

# SIPROTEC4

## Multifunctional machine protection 7UM61

Communication module

PROFIBUS-DP  
Bus mapping

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Although we have checked the contents of this publication for conformance with the hardware and software described we cannot guarantee complete conformance since differences cannot be ruled out.

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# Preface

## Contents of this manual

The manual is divided into the following topics:

- Data in the PROFIBUS-DP messages
- Message in output direction: PROFIBUS-DP master to the 7UM61
- Message in input direction: 7UM61 to the PROFIBUS-DP master

## Additional literature

This manual describes the data in the PROFIBUS-DP messages of the SIPROTEC devices 7UM61.

The following additional manuals inform you about the data types, bus specific parameters and hardware of the PROFIBUS-DP slave modul and the function, operation, assembly and commissioning of the SIPROTEC device 7UM61:

| <i>Manual</i>  | <i>Contents</i>   | <i>Order number</i>                  |
|--|---|--------------------------------------|
| Multifunctional machine protection<br>SIPROTEC 7UM61                         | Function, operation, assembly and commissioning of the SIPROTEC device 7UM61  | C53000-G1140-C127-1                  |
| 7SJ61...7SJ63, 7SJ65, 7UM61, 6MD63<br>PROFIBUS-DP -<br>Communication profile | Data types, bus specific parameters and hardware description of the PROFIBUS-DP slave modul of the SIPROTEC devices | <a href="#">C53000-L1840-B001-02</a> |

The PROFIBUS-DP specification and the structure of the PROFIBUS-DP messages are defined in the European standard EN 50170:

- PROFIBUS Specification  
Normative Parts of PROFIBUS-FMS, -DP., -PA  
According to the European Standard  
EN 50170 Volume 2  
Edition 1.0, May 1998  
PROFIBUS Nutzerorganisation e.V.  
Order-No. 0.032 or 0.042 on CD ROM

**Notes to this manual**

This manual provides you with the following aids to make it easier to locate the information you are looking for:

- At the beginning of this manual you will find a complete table of contents plus separate lists of figures and tables contained in this manual.
- In the individual chapters, you will find information in the left margin of each page which will give you an overview of the contents of that particular paragraph.
- Following the last chapter of this manual, you will find a glossary containing definitions of technical terms and abbreviations used in this manual.
- At the end of this manual, you will find a comprehensive index for fast access to the information you need.

**Validity**

This manual is valid for

- SIPROTEC devices 7UM61 with:
  - firmware version 4.0 or higher and
  - PROFIBUS-DP communication module version 01.03.01 or higher.

For device parameterization **DIGSI version 4.2 or higher** has to be used.

**Training courses**

See our catalog of courses for a list of available courses or contact our Training center in Nuremberg.

**Questions**

If you have questions to the SIPROTEC devices, contact your Siemens representative.

# Revision index

| <b><i>Modified chapters /<br/>pages</i></b> | <b><i>Edition</i></b> | <b><i>Reasons of modification</i></b>  |
|---|-----------------------|--|
|   | 1.0                   | First edition, Doc.-No.: C53000-L1840-B005-02<br>Oct 25 <sup>th</sup> , 2000   |
| Chap. 1.2                                   | 1.1                   | Parameterization of the PROFIBUS-DP master: Order numbers of the<br>modules in output direction corrected<br>Sept 5 <sup>th</sup> , 2001 |
|   |                       |  |



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# Data in the PROFIBUS-DP messages

# 1

## 1.1 Explanation



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### Note

The examples shown in this chapter 1.1 do not necessarily correspond to the real allocation of the objects in the bus mapping.

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The chapters 2 and 3 define the data area of the PROFIBUS-DP messages for data transfer between the PROFIBUS-DP slave of the SIPROTEC device 7UM61 and the PROFIBUS-DP master.

The listed SIPROTEC objects in the PROFIBUS-DP message data area are sorted after byte offset, beginning with 0.

### Variables with data type greater than or equal to 1 byte

The offset defines the start of the most significant byte in the message, e.g.:

| <i>Offset</i> | <i>Designation of the SIPROTEC objects</i> | <i>Comments</i>    | <i>Scaling (32767 corresponds to ...)</i> | <i>Internal object no.</i> |
|---------------|--|--------------------|---|----------------------------|
| 14            | la   | Current in phase A | 327,67%                                   | 601                        |

The measured value "la" is assigned to data byte 14 (most significant byte of the measured value) and data byte 15 (least significant byte of the measured value) in the PROFIBUS-DP message.

**Bit variables  
(SP/SC, DP/DC)**

The offset indicates the byte, which contains the bit value and the position of bit 0 of the bit variable, e.g. (input message):

| Offset | Designation of the SIPROTEC objects         | Comments                              | Internal object no. |
|--------|---|---------------------------------------|---------------------|
| 0/0    | CFC-Incoming annunciation 1 (UsCfcSpl1) OFF | Tagging ON/OFF, released as CFC input | -                   |
| 0/1    | CFC-Incoming annunciation 1 (UsCfcSpl1) ON  |                                       |                     |
| 12/6   | FAIL: Trip cir.                             | 1 = 74TC Failure Trip Circuit         | 6865                |

The control of the "CFC-Incoming annunciation 1" (control using two bits of the PROFIBUS-DP output message) is carried out via data byte 0, bit positions  $2^0$  (bit 0) and  $2^1$  (bit 1).

The single-point indication " FAIL: Trip cir." is located in byte 12, bit position  $2^6$ .




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The definitions of data types (single-point indication, measured value etc.) are contained in the manual "7SJ61...7SJ63, 7SJ65, 7UM61, 6MD63 PROFIBUS-DP - Communication profile" (ref. to page i).

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## 1.2 Configuration data of the standard mappings for the 7UM61

There are three standard mappings (standard mapping 2-1 to standard mapping 2-3) available for the SIPROTEC device 7UM61 which differ in the available data size in the PROFIBUS-DP messages.



The description of the standard mappings contains the pre-allocation of the mapping files at delivery or first assignment of a mapping in DIGSI to the SIPROTEC device.

Changes of the allocation and the scaling of the measured values are possible in adaptation to the concrete installation environment. You find information about this in the manual "7SJ61...7SJ63, 7SJ65, 7UM61, 6MD63 PROFIBUS-DP - Communication profile" (ref. to page i).

### Standard mapping 2-1

The *standard mapping 2-1* contains:

- all annunciations, commands, measured values and metered measurands listed in chap. 2 and 3.

### Standard mapping 2-2

The *standard mapping 2-2* contains:

- output direction: commands/annunciations,
- input direction: annunciations and measured values.

Unlike the standard mapping 2-1 there are no measured values in output direction and no metered measurands in input direction contained in the standard mapping 2-2.

### Standard mapping 2-3

The *standard mapping 2-3* contains:

- exclusively annunciations.

Unlike the standard mapping 2-1 there are no measured values in output direction as well as no measured values and metered measurands in input direction contained in the standard mapping 2-3.

### PROFIBUS-DP configuration data

- Standard mapping 2-1:* **1FH 1FH 1FH 13H 27H**  
(52 bytes input-, 8 bytes output direction)
- Standard mapping 2-2:* **1FH 1FH 13H 24H**  
(36 bytes input-, 5 bytes output direction)
- Standard mapping 2-3:* **1CH 24H**  
(13 bytes input-, 5 bytes output direction)

**PROFIBUS-DP  
master**

At the configuration of a PROFIBUS-DP slave of the SIPROTEC devices in the parameterization system of the PROFIBUS-DP masters are to select the following modules for the 7UM61 standard mappings and to allocate associated addresses in the I/O addressing range of the PROFIBUS-DP master:

*Standard mapping 2-1:*

| <b>Module</b> | <b>Order number</b> | <b>Input address</b> | <b>Output address</b> |
|---------------|---------------------|----------------------|-----------------------|
| 0             | Input – 16 Bytes    | Adr_lx               |                       |
| 1             | Input – 16 Bytes    | Adr_lx+16            |                       |
| 2             | Input – 16 Bytes    | Adr_lx+32            |                       |
| 3             | Input – 4 Bytes     | Adr_lx+48            |                       |
| 4             | Output – 8 Bytes    |                      | Adr_Ox                |

*Standard mapping 2-2:*

| <b>Module</b> | <b>Order number</b> | <b>Input address</b> | <b>Output address</b> |
|---------------|---------------------|----------------------|-----------------------|
| 0             | Input – 16 Bytes    | Adr_lx               |                       |
| 1             | Input – 16 Bytes    | Adr_lx+16            |                       |
| 2             | Input – 4 Bytes     | Adr_lx+32            |                       |
| 3             | Output – 5 Bytes    |                      | Adr_Ox                |

*Standard mapping 2-3:*

| <b>Module</b> | <b>Order number</b> | <b>Input address</b> | <b>Output address</b> |
|---------------|---------------------|----------------------|-----------------------|
| 0             | Input – 13 Bytes    | Adr_lx               |                       |
| 1             | Output – 5 Bytes    |                      | Adr_Ox                |

Adr\_lx and Addr\_Ox indicate arbitrary (as a rule even) addresses in the I/O addressing range of the PROFIBUS-DP master.

Adr\_lx (base address of the inputs) is identical with offset 0 of the PROFIBUS-DP message data of the SIPROTEC device in input direction (ref. to chap. 3).

Addr\_Ox (base address of the outputs) is identical with offset 0 of the PROFIBUS-DP message data of the SIPROTEC device in output direction (ref. to chap. 2).

**Note**

There is dependently on the PROFIBUS-DP master in addition possibly the demand to put the base address of the inputs on a value divisible by four so that accesses on the metered measurands (unsigned long values, ref. to chap. 3.3) can be correctly carried out in the PROFIBUS-DP master.

# Message in output direction: PROFIBUS-DP master to the 7UM61

# 2

The messages in PROFIBUS-DP output direction allow:

- manipulation of taggings (internal commands), which can be changed via PROFIBUS-DP and manipulation of CFC-Incoming annunciations for further logical data processing,
- transmission of measured values to the SIPROTEC device.

## 2.1 Application logic CFC

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b>  | <b>Comments</b>                       | <b>Internal object no.</b> |
|---------------|---|---------------------------------------|----------------------------|
| 0/0           | CFC-Incoming annunciation 1 (UsCfcSpl1) OFF | Tagging ON/OFF, released as CFC input | –                          |
| 0/1           | CFC-Incoming annunciation 1 (UsCfcSpl1) ON  |                                       |                            |
| 0/2           | CFC-Incoming annunciation 2 (UsCfcSpl2) OFF | Tagging ON/OFF, released as CFC input | –                          |
| 0/3           | CFC-Incoming annunciation 2 (UsCfcSpl2) ON  |                                       |                            |
| 0/4           | CFC-Incoming annunciation 3 (UsCfcSpl3) OFF | Tagging ON/OFF, released as CFC input | –                          |
| 0/5           | CFC-Incoming annunciation 3 (UsCfcSpl3) ON  |                                       |                            |
| 0/6           | CFC-Incoming annunciation 4 (UsCfcSpl4) OFF | Tagging ON/OFF, released as CFC input | –                          |
| 0/7           | CFC-Incoming annunciation 4 (UsCfcSpl4) ON  |                                       |                            |
| 1/0           | CFC-Incoming annunciation 5 (UsCfcSpl5) OFF | Tagging ON/OFF, released as CFC input | –                          |
| 1/1           | CFC-Incoming annunciation 5 (UsCfcSpl5) ON  |                                       |                            |
| 1/2           | CFC-Incoming annunciation 6 (UsCfcSpl6) OFF | Tagging ON/OFF, released as CFC input | –                          |
| 1/3           | CFC-Incoming annunciation 6 (UsCfcSpl6) ON  |                                       |                            |
| 1/4           | CFC-Incoming annunciation 7 (UsCfcSpl7) OFF | Tagging ON/OFF, released as CFC input | –                          |
| 1/5           | CFC-Incoming annunciation 7 (UsCfcSpl7) ON  |                                       |                            |
| 1/6           | CFC-Incoming annunciation 8 (UsCfcSpl8) OFF | Tagging ON/OFF, released as CFC input | –                          |
| 1/7           | CFC-Incoming annunciation 8 (UsCfcSpl8) ON  |                                       |                            |
| 2/0           | CFC-Incoming annunciation 9 (UsCfcSpl9) OFF | Tagging ON/OFF, released as CFC input | –                          |
| 2/1           | CFC-Incoming annunciation 9 (UsCfcSpl9) ON  |                                       |                            |

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b>    | <b>Comments</b>                       | <b>Internal object no.</b> |
|---------------|---|---------------------------------------|----------------------------|
| 2/2           | CFC-Incoming annunciation 10 (UsCfcSpl10) OFF | Tagging ON/OFF, released as CFC input | -                          |
| 2/3           | CFC-Incoming annunciation 10 (UsCfcSpl10) ON  |                                       |                            |
| 2/4           | CFC-Incoming annunciation 11 (UsCfcSpl11) OFF | Tagging ON/OFF, released as CFC input | -                          |
| 2/5           | CFC-Incoming annunciation 11 (UsCfcSpl11) ON  |                                       |                            |
| 2/6           | CFC-Incoming annunciation 12 (UsCfcSpl12) OFF | Tagging ON/OFF, released as CFC input | -                          |
| 2/7           | CFC-Incoming annunciation 12 (UsCfcSpl12) ON  |                                       |                            |
| 3/0           | CFC-Incoming annunciation 13 (UsCfcSpl13) OFF | Tagging ON/OFF, released as CFC input | -                          |
| 3/1           | CFC-Incoming annunciation 13 (UsCfcSpl13) ON  |                                       |                            |
| 3/2           | CFC-Incoming annunciation 14 (UsCfcSpl14) OFF | Tagging ON/OFF, released as CFC input | -                          |
| 3/3           | CFC-Incoming annunciation 14 (UsCfcSpl14) ON  |                                       |                            |
| 3/4           | CFC-Incoming annunciation 15 (UsCfcSpl15) OFF | Tagging ON/OFF, released as CFC input | -                          |
| 3/5           | CFC-Incoming annunciation 15 (UsCfcSpl15) ON  |                                       |                            |
| 3/6           | CFC-Incoming annunciation 16 (UsCfcSpl16) OFF | Tagging ON/OFF, released as CFC input | -                          |
| 3/7           | CFC-Incoming annunciation 16 (UsCfcSpl16) ON  |                                       |                            |

**Note**



The CFC-Incoming annunciations allow routing of further protection annunciations on PROFIBUS-DP, which are not contained in the standard mapping (e.g. ">Reverse Rot.", internal object number = 5145 or ">BLOCK 81-1", internal object number = 5206).

You find information about this in the manual "7SJ61...7SJ63, 7SJ65, 7UM61, 6MD63 PROFIBUS-DP - Communication profile" (ref. to page i) in the chapter "PROFIBUS-DP – Parameterization in DIGSI, Customization of the allocations".

**2.2 Internal commands**

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>               | <b>Internal object no.</b> |
|---------------|--|-------------------------------|----------------------------|
| 4/0           | Setting group A                            |                               | 53                         |
| 4/1           | Setting group A                            | Activation of setting group A |                            |
| 4/2           | Setting group B                            |                               | 54                         |
| 4/3           | Setting group B                            | Activation of setting group B |                            |
| 4/4           | <reserved>                                 |                               | -                          |
| 4/5           | <reserved>                                 |                               |                            |

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|----------|---------------------|
| 4/6    | <reserved>                          |          | -                   |
| 4/7    | <reserved>                          |          |                     |
| 5/0    | <reserved>                          |          | -                   |
| 5/1    | <reserved>                          |          |                     |
| 5/2    | <reserved>                          |          | -                   |
| 5/3    | <reserved>                          |          |                     |
| 5/4    | <reserved>                          |          | -                   |
| 5/5    | <reserved>                          |          |                     |
| 5/6    | <reserved>                          |          | -                   |
| 5/7    | <reserved>                          |          |                     |



### Changing the setting group

In order to change the setting group, the value "10" = ON must be transmitted for the corresponding pair of bits and afterwards be reset to "00" = "quiescent status" (controlled by an impulse from the PROFIBUS-DP master).

Switching ON one setting group automatically switches OFF the current active setting group. Transmission of the value "01" = OFF is insignificant for the change of the setting group and is refused by the device.

A change of the setting group is only possible via PROFIBUS-DP if the parameter **CHANGE TO ANOTHER SETTING GROUP** (parameter address = 302) has the value "Protocol".

## 2.3 Measured values




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### Note

Measured values in output direction are only available at use of standard mapping 2-1 (ref. to chap. 1.2).

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| Offset | Designation of the SIPROTEC objects | Comments                   | Scaling (32767 corresponds to ...) | Internal object no.. |
|--------|-------------------------------------|----------------------------|------------------------------------|----------------------|
| 6      | AMB.TEMP=                           | Cooling medium temperature | 327,67%                            | –                    |




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### Note

- The cooling medium temperature will be transferred in per cent (%) to the 7UM61. The protection device must be informed about the 100 % corresponding temperature using parameter **TEMPERATURE OF SCALING** (function "Thermal overload protection", parameter address = 1608).
  - The temperature value via PROFIBUS-DP is only taken into account and shown at the SIPROTEC device if the parameter **TEMPERATURE INPUT** (function "Thermal overload protection", parameter address = 1607) has the value "Profibus DP".
  - Unlike measured values in input direction the identification "Overflow" or "Invalid" is not carried out with the value –32768 (ref. to manual "7SJ61...7SJ63, 7SJ65, 7UM61, 6MD63 PROFIBUS-DP - Communication profile". If an evaluation of the measurement status of the cooling medium temperature is required then the indication **>FAIL. TEMP.INP** ("Failure: Temperature input", internal object no. = 1508), routed via a CFC incoming annunciation (ref. to chap. 2.1), is to use separately to the measured value.
-



# Message in input direction: 7UM61 to the PROFIBUS-DP master

# 3

The messages in PROFIBUS-DP input direction allow:

- transmission of annunciations, measured values and metered measurands to the PROFIBUS-DP master.

## 3.1 Annunciations



### Note

Depending on the device composition and the existing protection packages not all of the indicated protection annunciations (and corresponding PROFIBUS-DP message positions) may be available in the SIPROTEC device.

### 3.1.1 Application logic CFC

| <i>Offset</i> | <i>Designation of the SIPROTEC objects</i> | <i>Comments</i>  | <i>Internal object no.</i> |
|---------------|--|--|----------------------------|
| 0/0           | CFC-Output indication 1 (UsCfcSp01)        | Single-point indication ON/OFF, released as CFC output | –                          |
| 0/1           | CFC-Output indication 2 (UsCfcSp02)        | Single-point indication ON/OFF, released as CFC output | –                          |
| 0/2           | CFC-Output indication 3 (UsCfcSp03)        | Single-point indication ON/OFF, released as CFC output | –                          |
| 0/3           | CFC-Output indication 4 (UsCfcSp04)        | Single-point indication ON/OFF, released as CFC output | –                          |
| 0/4           | CFC-Output indication 5 (UsCfcSp05)        | Single-point indication ON/OFF, released as CFC output | –                          |
| 0/5           | CFC-Output indication 6 (UsCfcSp06)        | Single-point indication ON/OFF, released as CFC output | –                          |
| 0/6           | CFC-Output indication 7 (UsCfcSp07)        | Single-point indication ON/OFF, released as CFC output | –                          |
| 0/7           | CFC-Output indication 8 (UsCfcSp08)        | Single-point indication ON/OFF, released as CFC output | –                          |



### Note

The CFC-Output indications allow configuration of further protection annunciations with PROFIBUS-DP, which are not contained in the standard mapping.

### 3.1.2 Diagnosis

| Offset | Designation of the SIPROTEC objects | Comments   | Internal object no. |
|--------|-------------------------------------|--|---------------------|
| 1/0    | Device OK                           | 1 = Update of the device replica in the SIPROTEC device completed after initial start or restart   | 51                  |
| 1/1    | ProtActive                          | 1 = At least one protection function is active   | 52                  |
| 1/2    | Error Sum Alarm                     | 1 = Error with a summary alarm ON  | 140                 |
| 1/3    | Alarm Sum Event                     | 1 = Alarm summary event ON   | 160                 |
| 1/4    | Relay PICKUP                        | 1 = Relay PICKUP (summary alarm)   | 501                 |
| 1/5    | Relay TRIP                          | 1 = Relay GENERAL TRIP command (summary alarm)   | 511                 |
| 1/6    | Operat. Cond                        | 1 = Suitable measured quantities present at the device inputs ( $V > 0.1 * V_{nom}$ , $I > 0.1 * I_{nom}$ and $10 \text{ Hz} < \text{Freq.} < 70 \text{ Hz}$ ) | 5002                |
| 1/7    | <reserved>                          |  | -                   |



#### Error with a summary alarm

The "Error with a summary alarm" is ON if at least one of the following internal alarms assumes the value ON:

- "Error: A/D converter", "Error: 1A/5A wrong", "Error: Neutral CT different from MLFB", "Error Board 0", "Error Board 1", "Error Board 2", "Error Board 3", "Error Board 4", "Error Board 5", "Error Board 6", "Error Board 7".



#### Alarm summary event

The "Alarm summary event" is indicated if at least one of the following internal alarms assumes the ON status:

- "Failure: Current supervision", "Failure: Voltage supervision", "VT Fuse Failure", "Failure: Phase sequence", "Alarm: No calibration data available", "Error: Offset", "Error: Power supply", "Failure: Battery empty".

### 3.1.3 Overcurrent time protection I>

| Offset | Designation of the SIPROTEC objects | Comments                         | Internal object no. |
|--------|-------------------------------------|----------------------------------|---------------------|
| 2/0    | 50/51-1 Ph A PU                     | 1 = 50/51-1 Phase A picked up    | 1811                |
| 2/1    | 50/51-1 Ph B PU                     | 1 = 50/51-1 Phase B picked up    | 1812                |
| 2/2    | 50/51-1 Ph C PU                     | 1 = 50/51-1 Phase C picked up    | 1813                |
| 2/3    | I V< seal in                        | 1 = 50/51-1 undervoltage seal-in | 1970                |
| 2/4    | 50/51 TRIP                          | 1 = 50/51 I> TRIP                | 1815                |

### 3.1.4 Overcurrent time protection I>>

| Offset | Designation of the SIPROTEC objects | Comments                      | Internal object no. |
|--------|-------------------------------------|-------------------------------|---------------------|
| 2/5    | 67 forward                          | 1 = 67 I>> direction forward  | 1806                |
| 2/6    | 67 backward                         | 1 = 67 I>> direction backward | 1807                |
| 2/7    | 50/51-2 Ph A PU                     | 1 = 50/51-2 Phase A picked up | 1801                |
| 3/0    | 50/51-2 Ph B PU                     | 1 = 50/51-2 Phase B picked up | 1802                |
| 3/1    | 50/51-2 Ph C PU                     | 1 = 50/51-2 Phase C picked up | 1803                |
| 3/2    | 51/67 TRIP                          | 1 = 50/51/67 I>> TRIP         | 1809                |

### 3.1.5 Inverse overcurrent time protection

| Offset | Designation of the SIPROTEC objects | Comments                  | Internal object no. |
|--------|-------------------------------------|---------------------------|---------------------|
| 3/3    | 51V Ph A PU                         | 1 = 51V Phase A picked up | 1896                |
| 3/4    | 51V Ph B PU                         | 1 = 51V Phase B picked up | 1897                |
| 3/5    | 51V Ph C PU                         | 1 = 51V Phase B picked up | 1898                |
| 3/6    | 51/51V TRIP                         | 1 = 51/51V TRIP           | 1900                |
| 3/7    | <reserved>                          |                           | –                   |

### 3.1.6 Thermal overload protection

| Offset | Designation of the SIPROTEC objects | Comments                                | Internal object no. |
|--------|-------------------------------------|---|---------------------|
| 4/0    | 49 O/L I Alarm                      | 1 = 49 Overload Current Alarm (I alarm) | 1515                |
| 4/1    | 49 O/L ⊖ Alarm                      | 1 = 49 Thermal Overload Alarm           | 1516                |
| 4/2    | 49 Th O/L TRIP                      | 1 = 49 Thermal Overload TRIP            | 1521                |

### 3.1.7 Negative sequence protection

| Offset | Designation of the SIPROTEC objects | Comments                       | Internal object no. |
|--------|-------------------------------------|--------------------------------|---------------------|
| 4/3    | 46-1 Warn                           | 1 = 46-1 Current warning stage | 5156                |
| 4/4    | 46-1 picked up                      | 1 = 46-1 picked up             | 5165                |
| 4/5    | 46-2 picked up                      | 1 = 46-2 picked up             | 5159                |
| 4/6    | 46-2 TRIP                           | 1 = 46-2 TRIP of current stage | 5160                |
| 4/7    | 46-⊖ TRIP                           | 1 = 46 TRIP of thermal stage   | 5161                |

### 3.1.8 Sensitive overcurrent protection

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>                   | <b>Internal object no.</b> |
|---------------|--|-----------------------------------|----------------------------|
| 5/0           | Fail. REF lee<                             | 1 = Failure R/E/F protection lee< | 5396                       |
| 5/1           | 50Ns-1 Pickup                              | 1 = 50Ns-1 Pickup                 | 1224                       |
| 5/2           | 50Ns-1 TRIP                                | 1 = 50Ns-1 TRIP                   | 1226                       |
| 5/3           | 50Ns-2 Pickup                              | 1 = 50Ns-2 Pickup                 | 1221                       |
| 5/4           | 50Ns-2 TRIP                                | 1 = 50Ns-2 TRIP                   | 1223                       |

### 3.1.9 Stator ground fault protection

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>            | <b>Internal object no.</b> |
|---------------|--|----------------------------|----------------------------|
| 5/5           | 59/67 V0 PU                                | 1 = 59N/67GN U0 picked up  | 5186                       |
| 5/6           | 59/67 I0 PU                                | 1 = 59N/67GN I0 picked up  | 5188                       |
| 5/7           | 59/67 V0 TRIP                              | 1 = 59N/67GN U0 stage TRIP | 5187                       |
| 6/0           | 59N/67GN TRIP                              | 1 = 59N/67GN TRIP          | 5193                       |

### 3.1.10 Stator ground fault protection with 3<sup>rd</sup> harmonic

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>                                       | <b>Internal object no.</b> |
|---------------|--|---|----------------------------|
| 6/1           | 27TN/59TN PU                               | 1 = 27TN/59TN with 3 <sup>rd</sup> harmonic picked up | 5567                       |
| 6/2           | 27TN/59TN TRP                              | 1 = 27TN/59TN with 3 <sup>rd</sup> harmonic TRIP      | 5568                       |

### 3.1.11 Overvoltage protection

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>                    | <b>Internal object no.</b> |
|---------------|--|------------------------------------|----------------------------|
| 6/3           | 59-1 picked up                             | 1 = 59-1 Overvoltage V> picked up  | 6568                       |
| 6/4           | 59-2 picked up                             | 1 = 59-2 Overvoltage V>> picked up | 6571                       |
| 6/5           | 59-1 TRIP                                  | 1 = 59-1 Overvoltage V> TRIP       | 6570                       |
| 6/6           | 59-2 TRIP                                  | 1 = 59-2 Overvoltage V>> TRIP      | 6573                       |

### 3.1.12 Undervoltage protection

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>                     | <b>Internal object no.</b> |
|---------------|--|-------------------------------------|----------------------------|
| 6/7           | 27-1 picked up                             | 1 = 27-1 Undervoltage V< picked up  | 6533                       |
| 7/0           | 27-2 picked up                             | 1 = 27-2 Undervoltage V<< picked up | 6537                       |
| 7/1           | 27-1 TRIP                                  | 1 = 27-1 Undervoltage V< TRIP       | 6539                       |
| 7/2           | 27-2 TRIP                                  | 1 = 27-2 Undervoltage V<< TRIP      | 6540                       |

### 3.1.13 Over/Underfrequency protection

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>    | <b>Internal object no.</b> |
|---------------|--|--------------------|----------------------------|
| 7/3           | 81-1 picked up                             | 1 = 81-1 picked up | 5232                       |
| 7/4           | 81-2 picked up                             | 1 = 81-2 picked up | 5233                       |
| 7/5           | 81-3 picked up                             | 1 = 81-3 picked up | 5234                       |
| 7/6           | 81-4 picked up                             | 1 = 81-4 picked up | 5235                       |
| 7/7           | 81-1 TRIP                                  | 1 = 81-1 TRIP      | 5236                       |
| 8/0           | 81-2 TRIP                                  | 1 = 81-2 TRIP      | 5237                       |
| 8/1           | 81-3 TRIP                                  | 1 = 81-3 TRIP      | 5238                       |
| 8/2           | 81-4 TRIP                                  | 1 = 81-4 TRIP      | 5239                       |

### 3.1.14 Overexcitation protection

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>              | <b>Internal object no.</b> |
|---------------|--|------------------------------|----------------------------|
| 8/3           | 24 warn                                    | 1 = 24 V/f warning stage     | 5367                       |
| 8/4           | 24-1 picked up                             | 1 = 24-1 V/f> picked up      | 5370                       |
| 8/5           | 24-2 picked up                             | 1 = 24-2 V/f>> picked up     | 5373                       |
| 8/6           | 24 th. TRIP                                | 1 = 24 TRIP of th. stage     | 5372                       |
| 8/7           | 24-2 TRIP                                  | 1 = 24-2 TRIP of V/f>> stage | 5371                       |

### 3.1.15 Reverse power protection

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>              | <b>Internal object no.</b> |
|---------------|--|------------------------------|----------------------------|
| 9/0           | 32R picked up                              | 1 = 32R picked up            | 5096                       |
| 9/1           | 32R TRIP                                   | 1 = 32R TRIP                 | 5097                       |
| 9/2           | 32R+SV TRIP                                | 1 = 32R TRIP with stop valve | 5098                       |

### 3.1.16 Forward power supervision

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>            | <b>Internal object no.</b> |
|---------------|--|----------------------------|----------------------------|
| 9/3           | 32F< picked up                             | 1 = 32F P< stage picked up | 5126                       |
| 9/4           | 32F> picked up                             | 1 = 32F P> stage picked up | 5127                       |
| 9/5           | 32F P< TRIP                                | 1 = 32F P< stage TRIP      | 5128                       |
| 9/6           | 32F P> TRIP                                | 1 = 32F P> stage TRIP      | 5129                       |

### 3.1.17 Fuse Failure Monitor

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>                      | <b>Internal object no.</b> |
|---------------|--|--------------------------------------|----------------------------|
| 9/7           | VT Fuse Failure                            | 1 = Voltage Transformer Fuse Failure | 6575                       |

### 3.1.18 Underexcitation protection

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>                              | <b>Internal object no.</b> |
|---------------|--|--|----------------------------|
| 10/0          | 40 Vexc failure                            | 1 = 40 Excitation voltage failure recognized | 5336                       |
| 10/1          | 40 picked up                               | 1 = 40 picked up                             | 5337                       |
| 10/2          | 40-1 TRIP                                  | 1 = 40 characteristic 1 TRIP                 | 5344                       |
| 10/3          | 40-2 TRIP                                  | 1 = 40 characteristic 2 TRIP                 | 5345                       |
| 10/4          | 40&V<TRIP                                  | 1 = 40 characteristic & Vexc< TRIP           | 5346                       |
| 10/5          | 40-3 TRIP                                  | 1 = 40 characteristic 3 TRIP                 | 5343                       |

### 3.1.19 Breaker failure protection

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>    | <b>Internal object no.</b> |
|---------------|--|--------------------|----------------------------|
| 10/6          | 50BF pickup                                | 1 = 50BF picked up | 1445                       |
| 10/7          | 50BF TRIP                                  | 1 = 50BF TRIP      | 1471                       |

### 3.1.20 Impedance protection

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>                      | <b>Internal object no.</b> |
|---------------|--|--------------------------------------|----------------------------|
| 11/0          | 21 Fault Ph A                              | 1 = 21 Fault detection , Phase A     | 3967                       |
| 11/1          | 21 Fault Ph B                              | 1 = 21 Fault detection , Phase B     | 3968                       |
| 11/2          | 21 Fault Ph C                              | 1 = 21 Fault detection , Phase C     | 3969                       |
| 11/3          | 21 I> & U<                                 | 1 = 21 O/C with undervoltage seal in | 3970                       |
| 11/4          | 21 Z1< TRIP                                | 1 = 21 Z1< TRIP                      | 3977                       |

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>  | <b>Internal object no.</b> |
|---------------|--|------------------|----------------------------|
| 11/5          | 21 Z1B< TRIP                               | 1 = 21 Z1B< TRIP | 3978                       |
| 11/6          | 21 Z2< TRIP                                | 1 = 21 Z2< TRIP  | 3979                       |
| 11/7          | 21 T3> TRIP                                | 1 = 21 T3> TRIP  | 3980                       |

### 3.1.21 External trip functions

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>                   | <b>Internal object no.</b> |
|---------------|--|-----------------------------------|----------------------------|
| 12/0          | Ext 1 Gen.TRP                              | 1 = External trip 1: General TRIP | 4537                       |
| 12/1          | Ext 2 Gen.TRP                              | 1 = External trip 2: General TRIP | 4557                       |
| 12/2          | Ext 3 Gen.TRP                              | 1 = External trip 3: General TRIP | 4577                       |
| 12/3          | Ext 4 Gen.TRP                              | 1 = External trip 4: General TRIP | 4597                       |

### 3.1.22 Inadvertent energisation protection

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>     | <b>Internal object no.</b> |
|---------------|--|---------------------|----------------------------|
| 12/4          | 50/27 picked up                            | 1 = 50/27 picked up | 5547                       |
| 12/5          | 50/27 TRIP                                 | 1 = 50/27 TRIP      | 5548                       |

### 3.1.23 Trip coil monitor

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>               | <b>Internal object no.</b> |
|---------------|--|-------------------------------|----------------------------|
| 12/6          | FAIL: Trip cir.                            | 1 = 74TC Failure Trip Circuit | 6865                       |

| <b>Offset</b>     | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b> | <b>Internal object no.</b> |
|-------------------|--|-----------------|----------------------------|
| 12/7              | <reserved>                                 |                 | -                          |
| 13/0<br>-<br>13/7 | <reserved>                                 |                 | -                          |

### 3.2 Measured values



**Note**

- Measured values in input direction are only available at use of standard mapping 2-1 or standard mapping 2-2 (ref. to chap. 1.2).
- Depending on the device composition and the existing protection packages not all of the indicated analog inputs (and corresponding PROFIBUS-DP message positions) may be available in the SIPROTEC device.
- The transferred percentage values are with reference to the nominal values of the primary equipment.

| <b>Offset</b> | <b>Designation of the SIPROTEC objects</b> | <b>Comments</b>        | <b>Scaling (32767 corresponds to ...)</b> | <b>Internal object no.</b> |
|---------------|--|------------------------|---|----------------------------|
| 14            | Ia =                                       | Ia                     | 327.67 %                                  | 601                        |
| 16            | Ib =                                       | Ib                     | 327.67 %                                  | 602                        |
| 18            | Ic =                                       | Ic                     | 327.67 %                                  | 603                        |
| 20            | Va-b =                                     | Va-b                   | 327.67 %                                  | 624                        |
| 22            | Vb-c =                                     | Vb-c                   | 327.67 %                                  | 625                        |
| 24            | Vc-a =                                     | Vc-a                   | 327.67 %                                  | 626                        |
| 26            | P =  | P (active power)       | 327.67 %                                  | 641                        |
| 28            | Q =  | Q (reactive power)     | 327.67 %                                  | 642                        |
| 30            | Freq =                                     | Frequency              | 327.67 Hz                                 | 644                        |
| 32            | I2 =                                       | I2 (negative sequence) | 327.67 %                                  | 606                        |
| 34            | ⊕ / ⊖ trip                                 | Temperature rise       | 327.67 %                                  | 801                        |



### 3.3 Metered measurands



**Note**

Metered measurands are only available at use of standard mapping 2-1 (ref. to chap. 1.2).

**Scaling**

The scaling of the metered measurands, which are derived from measured values, refers to:

**60000 impulses per hour for  $V = V_{nom}$  and  $I = I_{nom}$**

$V_{nom} =$  **NOMINAL OPERATING VOLTAGE OF PRIMARY EQUIPMENT**  
(parameter address = 1101)

$I_{nom} =$  **NOMINAL OPERATING CURRENT OF PRIMARY EQUIPMENT**  
(parameter address = 1102)

**Example**

In the parameter set is configured:

$I_{nom} = 483 \text{ A}$  und  $V_{nom} = 6.3 \text{ kV}$ ,

60000 impulses correspond so that:

$1 \text{ h} * 483 \text{ A} * 6.3 \text{ kV} * \sqrt{3} = 5270.46 \text{ kWh}$



**Note**

The type of the update (cyclic, with or without deletion) and the update interval must be programmed for the metered measurands with the parameterization software DIGSI.

| Offset | Designation of the SIPROTEC objects | Comments   | Scaling<br>( $2^{31}-1$ of the unsigned long-value corresponds to...) | Internal object no. |
|--------|-------------------------------------|--|---|---------------------|
| 36     | Wp+=                                | Wp Forward (metered measurand derived from measured value) | $2^{31}-1$ impulses   | 924                 |
| 40     | Wq+=                                | Wq Forward (metered measurand derived from measured value) | $2^{31}-1$ impulses   | 925                 |
| 44     | Wp-=                                | Wp Reverse (metered measurand derived from measured value) | $2^{31}-1$ impulses   | 928                 |
| 48     | Wq-=                                | Wq Reverse (metered measurand derived fom measured value)  | $2^{31}-1$ impulses   | 929                 |



# Glossary

|  |   |
|--|---|
| <b>CFC</b>                               | <b>C</b> ontinuous <b>F</b> unction <b>C</b> hart   |
| <b>DDB file /<br/>GSD file</b>           | The <b>DDB</b> file contains the <b>D</b> evice <b>D</b> ata <b>B</b> ase (technical characteristics) of the PROFIBUS-DP communication module (PROFIBUS-DP slave). This file is required for configuration and is supplied together with the SIPROTEC device. |
| <b>DIGSI</b>                             | Parameterization system for SIPROTEC devices  |
| <b>Input data/<br/>input direction</b>   | Data from the PROFIBUS-DP <b>slave to the PROFIBUS-DP master</b> .  |
| <b>Mapping</b>                           | Allocation of the SIPROTEC data objects to the positions in the PROFIBUS-DP messages.   |
| <b>Octet</b>                             | Term from EN 50170, one octet corresponds to 8 bits.  |
| <b>OLM</b>                               | <b>O</b> ptical <b>L</b> ink <b>M</b> odule   |
| <b>Output data/<br/>output direction</b> | Data from the PROFIBUS-DP <b>master to the PROFIBUS-DP slave</b> .  |
| <b>PNO</b>                               | <b>P</b> ROFIBUS <b>N</b> utzerorganisation   |
| <b>PROFIBUS-DP</b>                       | <b>P</b> ROFIBUS - <b>D</b> ecentralized <b>P</b> eripherals  |
| <b>PSE</b>                               | <b>P</b> ROFIBUS interface module with ( <b>e</b> lectrical) isolated RS485 interface for the SIPROTEC devices from Siemens.  |
| <b>PSO</b>                               | <b>P</b> ROFIBUS interface module with <b>o</b> ptical interface for the SIPROTEC devices from Siemens.   |
| <b>SC</b>                                | <b>S</b> ingle <b>C</b> ommand  |
| <b>SP</b>                                | <b>S</b> ingle- <b>p</b> oint <b>I</b> ndication  |



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