

SIPROTEC4

Multifunction protection with
control
7SJ61...63, 7SJ65

Input/Output unit with local
control
6MD63

Communication module

PROFIBUS-DP
Bus mapping

Preface

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Non-liability clause

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
- Standard mapping 2-1
- Standard mapping 2-2
- Standard mapping 2-3
- Standard mapping 2-4

Additional literature

This manual describes the data in the PROFIBUS-DP messages of the SIPROTEC devices 7SJ61...7SJ63, 7SJ65, 6MD63.

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

<i>Manual</i>	<i>Contents</i>	<i>Order number</i>
Overcurrent, overload and motor protection with control SIPROTEC 7SJ61	Function, operation, assembly and commissioning of the SIPROTEC device 7SJ61	C53000-G1140-C118-2
Multifunction protection with control SIPROTEC 7SJ62	Function, operation, assembly and commissioning of the SIPROTEC device 7SJ62	C53000-G1140-C121-2
Multifunction protection with control SIPROTEC 7SJ63	Function, operation, assembly and commissioning of the SIPROTEC device 7SJ63	C53000-G1140-C120-2
Multifunction protection with control and small-signal interface SIPROTEC 7SJ65	Function, operation, assembly and commissioning of the SIPROTEC device 7SJ65	C53000-G1140-C144-1
Input/output unit with local control SIPROTEC 6MD63	Function, operation, assembly and commissioning of the SIPROTEC device 6MD63	C53000-C1840-C101-2
7SJ61...63, 7SJ65, 6MD63, 7UM61 PROFIBUS-DP - Communication profile	Data types, bus specific parameters and hardware description of the PROFIBUS-DP slave modul of the SIPROTEC devices	C53000-L1840-B001-02

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 7SJ61...7SJ63, 7SJ65, 6MD63 with:
 - firmware version 4.2 or higher (7SJ65: version 4.3 or higher) and
 - PROFIBUS-DP communication module version 01.01.02 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

Modified chapters / pages	Edition	Reasons of modification
	1.0	First edition, Doc.-No.: C53000-L1840-B006-02 Aug 23 rd , 2000
chap. 4.2.3.1 chap. 5 chap. 1.6 chap. 1.5.5	2.0	<ul style="list-style-type: none"> • Document also valid for 7SJ65 devices • Allocation 3/0...3/7 for Standard mapping 2-3 corrected • Standard mapping 2-4 added • Chap. "Using device firmware version 4.3 or higher" added • Description of "Error with a summary alarm" extended Feb 22 nd , 2001
chap. 1.4 chap. 4.2.3 chap. 2.1.3, 3.1.3	2.1	<ul style="list-style-type: none"> • Parameterization of the PROFIBUS-DP master: Order number of the output module for standard mapping 2-3 corrected • Offsets of metered measurands in Standard mapping 2-3 corrected • Internal object no. for activation/deactivation of Automatic recloser and Protection functions changed Oct 31 st , 2001

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Data in the PROFIBUS-DP messages

1

1.1 Explanation



Note

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

The chapters 2 to 5 define the data area of the PROFIBUS-DP messages for data transfer between the PROFIBUS-DP slave of the SIPROTEC device 7SJ61...7SJ63, 7SJ65, 6MD63 with 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>
2	la	Current in phase A	3276.7 A	601

The measured value “la” is assigned to data byte 2 (most significant byte of the measured value) and data byte 3 (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	Q0 ON/OFF OFF	Circuit breaker	-
0/1	Q0 ON/OFF ON		
17/4	Fail Ph. Seq.	1 = Failure: Phase Sequence	171

The checkback signal from the circuit breaker (as double-point indication) is located in data byte 0, bit positions 2^0 (bit 0) and 2^1 (bit 1).

The single-point indication "Fail Ph. Seq." is located in byte 17, bit position 2^4 .



The definitions of data types (single-point indication, double-point indication, measured value, metered measurand etc.) are contained in the manual "7SJ61...63, 7SJ65, 6MD63, 7UM61 PROFIBUS-DP - Communication profile" (ref. to page i).

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, 3.1, 4.1 and 5.1) allow:

- command outputs through the output relays of the SIPROTEC device (external commands),
- manipulation of taggings (internal commands), which can be changed by PROFIBUS-DP.



Note

The allocation of the output relays to the switching devices and to the output channels is defined during parametrization 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.

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

The messages in PROFIBUS-DP input direction (ref. to chap. 2.2, 3.2, 4.2 and 5.2) 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 given scaling values for the measured values in the standard mappings apply to installations with the following nominal operating values:

Nominal operating voltage of primary equipment (parameter address 1101):

➔ 1.0 ... 10 (32) kV

Nominal operating current of primary equipment (parameter address 1102):

➔ 10 ... 1000 A

Product of:

- Voltage transducer – Primary voltage (parameter address 0202) and
- Ratio factor V_{ph}/V_{delta} (parameter address 0206)

➔ >1.0 ... 10 (32) kV

Product of:

- Current transducer – Rated primary current (parameter address 0204) and
- Ratio factor I_N/I_{ph} (parameter address 0207) or (dependent on the device type)
- Ratio factor I_{Ns}/I_{ph} (parameter address 0208)

➔ 0.0 ... 1000 A

Power values:

- Product of Nominal operating voltage and Nominal operating current of primary equipment multiplied by $\sqrt{3}$

➔ >1.0 ... 10 (32) MW (MVAR)



Note

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 "7SJ61...63, 7SJ65, 6MD63, 7UM61 PROFIBUS-DP - Communication profile " (ref. to page i).

1.3.3 Metered measurands

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:

$I_{nom} = 100 \text{ A}$ und $V_{nom} = 12.00 \text{ kV}$,

60000 impulses correspond so that:

$1 \text{ h} * 100 \text{ A} * 12 \text{ kV} * \sqrt{3} = 2078.46 \text{ kWh}$



Note

- The type of the update (cyclic, with or without deletion) and the update interval must be programmed for the metered measurands (except for the operating hours meter) with the parameterization software DIGSI.
- The scaling of the metered measurands at binary inputs ("Wp(puls)" and "Wq(puls)") depends on the externally connected pulse generator.

1.4 Configuration data of the standard mappings 2-1 to 2-4

There are three standard mappings (standard mapping 2-1 to standard mapping 2-4) available for the SIPROTEC devices 7SJ61...7SJ63, 7SJ65, 6MD63 for parameterization with DIGSI version 4.2 or higher which differ in the data size of the PROFIBUS-DP messages.

Standard mapping 2-1

The standard mapping 2-1 contains:

Output direction:

- 7 double-point commands
- 29 single-point commands

Input direction:

- 7 double-point indications
- 146 single-point indications,
- 25 measured values (integer)
- 6 metered measureands (unsigned long)
- Fault locator: Fault location (integer)
- Counter of operating hours (unsigned long)

Standard mapping 2-2

The standard mapping 2-2 contains:

Output direction:

- 7 double-point commands
- 29 single-point commands

Input direction:

- 7 double-point indications
- 114 single-point indications
- 10 measured values (integer)
- 2 metered measurands (unsigned long)
- Counter of operating hours (unsigned long)

Standard mapping 2-3

The standard mapping 2-3 contains:

Output direction:

- 8 double-point commands
- 24 single-point commands

Input direction:

- 8 double-point indications
- 64 single-point indications
- 21 measured values (integer)
- 6 metered measurands (unsigned long)
- Counter of operating hours (unsigned long)

Standard mapping 2-4

The standard mapping 2-4 contains:

Output direction:

- 3 double-point commands
- 5 single-point commands

Input direction:

- 3 double-point indications
- 26 single-point indications
- 8 measured values (integer)
- 2 metered measurands (unsigned long)

PROFIBUS-DP configuration data

Standard mapping 2-1: **1FH 1FH 1FH 1FH 1FH 1FH 13H 28H**
(100 bytes input- and 9 bytes output direction)

Standard mapping 2-2: **1FH 1FH 1FH 28H**
(48 bytes input- and 9 bytes output direction)

Standard mapping 2-3: **1FH 1FH 1FH 1FH 1FH 27H**
(80 bytes input- and 8 bytes output direction)

Standard mapping 2-4: **1FH 1BH 21H**
(28 bytes input- and 2 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 7SJ61...7SJ63, 7SJ65, 6MD63 standard mappings and to allocate associated addresses in the I/O addressing range of the PROFIBUS-DP master:

Standard mapping 2-1:

Module	Order number	Input address	Output address
0	Input – 16 Bytes	Addr_lx	
1	Input – 16 Bytes	Addr_lx+16	
2	Input – 16 Bytes	Addr_lx+32	
3	Input – 16 Bytes	Addr_lx+48	
4	Input – 16 Bytes	Addr_lx+64	
5	Input – 16 Bytes	Addr_lx+80	
6	Input – 4 Bytes	Addr_lx+96	
7	Output – 9 Bytes		Addr_Ox

Standard mapping 2-2:

Module	Order number	Input address	Output address
0	Input – 16 Bytes	Addr_lx	
1	Input – 16 Bytes	Addr_lx+16	
2	Input – 16 Bytes	Addr_lx+32	
3	Output – 9 Bytes		Addr_Ox

Standard mapping 2-3:

Module	Order number	Input address	Output address
0	Input – 16 Bytes	Addr_lx	
1	Input – 16 Bytes	Addr_lx+16	
2	Input – 16 Bytes	Addr_lx+32	
3	Input – 16 Bytes	Addr_lx+48	
4	Input – 16 Bytes	Addr_lx+64	
5	Output – 8 Bytes		Addr_Ox

Standard mapping 2-4:

Module	Order number	Input address	Output address
0	Input – 16 Bytes	Addr_lx	
1	Input – 12 Bytes	Addr_lx+16	
5	Output – 2 Bytes		Addr_Ox

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

Addr_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. 2.2, 3.2, 4.2 and 5.2).

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. 2.1, 3.1, 4.1 and 5.1).

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. 2.2.4, 3.2.3, 4.2.3 and 5.2.3) can be correctly carried out in the PROFIBUS-DP master.

Compatibility to DIGSI 4.1 standard mappings

The standard mappings 1 to m (m = device type dependent number of standard mappings) enclosed to DIGSI 4.1 can be replaced by the standard mappings 2-1 to 2-3 to make customizations of the allocation and scaling possible.

The following relations are valid:

DIGSI 4.2 mapping	corresponds to DIGSI 4.1 mapping	
	in the size	in the measured value scaling
Standard mapping 2-1	Standard mapping 1 to 4 of the devices 7SJ62/63	Standard mapping 1 of the device 7SJ62/63
Standard mapping 2-2	Standard mapping 1 and 2 of the device 7SJ61	Standard mapping 1 of the device 7SJ61
Standard mapping 2-3	Standard mapping 1 to 3 of the device 6MD63	Standard mapping 1 of the device 6MD63

The DIGSI 4.1 standard mappings are not component of this documentation. You find associated information in the following manuals:

Manual	Contents	Order number
PROFIBUS-DP Bus mapping 7SJ61	Data in the PROFIBUS-DP messages of the SIPROTEC device 7SJ61	C53000-L1840-B002-01
PROFIBUS-DP Busmapping 7SJ62/63	Data in the PROFIBUS-DP messages of the SIPROTEC devices 7SJ62/63	C53000-L1840-B003-01
PROFIBUS-DP Bus mapping 6MD63	Data in the PROFIBUS-DP messages of the SIPROTEC device 6MD63	C53000-L1840-B004-01

1.5 Notes to SIPROTEC objects

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



The description of the standard mappings (ref. to chap. 2 to 5) 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...63, 7SJ65, 6MD63, 7UM61 PROFIBUS-DP - Communication profile" (ref. to page i).

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 Single commands

The command output mode (*pulse output, continuous output*) is changeable for the single commands using parameterization software DIGSI. The command output modes indicated in the standard mappings are predefined.

The switching direction OFF for single commands with *pulse output* is not permitted and is rejected in the SIPROTEC device.

References

Standard mapping 2-1: ref. to chap. 2.1.2

Standard mapping 2-2: ref. to chap. 3.1.2

Standard mapping 2-3: ref. to chap. 4.1.2

Standard mapping 2-4: ref. to chap. 5.1.2

1.5.2 Control mode REMOTE

Control mode with control authority is REMOTE, option of unlocked control with PROFIBUS-DP.

- Changing the "Control mode REMOTE" to UNLOCKED permits one unlocked control operation via PROFIBUS-DP. After execution of the command, the "Control mode REMOTE" in the SIPROTEC device will automatically be reset to LOCKED.
- A programmed test "Switch in position" for unlocked control operations will always be executed.
- If, after changing the "Control mode REMOTE" to UNLOCKED, no command is received via PROFIBUS-DP for a period of 5 minutes, then the "Control mode REMOTE" is automatically reset to LOCKED.
- If the "Control mode REMOTE" was automatically reset to LOCKED by the SIPROTEC device then this status can be recognized by the corresponding bit in the PROFIBUS-DP input message. In this case the status of "Control mode REMOTE" in output direction has to be updated by the PROFIBUS-DP master.

References

Standard mapping 2-1: ref. to chap. 2.1.3

Standard mapping 2-2: ref. to chap. 3.1.3

Standard mapping 2-3: ref. to chap. 4.1.3

Standard mapping 2-4: not pre-allocated

1.5.3 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".

References

Standard mapping 2-1: ref. to chap. 2.1.3

Standard mapping 2-2: ref. to chap. 3.1.3

Standard mapping 2-3: not pre-allocated

Standard mapping 2-4: ref. to chap. 5.1.3

1.5.4 CFC-Incoming annunciations

The CFC-Incoming annunciations allow routing of further protection annunciations on PROFIBUS-DP, which are not contained in the standard mapping (e.g. ">BLK 50/51", internal object number = 1704 or ">BLK 50N/51N", internal object number = 1714).

You find information about this in the manual "7SJ61...63, 7SJ65, 6MD63, 7UM61 PROFIBUS-DP - Communication profile" (ref. to page i) in the chapter "PROFIBUS-DP – Parametrization in DIGSI, Customization of the allocations".

References

Standard mapping 2-1: ref. to chap. 2.1.4

Standard mapping 2-2: ref. to chap. 3.1.4

Standard mapping 2-3: ref. to chap. 4.1.4

Standard mapping 2-4: ref. to chap. 5.1.4

1.5.5 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.

Depending on the device composition not all alarms are available.

7SJ61, 7SJ62:

- The "Error with a summary alarm" corresponds to the internal alarm "I/O-Board error".
- Additionally with firmware version 4.3 or higher: "Error Board 1", "Error 5V", "Error 1A/5A wrong", "Error neutral CT", "Error: Range CT Phase wrong"

7SJ63, 7SJ65, 6MD63:

- "Error Board 1", "Error Board 2", "Error Board 3", "Error Board 4", "Error Board 5", "Error Board 6", "Error Board 7", "I/O-Board error", "Error 5V", "Error 0V", "Error -5V".
- Additionally with firmware version 4.3 or higher: "Error Power Supply", "Error 1A/5A wrong", "Error neutral CT", "Error: Range CT Phase wrong"

References

Standard mapping 2-1: ref. to chap. 2.2.1.5

Standard mapping 2-2: ref. to chap. 3.2.1.5

Standard mapping 2-3: ref. to chap. 4.2.1.5

Standard mapping 2-4: ref. to chap. 5.2.1.8

1.5.6 Alarm summary event

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

- "Failure: Current summation", "Failure: Current balance", "Failure: Voltage balance", "Failure: Phase sequence current", "Failure: Phase sequence voltage".

References	<i>Standard mapping 2-1:</i> ref. to chap. 2.2.1.5
	<i>Standard mapping 2-2:</i> ref. to chap. 3.2.1.5
	<i>Standard mapping 2-3:</i> ref. to chap. 4.2.1.5
	<i>Standard mapping 2-4:</i> ref. to chap. 5.2.1.8

1.5.7 Stop data transmission

The functionality "Stop data transmission" is not supported via PROFIBUS-DP communication. If "Stop data transmission" is active nevertheless data via PROFIBUS-DP will be transmitted furthermore.

The annunciation "DataStop" signals the activation of "Stop data transmission" however and can be evaluated correspondingly in the PROFIBUS-DP master.

References	<i>Standard mapping 2-1:</i> ref. to chap. 2.2.1.21
	<i>Standard mapping 2-2:</i> ref. to chap. 3.2.1.18
	<i>Standard mapping 2-3:</i> ref. to chap. 4.2.1.8
	Standard mapping 2-4: not pre-allocated

1.5.8 Fault locator: Fault location

Always the latest fault location is stored.

In the event of a fault, reading out of the fault record protocol from the SIPROTEC device is necessary for an exact diagnosis.

References	<i>Standard mapping 2-1:</i> ref. to chap. 1.5.8
	<i>Standard mapping 2-2:</i> not available
	<i>Standard mapping 2-3:</i> not available
	<i>Standard mapping 2-4:</i> not available

1.6 Using device firmware version 4.3 or higher

The following SIPROTEC objects are no longer included per default in the parameter set of the device.

Double commands:

- Switching device D1 (UsrDC1) ...
Switching device D3 (UsrDC3)

Single commands:

- Output channel E1 (UsrSC5) ...
Output channel E6 (UsrSC12)

Application logic CFC:

- CFC-Incoming annunciation 1 (UsCfcSp1) ...
CFC-Incoming annunciation 16 (UsCfcSp16)
- CFC-Output indication 1 (UsCfcSpO1) ...
CFC-Output indication 16 (UsCfcSpO16)

Input channels with allocation to the binary inputs and tagging:

- Input channel 1 (UsrSpO/C1) ...
Input channel 8 (UsrSpO/C32)

After creating a SIPROTEC device with device firmware version 4.3 or higher in the parametrization system DIGSI and assignment of a PROFIBUS-DP mapping the PROFIBUS-DP message positions at which the above-mentioned SIPROTEC objects are defined in according to the descriptions (ref. to chap. 2 to 5) contain no pre-allocation.

Additional protection alarms or user defined annunciations can be routed on these positions using DIGSI Configuration matrix.

2

Standard mapping 2-1

2.1 Message in output direction

2.1.1 Double commands (with checkback indication)

- Ref. to chap. 1.6 for additional notes.

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
0/0	Q0 ON/OFF OFF	Impulse output, 3 relays (2-pole On, 1-pole Off)	-
0/1	Q0 ON/OFF ON		
0/2	Q1 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
0/3	Q1 ON/OFF ON		
0/4	Q8 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
0/5	Q8 ON/OFF ON		
0/6	Q2 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
0/7	Q2 ON/OFF ON		
1/0	Q9 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
1/1	Q9 ON/OFF ON		
1/2	Switching device D1 (UsrDC1) OFF	Impulse output, 4 relays (2-pole)	-
1/3	Switching device D1 (UsrDC1) ON		
1/4	Switching device D2 (UsrDC2) OFF	Impulse output, 2 relays, 1-pole	-
1/4	Switching device D2 (UsrDC2) ON		

2.1.2 Single commands (without checkback indication)

- Ref. to chap. 1.5.1 and 1.6 for additional notes.

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
1/6	Output channel E1 (UsrSC5) OFF	Impulse output, 1 relay, 1-pole	-
1/7	Output channel E1 (UsrSC5) ON		
2/0	Output channel E2 (UsrSC6) OFF	Impulse output, 1 relay, 1-pole	-
2/1	Output channel E2 (UsrSC6) ON		

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
2/2	Output channel E3 (UsrSC10) OFF	Continuous output without restauration, 1 relay, 1-pole	-
2/3	Output channel E3 (UsrSC10) ON		

2.1.3 Internal commands

- Ref. to chap. 1.5.2 and 1.5.3 for additional notes regarding "Control mode REMOTE" and "Changing the setting group".

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
2/4	Auto recl. OFF	Deactivation of "Autoreclosing"	2782
2/5	Auto recl. ON	Activation of "Autoreclosing"	
2/6	Protection OFF	Deactivation of protection functions	52
2/7	Protection ON	Activation of protection functions	
3/0	<reserved>		-
3/1	<reserved>		
3/2	Mode REMOTE	Control mode REMOTE = LOCKED	-
3/3	Mode REMOTE	Control mode REMOTE = UNLOCKED	
3/4	<reserved>		-
3/5	<reserved>		
3/6	<reserved>		-
3/7	<reserved>		
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	Setting group C		55
4/5	Setting group C	Activation of setting group C	
4/6	Setting group D		56
4/7	Setting group D	Activation of setting group D	

2.1.4 Application logic CFC

- Ref. to chap. 1.5.4 and 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
5/0	CFC-Incoming annunciation 1 (UsCfcSpl1) OFF	Tagging ON/OFF, released as CFC input	-
5/1	CFC-Incoming annunciation 1 (UsCfcSpl1) ON		

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
5/2	CFC-Incoming annunciation 2 (UsCfcSpl2) OFF	Tagging ON/OFF, released as CFC input	-
5/3	CFC-Incoming annunciation 2 (UsCfcSpl2) ON		
5/4	CFC-Incoming annunciation 3 (UsCfcSpl3) OFF	Tagging ON/OFF, released as CFC input	-
5/5	CFC-Incoming annunciation 3 (UsCfcSpl3) ON		
5/6	CFC-Incoming annunciation 4 (UsCfcSpl4) OFF	Tagging ON/OFF, released as CFC input	-
5/7	CFC-Incoming annunciation 4 (UsCfcSpl4) ON		
6/0	CFC-Incoming annunciation 5 (UsCfcSpl5) OFF	Tagging ON/OFF, released as CFC input	-
6/1	CFC-Incoming annunciation 5 (UsCfcSpl5) ON		
6/2	CFC-Incoming annunciation 6 (UsCfcSpl6) OFF	Tagging ON/OFF, released as CFC input	-
6/3	CFC-Incoming annunciation 6 (UsCfcSpl6) ON		
6/4	CFC-Incoming annunciation 7 (UsCfcSpl7) OFF	Tagging ON/OFF, released as CFC input	-
6/5	CFC-Incoming annunciation 7 (UsCfcSpl7) ON		
6/6	CFC-Incoming annunciation 8 (UsCfcSpl8) OFF	Tagging ON/OFF, released as CFC input	-
6/7	CFC-Incoming annunciation 8 (UsCfcSpl8) ON		
7/0	CFC-Incoming annunciation 9 (UsCfcSpl9) OFF	Tagging ON/OFF, released as CFC input	-
7/1	CFC-Incoming annunciation 9 (UsCfcSpl9) ON		
7/2	CFC-Incoming annunciation 10 (UsCfcSpl10) OFF	Tagging ON/OFF, released as CFC input	-
7/3	CFC-Incoming annunciation 10 (UsCfcSpl10) ON		
7/4	CFC-Incoming annunciation 11 (UsCfcSpl11) OFF	Tagging ON/OFF, released as CFC input	-
7/5	CFC-Incoming annunciation 11 (UsCfcSpl11) ON		
7/6	CFC-Incoming annunciation 12 (UsCfcSpl12) OFF	Tagging ON/OFF, released as CFC input	-
7/7	CFC-Incoming annunciation 12 (UsCfcSpl12) ON		
8/0	CFC-Incoming annunciation 13 (UsCfcSpl13) OFF	Tagging ON/OFF, released as CFC input	-
8/1	CFC-Incoming annunciation 13 (UsCfcSpl13) ON		
8/2	CFC-Incoming annunciation 14 (UsCfcSpl14) OFF	Tagging ON/OFF, released as CFC input	-
8/3	CFC-Incoming annunciation 14 (UsCfcSpl14) ON		
8/4	CFC-Incoming annunciation 15 (UsCfcSpl15) OFF	Tagging ON/OFF, released as CFC input	-
8/5	CFC-Incoming annunciation 15 (UsCfcSpl15) ON		
8/6	CFC-Incoming annunciation 16 (UsCfcSpl16) OFF	Tagging ON/OFF, released as CFC input	-
8/7	CFC-Incoming annunciation 16 (UsCfcSpl16) ON		

2.2 Message in input direction

2.2.1 Annunciations

2.2.1.1 Double commands – checkback signals

- Ref. to chap. 1.6 for additional notes.

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
0/0	Q0 ON/OFF OFF	Double-point indication ON/OFF	–
0/1	Q0 ON/OFF ON		
0/2	Q1 ON/OFF OFF	Double-point indication ON/OFF	–
0/3	Q1 ON/OFF ON		
0/4	Q8 ON/OFF OFF	Double-point indication ON/OFF	–
0/5	Q8 ON/OFF ON		
0/6	Q2 ON/OFF OFF	Double-point indication ON/OFF	–
0/7	Q2 ON/OFF ON		
1/0	Q9 ON/OFF OFF	Double-point indication ON/OFF	–
1/1	Q9 ON/OFF ON		
1/2	Switching device D1 (UsrDC1) OFF	Double-point indication ON/OFF	–
1/3	Switching device D1 (UsrDC1) ON		
1/4	Switching device D2 (UsrDC2) OFF	Double-point indication ON/OFF	–
1/5	Switching device D2 (UsrDC2) ON		

2.2.1.2 Single commands – status

- Ref. to chap. 1.6 for additional notes.

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
1/6	Output channel E1 (UsrSC5)	Single-point indication ON/OFF	–
1/7	Output channel E2 (UsrSC6)	Single-point indication ON/OFF	–
2/0	Output channel E3 (UsrSC10)	Single-point indication ON/OFF	–

2.2.1.3 Input channels with allocation to the binary inputs and tagging

- Ref. to chap. 1.6 for additional notes.

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
2/1	Input channel 1 (UsrSpO/C1)	Single-point indication OPEN/CLOSE	–
2/2	Input channel 2 (UsrSpO/C2)	Single-point indication OPEN/CLOSE	–
2/3	Input channel 3 (UsrSpO/O11)	Single-point indication ON/OFF	–

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
2/4	Input channel 4 (UsrSpO/O12)	Single-point indication ON/OFF	–
2/5	Input channel 5 (UsrSpO/O13)	Single-point indication ON/OFF	–
2/6	Input channel 6 (UsrSpO/O14)	Single-point indication ON/OFF	–
2/7	Input channel 7 (UsrSpO/O32)	Tagging / Internal single-point indication ON/OFF	–

2.2.1.4 Application logic CFC

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
3/0	CFC-Output indication 1 (UsCfcSpO1)	Single-point indication ON/OFF, released as CFC output	–
3/1	CFC-Output indication 2 (UsCfcSpO2)	Single-point indication ON/OFF, released as CFC output	–
3/2	CFC-Output indication 3 (UsCfcSpO3)	Single-point indication ON/OFF, released as CFC output	–
3/3	CFC-Output indication 4 (UsCfcSpO4)	Single-point indication ON/OFF, released as CFC output	–
3/4	CFC-Output indication 5 (UsCfcSpO5)	Single-point indication ON/OFF, released as CFC output	–
3/5	CFC-Output indication 6 (UsCfcSpO6)	Single-point indication ON/OFF, released as CFC output	–
3/6	CFC-Output indication 7 (UsCfcSpO7)	Single-point indication ON/OFF, released as CFC output	–
3/7	CFC-Output indication 8 (UsCfcSpO8)	Single-point indication ON/OFF, released as CFC output	–
4/0	CFC-Output indication 9 (UsCfcSpO9)	Single-point indication ON/OFF, released as CFC output	–
4/1	CFC-Output indication 10 (UsCfcSpO10)	Single-point indication ON/OFF, released as CFC output	–
4/2	CFC-Output indication 11 (UsCfcSpO11)	Single-point indication ON/OFF, released as CFC output	–
4/3	CFC-Output indication 12 (UsCfcSpO12)	Single-point indication ON/OFF, released as CFC output	–
4/4	CFC-Output indication 13 (UsCfcSpO13)	Single-point indication ON/OFF, released as CFC output	–
4/5	CFC-Output indication 14 (UsCfcSpO14)	Single-point indication ON/OFF, released as CFC output	–
4/6	CFC-Output indication 15 (UsCfcSpO15)	Single-point indication ON/OFF, released as CFC output	–
4/7	CFC-Output indication 16 (UsCfcSpO16)	Single-point indication ON/OFF, released as CFC output	–

2.2.1.5 Diagnosis

- Ref. to chap. 1.5.5 and 1.5.6 for additional notes regarding "Error with a summary alarm" and "Alarm summary event".

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
5/0	Device OK	1 = Update of the device replica in the SIPROTEC device completed after initial start or restart	51
5/1	ProtActive	1 = At least one protection function is active	52
5/2	Settings Calc.	1 = Setting calculation is running	70
5/3	Error Sum Alarm	1 = Error with a summary alarm ON	140
5/4	Alarm Sum Event	1 = Alarm summary event ON	160

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
5/5	Relay PICKUP	1 = Relay PICKUP (protection, summary alarm)	501
5/6	Relay TRIP	1 = Relay GENERAL TRIP command (common, summary alarm)	511
5/7	<reserved>		-

2.2.1.6 Automatic recloser status

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
6/0	>CB Ready	1 = Binary input "circuit breaker ready" is active	2730
6/1	79 OFF	1 = AR is switched OFF	2781
6/2	79 ON	1 = AR is switched ON	2782
6/3	79 Close	1 = AR close command	2851
6/4	79 Successful	1 = AR successfully completed	2862
6/5	79 Lockout	1 = AR definitive TRIP	2863
6/6	TRIP Gnd Fault	1 = AR TRIP ground fault	2869
6/7	TRIP Ph Fault	1 = AR TRIP phase fault	2870

2.2.1.7 Time overcurrent protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
7/0	50/51 PH OFF	1 = Time overcurrent phase is OFF	1751
7/1	50N/51N OFF	1 = Time overcurrent ground is OFF	1756
7/2	50(N)/51(N) PU	1 = Time overcurrent PICKUP	1761
7/3	50/51 Ph A PU	1 = Time overcurrent phase A picked up	1762
7/4	50/51 Ph B PU	1 = Time overcurrent phase B picked up	1763
7/5	50/51 Ph C PU	1 = Time overcurrent phase C picked up	1764
7/6	50/51N GND PU	1 = Time overcurrent ground picked up	1765
7/7	50(N)/51(N)TRIP	1 = Time overcurrent TRIP	1791
8/0	50-2 TRIP	1 = 50-2 TRIP	1805
8/1	50-1 TRIP	1 = 50-1 TRIP	1815
8/2	51 picked up	1 = 51 picked up	1820
8/3	51 TRIP	1 = 51 TRIP	1825
8/4	50N-2 TRIP	1 = 50N-2 TRIP	1833
8/5	50N-1 TimeOut	1 = 50N-1 TimeOut	1835
8/6	50N-1 TRIP	1 = 50N-1 TRIP	1836
8/7	51N TRIP	1 = 51N TRIP	1839

2.2.1.8 Directional time overcurrent protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
9/0	Phase A forward	1 = Phase A forward	2628
9/1	Phase B forward	1 = Phase B forward	2629
9/2	Phase C forward	1 = Phase C forward	2630
9/3	Phase A reverse	1 = Phase A reverse	2632
9/4	Phase B reverse	1 = Phase B reverse	2633
9/5	Phase C reverse	1 = Phase C reverse	2634
9/6	Ground forward	1 = Ground forward	2635
9/7	Ground reverse	1 = Ground reverse	2636
10/0	67-2 TRIP	1 = 67-2 TRIP	2649
10/1	67/67-TOC OFF	1 = Directional time overcurrent PHASE is switched OFF	2651
10/2	67N OFF	1 = Directional time overcurrent GROUND is switched OFF	2656
10/3	67-1 TRIP	1 = 67-1 TRIP	2665
10/4	67-TOC TRIP	1 = 67-TOC TRIP	2675
10/5	67N-2 TRIP	1 = 67N-2 TRIP	2679
10/6	67N-1 TRIP	1 = 67N-1 TRIP	2683
10/7	67N-TOC TRIP	1 = 67N-TOC TRIP	2686
11/0	67 A picked up	1 = Directional time overcurrent Phase A picked up	2692
11/1	67 B picked up	1 = Directional time overcurrent Phase B picked up	2693
11/2	67 C picked up	1 = Directional time overcurrent Phase C picked up	2694
11/3	67N picked up	1 = Directional time overcurrent GROUND picked up	2695
11/4	67/67N TRIP	1 = Directional time overcurrent TRIP	2696

2.2.1.9 Unbalanced load protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
11/5	46 OFF	1 = Unbalanced load protection is switched OFF	5151
11/6	46 TRIP	1 = 46 TRIP	5170

2.2.1.10 Frequency protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
11/7	81 OFF	1 = Frequency protection is switched OFF	5211
12/0	81-1 TRIP	1 = 81-1 TRIP	5236
12/1	81-2 TRIP	1 = 81-1 TRIP	5237

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
12/2	81-3 TRIP	1 = 81-1 TRIP	5238
12/3	81-4 TRIP	1 = 81-1 TRIP	5239

2.2.1.11 Undervoltage and overvoltage protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
12/4	27 OFF	1 = 27 Undervoltage protection is switched OFF	6530
12/5	27-1 TRIP	1 = 27-1 Undervoltage TRIP	6539
12/6	27-2 TRIP	1 = 27-2 Undervoltage TRIP	6540
12/7	59 OFF	1 = 59 Overvoltage protection is switched OFF	6565
13/0	59-1 TRIP	1 = 59 TRIP	6570

2.2.1.12 Sensitive ground fault protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
13/1	50Ns/67Ns OFF	1 = Sensitive ground fault protection is switched OFF	1211
13/2	64 Pickup	1 = 64 displacement voltage pick up	1215
13/3	64 TRIP	1 = 64 displacement voltage element TRIP	1217
13/4	50Ns-2 TRIP	1 = 50Ns-2 TRIP	1223
13/5	50Ns-1 TRIP	1 = 50Ns-1 TRIP	1226
13/6	51Ns TRIP	1 = 51Ns TRIP	1229
13/7	Sens.Gnd Pickup	1 = Sensitive ground fault pick up	1271
14/0	Sens. Gnd Ph A	1 = Sensitive ground fault picked up in phase A	1272
14/1	Sens. Gnd Ph B	1 = Sensitive ground fault picked up in phase B	1273
14/2	Sens. Gnd Ph C	1 = Sensitive ground fault picked up in phase C	1274
14/3	SensGnd Forward	1 = Sensitive GND fault in forward direction	1276
14/4	SensGnd Reverse	1 = Sensitive GND fault in reverse direction	1277
14/5	SensGnd undef.	1 = Sensitive GND fault direction undefined	1278

2.2.1.13 Circuit breaker failure protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
14/6	50BF OFF	1 = Circuit breaker failure protection is switched OFF	1451
14/7	50BF TRIP	1 = Circuit breaker failure TRIP	1471

2.2.1.14 Thermal overload protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
15/0	49 O/L OFF	1 = Thermal overload protection is switched OFF	1511
15/1	49 O/L I Alarm	1 = 49 Overload current alarm (I alarm)	1515
15/2	49 O/L <Theta> Alarm	1 = 49 Overload alarm! Near thermal TRIP	1516
15/3	49 Windings O/L	1 = 49 Winding overload	1517
15/4	49 Th O/L TRIP	1 = 49 Thermal overload TRIP	1521
15/5	<reserved>		-

2.2.1.15 Motor start protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
15/6	>66 emerg. start	1 = Binary input "Emergency start" is active	4823
15/7	66 OFF	1 = Motor start protection is switched OFF	4824
16/0	66 TRIP	1 = Motor start protection TRIP	4827

2.2.1.16 Startup supervision

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
16/1	START-SUP OFF	1 = Startup supervision is switched OFF	6811
16/2	START-SUP TRIP	1 = Startup supervision TRIP	6821
16/3	Rotor locked	1 = Rotor locked	6822
16/4	START-SUP pu	1 = Startup supervision Pickup	6823

2.2.1.17 Trip coil monitor

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
16/5	FAIL: Trip cir.	1 = 74TC Failure trip circuit	6865

2.2.1.18 Cold load pickup setup

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
16/6	CLP OFF	1 = Cold-load-pickup is switched OFF	1994
16/7	CLP BLOCKED	1 = Cold-load-pickup is BLOCKED	1995
17/0	CLP running	1 = Cold-load-pickup is RUNNING	1996
17/1	Dyn set. ACTIVE	1 = Dynamic settings are ACTIVE	1997

2.2.1.19 Measurement supervision

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
17/2	Fail I Superv.	1 = Failure: General current supervision	161
17/3	Failure <Sum>I	1 = Failure: Current summation	162
17/4	Fail Ph. Seq.	1 = Failure: Phase sequence	171
17/5	MeasSup OFF	1 = Measurement supervision is switched OFF	197

2.2.1.20 Set point alarms

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
17/6	SP. Op Hours>	1 = Set point operating hours	272
17/7	SP. IA dmd>	1 = Set point phase A dmd>	273
18/0	SP. IB dmd>	1 = Set point phase B dmd>	274
18/1	SP. IC dmd>	1 = Set point phase C dmd>	275
18/2	SP. I1 dmd>	1 = Set point positive sequence I1 dmd>	276
18/3	SP. P dmd>	1 = Set point P dmd>	277
18/4	SP. Q dmd>	1 = Set point Q dmd>	278
18/5	SP. S dmd>	1 = Set point S dmd>	279
18/6	SP. 37-1 alarm	1 = Set point 37-1 undercurrent alarm	284
18/7	SP. PF(55)alarm	1 = Set point 55 power factor alarm	285

2.2.1.21 Status annunciations

- Ref. to chap. 1.5.7 for additional notes regarding "Stop data transmission".

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
19/0	>No Volt	1 = Binary input "No voltage (fuse blown)" is active	-
19/1	DataStop	1 = "Stop data transmission" is active	-
19/2	Test mode	1 = Test mode is active	-
19/3	Cntrl Auth (device 7SJ63/6MD63) ¹	Control authority (0 = REMOTE, 1 = LOCAL)	-
19/4	ModeLOCAL (device 7SJ63/6MD63) ¹	Control mode LOCAL (0 = LOCKED, 1 = UNLOCKED)	-
19/5	ModeREMOTE	Control mode REMOTE (0 = LOCKED, 1 = UNLOCKED)	-
19/6	Cntrl Auth (device 7SJ61/62) ²	Control authority (0 = REMOTE, 1 = LOCAL)	-
19/7	ModeLOCAL (device 7SJ61/62) ²	Control mode LOCAL (0 = LOCKED, 1 = UNLOCKED)	-

¹ Not used in the 7SJ61, 7SJ62.

² Not used in the 7SJ63, 7SJ65, 6MD63.

2.2.2 Measured values

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

2.2.2.1 Recorded measured values

Offset	Designation of the SIPROTEC objects	Comments	Scaling (32767 corresponds to ...)	Internal object no.
20	Ia =	Ia	3276.7 A	601
22	Ib =	Ib	3276.7 A	602
24	Ic =	Ic	3276.7 A	603
26	In =	In	3276.7 A	604
28	Va-b =	Va-b	32.767 kV	624
30	Vb-c =	Vb-c	32.767 kV	625
32	Vc-a =	Vc-a	32.767 kV	626
34	VN =	VN	32.767 kV	627
36	P =	P (active power)	32.767 MW	641
38	Q =	Q (reactive power)	32.767 MVAR	642
40	S =	S (apparent power)	32.767 MVAR	645
42	Freq =	Frequency	327.67 Hz	644
44	INs Real =	Resistive ground current in isol. systems	3276.7 A	701
46	INs Reac =	Reactive ground current in isol. systems	3276.7 A	702
48	PF =	Power Factor	3.2767	901
50	I1 =	I1 (positive sequence)	3276.7 A	605
52	I2 =	I2 (negative sequence)	3276.7 A	606
54	V1 =	V1 (positive sequence)	32.767 kV	629
56	V2 =	V2 (negative sequence)	32.767 kV	630
58	<Theta> Rotor	Temperature of rotor	327.67 %	805
60	<Theta> Stator	Temperature of stator	327.67 %	806
62	Td1=	Transducer 1	32.767 mA	996
64	Td2=	Transducer 2	32.767 mA	997

2.2.2.2 Measured values – mean values

Offset	Designation of the SIPROTEC objects	Comments	Scaling (32767 corresponds to ...)	Internal object no.
66	I1 dmd =	I1 (positive sequence) demand	3276.7 A	833
68	P dmd =	Active power demand	32.767 MW	834

2.2.3 Fault locator

- Ref. to chap. 1.5.8 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Scaling (32767 corresponds to ...)	Internal object no.
70	dist =	Fault locator: Distance to fault (Fault location)	3276.7 km/miles	1119

2.2.4 Metered measurands

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

Offset	Designation of the SIPROTEC objects	Comments	Scaling ($2^{31}-1$ of the unsigned long-value corresponds to ...)	Internal object no.
72	Wp(puls) =	Pulsed Energy Wp (active) (metering impulses at binary input)	$2^{31}-1$ impulses	888
76	Wq(puls) =	Pulsed Energy Wq (reactive) (metering impulses at binary input)	$2^{31}-1$ impulses	889
80	WpForward=	Wp Forward (<i>metered measurand derived from measured value</i>)	$2^{31}-1$ impulses	924
84	WqForward=	Wq Forward (<i>metered measurand derived from measured value</i>)	$2^{31}-1$ impulses	925
88	WpReverse =	Wp Reverse (<i>metered measurand derived from measured value</i>)	$2^{31}-1$ impulses	928
92	WqReverse =	Wq Reverse (<i>metered measurand derived from measured value</i>)	$2^{31}-1$ impulses	929
96	Op.Hours=	Counter of operating hours of the primary equipment	$2^{31}-1$ hours	1020

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Standard mapping 2-2

3.1 Message in output direction

3.1.1 Double commands (with checkback indication)

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
0/0	Q0 ON/OFF OFF	Impulse output, 3 relays (2-pole On, 1-pole Off)	-
0/1	Q0 ON/OFF ON		
0/2	Q1 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
0/3	Q1 ON/OFF ON		
0/4	Q8 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
0/5	Q8 ON/OFF ON		
0/6	Q2 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
0/7	Q2 ON/OFF ON		
1/0	Q9 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
1/1	Q9 ON/OFF ON		
1/2	Switching device D1 (UsrDC1) OFF	Impulse output, 4 relays (2-pole)	-
1/3	Switching device D1 (UsrDC1) ON		
1/4	Switching device D2 (UsrDC2) OFF	Impulse output, 2 relays, 1-pole	-
1/5	Switching device D2 (UsrDC2) ON		

3.1.2 Single commands (without checkback indication)

- Ref. to chap. 1.5.1 and 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
1/6	Output channel E1 (UsrSC5) OFF	Impulse output, 1 relay, 1-pole	-
1/7	Output channel E1 (UsrSC5) ON		
2/0	Output channel E2 (UsrSC6) OFF	Impulse output, 1 relay, 1-pole	-
2/1	Output channel E2 (UsrSC6) ON		

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
2/2	Output channel E3 (UsrSC10) OFF	Continuous output without restauration, 1 relay, 1-pole	-
2/3	Output channel E3 (UsrSC10) ON		

3.1.3 Internal commands

- Ref. to chap. 1.5.2 and 1.5.3 for additional notes regarding "Control mode REMOTE" and "Changing the setting group".

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
2/4	Auto recl. OFF	Deactivation of "Autoreclosing"	2782
2/5	Auto recl. ON	Activation of "Autoreclosing"	
2/6	Protection OFF	Deactivation of protection functions	52
2/7	Protection ON	Activation of protection functions	
3/0	<reserved>		-
3/1	<reserved>		
3/2	Mode REMOTE	Control mode REMOTE = LOCKED	-
3/3	Mode REMOTE	Control mode REMOTE = UNLOCKED	
3/4	<reserved>		-
3/5	<reserved>		
3/6	<reserved>		-
3/7	<reserved>		
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	Setting group C		55
4/5	Setting group C	Activation of setting group C	
4/6	Setting group D		56
4/7	Setting group D	Activation of setting group D	

3.1.4 Application logic CFC

- Ref. to chap. 1.5.4 and 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
5/0	CFC-Incoming annunciation 1 (UsCfcSpl1) OFF	Tagging ON/OFF, released as CFC input	-
5/1	CFC-Incoming annunciation 1 (UsCfcSpl1) ON		

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
5/2	CFC-Incoming annunciation 2 (UsCfcSpl2) OFF	Tagging ON/OFF, released as CFC input	-
5/3	CFC-Incoming annunciation 2 (UsCfcSpl2) ON		
5/4	CFC-Incoming annunciation 3 (UsCfcSpl3) OFF	Tagging ON/OFF, released as CFC input	-
5/5	CFC-Incoming annunciation 3 (UsCfcSpl3) ON		
5/6	CFC-Incoming annunciation 4 (UsCfcSpl4) OFF	Tagging ON/OFF, released as CFC input	-
5/7	CFC-Incoming annunciation 4 (UsCfcSpl4) ON		
6/0	CFC-Incoming annunciation 5 (UsCfcSpl5) OFF	Tagging ON/OFF, released as CFC input	-
6/1	CFC-Incoming annunciation 5 (UsCfcSpl5) ON		
6/2	CFC-Incoming annunciation 6 (UsCfcSpl6) OFF	Tagging ON/OFF, released as CFC input	-
6/3	CFC-Incoming annunciation 6 (UsCfcSpl6) ON		
6/4	CFC-Incoming annunciation 7 (UsCfcSpl7) OFF	Tagging ON/OFF, released as CFC input	-
6/5	CFC-Incoming annunciation 7 (UsCfcSpl7) ON		
6/6	CFC-Incoming annunciation 8 (UsCfcSpl8) OFF	Tagging ON/OFF, released as CFC input	-
6/7	CFC-Incoming annunciation 8 (UsCfcSpl8) ON		
7/0	CFC-Incoming annunciation 9 (UsCfcSpl9) OFF	Tagging ON/OFF, released as CFC input	-
7/1	CFC-Incoming annunciation 9 (UsCfcSpl9) ON		
7/2	CFC-Incoming annunciation 10 (UsCfcSpl10) OFF	Tagging ON/OFF, released as CFC input	-
7/3	CFC-Incoming annunciation 10 (UsCfcSpl10) ON		
7/4	CFC-Incoming annunciation 11 (UsCfcSpl11) OFF	Tagging ON/OFF, released as CFC input	-
7/5	CFC-Incoming annunciation 11 (UsCfcSpl11) ON		
7/6	CFC-Incoming annunciation 12 (UsCfcSpl12) OFF	Tagging ON/OFF, released as CFC input	-
7/7	CFC-Incoming annunciation 12 (UsCfcSpl12) ON		
8/0	CFC-Incoming annunciation 13 (UsCfcSpl13) OFF	Tagging ON/OFF, released as CFC input	-
8/1	CFC-Incoming annunciation 13 (UsCfcSpl13) ON		
8/2	CFC-Incoming annunciation 14 (UsCfcSpl14) OFF	Tagging ON/OFF, released as CFC input	-
8/3	CFC-Incoming annunciation 14 (UsCfcSpl14) ON		
8/4	CFC-Incoming annunciation 15 (UsCfcSpl15) OFF	Tagging ON/OFF, released as CFC input	-
8/5	CFC-Incoming annunciation 15 (UsCfcSpl15) ON		
8/6	CFC-Incoming annunciation 16 (UsCfcSpl16) OFF	Tagging ON/OFF, released as CFC input	-
8/7	CFC-Incoming annunciation 16 (UsCfcSpl16) ON		

3.2 Message in input direction

3.2.1 Annunciations

3.2.1.1 Double commands – checkback signals

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
0/0	Q0 ON/OFF OFF	Double-point indication ON/OFF	–
0/1	Q0 ON/OFF ON		
0/2	Q1 ON/OFF OFF	Double-point indication ON/OFF	–
0/3	Q1 ON/OFF ON		
0/4	Q8 ON/OFF OFF	Double-point indication ON/OFF	–
0/5	Q8 ON/OFF ON		
0/6	Q2 ON/OFF OFF	Double-point indication ON/OFF	–
0/7	Q2 ON/OFF ON		
1/0	Q9 ON/OFF OFF	Double-point indication ON/OFF	–
1/1	Q9 ON/OFF ON		
1/2	Switching device D1 (UsrDC1) OFF	Double-point indication ON/OFF	–
1/3	Switching device D1 (UsrDC1) ON		
1/4	Switching device D2 (UsrDC2) OFF	Double-point indication ON/OFF	–
1/5	Switching device D2 (UsrDC2) ON		

3.2.1.2 Single commands – status

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
1/6	Output channel E1 (UsrSC5)	Single-point indication ON/OFF	–
1/7	Output channel E2 (UsrSC6)	Single-point indication ON/OFF	–
2/0	Output channel E3 (UsrSC10)	Single-point indication ON/OFF	–

3.2.1.3 Input channels with allocation to the binary inputs and tagging

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
2/1	Input channel 1 (UsrSpO/C1)	Single-point indication OPEN/CLOSE	–
2/2	Input channel 2 (UsrSpO/C2)	Single-point indication OPEN/CLOSE	–

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
2/3	Input channel 3 (UsrSpO/O11)	Single-point indication ON/OFF	–
2/4	Input channel 4 (UsrSpO/O12)	Single-point indication ON/OFF	–
2/5	Input channel 5 (UsrSpO/O13)	Single-point indication ON/OFF	–
2/6	Input channel 6 (UsrSpO/O14)	Single-point indication ON/OFF	–
2/7	Input channel 7 (UsrSpO/O32)	Tagging / Internal single-point indication ON/OFF	–

3.2.1.4 Application logic CFC

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
3/0	CFC-Output indication 1 (UsCfcSpO1)	Single-point indication ON/OFF, released as CFC output	–
3/1	CFC-Output indication 2 (UsCfcSpO2)	Single-point indication ON/OFF, released as CFC output	–
3/2	CFC-Output indication 3 (UsCfcSpO3)	Single-point indication ON/OFF, released as CFC output	–
3/3	CFC-Output indication 4 (UsCfcSpO4)	Single-point indication ON/OFF, released as CFC output	–
3/4	CFC-Output indication 5 (UsCfcSpO5)	Single-point indication ON/OFF, released as CFC output	–
3/5	CFC-Output indication 6 (UsCfcSpO6)	Single-point indication ON/OFF, released as CFC output	–
3/6	CFC-Output indication 7 (UsCfcSpO7)	Single-point indication ON/OFF, released as CFC output	–
3/7	CFC-Output indication 8 (UsCfcSpO8)	Single-point indication ON/OFF, released as CFC output	–
4/0	CFC-Output indication 9 (UsCfcSpO9)	Single-point indication ON/OFF, released as CFC output	–
4/1	CFC-Output indication 10 (UsCfcSpO10)	Single-point indication ON/OFF, released as CFC output	–
4/2	CFC-Output indication 11 (UsCfcSpO11)	Single-point indication ON/OFF, released as CFC output	–
4/3	CFC-Output indication 12 (UsCfcSpO12)	Single-point indication ON/OFF, released as CFC output	–
4/4	CFC-Output indication 13 (UsCfcSpO13)	Single-point indication ON/OFF, released as CFC output	–
4/5	CFC-Output indication 14 (UsCfcSpO14)	Single-point indication ON/OFF, released as CFC output	–
4/6	CFC-Output indication 15 (UsCfcSpO15)	Single-point indication ON/OFF, released as CFC output	–
4/7	CFC-Output indication 16 (UsCfcSpO16)	Single-point indication ON/OFF, released as CFC output	–

3.2.1.5 Diagnosis

- Ref. to chap. 1.5.5 and 1.5.6 for additional notes regarding "Error with a summary alarm" and "Alarm summary event".

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
5/0	Device OK	1 = Update of the device replica in the SIPROTEC device completed after initial start or restart	51
5/1	ProtActive	1 = At least one protection function is active	52
5/2	Settings Calc.	1 = Setting calculation is running	70
5/3	Error Sum Alarm	1 = Error with a summary alarm ON	140

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
5/4	Alarm Sum Event	1 = Alarm summary event ON	160
5/5	Relay PICKUP	1 = Relay PICKUP (summary alarm)	501
5/6	Relay TRIP	1 = Relay GENERAL TRIP command (summary alarm)	511
5/7	<reserved>		-

3.2.1.6 Automatic recloser status

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
6/0	>CB Ready	1 = Binary input "circuit breaker ready" is active	2730
6/1	79 OFF	1 = AR is switched OFF	2781
6/2	79 ON	1 = AR is switched ON	2782
6/3	79 Close	1 = AR close command	2851
6/4	79 Successful	1 = AR successfully completed	2862
6/5	79 Lockout	1 = AR definitive TRIP	2863
6/6	TRIP Gnd Fault	1 = AR TRIP ground fault	2869
6/7	TRIP Ph Fault	1 = AR TRIP phase fault	2870

3.2.1.7 Time overcurrent protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
7/0	50/51 PH OFF	1 = Time overcurrent phase is OFF	1751
7/1	50N/51N OFF	1 = Time overcurrent ground is OFF	1756
7/2	50(N)/51(N) PU	1 = Time overcurrent PICKUP	1761
7/3	50/51 Ph A PU	1 = Time overcurrent phase A picked up	1762
7/4	50/51 Ph B PU	1 = Time overcurrent phase B picked up	1763
7/5	50/51 Ph C PU	1 = Time overcurrent phase C picked up	1764
7/6	50/51N GND PU	1 = Time overcurrent ground picked up	1765
7/7	50(N)/51(N)TRIP	1 = Time overcurrent TRIP	1791
8/0	50-2 TRIP	1 = 50-2 TRIP	1805
8/1	50-1 TRIP	1 = 50-1 TRIP	1815
8/2	51 picked up	1 = 51 picked up	1820
8/3	51 TRIP	1 = 51 TRIP	1825
8/4	50N-2 TRIP	1 = 50N-2 TRIP	1833
8/5	50N-1 TimeOut	1 = 50N-1 TimeOut	1835
8/6	50N-1 TRIP	1 = 50N-1 TRIP	1836
8/7	51N TRIP	1 = 51N TRIP	1839

3.2.1.8 Unbalanced load protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
9/0	46 OFF	1 = Unbalanced load protection is switched OFF	5151
9/1	46 TRIP	1 = 46 TRIP	5170

3.2.1.9 Sensitive ground fault protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
9/2	50Ns/67Ns OFF	1 = Sensitive ground fault protection is switched OFF	1211
9/3	50Ns-2 TRIP	1 = 50Ns-2 TRIP	1223
9/4	50Ns-1 TRIP	1 = 50Ns-1 TRIP	1226
9/5	51Ns TRIP	1 = 51Ns TRIP	1229

3.2.1.10 Circuit breaker failure protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
9/6	50BF OFF	1 = Circuit breaker failure protection is switched OFF	1451
9/7	50BF TRIP	1 = Circuit breaker failure TRIP	1471

3.2.1.11 Thermal overload protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
10/0	49 O/L OFF	1 = Thermal overload protection is switched OFF	1511
10/1	49 O/L I Alarm	1 = 49 Overload current alarm (I alarm)	1515
10/2	49 O/L <Theta> Alarm	1 = 49 Overload alarm! Near thermal TRIP	1516
10/3	49 Windings O/L	1 = 49 Winding overload	1517
10/4	49 Th O/L TRIP	1 = 49 Thermal overload TRIP	1521

3.2.1.12 Motor start protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
10/5	>66 emerg. start	1 = Binary input "Emergency start" is active	4823
10/6	66 OFF	1 = Motor start protection is switched OFF	4824
10/7	66 TRIP	1 = Motor start protection TRIP	4827

3.2.1.13 Startup supervision

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
11/0	START-SUP OFF	1 = Startup supervision is switched OFF	6811
11/1	START-SUP OFF	1 = Startup supervision TRIP	6821

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
11/2	Rotor locked	1 = Rotor locked	6822
11/3	START-SUP pu	1 = Startup supervision Pickup	6823

3.2.1.14 Trip coil monitor

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
11/4	FAIL: Trip cir.	1 = 74TC Failure trip circuit	6865

3.2.1.15 Cold load pickup

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
11/5	CLP OFF	1 = Cold-load-pickup is switched OFF	1994
11/6	CLP BLOCKED	1 = Cold-load-pickup is BLOCKED	1995
11/7	CLP running	1 = Cold-load-pickup is RUNNING	1996
12/0	Dyn set. ACTIVE	1 = Dynamic settings are ACTIVE	1997

3.2.1.16 Measurement supervision

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
12/1	Fail I Superv.	1 = Failure: General current supervision	161
12/2	Failure <Sum>I	1 = Failure: Current summation	162
12/3	Fail Ph. Seq.	1 = Failure: Phase sequence	171
12/4	MeasSup OFF	1 = Measurement supervision is switched OFF	197

3.2.1.17 Set point alarms

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
12/5	SP. Op Hours>	1 = Set point operating hours	272
12/6	SP. IA dmd>	1 = Set point phase A dmd>	273
12/7	SP. IB dmd>	1 = Set point phase B dmd>	274
13/0	SP. IC dmd>	1 = Set point phase C dmd>	275
13/1	SP. I1 dmd>	1 = Set point positive sequence I1 dmd>	276
13/2	SP. Pdmd >	1 = Set point Pdmd >	277
13/3	SP. Qdmd >	1 = Set point Qdmd >	278
13/4	SP. Sdmd >	1 = Set point Sdmd >	279
13/5	SP. 37-1 alarm	1 = Set point 37-1 Undercurrent alarm	284
13/6	SP. PF(55)alarm	1 = Set point 55 Power factor alarm	285
13/7	<reserved>		-

3.2.1.18 Status annunciations

- Ref. to chap. 1.5.7 for additional notes regarding "Stop data transmission".

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
14/0	>No Volt	1 = Binary input "No voltage (fuse blown)" is active	–
14/1	DataStop	1 = "Stop data transmssion" is active	–
14/2	Test mode	1 = Test mode is active	–
14/3	Cntrl Auth (7SJ61, 7SJ82)	Control authority (0 = REMOTE, 1 = LOCAL)	–
14/4	ModeLOCAL (7SJ61, 7SJ82)	Control mode LOCAL (0 = LOCKED, 1 = UNLOCKED)	–
14/5	ModeREMOTE	Control mode REMOTE (0 = LOCKED, 1 = UNLOCKED)	–
14/6	<reserved>		–
14/7	<reserved>		–
15/0	<reserved>		–
15/1	<reserved>		–
15/2	<reserved>		–
15/3	<reserved>		–
15/4	<reserved>		–
15/5	<reserved>		–
15/6	<reserved>		–
15/7	<reserved>		–

3.2.2 Measured values

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

3.2.2.1 Recorded measured values

Offset	Designation of the SIPROTEC objects	Comments	Scaling (32767 corresponds to ...)	Internal object no.
16	Ia =	Ia	3276.7 A	601
18	Ib =	Ib	3276.7 A	602
20	Ic =	Ic	3276.7 A	603
22	In =	In	3276.7 A	604
24	I1 =	I1 (positive sequence)	3276.7 A	605
26	I2 =	I2 (negative sequence)	3276.7 A	606
28	<Theta> Rotor	Temperature of rotor	327.67 %	805
30	<Theta> Stator	Temperature of stator	327.67 %	806

3.2.2.2 Measured values – mean values

Offset	Designation of the SIPROTEC objects	Comments	Scaling (32767 corresponds to ...)	Internal object no.
32	I1 dmd =	I1 (positive sequence) demand	3276.7 A	833
34	<reserved>			–

3.2.3 Metered measurands

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

Offset	Designation of the SIPROTEC objects	Comments	Scaling ($2^{31}-1$ of the unsigned long-value corresponds to ...)	Internal object no.
36	Wp(puls) =	Pulsed Energy Wp (active) (metering impulses at binary input)	$2^{31}-1$ impulses	888
40	Wq(puls) =	Pulsed Energy Wq (reactive) (metering impulses at binary input)	$2^{31}-1$ impulses	889
44	Op.Hours=	Counter of operating hours of the primary equipment	$2^{31}-1$ hours	1020

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Standard mapping 2-3

4.1 Message in output direction

4.1.1 Double commands (with checkback indication)

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
0/0	Q0 ON/OFF OFF	Impulse output, 3 relays (2-pole ON, 1-pole OFF)	-
0/1	Q0 ON/OFF ON		
0/2	Q1 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
0/3	Q1 ON/OFF ON		
0/4	Q8 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
0/5	Q8 ON/OFF ON		
0/6	Q2 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
0/7	Q2 ON/OFF ON		
1/0	Q9 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
1/1	Q9 ON/OFF ON		
1/2	Switching device D1 (UsrDC1) OFF	Impulse output, 4 relays (2-pole)	-
1/3	Switching device D1 (UsrDC1) ON		
1/4	Switching device D2 (UsrDC2) OFF	Impulse output, 2 relays, 1-pole	-
1/5	Switching device D2 (UsrDC2) ON		
1/6	Switching device D3 (UsrDC3) OFF	Impulse output, 2 relays, 1-pole	-
1/7	Switching device D3 (UsrDC3) ON		

4.1.2 Single commands (without checkback indication)

- Ref. to chap. 1.5.1 and 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
2/0	Output channel E1 (UsrSC5) OFF	Impulse output, 1 relay, 1-pole	-
2/1	Output channel E1 (UsrSC5) ON		

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
2/2	Output channel E2 (UsrSC6) OFF	Impulse output, 1 relay, 1-pole	-
2/3	Output channel E2 (UsrSC6) ON		
2/4	Output channel E3 (UsrSC14) OFF	Impulse output, 1 relay, 1-pole	-
2/5	Output channel E3 (UsrSC14) ON		
2/6	Output channel E4 (UsrSC15) OFF	Impulse output, 1 relay, 1-pole	-
2/7	Output channel E4 (UsrSC15) ON		
3/0	Output channel E5 (UsrSC10) OFF	Continuous output without restauration, 1 relay, 1-pole	-
3/1	Output channel E5 (UsrSC10) ON		
3/2	Output channel E6 (UsrSC12) OFF	Continuous output with restauration, 1 relay, 1-pole	-
3/3	Output channel E6 (UsrSC12) ON		

4.1.3 Internal commands

- Ref. to chap. 1.5.2 for additional notes regarding "Control mode REMOTE".

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
3/4	<reserved>		-
3/5	<reserved>		
3/6	Mode REMOTE	Control mode REMOTE = LOCKED	-
3/7	Mode REMOTE	Control mode REMOTE = UNLOCKED	

4.1.4 Application logic CFC

- Ref. to chap. 1.5.4 and 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
4/0	CFC-Incoming annunciation 1 (UsCfcSpl1) OFF	Tagging ON/OFF, released as CFC input	-
4/1	CFC-Incoming annunciation 1 (UsCfcSpl1) ON		
4/2	CFC-Incoming annunciation 2 (UsCfcSpl2) OFF	Tagging ON/OFF, released as CFC input	-
4/3	CFC-Incoming annunciation 2 (UsCfcSpl2) ON		
4/4	CFC-Incoming annunciation 3 (UsCfcSpl3) OFF	Tagging ON/OFF, released as CFC input	-
4/5	CFC-Incoming annunciation 3 (UsCfcSpl3) ON		
4/6	CFC-Incoming annunciation 4 (UsCfcSpl4) OFF	Tagging ON/OFF, released as CFC input	-
4/7	CFC-Incoming annunciation 4 (UsCfcSpl4) ON		
5/0	CFC-Incoming annunciation 5 (UsCfcSpl5) OFF	Tagging ON/OFF, released as CFC input	-
5/1	CFC-Incoming annunciation 5 (UsCfcSpl5) ON		

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
5/2	CFC-Incoming annunciation 6 (UsCfcSpl6) OFF	Tagging ON/OFF, released as CFC input	-
5/3	CFC-Incoming annunciation 6 (UsCfcSpl6) ON		
5/4	CFC-Incoming annunciation 7 (UsCfcSpl7) OFF	Tagging ON/OFF, released as CFC input	-
5/5	CFC-Incoming annunciation 7 (UsCfcSpl7) ON		
5/6	CFC-Incoming annunciation 8 (UsCfcSpl8) OFF	Tagging ON/OFF, released as CFC input	-
5/7	CFC-Incoming annunciation 8 (UsCfcSpl8) ON		
6/0	CFC-Incoming annunciation 9 (UsCfcSpl9) OFF	Tagging ON/OFF, released as CFC input	-
6/1	CFC-Incoming annunciation 9 (UsCfcSpl9) ON		
6/2	CFC-Incoming annunciation 10 (UsCfcSpl10) OFF	Tagging ON/OFF, released as CFC input	-
6/3	CFC-Incoming annunciation 10 (UsCfcSpl10) ON		
6/4	CFC-Incoming annunciation 11 (UsCfcSpl11) OFF	Tagging ON/OFF, released as CFC input	-
6/5	CFC-Incoming annunciation 11 (UsCfcSpl11) ON		
6/6	CFC-Incoming annunciation 12 (UsCfcSpl12) OFF	Tagging ON/OFF, released as CFC input	-
6/7	CFC-Incoming annunciation 12 (UsCfcSpl12) ON		
7/0	CFC-Incoming annunciation 13 (UsCfcSpl13) OFF	Tagging ON/OFF, released as CFC input	-
7/1	CFC-Incoming annunciation 13 (UsCfcSpl13) ON		
7/2	CFC-Incoming annunciation 14 (UsCfcSpl14) OFF	Tagging ON/OFF, released as CFC input	-
7/3	CFC-Incoming annunciation 14 (UsCfcSpl14) ON		
7/4	CFC-Incoming annunciation 15 (UsCfcSpl15) OFF	Tagging ON/OFF, released as CFC input	-
7/5	CFC-Incoming annunciation 15 (UsCfcSpl15) ON		
7/6	CFC-Incoming annunciation 16 (UsCfcSpl16) OFF	Tagging ON/OFF, released as CFC input	-
7/7	CFC-Incoming annunciation 16 (UsCfcSpl16) ON		

4.2 Message in input direction

4.2.1 Annunciations

4.2.1.1 Double commands – checkback signals

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
0/0	Q0 ON/OFF OFF	Double-point indication ON/OFF	–
0/1	Q0 ON/OFF ON		
0/2	Q1 ON/OFF OFF	Double-point indication ON/OFF	–
0/3	Q1 ON/OFF ON		
0/4	Q8 ON/OFF OFF	Double-point indication ON/OFF	–
0/5	Q8 ON/OFF ON		
0/6	Q2 ON/OFF OFF	Double-point indication ON/OFF	–
0/7	Q2 ON/OFF ON		
1/0	Q9 ON/OFF OFF	Double-point indication ON/OFF	–
1/1	Q9 ON/OFF ON		
1/2	Switching device D1 (UsrDC1) OFF	Double-point indication ON/OFF	–
1/3	Switching device D1 (UsrDC1) ON		
1/4	Switching device D2 (UsrDC2) OFF	Double-point indication ON/OFF	–
1/5	Switching device D2 (UsrDC2) ON		
1/6	Switching device D3 (UsrDC3) OFF	Double-point indication ON/OFF	–
1/7	Switching device D3 (UsrDC3) ON		

4.2.1.2 Single commands – status

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
2/0	Output channel E1 (UsrSC5)	Single-point indication ON/OFF	–
2/1	Output channel E2 (UsrSC6)	Single-point indication ON/OFF	–
2/2	Output channel E3 (UsrSC14)	Single-point indication ON/OFF	–
2/3	Output channel E4 (UsrSC15)	Single-point indication ON/OFF	–
2/4	Output channel E5 (UsrSC10)	Single-point indication ON/OFF	–
2/5	Output channel E6 (UsrSC12)	Single-point indication ON/OFF	–
2/6	<reserved>		–
2/7	<reserved>		–

4.2.1.3 Input channels with allocation to the binary inputs and tagging

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
3/0	Input channel 1 (UsrSpO/C1)	Single-point indication OPEN/CLOSE	–
3/1	Input channel 2 (UsrSpO/C2)	Single-point indication OPEN/CLOSE	–
3/2	Input channel 3 (UsrSpO/O11)	Single-point indication ON/OFF	–
3/3	Input channel 4 (UsrSpO/O12)	Single-point indication ON/OFF	–
3/4	Input channel 5 (UsrSpO/O13)	Single-point indication ON/OFF	–
3/5	Input channel 6 (UsrSpO/O14)	Single-point indication ON/OFF	–
3/6	Input channel 7 (UsrSpO/O15)	Single-point indication ON/OFF	–
3/7	Input channel 8 (UsrSpO/O32)	Tagging / Internal single-point indication ON/OFF	–

4.2.1.4 Application logic CFC

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
4/0	CFC-Output indication 1 (UsCfcSpO1)	Single-point indication ON/OFF, released as CFC output	–
4/1	CFC-Output indication 2 (UsCfcSpO2)	Single-point indication ON/OFF, released as CFC output	–
4/2	CFC-Output indication 3 (UsCfcSpO3)	Single-point indication ON/OFF, released as CFC output	–
4/3	CFC-Output indication 4 (UsCfcSpO4)	Single-point indication ON/OFF, released as CFC output	–
4/4	CFC-Output indication 5 (UsCfcSpO5)	Single-point indication ON/OFF, released as CFC output	–
4/5	CFC-Output indication 6 (UsCfcSpO6)	Single-point indication ON/OFF, released as CFC output	–
4/6	CFC-Output indication 7 (UsCfcSpO7)	Single-point indication ON/OFF, released as CFC output	–
4/7	CFC-Output indication 8 (UsCfcSpO8)	Single-point indication ON/OFF, released as CFC output	–
5/0	CFC-Output indication 9 (UsCfcSpO9)	Single-point indication ON/OFF, released as CFC output	–
5/1	CFC-Output indication 10 (UsCfcSpO10)	Single-point indication ON/OFF, released as CFC output	–
5/2	CFC-Output indication 11 (UsCfcSpO11)	Single-point indication ON/OFF, released as CFC output	–
5/3	CFC-Output indication 12 (UsCfcSpO12)	Single-point indication ON/OFF, released as CFC output	–
5/4	CFC-Output indication 13 (UsCfcSpO13)	Single-point indication ON/OFF, released as CFC output	–
5/5	CFC-Output indication 14 (UsCfcSpO14)	Single-point indication ON/OFF, released as CFC output	–
5/6	CFC-Output indication 15 (UsCfcSpO15)	Single-point indication ON/OFF, released as CFC output	–
5/7	CFC-Output indication 16 (UsCfcSpO16)	Single-point indication ON/OFF, released as CFC output	–

4.2.1.5 Diagnosis

- Ref. to chap. 1.5.5 and 1.5.6 for additional notes regarding "Error with a summary alarm" and "Alarm summary event".

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
6/0	Device OK	1 = Update of the device replica in the SIPROTEC device completed after initial start or restart	51
6/1	<reserved>		–
6/2	Settings Calc.	1 = Setting calculation is running	70
6/3	Error Sum Alarm	1 = Error with a summary alarm ON	140
6/4	Alarm Sum Event	1 = Alarm summary event ON	160
6/5	<reserved>		–
6/6	<reserved>		–
6/7	<reserved>		–

4.2.1.6 Measurement supervision

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
7/0	Fail I Superv.	1 = Failure: General current supervision	161
7/1	Failure <Sum>I	1 = Failure: Current summation	162
7/2	Fail Ph. Seq.	1 = Failure: Phase sequence	171
7/3	MeasSup OFF	1 = Measurement supervision is switched OFF	197

4.2.1.7 Set point alarms

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
7/4	SP. Op Hours>	1 = Set point operating hours	272
7/5	SP. IA dmd>	1 = Set point phase A dmd>	273
7/6	SP. IB dmd>	1 = Set point phase B dmd>	274
7/7	SP. IC dmd>	1 = Set point phase C dmd>	275
8/0	SP. I1 dmd>	1 = Set point positive sequence I1 dmd>	276
8/1	SP. Pdmd >	1 = Set point Pdmd >	277
8/2	SP. Qdmd >	1 = Set point Qdmd >	278
8/3	SP. Sdmd >	1 = Set point Sdmd >	279
8/4	SP. 37-1 alarm	1 = Set point 37-1 Undercurrent alarm	284
8/5	SP. PF(55)alarm	1 = Set point 55 Power factor alarm	285
8/6	<reserved>		–
8/7	<reserved>		–

4.2.1.8 Status annunciations

- Ref. to chap. 1.5.7 for additional notes regarding "Stop data transmission".

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
9/0	>No Volt	1 = Binary input "No voltage (fuse blown)" is active	–
9/1	DataStop	1 = "Stop data transmission" is active	–
9/2	Test mode	1 = Test mode is active	–
9/3	Cntrl Auth (7SJ63, 7SJ65, 6MD63)	Control authority (0 = REMOTE, 1 = LOCAL)	–
9/4	ModeLOCAL (7SJ63, 7SJ65, 6MD63)	Control mode LOCAL (0 = LOCKED, 1 = UNLOCKED)	–
9/5	ModeREMOTE	Control mode REMOTE (0 = LOCKED, 1 = UNLOCKED)	–
9/6	<reserved>		–
9/7	<reserved>		–

4.2.2 Measured values

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

4.2.2.1 Recorded measured values

Offset	Designation of the SIPROTEC objects	Comments	Scaling (32767 corresponds to ...)	Internal object no.
10	Ia =	Ia	3276.7 A	601
12	Ib =	Ib	3276.7 A	602
14	Ic =	Ic	3276.7 A	603
16	In =	In	3276.7 A	604
18	Va-b =	Va-b	32.767 kV	624
20	Vb-c =	Vb-c	32.767 kV	625
22	Vc-a =	Vc-a	32.767 kV	626
24	VN =	VN	32.767 kV	627
26	P =	P (active power)	32.767 MW	641
28	Q =	Q (reactive power)	32.767 MVAR	642
30	S =	S (apparent power)	32.767 MVAR	645
32	Freq =	Frequency	327.67 Hz	644
34	PF =	Power Factor	3.2767	901
36	I1 =	I1 (positive sequence)	3276.7 A	605
38	I2 =	I2 (negative sequence)	3276.7 A	606
40	V1 =	V1 (positive sequence)	32.767 kV	629
42	V2 =	V2 (negative sequence)	32.767 kV	630
44	Td1=	Transducer 1	32.767 mA	996
46	Td2=	Transducer 2	32.767 mA	997

4.2.2.2 Measured values – mean values

Offset	Designation of the SIPROTEC objects	Comments	Scaling (32767 corresponds to ...)	Internal object no.
48	I1 dmd =	I1 (positive sequence) demand	3276.7 A	833
50	P dmd =	Active power demand	32.767 MW	834

4.2.3 Metered measurands

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

Offset	Designation of the SIPROTEC objects	Comments	Scaling ($2^{31}-1$ of the unsigned long-value corresponds to ...)	Internal object no.
52	Wp(puls) =	Pulsed Energy Wp (active) (metering impulses at binary input)	$2^{31}-1$ impulses	888
56	Wq(puls) =	Pulsed Energy Wq (reactive) (metering impulses at binary input)	$2^{31}-1$ impulses	889
60	WpForward=	Wp Forward (<i>metered measurand derived from measured value</i>)	$2^{31}-1$ impulses	924
64	WqForward=	Wq Forward (<i>metered measurand derived from measured value</i>)	$2^{31}-1$ impulses	925
68	WpReverse =	Wp Reverse (<i>metered measurand derived from measured value</i>)	$2^{31}-1$ impulses	928
72	WqReverse =	Wq Reverse (<i>metered measurand derived fom measured value</i>)	$2^{31}-1$ impulses	929
76	Op.Hours=	Counter of operating hours of the primary equipment	$2^{31}-1$ hours	1020

5

Standard mapping 2-4

5.1 Message in output direction

5.1.1 Double commands (with checkback indication)

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
0/0	Q0 ON/OFF OFF	Impulse output, 3 relays (2-pole ON, 1-pole OFF)	-
0/1	Q0 ON/OFF ON		
0/2	Q1 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
0/3	Q1 ON/OFF ON		
0/4	Q8 ON/OFF OFF	Impulse output, 2 relays, 1-pole	-
0/5	Q8 ON/OFF ON		

5.1.2 Single commands (without checkback indication)

- Ref. to chap. 1.5.1 and 1.6 for additional notes.

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
0/6	Output channel E1 (UsrSC5) OFF	Impulse output, 1 relay, 1-pole	-
0/7	Output channel E1 (UsrSC5) ON		

5.1.3 Internal commands

- Ref. to chap. 1.5.3 for additional notes regarding "Changing the setting group".

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
1/0	Setting group A		53
1/1	Setting group A	Activation of setting group A	
1/2	Setting group B		54
1/3	Setting group B	Activation of setting group B	

5.1.4 Application logic CFC

- Ref. to chap. 1.5.4 and 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
1/4	CFC-Incoming annunciation 1 (UsCfcSpl1) OFF	Tagging ON/OFF, released as CFC input	-
1/5	CFC-Incoming annunciation 1 (UsCfcSpl1) ON		
1/6	CFC-Incoming annunciation 2 (UsCfcSpl2) OFF	Tagging ON/OFF, released as CFC input	-
1/7	CFC-Incoming annunciation 2 (UsCfcSpl2) ON		

5.2 Message in input direction

5.2.1 Annunciations

5.2.1.1 Double commands – checkback signals

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
0/0	Q0 ON/OFF OFF	Double-point indication ON/OFF	–
0/1	Q0 ON/OFF ON		
0/2	Q1 ON/OFF OFF	Double-point indication ON/OFF	–
0/3	Q1 ON/OFF ON		
0/4	Q8 ON/OFF OFF	Double-point indication ON/OFF	–
0/5	Q8 ON/OFF ON		

5.2.1.2 Single commands – status

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
0/6	Output channel E1 (UsrSC5)	Single-point indication ON/OFF	–

5.2.1.3 Application logic CFC

- Ref. to chap. 1.6 for additional notes.

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
0/7	CFC-Output indication 1 (UsCfcSp01)	Single-point indication ON/OFF, released as CFC output	–
1/0	CFC-Output indication 2 (UsCfcSp02)	Single-point indication ON/OFF, released as CFC output	–
1/1	CFC-Output indication 3 (UsCfcSp03)	Single-point indication ON/OFF, released as CFC output	–
1/2	CFC-Output indication 4 (UsCfcSp04)	Single-point indication ON/OFF, released as CFC output	–
1/3	CFC-Output indication 5 (UsCfcSp05)	Single-point indication ON/OFF, released as CFC output	–
1/4	CFC-Output indication 6 (UsCfcSp06)	Single-point indication ON/OFF, released as CFC output	–
1/5	CFC-Output indication 7 (UsCfcSp07)	Single-point indication ON/OFF, released as CFC output	–
1/6	CFC-Output indication 8 (UsCfcSp08)	Single-point indication ON/OFF, released as CFC output	–
1/7	CFC-Output indication 9 (UsCfcSp09)	Single-point indication ON/OFF, released as CFC output	–

5.2.1.4 Time overcurrent protection

Offset	Designation of the SIPROTEC objects	Comments	Internal object no.
2/0	50-2 TRIP	1 = 50-2 TRIP	1805
2/1	50-1 TRIP	1 = 50-1 TRIP	1815

5.2.1.5 Sensitive ground fault protection

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
2/2	50Ns-2 TRIP	1 = 50Ns-2 TRIP	1223
2/3	50Ns-1 TRIP	1 = 50Ns-1 TRIP	1226

5.2.1.6 Thermal overload protection

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
2/4	49 Th O/L TRIP	1 = 49 Thermal overload TRIP	1521
2/5	49 O/L <Theta> Alarm	1 = 49 Overload alarm! Near thermal TRIP	1516

5.2.1.7 Directional time overcurrent protection

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
2/6	67-2 TRIP	1 = 67-2 TRIP	2649
2/7	67-1 TRIP	1 = 67-1 TRIP	2665

5.2.1.8 Diagnosis

- Ref. to chap. 1.5.5 and 1.5.6 for additional notes regarding "Error with a summary alarm" and "Alarm summary event".

<i>Offset</i>	<i>Designation of the SIPROTEC objects</i>	<i>Comments</i>	<i>Internal object no.</i>
3/0	Device OK	1 = Update of the device replica in the SIPROTEC device completed after initial start or restart	51
3/1	ProtActive	1 = At least one protection function is active	52
3/2	Settings Calc.	1 = Setting calculation is running	70
3/3	Error Sum Alarm	1 = Error with a summary alarm ON	140
3/4	Alarm Sum Event	1 = Alarm summary event ON	160
3/5	Relay PICKUP	1 = Relay PICKUP (summary alarm)	501
3/6	Relay TRIP	1 = Relay GENERAL TRIP command (summary alarm)	511
3/7	>No Volt	1 = Binary input "No voltage (fuse blown)" is active	–

5.2.2 Measured values

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

Offset	Designation of the SIPROTEC objects	Comments	Scaling (32767 corresponds to ...)	Internal object no.
4	Va-b =	Va-b	32.767 kV	624
6	Ia =	Ia	3276.7 A	601
8	Ib =	Ib	3276.7 A	602
10	Ic =	Ic	3276.7 A	603
12	INs Reac =	Reactive ground current in isol. systems	3276.7 A	702
14	P =	P (active power)	32.767 MW	641
16	Q =	Q (reactive power)	32.767 MVAR	642
18	PF =	Power Factor	3.2767	901

5.2.3 Metered measurands

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

Offset	Designation of the SIPROTEC objects	Comments	Scaling ($2^{31}-1$ of the unsigned long-value corresponds to ...)	Internal object no.
20	WpForward=	Wp Forward (<i>metered measurand derived from measured value</i>)	$2^{31}-1$ impulses	924
24	WqForward=	Wq Forward (<i>metered measurand derived from measured value</i>)	$2^{31}-1$ impulses	925

Glossary

AR	Automatic Recloser
CFC	Continuous Function Chart
DC	Double Command
DDB file / GSD file	The DDB file contains the Device Data Base (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.
DIGSI	Parameterization system for SIPROTEC devices
DP	Double-point Indication
Input data/ input direction	Data from the PROFIBUS-DP slave to the PROFIBUS-DP master .
Mapping	Allocation of the SIPROTEC data objects to the positions in the PROFIBUS-DP messages.
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-DP	PROFIBUS - Decentralized Peripherals
PSE	PROFIBUS interface module with (electrical) isolated RS485 interface for the SIPROTEC devices from Siemens.
PSO	PROFIBUS interface module with optical interface for the SIPROTEC devices from Siemens.
SC	Single Command
SP	Single-point Indication

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