

SIPROTEC

Multifunctional
machine protection
7UM61

Communication module

PROFIBUS-DP
Bus mapping

Preface

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The information in this manual is checked periodically, and necessary corrections will be included in future editions.

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Preface

Purpose of this manual

This manual describes the data in the PROFIBUS-DP messages of the SIPROTEC device 7UM61 and is divided into the following topics:

- Data of the PROFIBUS-DP messages → Chapter 1,
- Standard mappings 3-1 to 3-3 → Chapter 2,
- Standard mapping 3-4 → Chapter 3.

General details about the function, operation, assembly and commissioning of the SIPROTEC devices you find in the

- SIPROTEC4 System Manual, order no. E50417–H1176–C151.

PROFIBUS-DP communication profile documentation

The following additional manual informs you about the data types, bus specific parameters and hardware interface of the PROFIBUS-DP slave module of the SIPROTEC devices:

| Manual | Order number |
|--|----------------------|
| SIPROTEC Communication module, PROFIBUS-DP - Communication profile | C53000-L1840-B001-03 |

PROFIBUS-DP specification

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
PROFIBUS Nutzerorganisation e.V.

| | |
|---------------------------|---|
| Validity | <p>This manual is valid for the SIPROTEC device:</p> <ul style="list-style-type: none">• 7UM61 (firmware version 4.10 or higher) <p>with</p> <ul style="list-style-type: none">• PROFIBUS-DP communication module version 02.00.05 or higher. <p>For device parameterization have to be used:</p> <ul style="list-style-type: none">• DIGSI 4.30 or higher,• PROFIBUS-DP standard mappings 3-1 to 3-n (n = device type dependent number of standard mappings). |
| Additional Support | <p>For questions regarding SIPROTEC4 devices, please contact your Siemens representative.</p> |
| Training courses | <p>Individual course offerings may be found in our Training Catalog and questions can be directed to our Training Centre. Please contact your Siemens representative.</p> |
| Target audience | <p>Protection engineers, commissioning engineers, personnel concerned with adjustment, checking and service of selective protective equipment, automatic and control facilities and personnel of electrical facilities and power plants.</p> |



Warning!

Hazardous voltages are present in this electrical equipment during operation. Non-observance of the safety rules can result in severe personal injury or property damage.

Only qualified personnel shall work on and around this equipment after becoming thoroughly familiar with all warnings and safety notices of this and the associated manuals as well as with the applicable safety regulations.

The successful and safe operation of this device is dependent on proper transport and storage, proper handling, installation, operation, and maintenance by qualified personnel under observance of all warnings and hints contained in this and the associated manuals.

In particular the general erection and safety regulations (e.g. IEC, EN, DIN, VDE, or other national and international standards) regarding the correct use of high-voltage installations must be observed. Non-observance can result in death, personal injury or substantial property damage.

QUALIFIED PERSONNEL

For the purpose of this manual and product labels, a qualified person is one who is familiar with the installation, construction and operation of the equipment and the hazards involved. In addition, he has the following qualifications:

- Is trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety practices.
- Is trained in the proper care and use of protective equipment in accordance with established safety practices.
- Is trained in rendering first aid.

Typographic and graphical conventions

The following text formats are used to identify concepts giving device information described by the text flow:

Parameter names, or identifiers for configuration or function parameters that appear in the device display or on the screen of a PC (with DIGSI) are shown in mono-script (same point size) bold text. This also applies to header bars for selection menus.

Parameter conditions, or possible settings of parameters that appear in the device display or on the screen of a PC (with DIGSI), are additionally shown in italic style. This also applies to selection items for selection menus.

„Annunciations“, or identifiers for information produced by the device or required by other devices or from the switchgear is shown in mono-script (same point size) and placed into quotation marks.

For diagrams in which the identifier type results from the representation itself, text conventions may differ from the above-mentioned.

Revision index

Listing of the changes between the editions of this manual:

| Modified chapters / pages | Edition | Reasons of modification |
|---------------------------|---------|---|
| | 1.0 | First edition, Doc.-No.: C53000-L1840-B005-03 Sept. 18 th , 2002 |
| Chap. 1.4 | 1.1 | corrected: Standard mappings 3-1 and 3-2 contain 11 measured values Nov. 18 th , 2002 |
| general Chap. 1.4, 3 | 2.0 | <ul style="list-style-type: none">• Page numbering in the manual now continuous, not chapter-related any more• New: description of Standard mapping 3-4 with event list Feb. 10 th , 2004 |
| | | |

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Data of the PROFIBUS-DP messages

This chapter delivers explanations to the data descriptions of the standard mappings as well as notes for evaluation of selected SIPROTEC objects and for the configuration of the standard mapping in the PROFIBUS-DP master.

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1.1 Explanations



Note:

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

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 columns "Designation of the SIPROTEC objects" contain the names of the SIPROTEC objects for "US English" device language.

The listed SIPROTEC objects in the PROFIBUS-DP messages' 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.:

| Offset | Designation of the SIPROTEC objects | Comments | Scaling (32767 corresponds to...) | Internal object no. |
|--------|-------------------------------------|--------------------|-----------------------------------|---------------------|
| 14 | Ia = | Current in phase A | 327.67 % | 601 |

The measured value "Ia" 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. |
|--------|-------------------------------------|-------------------------------|---------------------|
| 2 / 0 | 50/51-1 Ph A PU | 1 = 50/51-1 Phase A picked up | 1811 |

The single-point indication "50/51 - 1 Ph A PU" is located in byte 2, bit position 2⁰.



Note:

The definition of the data types (single-point indication, measured value etc.) are contained in the manual "SIPROTEC Communication module, PROFIBUS-DP - Communication profile" (ref. to page 3).

1.2 Messages in output direction: PROFIBUS-DP master to the SIPROTEC device

The messages in PROFIBUS-DP output direction (ref to chap. 2.1 and 3.1) allow:

- command outputs through the output relays of the SIPROTEC devices (external commands),
- manipulation of taggings (internal commands),
- transmission of measured values to the SIPROTEC device.

1.2.1 Commands



Note:

- The allocation of the output relays to the switching devices and to the output channels is defined during parameterization of the SIPROTEC devices.
 - Depending on the device composition there may be less than indicated output relays (and corresponding PROFIBUS-DP message positions) available in the SIPROTEC device.
-

1.2.2 Measured values



Note:

- Unlike measured values in input direction, the identification "Overflow" or "Invalid" is not indicated with the value -32768 (ref. to manual "SIPROTEC Communication module, PROFIBUS-DP - Communication profile").
 - If an evaluation of the measurement status of the cooling medium temperature is required then the indication ">Fail.Temp.inp" (>49 Failure temperature input, internal object no. = 1508), routed to "Destination system interface" in the **DIGSI Configuration matrix**, has to be used for this separately.
-

1.3 Messages in input direction: SIPROTEC device to the PROFIBUS-DP master

The messages in PROFIBUS-DP input direction (ref. to chap. 2.2 and 3.2) allow:

- polling of switching devices' status and binary inputs,
- transmission of annunciations, measurands and meter values to the PROFIBUS-DP master.

1.3.1 Annunciations



Note:

- The allocation of the input channels to the binary inputs is defined during parameterization of the devices.
 - Depending on the device composition and the existing protection packages not all of the indicated binary inputs or protection annunciations (and corresponding PROFIBUS-DP message positions) may be available in the SIPROTEC device.
-

1.3.2 Measured values



Note:

- Depending on the device composition 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.
Changes of the scaling of the measured values are possible in adaptation to the concrete installation environment.
You find information about this in the manual "SIPROTEC Communication module, PROFIBUS-DP - Communication profile" (ref. to page 3).
-

1.3.3 Metered measurands

Skalierung

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

60000 impulses per hour for $S = S_{nom}$

S_{nom} = Rated Apparent Power of the Generator (parameter address = 0252)

Example

In the parameter set is configured:

$S_{nom} = 5.27 \text{ MVA}$

60000 impulses correspond so that:

$1 \text{ h} * 5.27 \text{ MVA} = 5.27 \text{ MVAh}$



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.
 - The scaling of the metered measurands at binary inputs (pulse counters) depends on the externally connected pulse generator.
-

1.4 Configuration data of the standard mappings

There are four standard mappings (standard mapping 3-1 to standard mapping 3-4) available for the SIPROTEC device 7UM61 which differ in the available data size of the PROFIBUS-DP messages.

Standard mapping 3-1

The standard mapping 3-1 contains:

Output direction:

- 2 Double commands
- 22 Single commands
- 1 Measured value (Cooling medium temperature)

Input direction:

- 2 Double-point indications
- 108 Single-point indications
- 11 Measured values (integer)
- 4 Metered measurands (counter, unsigned long)

Standard mapping 3-2

The standard mapping 3-2 contains:

Output direction:

- 2 Double commands
- 22 Single commands

Input direction:

- 2 Double-point indications
- 108 Single-point indications
- 11 Measured values (integer)

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

Standard mapping 3-3

The standard mapping 3-3 contains:

Output direction:

- 2 Double commands
- 22 Single commands

Input direction:

- 2 Double-point indications
- 108 Single-point indications

Unlike the standard mapping 3-1 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 3-3.

**Standard mapping
3-4**

The standard mapping 3-4 contains:

Output direction:

- Handshake byte for event list via PROFIBUS-DP
- 2 Double commands
- 22 Single commands
- 1 Measured value (Cooling medium temperature)

Input direction:

- 2 Double-point indications
- 108 Single-point indications
- 11 Measured values (integer)
- 4 Metered measurands (counter, unsigned long)
- Handshake byte and three message blocks for event list via PROFIBUS-DP

Configuration data

Standard mapping 3-1: **1FH 1FH 1FH 13H 27H**

(52 bytes input-, 8 bytes output direction)

Standard mapping 3-2: **1FH 1FH 13H 25H**

(36 bytes input-, 6 bytes output direction)

Standard mapping 3-3: **1DH 25H**

(14 bytes input-, 6 bytes output direction)

Standard mapping 3-4: **1FH 1FH 1FH 13H DFH 29H**

(84 bytes input-, 10 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 3-1:

| Module | Order number | Input address | Output address |
|--------|------------------|---------------|----------------|
| 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 3-2:

| Module | Order number | Input address | Output address |
|--------|------------------|---------------|----------------|
| 0 | Input - 16 Bytes | Adr_Ix | |
| 1 | Input - 16 Bytes | Adr_Ix + 16 | |
| 2 | Input - 4 Bytes | Adr_Ix + 32 | |
| 3 | Output - 6 Bytes | | Adr_Ox |

Standard mapping 3-3:

| Module | Order number | Input address | Output address |
|--------|------------------|---------------|----------------|
| 0 | Input - 14 Bytes | Adr_Ix | |
| 1 | Output - 6 Bytes | | Adr_Ox |

Standard mapping 3-4:

| Module | Order number | Input address | Output address |
|--------|------------------------------|---------------|----------------|
| 0 | Input - 16 Bytes | Adr_Ix | |
| 1 | Input - 16 Bytes | Adr_Ix + 16 | |
| 2 | Input - 16 Bytes | Adr_Ix + 32 | |
| 3 | Input - 4 Bytes | Adr_Ix + 48 | |
| 4 | Input - 16 Words, consistent | Adr_Ix + 52 | |
| 5 | Output - 8 Bytes | | Adr_Ox |

Adr_Ix and Adr_Ox indicate arbitrary (as a rule even) addresses in the I/O addressing range of the PROFIBUS-DP master.

Adr_Ix (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. 2.2 and 3.2).

Adr_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. 2.1 and 3.1).



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. 2.2.3 and 3.2.3) can be correctly carried out in the PROFIBUS-DP master.

1.5 Notes to SIPROTEC objects

This chapter contains notes for the use and evaluation of certain SIPROTEC objects.



Note:

- The descriptions of the standard mappings (ref. to chap. 2 and 3) contain the pre-allocation of the mapping files at delivery or at 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 "SIPROTEC Communication module, PROFIBUS-DP - Communication profile" (ref. to page 3).
- If a mapping file is assigned to a SIPROTEC device and if the data size of the PROFIBUS-DP message of this SIPROTEC device is changed by choice of a new mapping file then assignments which are not available in the existing mapping file remain unassigned furthermore.

1.5.1 Changing the setting group

In order to change the setting group, the value "10" = ON must be transmitted to 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**.

References

Standard mapping 3-1 to 3-3: ref. to chap. 2.1.2

Standard mapping 3-4: ref. to chap. 3.1.3

1.5.2 Cooling medium temperature

- The cooling medium temperature is transferred in per cent (%) to the 7UM61. The protection device must be informed about the 100 % corresponding temperature using parameter **49 Temperature for Scaling** (function **49 Thermal Overload**, parameter address = 1608).
- The temperature value via PROFIBUS-DP is only taken into account and shown at the SIPROTEC device if the parameter **49 Temperature Input** (function **49 Thermal Overload**, parameter address = 1607) has the value **Fieldbus**.

Reference

Standard mapping 3-1: ref. to chap. 2.1.4

Standard mapping 3-2 to 3-3: not available

Standard mapping 3-4: ref. to chap. 3.1.5

Standard mappings 3-1 to 3-3

This chapter describes the data in the PROFIBUS-DP messages between the PROFIBUS-DP master and the SIPROTEC device 7UM61 if one of the standard mappings 3-1 to 3-3 is used.

| | | |
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2.1 Message in output direction

2.1.1 Single commands and taggings

- Single commands and taggings can be routed on these positions as “Source system interface” using the **DIGSI Configuration matrix**.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 0 / 0 | <user-defined> OFF | not pre-allocated | - |
| 0 / 1 | <user-defined> ON | | |
| 0 / 2 | <user-defined> OFF | not pre-allocated | - |
| 0 / 3 | <user-defined> ON | | |
| 0 / 4 | <user-defined> OFF | not pre-allocated | - |
| 0 / 5 | <user-defined> ON | | |
| 0 / 6 | <user-defined> OFF | not pre-allocated | - |
| 0 / 7 | <user-defined> ON | | |
| 1 / 0 | <user-defined> OFF | not pre-allocated | - |
| 1 / 1 | <user-defined> ON | | |
| 1 / 2 | <user-defined> OFF | not pre-allocated | - |
| 1 / 3 | <user-defined> ON | | |
| 1 / 4 | <user-defined> OFF | not pre-allocated | - |
| 1 / 5 | <user-defined> ON | | |
| 1 / 6 | <user-defined> OFF | not pre-allocated | - |
| 1 / 7 | <user-defined> ON | | |
| 2 / 0 | <user-defined> OFF | not pre-allocated | - |
| 2 / 1 | <user-defined> ON | | |
| 2 / 2 | <user-defined> OFF | not pre-allocated | - |
| 2 / 3 | <user-defined> ON | | |
| 2 / 4 | <user-defined> OFF | not pre-allocated | - |
| 2 / 5 | <user-defined> ON | | |
| 2 / 6 | <user-defined> OFF | not pre-allocated | - |
| 2 / 7 | <user-defined> ON | | |
| 3 / 0 | <user-defined> OFF | not pre-allocated | - |
| 3 / 1 | <user-defined> ON | | |
| 3 / 2 | <user-defined> OFF | not pre-allocated | - |
| 3 / 3 | <user-defined> ON | | |
| 3 / 4 | <user-defined> OFF | not pre-allocated | - |
| 3 / 5 | <user-defined> ON | | |

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 3 / 6 | <user-defined> OFF | not pre-allocated | - |
| 3 / 7 | <user-defined> ON | | |

2.1.2 Internal Commands

- Ref. to chap. 1.5.1 for additional notes regarding “Changing the setting group”.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------------------|---------------------|
| 4 / 0 | Setting Group A | Activation of setting group A | - |
| 4 / 1 | Setting Group A | | |
| 4 / 2 | Setting Group B | Activation of setting group B | - |
| 4 / 3 | Setting Group B | | |
| 4 / 4 | <user-defined> OFF | not pre-allocated | - |
| 4 / 5 | <user-defined> ON | | |
| 4 / 6 | <user-defined> OFF | not pre-allocated | - |
| 4 / 7 | <user-defined> ON | | |
| 5 / 0 | <user-defined> OFF | not pre-allocated | - |
| 5 / 1 | <user-defined> ON | | |
| 5 / 2 | <user-defined> OFF | not pre-allocated | - |
| 5 / 3 | <user-defined> ON | | |

2.1.3 Double commands

- Double commands with double-point indications as checkback indication can be routed on these positions as “Source system interface” using the **DIGSI Configuration matrix**.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 5 / 4 | <user-defined> OFF | not pre-allocated | - |
| 5 / 5 | <user-defined> ON | | |
| 5 / 6 | <user-defined> OFF | not pre-allocated | - |
| 5 / 7 | <user-defined> ON | | |

2.1.4 Measured values

- Measured values in output direction are only available at use of standard mapping 3-1 (ref. to chap. 1.4).
- Ref. to chap. 1.5.2 for additional notes regarding the measured value “Cooling medium temperature”.

| Offset | Designation of the SIPROTEC objects | Comments | Scaling (32767 corresponds to ...) | Internal object no. |
|--------|-------------------------------------|----------------------------|---------------------------------------|------------------------|
| 6 | AMB.TEMP = | Cooling medium temperature | 327.67 % | - |

2.2 Message in input direction

2.2.1 Annunciations

2.2.1.1 User-defined annunciations

- User-defined protection annunciations, single-point indications and taggings can be routed on these positions as “Destination system interface” using the **DIGSI Configuration matrix**.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 0 / 0 | <user-defined> | not pre-allocated | - |
| 0 / 1 | <user-defined> | not pre-allocated | - |
| 0 / 2 | <user-defined> | not pre-allocated | - |
| 0 / 3 | <user-defined> | not pre-allocated | - |
| 0 / 4 | <user-defined> | not pre-allocated | - |
| 0 / 5 | <user-defined> | not pre-allocated | - |
| 0 / 6 | <user-defined> | not pre-allocated | - |
| 0 / 7 | <user-defined> | not pre-allocated | - |

2.2.1.2 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 (group signal) | 501 |
| 1 / 5 | Relay TRIP | 1 = Relay GENERAL TRIP command | 511 |
| 1 / 6 | Operat. Cond. | 1 = Suitable measured quantities are 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 | Data valid | 1 = Data in the PROFIBUS-DP message are valid. (This indication is created by the PROFIBUS-DP slave; not available in DIGSI and not relocatable.) | - |

2.2.1.3 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 | V< seal in | 1 = 50/51-1 undervoltage seal-in | 1970 |
| 2 / 4 | 50/51 TRIP | 1 = 50/51 I> TRIP | 1815 |

2.2.1.4 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 |

2.2.1.5 Inverse time overcurrent 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 C picked up | 1898 |
| 3 / 6 | 51V TRIP | 1 = 51V TRIP | 1900 |
| 3 / 7 | <user-defined> | not pre-allocated | - |

2.2.1.6 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 Θ Alarm | 1 = 49 Thermal Overload Alarm | 1516 |
| 4 / 2 | 49 Th O/L TRIP | 1 = 49 Thermal Overload TRIP | 1521 |

2.2.1.7 Unbalanced load 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- Θ TRIP | 1 = 46 TRIP of thermal stage | 5161 |

2.2.1.8 Sensitive ground fault protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|--|---------------------|
| 5 / 0 | Failure 64R In< | 1 = Failure 64R In<: measuring circuit | 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 |

2.2.1.9 Stator ground fault protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|----------------------------|---------------------|
| 5 / 5 | 59/67 V0 PU | 1 = 59N/67GN V0 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 V0 stage TRIP | 5187 |
| 6 / 0 | 59N/67GN TRIP | 1 = 59N/67GN TRIP | 5193 |

2.2.1.10 Stator ground fault protection with 3rd harmonic

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

2.2.1.11 Overvoltage protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|------------------------------------|---------------------|
| 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 |

2.2.1.12 Undervoltage protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------------------------|---------------------|
| 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 |

2.2.1.13 Frequency protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|--------------------|---------------------|
| 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 |

2.2.1.14 Overexcitation protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|------------------------------|---------------------|
| 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 thermal stage | 5372 |
| 8 / 7 | 24-2 TRIP | 1 = 24-2 TRIP of V/f>> stage | 5371 |

2.2.1.15 Reverse power protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|------------------------------|---------------------|
| 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 |

2.2.1.16 Forward power supervision

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|----------------------------|---------------------|
| 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 |

2.2.1.17 Fuse Failure Monitor

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

2.2.1.18 Underexcitation protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|--|---------------------|
| 10 / 0 | 40 Vexc failure | 1 = 40 Exc. 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 |

2.2.1.19 Circuit breaker failure protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|--------------------|---------------------|
| 10 / 6 | 50BF pickup | 1 = 50BF picked up | 1455 |
| 10 / 7 | 50BF TRIP | 1 = 50BF TRIP | 1471 |

2.2.1.20 Impedance protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|--------------------------------------|---------------------|
| 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 |
| 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 |

2.2.1.21 Binary inputs

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

2.2.1.22 Inadvertent energisation protection

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

2.2.1.23 Trip coil monitor

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

2.2.1.24 User-defined annunciations

- User-defined protection annunciations, single-point indications and taggings can be routed on these positions as “Destination system interface” using the **DIGSI Configuration matrix**.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 12 / 7 | <user-defined> | not pre-allocated | - |
| 13 / 0 | <user-defined> | not pre-allocated | - |
| 13 / 1 | <user-defined> | not pre-allocated | - |
| 13 / 2 | <user-defined> | not pre-allocated | - |
| 13 / 3 | <user-defined> | not pre-allocated | - |

2.2.1.25 Double-point indications

- Double-point indications (e.g. checkback indications of double commands) can be routed on these positions as “Destination system interface” using the **DIGSI Configuration matrix**.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 13 / 4 | <user-defined> OFF | not pre-allocated | - |
| 13 / 5 | <user-defined> ON | | |
| 13 / 6 | <user-defined> OFF | not pre-allocated | - |
| 13 / 7 | <user-defined> ON | | |

2.2.2 Measured values

- Measured values in input direction are only available at use of standard mapping 3-1 or standard mapping 3-2 (ref. to chap. 1.4).
- Ref. to chap. 1.3.2 for notes regarding scaling of measured values.

| Offset | Designation of the SIPROTEC objects | Comments | Scaling (32767 corresponds to ...) | Internal object no. |
|--------|-------------------------------------|---------------------------------------|---------------------------------------|---------------------|
| 14 | Ia = | Current in phase A | 327.67 % | 601 |
| 16 | Ib = | Current in phase B | 327.67 % | 602 |
| 18 | Ic = | Current in phase C | 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 | f = | Frequency | 327.67 Hz | 644 |
| 32 | I2 = | I2 (negative sequence) | 327.67 % | 606 |
| 34 | Θ/Θtrip = | Temperature rise for warning and trip | 327.67 % | 801 |

2.2.3 Metered measurands

- Metered measurands are only available at use of standard mapping 3-1 (ref. to chap. 1.4).
- Ref. to chap. 1.3.3 for notes regarding scaling of metered measurands.

| Offset | Designation of the SIPROTEC objects | Comments | Scaling (2 ³¹ -1 corresponds to ...) | Internal object no. |
|--------|-------------------------------------|---|--|---------------------|
| 36 | Wp+ | Wp Forward (Metered measurand derived from measured values) | 2 ³¹ -1 impulses | 924 |
| 40 | Wq+ | Wq Forward (Metered measurand derived from measured values) | 2 ³¹ -1 impulses | 925 |
| 44 | Wp- | Wp Reverse (Metered measurand derived from measured values) | 2 ³¹ -1 impulses | 928 |
| 48 | Wq- | Wq Reverse (Metered measurand derived from measured values) | 2 ³¹ -1 impulses | 929 |

Standard mapping 3-4

This chapter describes the data in the PROFIBUS-DP messages between the PROFIBUS-DP master and the SIPROTEC device 7UM61 if standard mapping 3-4 is selected.

| | | |
|-----|-----------------------------|----|
| 3.1 | Message in output direction | 36 |
| 3.2 | Message in input direction | 39 |

3.1 Message in output direction

3.1.1 Event list

- Information regarding the handshake bytes as well as the retrieval methods of the event list via PROFIBUS-DP can be found in the manual “SIPROTEC Communication module, PROFIBUS-DP - Communication profile”.

| Offset | Designation | Comments | Internal object no. |
|--------|-------------|--|---------------------|
| 0 | Control_O | Handshake byte for event list via PROFIBUS-DP | - |
| 1 | SPARE | reserved for future use (the value at this position is ignored) | - |

3.1.2 Single commands and taggings

- Single commands and taggings can be routed on these positions as “Source system interface” using the **DIGSI Configuration matrix**.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 2 / 0 | <user-defined> OFF | not pre-allocated | - |
| 2 / 1 | <user-defined> ON | | |
| 2 / 2 | <user-defined> OFF | not pre-allocated | - |
| 2 / 3 | <user-defined> ON | | |
| 2 / 4 | <user-defined> OFF | not pre-allocated | - |
| 2 / 5 | <user-defined> ON | | |
| 2 / 6 | <user-defined> OFF | not pre-allocated | - |
| 2 / 7 | <user-defined> ON | | |
| 3 / 0 | <user-defined> OFF | not pre-allocated | - |
| 3 / 1 | <user-defined> ON | | |
| 3 / 2 | <user-defined> OFF | not pre-allocated | - |
| 3 / 3 | <user-defined> ON | | |
| 3 / 4 | <user-defined> OFF | not pre-allocated | - |
| 3 / 5 | <user-defined> ON | | |
| 3 / 6 | <user-defined> OFF | not pre-allocated | - |
| 3 / 7 | <user-defined> ON | | |
| 4 / 0 | <user-defined> OFF | not pre-allocated | - |
| 4 / 1 | <user-defined> ON | | |
| 4 / 2 | <user-defined> OFF | not pre-allocated | - |
| 4 / 3 | <user-defined> ON | | |

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 4 / 4 | <user-defined> OFF | not pre-allocated | - |
| 4 / 5 | <user-defined> ON | | |
| 4 / 6 | <user-defined> OFF | not pre-allocated | - |
| 4 / 7 | <user-defined> ON | | |
| 5 / 0 | <user-defined> OFF | not pre-allocated | - |
| 5 / 1 | <user-defined> ON | | |
| 5 / 2 | <user-defined> OFF | not pre-allocated | - |
| 5 / 3 | <user-defined> ON | | |
| 5 / 4 | <user-defined> OFF | not pre-allocated | - |
| 5 / 5 | <user-defined> ON | | |
| 5 / 6 | <user-defined> OFF | not pre-allocated | - |
| 5 / 7 | <user-defined> ON | | |

3.1.3 Internal Commands

- Ref. to chap. 1.5.1 for additional notes regarding “Changing the setting group”.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------------------|---------------------|
| 6 / 0 | Setting Group A | Activation of setting group A | - |
| 6 / 1 | Setting Group A | | |
| 6 / 2 | Setting Group B | Activation of setting group B | - |
| 6 / 3 | Setting Group B | | |
| 6 / 4 | <user-defined> OFF | not pre-allocated | - |
| 6 / 5 | <user-defined> ON | | |
| 6 / 6 | <user-defined> OFF | not pre-allocated | - |
| 6 / 7 | <user-defined> ON | | |
| 7 / 0 | <user-defined> OFF | not pre-allocated | - |
| 7 / 1 | <user-defined> ON | | |
| 7 / 2 | <user-defined> OFF | not pre-allocated | - |
| 7 / 3 | <user-defined> ON | | |

3.1.4 Double commands

- Double commands with double-point indications as checkback indication can be routed on these positions as “Source system interface” using the **DIGSI Configuration matrix**.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 7 / 4 | <user-defined> OFF | not pre-allocated | - |
| 7 / 5 | <user-defined> ON | | |
| 7 / 6 | <user-defined> OFF | not pre-allocated | - |
| 7 / 7 | <user-defined> ON | | |

3.1.5 Measured values

- Ref. to chap. 1.5.2 for additional notes regarding the measured value “Cooling medium temperature”.

| Offset | Designation of the SIPROTEC objects | Comments | Scaling (32767 corresponds to ...) | Internal object no. |
|--------|-------------------------------------|----------------------------|------------------------------------|---------------------|
| 8 | AMB.TEMP = | Cooling medium temperature | 327.67 % | - |

3.2 Message in input direction

3.2.1 Annunciations

3.2.1.1 User-defined annunciations

- User-defined protection annunciations, single-point indications and taggings can be routed on these positions as “Destination system interface” using the **DIGSI Configuration matrix**.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 0 / 0 | <user-defined> | not pre-allocated | - |
| 0 / 1 | <user-defined> | not pre-allocated | - |
| 0 / 2 | <user-defined> | not pre-allocated | - |
| 0 / 3 | <user-defined> | not pre-allocated | - |
| 0 / 4 | <user-defined> | not pre-allocated | - |
| 0 / 5 | <user-defined> | not pre-allocated | - |
| 0 / 6 | <user-defined> | not pre-allocated | - |
| 0 / 7 | <user-defined> | not pre-allocated | - |

3.2.1.2 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 (group signal) | 501 |
| 1 / 5 | Relay TRIP | 1 = Relay GENERAL TRIP command | 511 |
| 1 / 6 | Operat. Cond. | 1 = Suitable measured quantities are 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 | Data valid | 1 = Data in the PROFIBUS-DP message are valid. (This indication is created by the PROFIBUS-DP slave; not available in DIGSI and not relocatable.) | - |

3.2.1.3 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 | V< seal in | 1 = 50/51-1 undervoltage seal-in | 1970 |
| 2 / 4 | 50/51 TRIP | 1 = 50/51 I> TRIP | 1815 |

3.2.1.4 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 |

3.2.1.5 Inverse time overcurrent 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 C picked up | 1898 |
| 3 / 6 | 51V TRIP | 1 = 51V TRIP | 1900 |
| 3 / 7 | <user-defined> | not pre-allocated | - |

3.2.1.6 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 Θ Alarm | 1 = 49 Thermal Overload Alarm | 1516 |
| 4 / 2 | 49 Th O/L TRIP | 1 = 49 Thermal Overload TRIP | 1521 |

3.2.1.7 Unbalanced load 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-Θ TRIP | 1 = 46 TRIP of thermal stage | 5161 |

3.2.1.8 Sensitive ground fault protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|--|---------------------|
| 5 / 0 | Failure 64R In< | 1 = Failure 64R In<: measuring circuit | 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 |

3.2.1.9 Stator ground fault protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|----------------------------|---------------------|
| 5 / 5 | 59/67 V0 PU | 1 = 59N/67GN V0 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 V0 stage TRIP | 5187 |
| 6 / 0 | 59N/67GN TRIP | 1 = 59N/67GN TRIP | 5193 |

3.2.1.10 Stator ground fault protection with 3rd harmonic

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

3.2.1.11 Overvoltage protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|------------------------------------|---------------------|
| 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 |

3.2.1.12 Undervoltage protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------------------------|---------------------|
| 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 |

3.2.1.13 Frequency protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|--------------------|---------------------|
| 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 |

3.2.1.14 Overexcitation protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|------------------------------|---------------------|
| 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 thermal stage | 5372 |
| 8 / 7 | 24-2 TRIP | 1 = 24-2 TRIP of V/f>> stage | 5371 |

3.2.1.15 Reverse power protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|------------------------------|---------------------|
| 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 |

3.2.1.16 Forward power supervision

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|----------------------------|---------------------|
| 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 |

3.2.1.17 Fuse Failure Monitor

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

3.2.1.18 Underexcitation protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|--|---------------------|
| 10 / 0 | 40 Vexc failure | 1 = 40 Exc. 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 |

3.2.1.19 Circuit breaker failure protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|--------------------|---------------------|
| 10 / 6 | 50BF pickup | 1 = 50BF picked up | 1455 |
| 10 / 7 | 50BF TRIP | 1 = 50BF TRIP | 1471 |

3.2.1.20 Impedance protection

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|--------------------------------------|---------------------|
| 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 |
| 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 |

3.2.1.21 Binary inputs

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

3.2.1.22 Inadvertent energisation protection

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

3.2.1.23 Trip coil monitor

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

3.2.1.24 User-defined annunciations

- User-defined protection annunciations, single-point indications and taggings can be routed on these positions as “Destination system interface” using the **DIGSI Configuration matrix**.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 12 / 7 | <user-defined> | not pre-allocated | - |
| 13 / 0 | <user-defined> | not pre-allocated | - |
| 13 / 1 | <user-defined> | not pre-allocated | - |
| 13 / 2 | <user-defined> | not pre-allocated | - |
| 13 / 3 | <user-defined> | not pre-allocated | - |

3.2.1.25 Double-point indications

- Double-point indications (e.g. checkback indications of double commands) can be routed on these positions as “Destination system interface” using the **DIGSI Configuration matrix**.

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|--------|-------------------------------------|-------------------|---------------------|
| 13 / 4 | <user-defined> OFF | not pre-allocated | - |
| 13 / 5 | <user-defined> ON | | |
| 13 / 6 | <user-defined> OFF | not pre-allocated | - |
| 13 / 7 | <user-defined> ON | | |

3.2.2 Measured values

- Ref. to chap. 1.3.2 for notes regarding scaling of measured values.

| Offset | Designation of the SIPROTEC objects | Comments | Scaling (32767 corresponds to ...) | Internal object no. |
|--------|-------------------------------------|---------------------------------------|---------------------------------------|---------------------|
| 14 | Ia = | Current in phase A | 327.67 % | 601 |
| 16 | Ib = | Current in phase B | 327.67 % | 602 |
| 18 | Ic = | Current in phase C | 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 | f = | Frequency | 327.67 Hz | 644 |
| 32 | I2 = | I2 (negative sequence) | 327.67 % | 606 |
| 34 | Θ/Θtrip = | Temperature rise for warning and trip | 327.67 % | 801 |

3.2.3 Metered measurands

- Ref. to chap. 1.3.3 for notes regarding scaling of metered measurands.

| Offset | Designation of the SIPROTEC objects | Comments | Scaling ($2^{31}-1$ corresponds to ...) | Internal object no. |
|--------|-------------------------------------|---|---|---------------------|
| 36 | Wp+ | Wp Forward (Metered measurand derived from measured values) | $2^{31}-1$ impulses | 924 |
| 40 | Wq+ | Wq Forward (Metered measurand derived from measured values) | $2^{31}-1$ impulses | 925 |
| 44 | Wp- | Wp Reverse (Metered measurand derived from measured values) | $2^{31}-1$ impulses | 928 |
| 48 | Wq- | Wq Reverse (Metered measurand derived from measured values) | $2^{31}-1$ impulses | 929 |

3.2.4 Event list

- Information regarding the handshake bytes as well as the retrieval methods of the event list via PROFIBUS-DP can be found in the manual "SIPROTEC Communication module, PROFIBUS-DP - Communication profile".

| Offset | Designation of the SIPROTEC objects | Comments | Internal object no. |
|---------|-------------------------------------|--|---------------------|
| 52 | Control_I | Handshake byte for event list via PROFIBUS-DP | - |
| 53 | SPARE | reserved for future use (the value 0 is transmitted at this position) | - |
| 54 | Message block #1 | Identification #1 | - |
| 55 | | Value #1 | |
| 56 - | | Time stamp #1 | |
| 63 | | | |
| 64 | Message block #2 | Identification #2 | - |
| 65 | | Value #2 | |
| 66 - | | Time stamp #2 | |
| 73 | | | |
| 74 | Message block #3 | Identification #3 | - |
| 75 | | Value #3 | |
| 76 - | | Time stamp #3 | |
| 83 | | | |

Glossary

| | |
|---|--|
| CFC | Continuous Function Chart |
| DC | Double command |
| DDB file / GSD file | <p>The DDB file contains the Device Data Base (technical characteristics) of the PROFIBUS-DP communication module (PROFIBUS-DP slave).</p> <p>This file is required for configuration of the PROFIBUS-DP master and is supplied together with DIGSI.</p> |
| DIGSI | Parameterization system / parameterization software for SIPROTEC devices |
| DP | Double-point indication |
| Input data / Input direction | Data from the PROFIBUS-DP slave to the PROFIBUS-DP master. |
| Octet | Term from EN 50170, one octet corresponds to 8 bits. |
| OLM | Optical Link Module |
| Output data / Output direction | Data from the PROFIBUS-DP master to the PROFIBUS-DP slave. |
| PNO | PROFIBUS Nutzerorganisation (PROFIBUS International Organization) |
| PROFIBUS-DP | PROFIBUS - Decentralized Peripherals |
| PSE | PROFIBUS interface module with (electrical) isolated RS485 interface for the SIPROTEC devices from Siemens. |
| PSO | PROFIBUS interface module with fibre-optical interface for the SIPROTEC devices from Siemens. |
| SC | Single command |
| SP | Single-point indication |

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