	225	225	225	194	194	194	173	173	173	500	500	400			
	3RT1 265	265	265	265	265	265	265	265	265	265	228	228	228	204	204	204	500	500	400			
	3RT1 266	300	300	300	300	300	300	300	300	300	258	258	258	231	231	231	500	500	400			
	3RT1 275	400	400	400	400	400	400	400	400	400	344	344	344	308	308	308	800	800	630			
Setting range 125 to 500 A																							
3UF5 04	3RT1 056	185	185	170	150	150	150	131	131	131	120	120	120	111	111	111	355	315	200	250	–	200
	3RT1 064	225	225	225	182	182	182	160	160	160	146	146	146	135	135	135	500	400	250	315	–	300
	3RT1 065	265	265	265	215	215	215	188	188	188	172	172	172	159	159	159	500	400	315	355	–	300
	3RT1 066	300	300	280	243	243	243	213	213	213	195	195	195	180	180	180	500	400	315	400	–	300
	3RT1 075	400	400	400	324	324	324	284	284	284	260	260	260	240	240	240	630	500	500	500	–	400
	3RT1 076	500	500	450	405	405	405	355	355	355	325	325	325	300	300	300	630	630	630	630	–	400
	3RT1 264	225	225	225	225	225	225	225	225	225	194	194	194	173	173	173	500	500	400			
	3RT1 265	265	265	265	265	265	265	265	265	265	228	228	228	204	204	204	500	500	400			
	3RT1 266	300	300	300	300	300	300	300	300	300	258	258	258	231	231	231	500	500	400			
	3RT1 275	400	400	400	400	400	400	400	400	400	344	344	344	308	308	308	800	800	630			
	3RT1 276	500	500	500	500	500	500	500	500	500	430	430	430	385	385	385	800	800	630			
	3TF6 8	500	500	500	500	500	500	440	440	440	408	408	408	376	376	376	800	500 [4]	630	500	–	1200
	3TF6 9							500	500	500	500	500	500	500	500	500	800	630 [4]	630	500	–	CLASS L
Setting range 200 to 820 A																							
3UF5 05	3TF6 8 [1]	630	630	630	502	502	502	440	440	440	408	408	408	376	376	376	1000	500 [4]	630	500	–	1200
	3TF6 9 [1]	820	820	820	662	662	662	572	572	572	531	531	531	500	500	500	1250	630 [4]	630	630	–	CLASS L

1) Mounting onto contactor is possible.

2) Type of coordination and short-circuit protection devices according to IEC 947-4-1/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 need to be suitable for further operation without repair and the renewal of parts.
- 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.

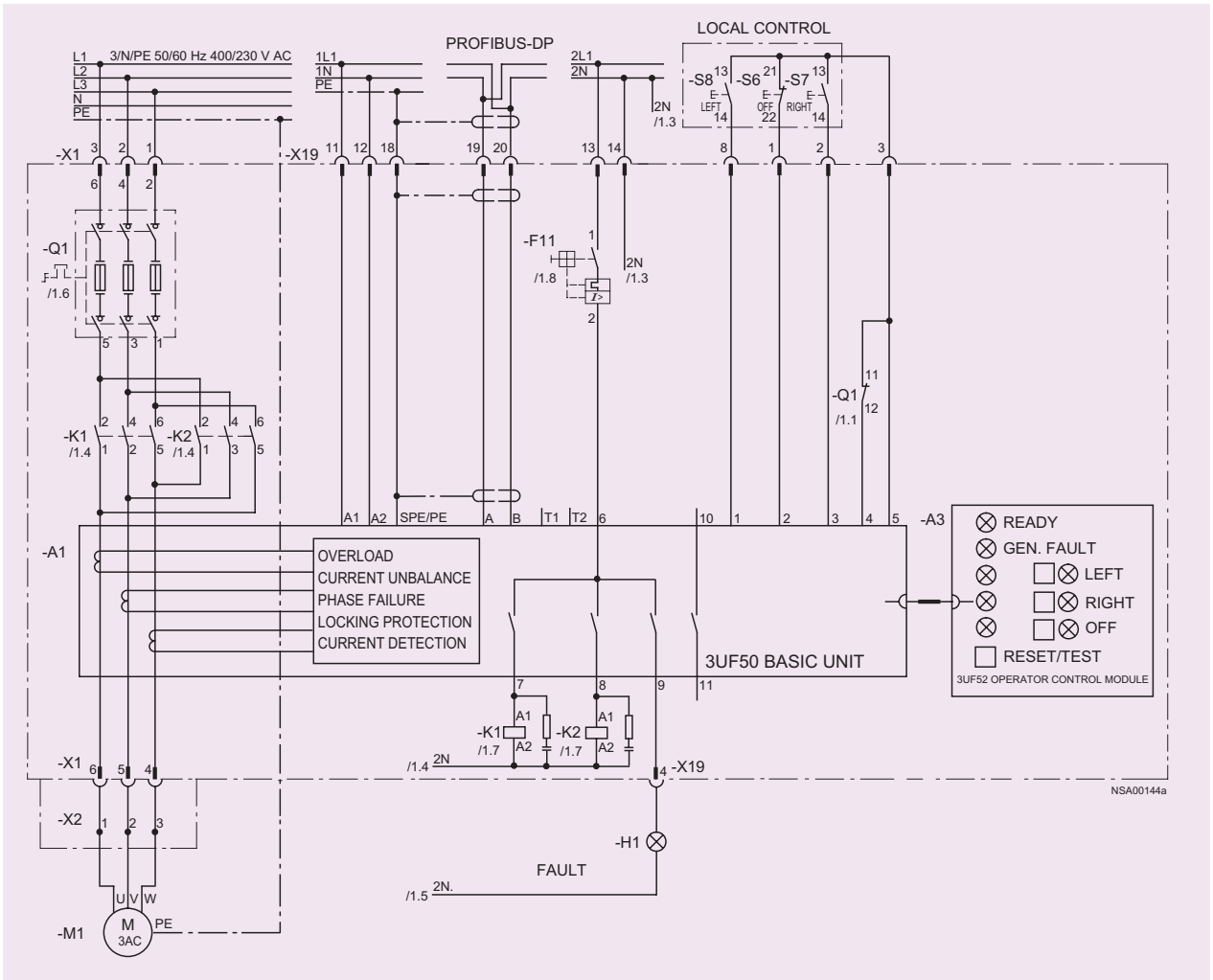
3) Observe operating voltage.

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

3UF5

Circuit diagrams

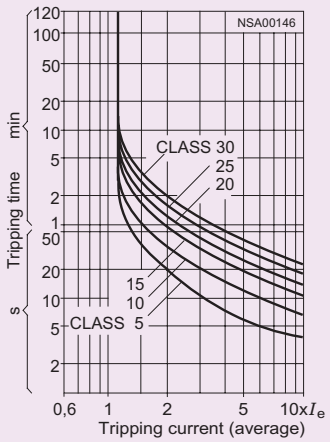
Reversing starter circuit with SIMOCODE-DP



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.

Characteristics

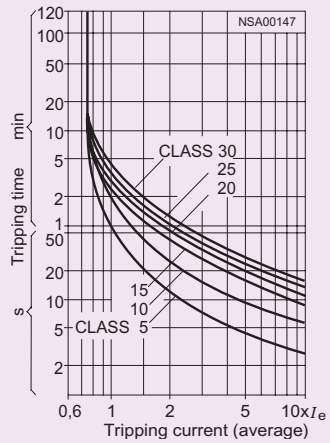
Tripping characteristic for 3-pole loading



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

In case of preloading the device with 100 % of the current setting, the tripping times are reduced (see characteristic NSA00146).

Tripping characteristic for 2-pole loading

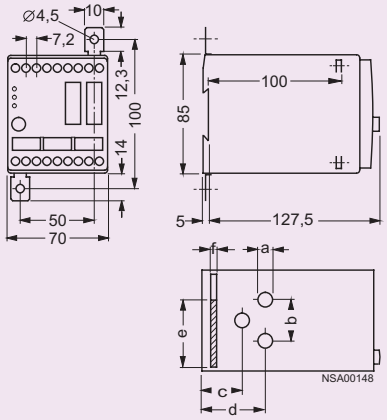


With 2-pole load (phase failure) or in case of a current unbalance > 40 % of the current setting, characteristic NSA00147 is applicable.

3UF5

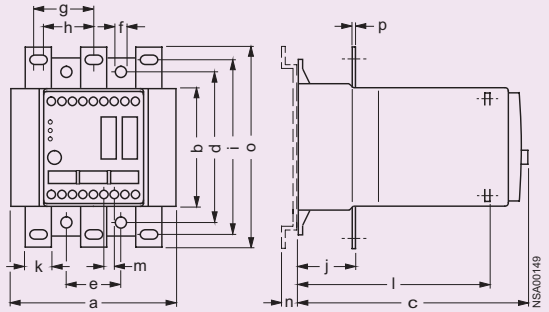
Dimension drawings

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



	a	b	c	d	e	f
3UF5 001	10	34	29	46	–	–
3UF5 011	10	34	29	46	48	4
3UF5 021	15	29	24	47	48	4

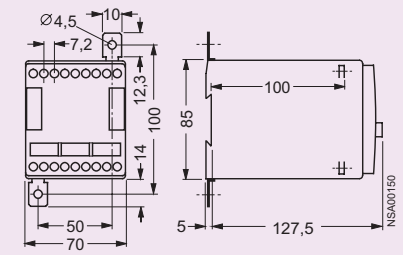
3UF5 031, 3UF5 041 and 3UF5 051 basic units



	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