

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

3UF5011-3AN00-1

MOTOR MANAGEMENT BASIC UNIT

Used with the applicable SIMATIC industrial automation configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens official manufacturer document: 3UF5011-3AN00-1.pdf

SIEMENS

3UF5 SIMOCODE-DP System Motor Protection and Control Device



Manual

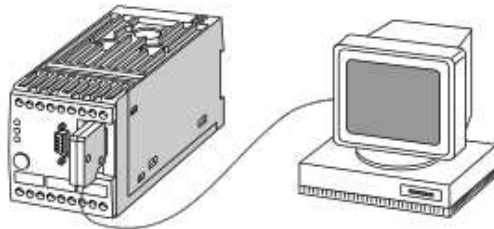
Order No.: 3UF57 00-0AA00-1

Contents

Figures	v
Tables	ix
Introduction and Notes on the Manual	xiii
1 A Description of the System	1-1
1.1 Philosophy behind the SIMOCODE-DP 3UF5 system	1-2
1.2 Overview	1-7
1.3 Components of the SIMOCODE-DP system	1-9
1.4 System configurations	1-10
1.5 Summary of functions	1-11
1.6 Structural design of the SIMOCODE-DP system	1-12
2 The 3UF50 Basic Unit.	2-1
2.1 Description	2-2
2.2 Summary of functions	2-3
2.3 Outputs	2-4
2.4 Inputs	2-5
2.5 Protection functions	2-7
2.5.1 Current-dependent motor protection	2-7
2.5.2 Current Limit Value / Blocking Protection	2-16
2.5.3 Earth Fault Detection	2-17
2.5.4 Thermistor Motor Protection	2-19
2.6 Branch control	2-21
2.6.1 Control and motor protection block	2-21
2.6.2 Information data block	2-22
2.6.3 Description of the Control Stations	2-23
2.6.4 Description of the Control Functions	2-27
2.6.5 Description of the Function Block Inputs	2-47
2.6.6 Test / status LEDs	2-50
2.7 Logic modules	2-52
2.7.1 Signal Matching	2-52
2.7.2 Non-Resetting Elements on Power Loss	2-53
2.7.3 Truth Table 3I / 1O	2-54
2.7.4 Truth Table 5I / 2O	2-57
2.7.5 Flash /Flicker	2-59
2.7.6 Timers	2-60
2.7.7 Counters	2-61
3 The 3UF51 Expansion Module	3-1
3.1 Description	3-2
3.2 Summary of functions for Expansion Module	3-2
3.3 Inputs	3-3
3.4 Outputs	3-4

1.4 System configurations

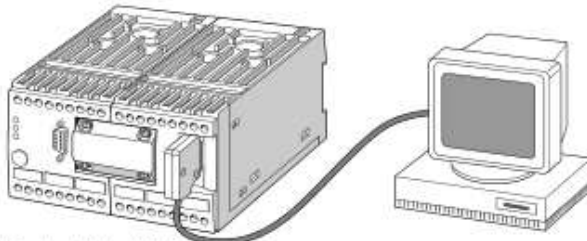
System configuration 1: Minimum configuration



The minimum configuration is sufficient to enable you to implement all available control functions.

Basic Unit (BU) PC / Programming Unit (PU)

System configuration 2:



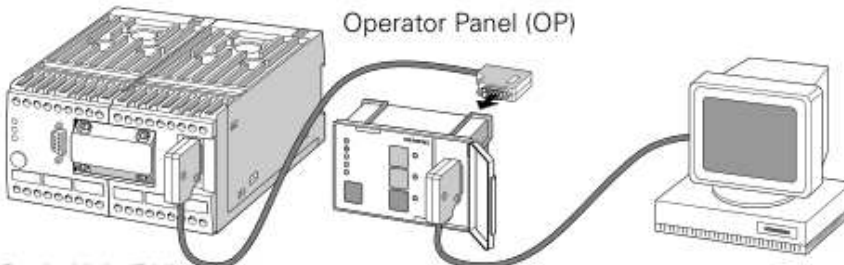
Basic Unit (BU)
Expansion Module (EM) PC / Programming Unit (PU)

System configuration 3:



Basic Unit (BU) Operator Panel (OP) PC / Programming Unit (PU)

System configuration 4:



Basic Unit (BU)
Expansion Module (EM) Operator Panel (OP) PC / Programming Unit (PU)

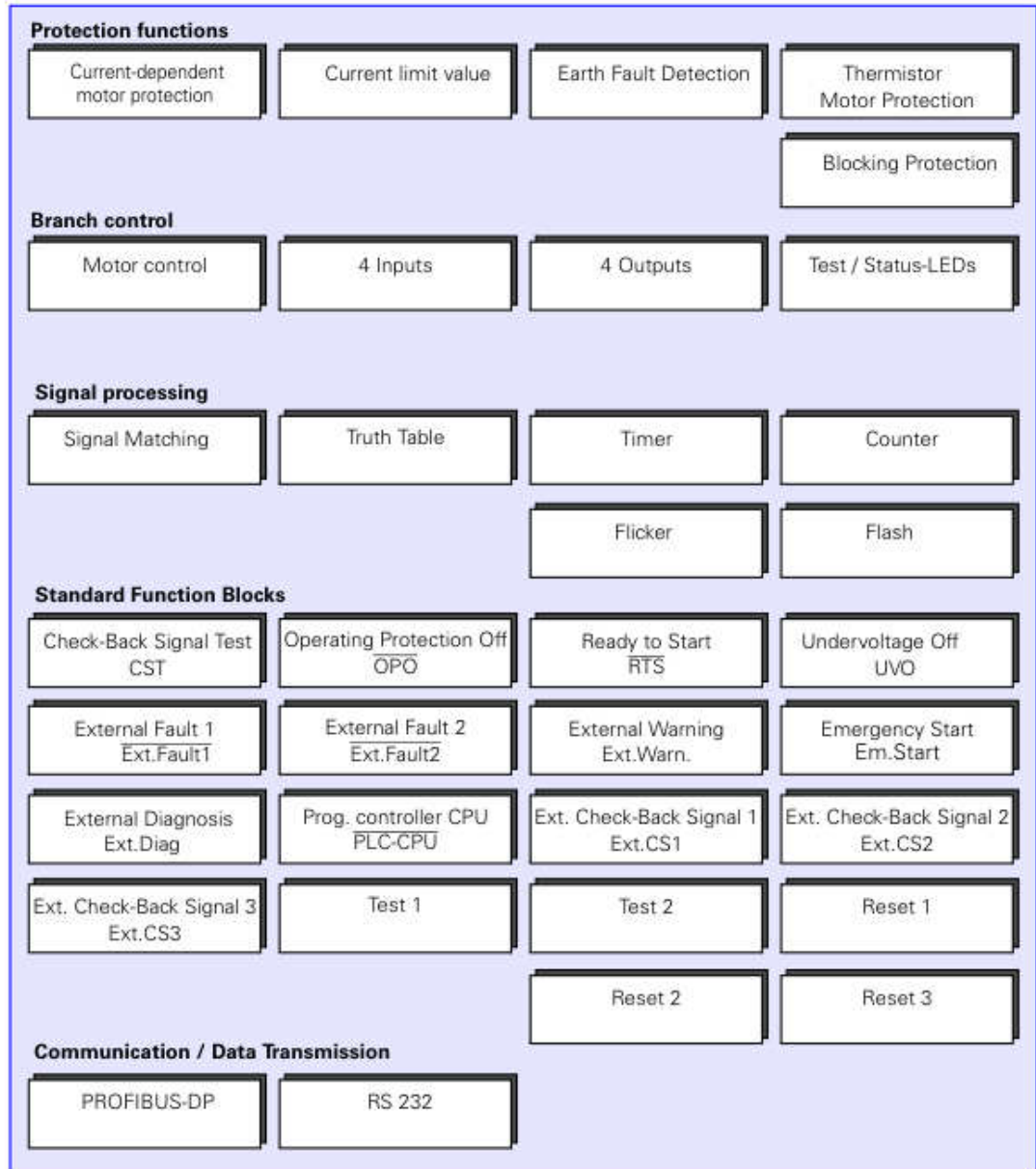
Fig. 8: System configurations

1.5 Summary of functions

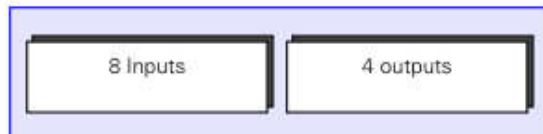
Diagram

Summary of functions SIMOCODE-DP system:

Basic Unit



Expansion Module



Operator Panel



Fig. 9: Summary of functions

1.6 Structural design of the SIMOCODE-DP system

Free elements	As the motor branches differ in terms of protection and control functions from one set of switchgear to another, all elements in the SIMOCODE-DP system are free.
What does free mean?	Free means that the inputs and outputs can be assigned to the various elements such as – the Control and motor protection block, – the Function Blocks, – the Logic Modules etc. This occurs in accordance with the requirements of the installation-specific motor branch.
Structural design	The figure on page 1-13 shows the structural design of the system with its free elements in the form of a block diagram: 1. The four outputs of the 3UF50 Basic Unit. 2. The process data (signal bits) that are transmitted from the SIMOCODE-DP to the PROFIBUS-DP master. There are three different base types. 3. The logic modules for Signal Matching, Truth Tables, Timers and Counters. 4. The Control Stations, Auxiliary Control inputs, Contactor Controls, Function Blocks. 5. The four buttons, the three green and three yellow LEDs of the 3UF52 Operator Panel. 6. The four inputs of the 3UF50 Basic Unit. 7. The process data (control bits) that are transmitted from the PROFIBUS-DP master to the SIMOCODE-DP. 8. The eight inputs and four outputs of the 3UF51 Expansion Module.
Plugs and sockets	You will see that all of the elements have plugs  and sockets : you can connect the individual free elements to each other by parameterization. A socket  can be used as many times as required, a plug  just once.



The 3UF50 Basic Unit

Section	Topic	Page
2.1	Description	2-2
2.2	Summary of functions	2-3
2.3	Outputs	2-4
2.4	Inputs	2-5
2.5	Protection functions	2-7
2.5.1	Current-dependent motor protection	2-7
2.5.2	Current Limit Value / Blocking Protection	2-16
2.5.3	Earth Fault Detection	2-17
2.5.4	Thermistor Motor Protection	2-19
2.6	Branch control	2-21
2.6.1	Control and motor protection block	2-21
2.6.2	Information data block	2-22
2.6.3	Description of the Control Stations	2-23
2.6.4	Description of the Control Functions	2-27
2.6.5	Description of the Function Block Inputs	2-47
2.6.6	Test / status LEDs	2-50
2.7	Logic modules	2-52
2.7.1	Signal Matching	2-52
2.7.2	Non-Resetting Elements on Power Loss	2-53
2.7.3	Truth Table 3I / 1O	2-54
2.7.4	Truth Table 5I / 2O	2-57
2.7.5	Flash /Flicker	2-59
2.7.6	Timers	2-60
2.7.7	Counters	2-61

2.1 Description

Front

The following diagram shows the front of the Basic Unit, e.g. a 230 V version.

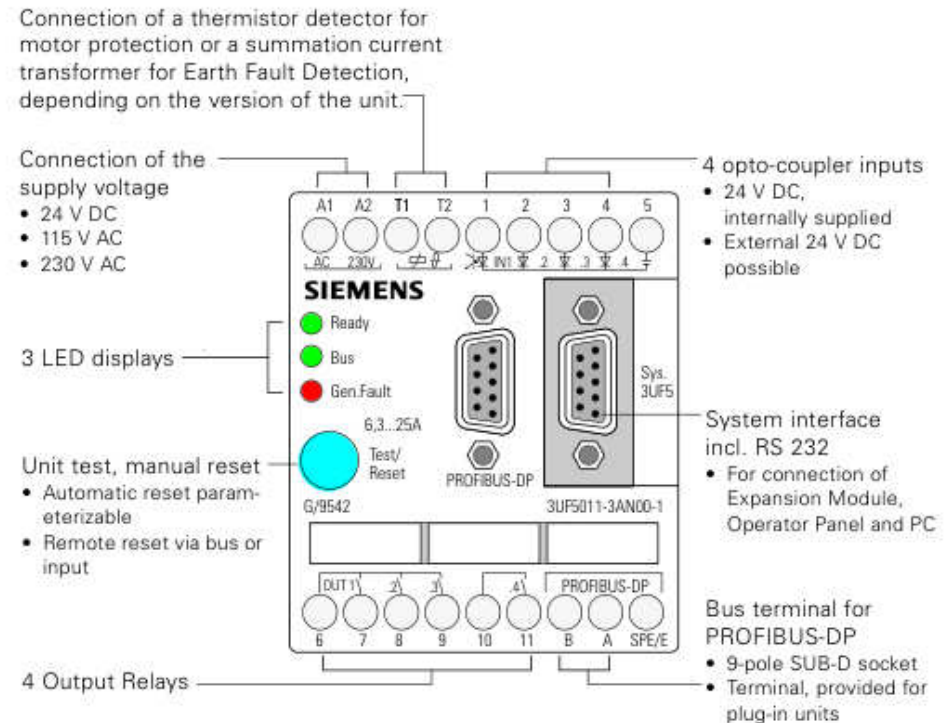


Fig. 11: Front of Basic Unit

2.2 Summary of functions

Diagram

The following diagram contains a summary of the functions performed by the 3UF50 Basic Unit:

Basic Unit

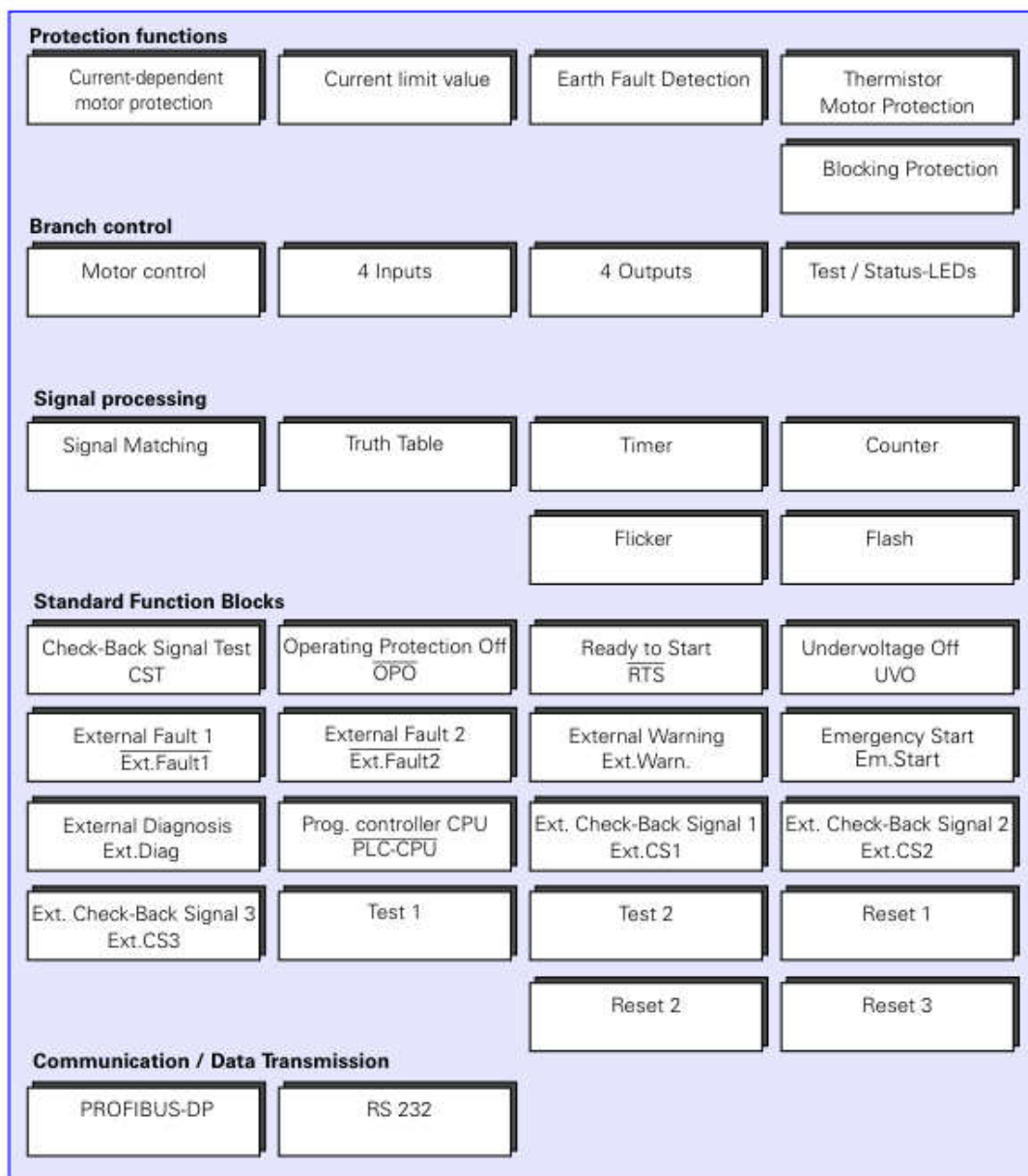


Fig. 12: Summary of functions performed by the Basic Unit

2.3 Outputs

Description of functions

The Basic Unit has 4 Output Relays with which, for example, you can operate contactors or lamps.

Bistable behaviour

If the status of the Output Relays is to be retained when the supply voltage is cut off, you have to select the 3UF..-3.10-1 version of the unit (bistable behaviour).

Then, you have to set the parameters for

- "Response - 3UF50 CPU Fault" and
- "Response - Control Voltage Fault" to "Retain Status".

Diagram

The following diagram shows the Output Relays.

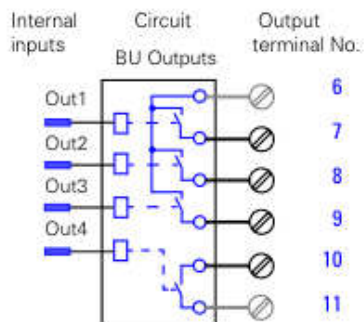


Fig. 13: Diagram of Output Relays for Basic Unit

2.4 Inputs

Description of functions

The Basic Unit has 4 inputs with which you can interrogate mechanical contacts or detectors.

Examples

If you wish, you can wire up the START and STOP keys of the Local Control to the inputs, and assign the internal control to "local".

With the signals, you can, for example, activate Function Blocks such as "Reset" or "Ready to Start (RTS)" by appropriate assignment of the inputs.

Schema

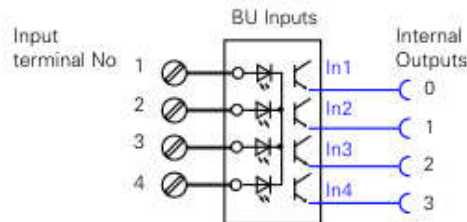


Fig. 14: Diagram of the Inputs for Basic Unit

Input delay

For reasons of interference immunity, you can set a debounce time for the inputs.

Voltage supply

- internal 24 V DC supply, if you are using *mechanical* contacts
- external 24 V DC supply, if you are using *solid-state* sensors (e.g. limit switches for level measurements). Input 1 is the reference potential, i.e. three inputs are available to you.
- external 24 V DC, if you are using *mechanical* contacts. A2 is the reference potential, i.e. there are four inputs available (only 24 V DC versions of the unit).

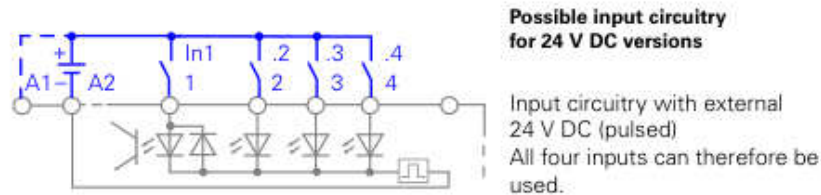
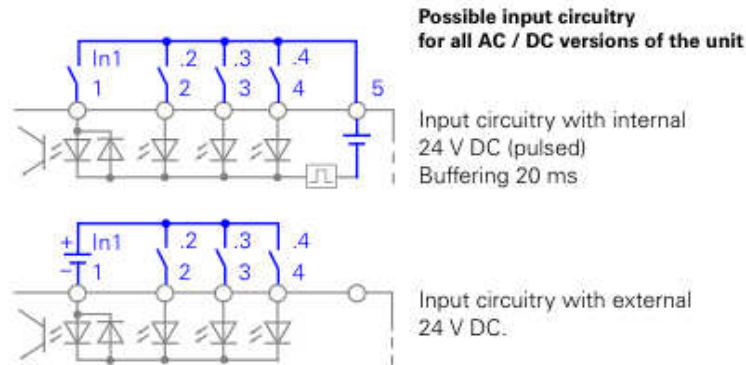


Fig. 15: Diagram of input circuitry

Note

The internal 24 V DC voltage supply must be used for the inputs of the Basic Unit only.

Cable lengths

Further information about cable lengths is given in the appendix, page C-5.

2.5 Protection functions

2.5.1 Current-dependent motor protection

Description of functions

The SIMOCODE-DP protects motors and load branches against Overload, phase failure and Current Asymmetry by means of stored current-time functions (tripping characteristic) in the range from 0.25 A to 820 A. In the event of an Overload, the SIMOCODE-DP reacts either

- by turning off the Contactor Controls or
- with a signal,

depending on the setting you have entered.

Current Detection

The Basic Unit detects the current of three-phases with the help of the integrated current transformer.

The Basic Unit detects Asymmetries above approximately 40 % and phase failures.

Lowest Current Detection limit

The Lowest Current Detection limit is 20% of the minimum set value.

Example: Basic Unit 3UF5001-3...0-1 setting range 1.25 A to 6.3 A

Minimum set value 1.25: Minimum detectable current: 0.25 A (20%)

Accuracy of Current Detection

The accuracy of Current Detection is 5% within the setting range.

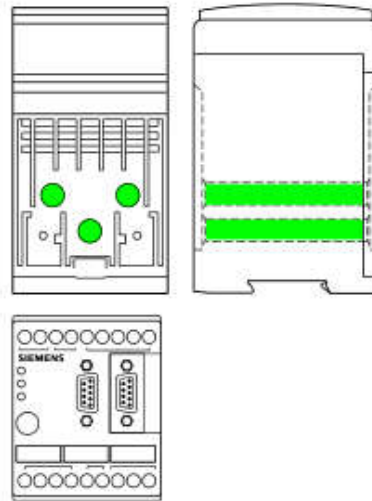
Current Detection with SIMOCODE-DP

Assembly method

You have to select the unit with an assembly method which corresponds to the size of the Motor Current.

- Penetration method up to 100 A
- Bus connection method from 50 A to 820 A, also for direct mounting on Siemens contactors.

Penetration method



Bus connection method

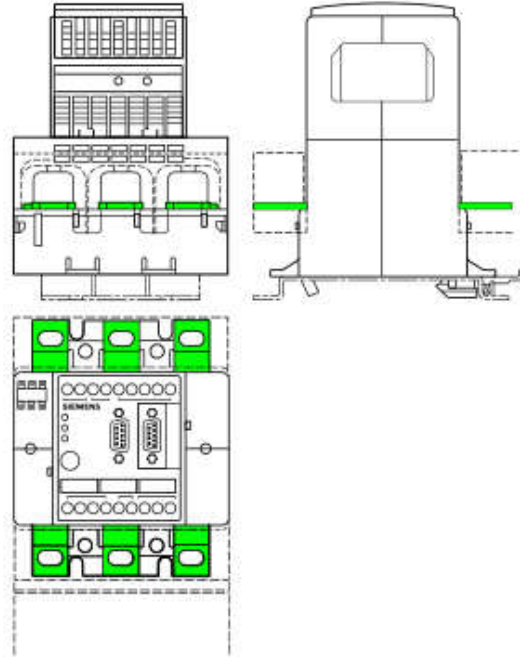


Fig. 16: Method of assembly