

# SIEMENS

## SIPROTEC Multi-Functional Protective Relay

### 7UM62

**Communication Module  
PROFINET IO**

**Bus Mapping**

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## NOTE

For your own safety, please observe the warnings and safety instructions contained in this document.

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# Preface

## Content of this Manual

This manual describes the data in the telegrams of the PROFINET IO device for the SIPROTEC devices 7UM62.

It is subdivided as follows:

- Data in the PROFINET IO mapping → Chapter 1
- Standard mapping 3-1 → Chapter 2

For general information on operation, installation, commissioning, and configuration of the SIPROTEC devices, refer to the following manuals:

Manual	Order Number
SIPROTEC 4 System manual	E50417-H1176-C151
Device manual 7UM62	C53000-G1140-C149

## PROFINET IO Communication Profile

For information on the bus-specific parameters, data type definitions, parameterization and hardware description of the PROFINET IO communication modules for SIPROTEC devices, please refer to the following manual:

Manual	Order Number
SIPROTEC 4 Communication module, PROFINET IO - Communication profile	C53000-L1840-C360

The manuals are available on the Internet at:

<http://www.siprotec.com>

## PROFINET IO Specification

The PROFINET IO specification and the structure of the PROFINET IO telegrams are defined in the following international standards:

- IEC 61158  
Digital data communications for measurement and control - Fieldbus for use in industrial control systems
- IEC 61784  
Digital data communications for measurement and control

## Target Audience

Protection engineers, commissioning engineers, persons who are involved in setting, testing, and service of protection, automation, and control devices, as well as operation personnel in electrical plants and power plants.

## Scope of Validity of this Manual

This manual is valid for the following SIPROTEC devices:

- 7UM62 (firmware version V4.90 or higher) with PROFINET IO communication module firmware version 01.00 or higher

For the device parameterization, please use the following:

- DIGSI 4 Version 4.86 or higher
- PROFINET IO standard mapping 3-1

## Additional Support

Should further information be desired or should particular problems arise which are not covered sufficiently for the purpose of the purchaser, the matter should be referred to the local Siemens representative.

Our Customer Support Center provides around-the-clock support.

Phone: +49 (1805) 24-8437  
Fax: +49 (1805) 24-2471  
Internet: <http://www.siprotec.com>  
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## Training Courses

If you are interested in our current training program, contact our training center:

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Internet: [www.siemens.com/poweracademy](http://www.siemens.com/poweracademy)

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## Notes On Safety

This manual does not constitute a complete catalog of all safety measures required for operating the equipment (module, device) in question, because special operating conditions may require additional measures. However, it does contain notes that must be adhered to for your own personal safety and to avoid material damage to property. These notes are highlighted with a warning triangle and different keywords indicating different degrees of danger.

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### DANGER

**Danger** means that death or severe injury **will** occur if the appropriate safety measures are not taken.

- ✧ Follow all advice instructions to prevent death or severe injury.
- 



### WARNING

**Warning** means that death or severe injury **can** occur if the appropriate safety measures are not taken.

- ✧ Follow all advice instructions to prevent death or severe injury.
- 



### CAUTION

**Caution** means that minor or moderate injury can occur if the appropriate safety measures are not taken.

- ✧ Follow all advice instructions to prevent minor injury.
- 

### NOTICE

**Notice** means that damage to property can occur if the appropriate safety measures are not taken.

- ✧ Follow all advice instructions to prevent damage to property.
- 



### NOTE

is important information about the product, the handling of the product, or the part of the documentation in question to which special attention must be paid.

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## Qualified Personnel

Commissioning and operation of the equipment (module, device) described in this manual must be performed by qualified personnel only. As used in the safety notes contained in this manual, qualified personnel are those persons who are authorized to commission, release, ground and tag devices, systems, and circuits in accordance with safety standards.

## Use as Prescribed

The equipment (device, module) must not be used for any other purposes than those described in the Catalog and the Technical Description. If it is used together with third-party devices and components, these must be recommended or approved by Siemens.

Correct and safe operation of the product requires adequate transportation, storage, installation, and mounting as well as appropriate use and maintenance.

During the operation of electrical equipment, it is unavoidable that certain parts of this equipment will carry hazardous voltages. Severe injury or damage to property can occur if the appropriate measures are not taken:

- Before making any connections at all, ground the equipment at the grounding terminal.
- Hazardous voltages can be present on all switching components connected to the power supply.
- Even after the supply voltage has been disconnected, hazardous voltages can still be present in the equipment (capacitor storage).
- Equipment with current transformer circuits must not be operated while open.
- The limiting values indicated in the manual or the operating instructions must not be exceeded; this also refers to testing and commissioning.

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# 1 Data in the PROFINET IO Mapping

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## 1.1 Explanations

In Chapter 2, the maximum data scope and the pre-allocated data objects of the PROFINET IO device of the SIPROTEC devices 7UM62 are defined for the cyclic data exchange with a PROFINET IO controller. The transferred SIPROTEC objects are given in a list sorted by the data type.

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

The assignment of output relays to the switchgear and to the output channels, and the assignment of input channels to the binary inputs is defined during parameterization of the devices.

Depending on the device type and on composition and the existing protection packages, not all of the indicated output channels, binary inputs, protection indications, analog inputs (and corresponding PROFINET IO data objects) may be available in the SIPROTEC device.



### NOTE

More information is available in the **SIPROTEC 4 Communication Module, PROFINET IO Communication Profile** manual, order number C53000-L1840-C360-x (see preface). In the manual you can find, among other things, the following topics:

- Data types (double-point indication, single-point indication, measured value, metered values, etc.) and the corresponding definitions
  - Assigning PROFINET IO modules to SIPROTEC objects
  - Reading information via acyclic data services
  - Unit IDs for measured values, statistic values, and metered values
  - Conversion factors for metered values
  - Presetting statistic values and metered values via acyclic services
  - Reading event list entries (indications with a time stamp)
  - Assigning indications to a process alarm
  - Parameterization in DIGSI
  - Parameterization of the IO controllers
-

## 1.2 Standard Mapping

Standard mapping (standard mapping 3-1) is available for the parameterization of SIPROTEC devices 7UM62.

### Standard Mapping 3-1

Standard mapping 3-1 comprises the following:

**Output direction:**

- 4 double commands
- 24 single commands

**Input direction:**

- 4 double-point indications
- 160 single-point indications
- 24 measured values
- 18 value indications
- 8 metered values

The option of transferring indications with a time stamp via an event list is possible independent of the standard mapping as a rule and it is not contained separately in the description of the standard mapping.



## 2 Standard Mapping 3-1

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## 2.1 Double Commands

In the **DIGSI Configuration Matrix**, further double commands with double-point indications as feedback can be allocated as "source system interface" to the "<user defined>" positions.

Table 2-1 Double Commands

<b>PROFINET IO double-command number</b>	<b>Designation of the SIPROTEC objects</b>	<b>Remark</b>	<b>Internal object no.</b>
1	<user defined>	not pre-allocated	-
2	<user defined>	not pre-allocated	-
3	<user defined>	not pre-allocated	-
4	<user defined>	not pre-allocated	-

## 2.2 Single Commands

In the **DIGSI Configuration Matrix**, further single commands or taggings can be allocated as "source system interface" to the "<user defined>" positions.

Table 2-2 Single Commands

<b>PROFINET IO single-command number</b>	<b>Designation of the SIPROTEC objects</b>	<b>Remark</b>	<b>Internal object no.</b>
1	<user defined>	not pre-allocated	-
2	<user defined>	not pre-allocated	-
3	<user defined>	not pre-allocated	-
4	<user defined>	not pre-allocated	-
5	<user defined>	not pre-allocated	-
6	<user defined>	not pre-allocated	-
7	<user defined>	not pre-allocated	-
8	<user defined>	not pre-allocated	-
9	<user defined>	not pre-allocated	-
10	<user defined>	not pre-allocated	-

Table 2-2 Single Commands (Continued)

PROFINET IO single-command number	Designation of the SIPROTEC objects	Remark	Internal object no.
11	<user defined>	not pre-allocated	-
12	<user defined>	not pre-allocated	-
13	<user defined>	not pre-allocated	-
14	<user defined>	not pre-allocated	-
15	<user defined>	not pre-allocated	-
16	<user defined>	not pre-allocated	-
17	<user defined>	not pre-allocated	-
18	<user defined>	not pre-allocated	-
19	Setting Group A	Activation of Setting Group A	-
20	Setting Group B	Activation of Setting Group B	-
21	<user defined>	not pre-allocated	-
22	<user defined>	not pre-allocated	-
23	<user defined>	not pre-allocated	-
24	<user defined>	not pre-allocated	-

### Setting Group Switching

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 IO-Controller).

- 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 7UM62 if the parameter **Change to Another Setting Group** (parameter address = 302) has the value **Protocol**.

## 2.3 Double-Point Indications

In the **DIGSI Configuration Matrix**, further double-point indications (for example, feedbacks of double commands) can be allocated as "destination-system interface" to the "<user defined>" positions.

Table 2-3 Double-Point Indications

PROFINET IO double-point indication number	Designation of the SIPROTEC objects	Remark	Internal object no.
1	<user defined>	not pre-allocated	-
2	<user defined>	not pre-allocated	-
3	<user defined>	not pre-allocated	-
4	<user defined>	not pre-allocated	-

## 2.4 Single-Point Indications

In the **DIGSI Configuration Matrix**, further protection indications, single-point indications, or taggings can be allocated as "destination system interface" to the "<user defined>" positions.

Table 2-4 Single-Point Indications

PROFINET IO single-point indication number	Designation of the SIPROTEC objects	Remark	Internal object no.
1	<user defined>	not pre-allocated	-
2	<user defined>	not pre-allocated	-
3	<user defined>	not pre-allocated	-
4	<user defined>	not pre-allocated	-
5	<user defined>	not pre-allocated	-
6	<user defined>	not pre-allocated	-
7	<user defined>	not pre-allocated	-
8	<user defined>	not pre-allocated	-



Table 2-4 Single-Point Indications (Continued)

PROFINET IO single-point indication number	Designation of the SIPROTEC objects	Remark	Internal object no.
<b>Diagnosis</b>			
9	Device OK	1 = Update of the data image in the SIPROTEC device completed after initial start or restart	51
10	ProtActive	1 = At least one protection function is active	52
11	Error Sum Alarm	1 = Error with a summary alarm ON	140
12	Alarm Sum Event	1 = Alarm summary event ON	160
13	Relay PICKUP	1 = Relay PICKUP (group signal)	501
14	Relay TRIP	1 = Relay GENERAL TRIP command	511
15	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
16	<user defined>	not pre-allocated	-
<b>Overcurrent time protection I&gt;</b>			
17	50/51-1 Ph A PU	1 = 50/51-1 Phase A picked up	1811
18	50/51-1 Ph B PU	1 = 50/51-1 Phase B picked up	1812
19	50/51-1 Ph C PU	1 = 50/51-1 Phase C picked up	1813
20	V< seal in	1 = 50/51-1 undervoltage seal-in	1970
21	50/51 TRIP	1 = 50/51 I> TRIP	1815
<b>Overcurrent time protection I&gt;&gt;</b>			
22	67 forward	1 = 67 I>> direction forward	1806
23	67 backward	1 = 67 I>> direction backward	1807
24	50/51-2 Ph A PU	1 = 50/51-2 Phase A picked up	1801

Table 2-4 Single-Point Indications (Continued)

<b>PROFINET IO single-point indication number</b>	<b>Designation of the SIPROTEC objects</b>	<b>Remark</b>	<b>Internal object no.</b>
25	50/51-2 Ph B PU	1 = 50/51-2 Phase B picked up	1802
26	50/51-2 Ph C PU	1 = 50/51-2 Phase C picked up	1803
27	51/67 TRIP	1 = 50/51/67 I>> TRIP	1809
<b>Inverse time overcurrent protection</b>			
28	51V Ph A PU	1 = 51V Phase A picked up	1896
29	51V Ph B PU	1 = 51V Phase B picked up	1897
30	51V Ph C PU	1 = 51V Phase C picked up	1898
31	51V TRIP	1 = 51V TRIP	1900
32	<user-defined>	not pre-allocated	-
<b>Thermal overload protection</b>			
33	49 O/L I Alarm	1 = 49 Overload Current Alarm (I alarm)	1515
34	49 O/L $\Theta$ Alarm	1 = 49 Thermal Overload Alarm	1516
35	49 Th O/L TRIP	1 = 49 Thermal Overload TRIP	1521
<b>Unbalanced load protection</b>			
36	46-1 Warn	1 = 46-1 Current warning stage	5156
37	46-1 picked up	1 = 46-1 picked up	5165
38	46-2 picked up	1 = 46-2 picked up	5159
39	46-2 TRIP	1 = 46-2 TRIP of current stage	5160
40	46- $\Theta$ TRIP	1 = 46 TRIP of thermal stage	5161
<b>Sensitive ground fault protection</b>			
41	Failure 64R In<	1 = Failure 64R In<: measuring circuit	5396

Table 2-4 Single-Point Indications (Continued)

PROFINET IO single-point indication number	Designation of the SIPROTEC objects	Remark	Internal object no.
42	50Ns-1 Pickup	1 = 50Ns-1 Pickup	1224
43	50Ns-1 TRIP	1= 50Ns-1 TRIP	1226
44	50Ns-2 Pickup	1 = 50Ns-2 Pickup	1221
45	50Ns-2 TRIP	1 = 50Ns-2 TRIP	1223
<b>Stator ground fault protection</b>			
46	59/67 V0 PU	1 = 59N/67GN V0 picked up	5186
47	59/67 I0 PU	1 = 59N/67GN I0 picked up	5188
48	59/67 V0 TRIP	1 = 59N/67GN V0 stage TRIP	5187
49	59N/67GN TRIP	1 = 59N/67GN TRIP	5193
<b>Stator ground fault protection with 3<sup>rd</sup> harmonic</b>			
50	27TN/59TN PU	1 = 27TN/59TN with 3 <sup>rd</sup> harmonic picked up	5567
51	27TN/59TN TRP	1 = 27TN/59TN with 3 <sup>rd</sup> harmonic TRIP	5568
<b>Overvoltage protection</b>			
52	59-1 picked up	1 = 59-1 Overvoltage V> picked up	6568
53	59-2 picked up	1 = 59-2 Overvoltage V>> picked up	6571
54	59-1 TRIP	1 = 59-1 Overvoltage V> TRIP	6570
55	59-2 TRIP	1 = 59-2 Overvoltage V>> TRIP	6573
<b>Undervoltage protection</b>			
56	27-1 picked up	1 = 27-1 Undervoltage V< picked up	6533
57	27-2 picked up	1 = 27-2 Undervoltage V<< picked up	6537
58	27-1 TRIP	1 = 27-1 Undervoltage V< TRIP	6539

Table 2-4 Single-Point Indications (Continued)

PROFINET IO single-point indication number	Designation of the SIPROTEC objects	Remark	Internal object no.
59	27-2 TRIP	1 = 27-2 Undervoltage V<< TRIP	6540
<b>Frequency protection</b>			
60	81-1 picked up	1 = 81-1 picked up	5232
61	81-2 picked up	1 = 81-2 picked up	5233
62	81-3 picked up	1 = 81-3 picked up	5234
63	81-4 picked up	1 = 81-4 picked up	5235
64	81-1 TRIP	1 = 81-1 TRIP	5236
65	81-2 TRIP	1 = 81-2 TRIP	5237
66	81-3 TRIP	1 = 81-3 TRIP	5238
67	81-4 TRIP	1 = 81-4 TRIP	5239
<b>Overexcitation protection</b>			
68	24 warn	1 = 24 V/f warning stage	5367
69	24-1 picked up	1 = 24-1 V/f> picked up	5370
70	24-2 picked up	1 = 24-2 V/f>> picked up	5373
71	24 th.TRIP	1 = 24 TRIP of thermal stage	5372
72	24-2 TRIP	1 = 24-2 TRIP of V/f>> stage	5371
<b>Reverse power protection</b>			
73	32R picked up	1 = 32R picked up	5096
74	32R TRIP	1 = 32R TRIP	5097
75	32R+SV TRIP	1 = 32R TRIP with stop valve	5098
<b>Forward power supervision</b>			
76	32F< picked up	1 = 32F P< stage picked up	5126

Table 2-4 Single-Point Indications (Continued)

PROFINET IO single-point indication number	Designation of the SIPROTEC objects	Remark	Internal object no.
77	32F> picked up	1 = 32F P> stage picked up	5127
78	32F P< TRIP	1 = 32F P< stage TRIP	5128
79	32F P> TRIP	1 = 32F P> stage TRIP	5129
<b>Fuse Failure Monitor</b>			
80	VT Fuse Failure	1 = Voltage Transformer Fuse Failure	6575
<b>Underexcitation protection</b>			
81	40 Vexc failure	1 = 40 Exc. voltage failure recognized	5336
82	40 picked up	1 = 40 picked up	5337
83	40-1 TRIP	1 = 40 characteristic 1 TRIP	5344
84	40-2 TRIP	1 = 40 characteristic 2 TRIP	5345
85	40&V<TRIP	1 = 40 characteristic&Vexc< TRIP	5346
86	40-3 TRIP	1 = 40 characteristic 3 TRIP	5343
<b>Circuit breaker failure protection</b>			
87	50BF pickup	1 = 50BF picked up	1455
88	50BF TRIP	1 = 50BF TRIP	1471
<b>Impedance protection</b>			
89	21 Fault Ph A	1 = 21 Fault detection Phase A	3967
90	21 Fault Ph B	1 = 21 Fault detection Phase B	3968
91	21 Fault Ph C	1 = 21 Fault detection Phase C	3969
92	21 I> & U<	1 = 21 O/C with undervoltage seal in	3970
93	21 Z1< TRIP	1 = 21 Z1< TRIP	3977
94	21 Z1B< TRIP	1 = 21 Z1B< TRIP	3978

Table 2-4 Single-Point Indications (Continued)

<b>PROFINET IO single-point indication number</b>	<b>Designation of the SIPROTEC objects</b>	<b>Remark</b>	<b>Internal object no.</b>
95	21 Z2< TRIP	1 = 21 Z2< TRIP	3979
96	21 T3> TRIP	1 = 21 T3> TRIP	3980
<b>Binary inputs</b>			
97	Ext 1 Gen.TRP	1 = External trip 1: General TRIP	4537
98	Ext 2 Gen.TRP	1 = External trip 2: General TRIP	4557
99	Ext 3 Gen.TRP	1 = External trip 3: General TRIP	4577
100	Ext 4 Gen.TRP	1 = External trip 4: General TRIP	4597
<b>Inadvertent energisation protection</b>			
101	50/27 picked up	1 = 50/27 picked up	5547
102	50/27 TRIP	1 = 50/27 TRIP	5548
<b>Trip coil monitor</b>			
103	FAIL: Trip cir.	1 = 74TC Failure Trip Circuit	6865
<b>Inverse undervoltage protection</b>			
104	Vp< picked up	1 = Inverse Undervoltage Vp< picked up	6525
105	Vp< TRIP	1 = Inverse Undervoltage Vp< TRIP	6527
<b>Startup supervision of motors</b>			
106	48 Rot. locked	1 = 48 Rotor LOCKED after Lock. Rotor Time	6822
107	48 picked up	1 = 48 Starting time supervision picked up	6823
108	48 TRIP	1 = 48 Starting time supervision TRIP	6821
<b>Startup counter for motors</b>			
109	66 TRIP	1 = 66 Restart inhibit motor TRIP	4827

Table 2-4 Single-Point Indications (Continued)

PROFINET IO single-point indication number	Designation of the SIPROTEC objects	Remark	Internal object no.
<b>Rotor ground fault protection</b>			
110	64R-1 picked up	1 = 64R-1 picked up (Alarm)	5397
111	64R-2 TRIP	1 = 64R-2 TRIP	5399
<b>DC voltage/current protection</b>			
112	DC Prot.pick.up	1 = DC protection picked up	5306
113	DC Prot. TRIP	1 = DC protection TRIP	5307
<b>State of the out-of-step protection</b>			
114	78 det. char. 1	1 = 78 characteristic 1 picked up	5069
115	78 det. char. 2	1 = 78 characteristic 2 picked up	5070
116	78 TRIP char. 1	1 = 78 TRIP characteristic 1	5071
117	78 TRIP char. 2	1 = 78 TRIP characteristic 2	5072
<b>Differential Protection</b>			
118	87 picked up	1 = 87 Differential protection picked up	5631
119	87 TRIP	1 = 87 Differential protection TRIP	5671
120	87 TRIP Phase A	1 = 87 Differential protection: TRIP Phase A	5672
121	87 TRIP Phase B	1 = 87 Differential protection: TRIP Phase B	5673
122	87 TRIP Phase C	1 = 87 Differential protection: TRIP Phase C	5674
123	87 Diff> TRIP	1 = 87 Differential prot.: TRIP by IDIFF>	5691
124	87 Diff>> TRIP	1 = 87 Diff>> TRIP	5692
<b>User-defined indications</b>			

Table 2-4 Single-Point Indications (Continued)

<b>PROFINET IO single-point indication number</b>	<b>Designation of the SIPROTEC objects</b>	<b>Remark</b>	<b>Internal object no.</b>
125	<user defined>	not pre-allocated	-
126	<user defined>	not pre-allocated	-
127	<user defined>	not pre-allocated	-
128	<user defined>	not pre-allocated	-
129	<user defined>	not pre-allocated	-
130	<user defined>	not pre-allocated	-
131	<user defined>	not pre-allocated	-
132	<user defined>	not pre-allocated	-
133	<user defined>	not pre-allocated	-
134	<user defined>	not pre-allocated	-
135	<user defined>	not pre-allocated	-
136	<user defined>	not pre-allocated	-
137	<user defined>	not pre-allocated	-
138	<user defined>	not pre-allocated	-
139	<user defined>	not pre-allocated	-
140	<user defined>	not pre-allocated	-
141	<user defined>	not pre-allocated	-
142	<user defined>	not pre-allocated	-
143	<user defined>	not pre-allocated	-
144	<user defined>	not pre-allocated	-
<b>Stator ground fault protection 100%</b>			



Table 2-4 Single-Point Indications (Continued)

<b>PROFINET IO single-point indication number</b>	<b>Designation of the SIPROTEC objects</b>	<b>Remark</b>	<b>Internal object no.</b>
145	SGF100 Alarm	1 = Stator ground fault prot. 100%: Alarm stage	5487
146	SGF100 TRIP	1 = Stator ground fault prot. 100%: TRIP	5489
<b>Rotor ground fault protection 1-3 Hz</b>			
147	64R-1_3Hzpickup	1 = 64R-1 (1-3Hz) picked up (Alarm)	5403
148	64R-2_3Hz TRIP	1 = 64R-2 (1-3Hz) TRIP	5407
<b>Restricted ground fault protection</b>			
149	87N picked up	1 = 87N picked up	5817
150	87N TRIP	1 = 87N TRIP	5821
<b>Fault indications of protection functions</b>			
151	Failure SGF	1 = Failure stator ground fault prot. 100%	5486
152	Failure 64R	1 = Failure 64R: measuring circuit	5400
153	Fail 64R 1-3Hz	1 = Failure 64R protection (1-3Hz)	5401
<b>Setting group</b>			
154	P-GrpA akt.	1 = Setting group A is active	-
155	P-GrpB akt.	1 = Setting group B is active	-
156	<user defined>	not pre-allocated	-
157	<user defined>	not pre-allocated	-
158	<user defined>	not pre-allocated	-
159	<user defined>	not pre-allocated	-
160	<user defined>	not pre-allocated	-

## 2.5 Measured Values

In the **DIGSI Configuration Matrix**, further measured values can be allocated as "destination system interface" to the "<user defined>" positions.

Table 2-5 Measured Values

PROFINET IO measured-values number	Designation of the SIPROTEC objects	Remark	Internal object no.
1	IA S2 =	Operat. meas. current A side 2	724
2	IB S2 =	Operat. meas. current B side 2	725
3	IC S2 =	Operat. meas. current C side 2	726
4	Va-b =	Va-b	624
5	Vb-c =	Vb-c	625
6	Vc-a =	Vc-a	626
7	P =	P (active power)	641
8	Q =	Q (reactive power)	642
9	f =	Frequency	644
10	I2 =	I2 (negative sequence)	606
11	Θ/Θtrip =	Temperature rise for warning and trip	801
12	<user defined>	not pre-allocated	-
13	IA S1 =	Operat. meas. current A side 1	721
14	IB S1 =	Operat. meas. current B side 1	722
15	IC S1 =	Operat. meas. current C side 1	723
16	<user defined>	not pre-allocated	-
17	<user defined>	not pre-allocated	-
18	<user defined>	not pre-allocated	-
19	<user defined>	not pre-allocated	-

Table 2-5 Measured Values (Continued)

PROFINET IO measured-values number	Designation of the SIPROTEC objects	Remark	Internal object no.
20	<user defined>	not pre-allocated	-
21	<user defined>	not pre-allocated	-
22	<user defined>	not pre-allocated	-
23	<user defined>	not pre-allocated	-
24	<user defined>	not pre-allocated	-

## 2.6 Statistic Values

In the **DIGSI Configuration Matrix**, further statistic values can be allocated as "destination system interface" to the "<user defined>" positions.

Table 2-6 Statistic Values

PROFINET IO statistic-values number	Designation of the SIPROTEC objects	Remark	Internal object no.
1	SumIL1 S1:	Accumulation of interrupted curr. L1 S1	30607
2	SumIL2 S1:	Accumulation of interrupted curr. L2 S1	30608
3	SumIL3 S1:	Accumulation of interrupted curr. L3 S1	30609
4	SumIL1 S2:	Accumulation of interrupted curr. L1 S2	30610
5	SumIL2 S2:	Accumulation of interrupted curr. L2 S2	30611
6	SumIL3 S2:	Accumulation of interrupted curr. L3 S2	30612
7	Op.Hours =	Counter of operating hours	1020
8	<user defined>	not pre-allocated	-
9	<user defined>	not pre-allocated	-
10	<user defined>	not pre-allocated	-
11	<user defined>	not pre-allocated	-

Table 2-6 Statistic Values (Continued)

PROFINET IO statistic-values number	Designation of the SIPROTEC objects	Remark	Internal object no.
12	<user defined>	not pre-allocated	-
13	<user defined>	not pre-allocated	-
14	<user defined>	not pre-allocated	-
15	<user defined>	not pre-allocated	-
16	<user defined>	not pre-allocated	-
17	<user defined>	not pre-allocated	-
18	<user defined>	not pre-allocated	-

## 2.7 Metered Values

In the **DIGSI Configuration Matrix**, further metered values can be allocated as "destination system interface" to the "<user defined>" positions.

Table 2-7 Metered Values

PROFINET IO metered-values number	Designation of the SIPROTEC objects	Remark	Internal object no.
1	Wp+	Wp Forward (Metered measurand derived from measured values)	924
2	Wq+	Wq Forward (Metered measurand derived from measured values)	925
3	Wp-	Wp Reverse (Metered measurand derived from measured values)	928
4	Wq-	Wq Reverse (Metered measurand derived from measured values)	929
5	Wp(puls)	Pulsed Energy Wp (active)	888
6	Wq(puls)	Pulsed Energy Wq (reactive)	889

Table 2-7 Metered Values (Continued)

PROFINET IO metered-values number	Designation of the SIPROTEC objects	Remark	Internal object no.
7	#of TRIPs=	Number of TRIPs	-
8	<user defined>	not pre-allocated	-

The scaling factor of the metered values can be determined with the following relationship or can be read via acyclic data services using PROFINET IO (see manual **SIPROTEC 4 Communication Modules, PROFINET IO Communication Profile**).

### Scaling

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

$$(60000 * V_{\text{nom, secondary}}/100 \text{ V}) \text{ impulses per hour for } S = S_{\text{nom}}$$

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

$V_{\text{nom, secondary}}$  = phase-to-phase secondary voltage of the voltage transformer (parameter address = 0222)

### Example

In the parameter set is configured:

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

$$V_{\text{nom, secondary}} = 100 \text{ V}$$

60000 impulses correspond so that:

$$1 \text{ h} * 5.27 \text{ MVA} * 100 \text{ V}/100 \text{ V} = 5.27 \text{ MVAh}$$



### NOTE

- The type of restoring (cyclic, with or without deletion) and the restoring interval must be set for the metered values using the DIGSI parameterization software.
- Non restored metered values are invalid, e.g. when they are not restored cyclically.
- The scaling of the metered values at a binary input (pulse counter) depends on the externally connected pulse generator.



# Glossary

## C

CFC	<b>Continuous Function Chart</b>
Client	Device in the communication network that sends data requests or commands to the server devices and receives responses from these devices

## D

DAP	<b>Device Access Point:</b> usually in slot 0 of the IO device; interface data and port data can be read.
DC	<b>Double command;</b> data type
DB	Data block (in S7 programming)
DCP	<b>Discovery and Configuration Protocol</b>
DHCP	<b>Dynamic Host Configuration Protocol</b> enables the network configuration to be assigned to the devices by a DHCP server.
DIGSI	Parameterization software for SIPROTEC 4 devices
DP	<b>Double-point</b> indication; data type
DST	<b>Daylight Saving Time</b>

## E

EEPROM	<b>Electrically Erasable Programmable Read-Only Memory;</b> integrated circuit in the EN100 for permanently storing the network parameters, station name and I&M data
EN100	100-Mbit Ethernet module for SIPROTEC 4 devices
Ethernet	Cable-based data network technology for local data networks

## G

Gateway	Enables networks based on different protocols to communicate with each other
GOOSE	<b>Generic Object Oriented Substation Event</b>
GSDML	<b>Generic Station Description as XML</b> file

## H

HTML	<b>HyperText Markup Language</b>
HTTP	<b>HyperText Transfer Protocol</b>

<b>I</b>		
IEC	<b>I</b> nternational <b>E</b> lectrotechnical <b>C</b> ommission: standardization body; communication standard for substations and protection devices	
IED	<b>I</b> ntelligent <b>E</b> lectronic <b>D</b> evice	
I&M	<b>D</b> evice <b>I</b> dentification <b>and</b> <b>M</b> aintenance functions	
Indication CLEARED	The status of the indication changes from ON to OFF, that is the indication is deleted.	
Indication RAISING	The status of the indication changes from OFF to ON, that is the indication is currently present.	
Input direction/ Input data	Data-transmission direction from the IO device to the IO controller with the direction of data transmission always being observed from the location of the IO controller. This transmission direction is also referred to as the monitoring direction.	
IO controller	Controlling device in a PROFINET IO network	
IO device	Controlled device in a PROFINET IO network	
IO module	Module in the IO device which executes a part of or all input and output functionalities (indications, measured values, commands, etc.) of the device, including the associated parameter settings via the PROFINET IO parameterization software.  An IO module can be either real hardware (hardware module for the data acquisition in a modular IO device, for example ET200S from Siemens I IA) or a virtual module. The module can be parameterized for different applications in a SIPROTEC device.	
IOCS	<b>I</b> nput/ <b>O</b> utput <b>C</b> onsumer <b>S</b> tatus	
IOPS	<b>I</b> nput/ <b>O</b> utput <b>P</b> rovider <b>S</b> tatus	
IP	<b>I</b> nternet <b>P</b> rotocol	
IP address	Addresses in computer networks based on the Internet protocol	
<b>L</b>		
LLDP	<b>L</b> ower <b>L</b> ayer <b>D</b> iscovery <b>P</b> rotocol	
LSB	<b>L</b> east <b>S</b> ignificant <b>B</b> it	
<b>M</b>		
MIB	<b>M</b> anagement <b>I</b> nformation <b>B</b> ase: Information that can be queried or modified via the SNMP network management protocol	
MLFB	Order number	
MMS	<b>M</b> anufacturing <b>M</b> essage <b>S</b> pecification	
MRP	<b>M</b> edia <b>R</b> edundancy <b>P</b> rotocol	
MSB	<b>M</b> ost <b>S</b> ignificant <b>B</b> it	
<b>N</b>		
NaN	<b>N</b> ot a <b>N</b> umber means "invalid": result of an invalid computing operation	
NRT	<b>N</b> on- <b>R</b> eal <b>T</b> ime; PROFINET IO NRT processing when using UDP	
NTP	<b>N</b> etwork <b>T</b> ime <b>P</b> rotocol: standard for synchronizing clocks in computer systems using packet-based communication networks (see RFC5905)	



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<b>O</b>	OB	<b>Organization block</b> (in S7 programming)
	OID	<b>Object Identifier</b> (of the data point in an SNMP MIB)
	Output direction/ Output data	Data-transmission direction from the IO controller to the IO device with the direction of data transmission always being observed from the location of the IO controller. This transmission direction is also referred to as the control direction.
<b>P</b>	PLC	<b>Programmable Logic Controller</b>
	PRP	<b>Parallel Redundancy Protocol</b>
<b>R</b>	RJ45	Ethernet plug connector
	RSTP	<b>Rapid Spanning Tree Protocol</b>
	RT	<b>Real Time</b> (PROFINET IO RT uses Ethernet EtherType 0x8892)
	RTA	<b>Real Time Alarm</b> (PROFINET IO alarm processing)
<b>S</b>	SC	<b>Single command</b> ; data type
	Server	Sends data upon the client's request
	SFB	<b>System function block</b> (in S7 programming)
	SFC	<b>System function</b> (in S7 programming)
	SNMP	<b>Simple Network Management Protocol</b> : monitors and controls network elements from a central station.
	SNTP	<b>Simple Network Time Protocol</b> : simplified version of the NTP
	SP	<b>Single-point indication</b> ; data type
Step 7	Software for programming programmable logic controllers (PLC) of the SIMATIC-S7 family of Siemens AG	
<b>T</b>	TCP	<b>Transmission Control Protocol</b>
<b>U</b>	UTC	<b>Universal Time Coordinated</b> : universal time standard referred to the time at the prime meridian
	UDP	<b>User Datagram Protocol</b>
<b>V</b>	VI	<b>Value Indication</b> ; DIGSI data type for statistic values



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