SIPROTEC

Overcurrent Protection
7SJ80

Motor Protection
7SK80

Voltage and Frequency Protection
7RW80

Communication module

DNP 3.0

Bus mapping / Point lists

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Preface

Aim of the Manual
The manual is devided into the following topics:

- Notes to SIPROTEC objects
- DNP V3.0 Device Profile
- Point lists

General information about design, configuration, and operation of SIPROTEC devices are laid down in the SIPROTEC 4 system manual, order no. E50417-H1176-C151.

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 stations.

Additional literature
This manual describes the DNP 3.0 Device Profile of the SIPROTEC devices.

The following additional manuals inform you about the DNP point lists and the function, operation, assembly and commissioning of the SIPROTEC devices:

Manual	Contents	Order number
Overcurrent Protection SIPROTEC 7SJ80 V4.6	Function, operation, assembly and commissioning of the SIPROTEC device 7SJ80	E50417-G1140-C343
Motor Protection SIPROTEC 7SK80 V4.6	Function, operation, assembly and commissioning of the SIPROTEC device 7SK80	E50417-G1140-C344
Voltage and Frequency Protction 7RW80 V4.6	Function, operation, assembly and commissioning of the SIPROTEC device 7RW80	C53000-G1140-C233
DNP 3.0 Communication Database	DNP communication database of the SIPROTEC devices	C53000-L1840-A001-03

The DNP V3.0 specification and the structure of the DNP messages are defined in:

> DNP V3.00 Subset Definitions
> Edition 2.00, November 1995
> DNP Users Group,
> Document Nr.: P009-OIG.SUB

> DNP V3.00 Data Object Library
> Edition 0.02, July 1997
> DNP Users Group
> Document Nr.: P009-OBL

> DNP V3.00 Data Link Layer
> Edition 0.02, May 1997
> DNP Users Group
> Document Nr.: P009-OPD.DL

> DNP V3.00 Application Layer
> Edition 0.03, May 1997
> DNP Users Group
> Document Nr.: P009-OPD.APP

> DNP V3.00 Transport Functions
> Edition 0.01, May 1997
> DNP Users Group
> Document Nr.: P009-OPD.TF

Applicability of the Manual

This manual is valid for

• SIPROTEC devices 7SJ80/7SK80/7RW80 with

   – firmware version 4.6 or higher

   – DNP communication module version 02.00.01 or higher.

For device parameterization **DIGSI** 4 **version 4.8 or higher** and
DNP standard mappings 3-1 to 3-n (n = device type dependent number of standard mappings) have to be used.

Additional Support

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

Training Courses

Individual course offerings may be found in our Training Catalogue, or questions may be directed to our training center. Please contact your Siemens representative.

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Instructions and Warnings

The warnings and notes contained in this manual serve for your own safety and for an appropriate lifetime of the device. Please observe them!

The following terms are used:

DANGER

indicates that death, severe personal injury or substantial property damage <u>will</u> result if proper precautions are not taken.

Warning

indicates that death, severe personal injury or substantial property damage <u>can</u> result if proper precautions are not taken.

Caution

indicates that minor personal injury or property damage can result if proper precautions are not taken. This particularly applies to damage on or in the device itself and consequential damage thereof.

Note
indicates information about the device or respective part of the instruction manual which is essential to highlight.

Warning!

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

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

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

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

QUALIFIED PERSONNEL

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

- Is trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety practices.

- Is trained in the proper care and use of protective equipment in accordance with established safety practices.

- Is trained in rendering first aid.

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Typographic and Symbol Conventions

The following text formats are used when literal information from the device or to the device appear in the text flow:

Parameter names, i.e. designators of configuration or function parameters which may appear word-for-word in the display of the device or on the screen of a personal computer (with operation software DIGSI 4), are marked in bold letters of a monospace type style.

Parameter options, i.e. possible settings of text parameters, which may appear word-for-word in the display of the device or on the screen of a personal computer (with operation software DIGSI 4), are written in italic style, additionally.

"Annunciations", i.e. designators for information, which may be output by the relay or required from other devices or from the switch gear, are marked in a monospace type style in quotation marks.

Deviations may be permitted in drawings when the type of designator can be obviously derived from the illustration.

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Notes to SIPROTEC objects

<div style="text-align: right; font-size: 3em; font-weight: bold;">1</div>

This chapter contains notes for the use and evaluation of certain SIPROTEC objects which are available via DNP3.0 communication.

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Note

The description of the standard mappings / point lists (ref. to chap. 3) contains the pre-allocation of the mapping files at delivery or first assignment of a mapping in DIGSI 4 to the SIPROTEC device.

Changes of the allocation and the scaling of the measured values are possible in adaptation to the concrete installation enviroment (ref. to page 3).

1.1 Binary Inputs / Annunciations

Note

Depending on the device composition and the existing protection packages not all of the indicated binary inputs or protection annunciations (and corresponding DNP points) may be available in the SIPROTEC device

1.1.1 Error with a summary alarm

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

- "Error 5V", "Error neutral CT", "Error 1A/5A wrong", "Error A/D converter".

Reference   ref to chap. 3.2.12

1.1.2 Alarm Summary Event

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

- "Error Board 1", "Error Board 2", "Error Board 3", "Error Board 4", "Error Board 5", "Error Board 6", "Error Board 7",

- "Alarm NO calibration", "Failure Battery", "Alarm Real Time Clock",

- "Failure Phase Sequence", "VT Fuse Failure", "Failure Voltage Balance", "Failure Voltage Summation Phase – Ground", "Failure General Voltage Supervision",

- "Failure Current Balance", "Failure Current Summation", "Failure General Current Supervision".

Reference   ret. to chap. 3.2.12

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1.1.3 Stop Data Transmission

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

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

Reference   ref. to chap. 3.2.12

1.2 Binary Outputs / Commands

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 DNP message points) available in the SIPROTEC device.

1.2.1 Single Commands

The command output mode (*pulse output*, *continuous output*) is changeable for the single commands using parametrization software DIGSI 4.

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

Reference   ref. to chap. 3.3.3

1.2.2 Control mode REMOTE

Control mode with control authority is REMOTE, option of unlocked control with DNP.

• Changing the Control mode REMOTE" to UNLOCKED permits one unlocked control operation via DNP. 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 DNP for a period of 5 minutes, then the "Control mode REMOTE" is automatically reset to LOCKED.

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Reference   ref. to chap. 3.3.2

1.2.3   Changing the setting group

Switching on one setting group automatically switches off the current active setting group. Transmission of the value 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 DNP if the parameter **CHANGE TO ANOTHER SETTING GROUP** (parameter address = 302) has the value "Protocol".

Reference   ref. to chap. 3.3.2

1.3   Analog Inputs / Measured values

Note

Depending on the device composition not all of the indicated analog inputs (and corresponding DNP message points) may be available in the SIPROTEC device.

The given scaling values for the measured values in the standard mapping apply to installations with the following nominal operating values:

Measurement: Full Scale Voltage (parameter address 1101):
– >100 ... 1000 kV

Measurement: Full Scale Current (parameter address 1102):
– >10 ... 1000 A

Product of:
• Transformers – Rated Primary Voltage (parameter address 0202) and
• Ratio factor Vph/Vdelta (parameter address 0206)
– >100 ... 1000 kV

Transformers– CT Rated primary current (parameter address 0217)
• >10 ... 1000 A

Power values:
• Product of Full Scale Voltage and Full Scale Current multiplied by $\sqrt{3}$
– >100 ... 1000 MW (MVAR)

Note

Changes of the scaling of the measured values are possible in adaptation to the concrete installation environment (ref. to manual "DNP 3.0 Communication Database").

1.4   Metered measurands

Scaling   The scaling of the metered measurands, which are derived from measured values, re-fers to**:**

60000 impulses per hour for V = Vprim and I = Iprim

V_{prim} = **Full Scale Voltage**
(parameter address = 1101)

I_{prim} = **FULL SCALE CURRENT**
parameter address = 1102)

Example   In the parameter set is configured:

I_{prim} = 1000 A and V_{prim} = 400.0 kV,

60000 impulses correspond so that:

1 h * 1000 A * 400 kV * $\sqrt{3}$ = 692.82 MWh

Note

- The type of the update (cyclic, with or without deletion) and the update interval must be programmed for the metered measurands with the parametrization software DIGSI 4.

- The scaling of the metered measurands at binary inputs ("Wp(puls)" and "Wq(puls)") depends on the externally connected pulse generator.

DNP V3.0 Device Profile

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2.1 Implementation Table

The following table gives a list of all objects recognized and returned by the SIPRO-TEC device.

For static objects, requests sent with qualifiers 00, 01, 06, 07 or 08 will be responded with qualifiers 00 or 01.

Requests sent with qualifiers 17 or 28 will be responded with qualifiers 17 or 28.

For change-event objects, qualifiers17 or 28 are always responded.

In the table below text shaded 00, 01 (start stop) indicates Subset Level 3 functionality (beyond Subset Level 2), text shaded as 07, 08 (limited qty) indicates functionality beyond Subset Level 3.

1

OBJECTS			REQUEST		RESPONSE	
Object	Vari-ation	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
1	0	Binary Input - Any Variations	1 (read)	00, 01 (start-stop) 06 (no range) 07, 08 (limited qfy) 17, 28 (index)		
1	2	Binary Input with Status	1 (read)	00, 01 (start-stop) 06 (no range) 07, 08 (limited qfy) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
2	0	Binary Input Change - Any Variations	1 (read)	06 (no range) 07, 08 (limited qfy)		
2	2	Binary Input Change with Time	1 (read)	06 (no range) 07, 08 (limited qfy)	129 (response) 130 (unsol. resp)	17, 28 (index)
10	0	Binary Output - Any Variations	1 (read)	00, 01 (start-stop) 06 (no range) 07, 08 (limited qfy) 17, 28 (index)		
10	2	Binary Output with Status	1 (read)	00, 01 (start-stop) 06 (no range) 07, 08 (limited qfy) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
12	1	Contol Relay Output Block	3 (select) 4 (operate) 5 (direct op.) 6 (dir. op. noack)	00, 01 (start-stop) 07, 08 (limited qfy) 17, 28 (index)	129 (response)	echo of response
20	0	Binary Counter - Any Variations	1 (read)	00, 01 (start-stop) 06 (no range) 07, 08 (limited qfy) 17, 28 (index)		
20	1	32-Bit Binary Counter (with Flag)	1 (read)	00, 01 (start-stop) 06 (no range) 07, 08 (limited qfy) 17, 28 (index)		
22	0	Counter Change Event - Any Variations	1 (read)	06 (no range) 07, 08 (limited qfy)		
22	1	32-Bit Counter Change Event without Time	1 (read)	06 (no range) 07, 08 (limited qfy)		

OBJECTS			REQUEST		RESPONSE	
Object	Vari-ation	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
30	0	16-Bit Analog Input - Any Variations	1 (read)	00, 01 (start-stop) 06 (no range) 07, 08 (limited qfy) 17, 28 (index)		
30	1	32-Bit Analog Input with Status	1 (read)	00, 01 (start-stop) 06 (no range) 07, 08 (limited qfy) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
30	2	16-Bit Analog Input with Status	1 (read)	00, 01 (start-stop) 06 (no range) 07, 08 (limited qfy) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
32	0	Analog Change Event - Any Variations	1 (read)	06 (no range) 07, 08 (limited qfy)		
32	1	32-Bit Analog Change Event without Time	1 (read)	06 (no range) 07, 08 (limited qfy)	129 (response) 130 (unsol. resp)	17, 28 (index)
32	2	16-Bit Analog Change Event without Time	1 (read)	06 (no range) 07, 08 (limited qfy)	129 (response) 130 (unsol. resp)	17, 28 (index)
50	1	Time and Date	2 (write)	07 (limited qfy = 1)		
60	1	Class 0 Data	1 (read)	06 (no range)		
60	2	Class 1 Data	1 (read)	06 (no range) 07, 08 (limited qfy)		
60	3	Class 2 Data	1 (read)	06 (no range) 07, 08 (limited qfy)		
60	4	Class 3 Data	1 (read)	06 (no range) 07, 08 (limited qfy)		
80	1	Internal Indications	2 (write)	00 (start-stop) (index must = 7)		

2.2   Device Profile Document

DNP V3.0

DEVICE PROFILE DOCUMENT

Vendor Name: **SIEMENS AG**

Device Name: **7SJ80/7SK80/7RW80**

Highest DNP Level Supported:	Device Function:
For Requests DNP-L2	☐ Master ☒ Slave
For Responses DNP-L2	

Notable objects, functions, and/or qualifiers supported in addition to the Highest DNP Levels Supported (the complete list is described in the attached table):

For static (non-change-event) object requests, request qualifier codes 00 and 01 (start-stop), 07 and 08 (limited quantity), and 17 and 28 (index) are supported in addition to request qualifier code 06 (no range). Static object requests sent with qualifiers 00, 01, 06, 07, or 08, will be responded with qualifiers 00 or 01. Static object requests sent with qualifiers 17 or 28 will be responded with qualifiers 17 or 28. For change-event object requests, qualifiers 17 or 28 are always responded.

16-bit Analog Change Events with Time may be requested.

The write function code for Object 50 (Time and Date), variation 1, is supported.

The features outlined within this Device Profile have successfully passed DNP Conformance Test of Subset Level 2 outlined in DNP3-2000 IED Certification Procedure.

Maximum Data Link Frame Size (octets):	Maximum Application Fragment Size (octets):
Transmitted____292_____	Transmitted _Configurable up to 2048
Received_____292_____	Received_____2048_____
Maximum Data Link Re-tries:	Maximum Application Layer Re-tries:
☒ None ☐ Fixed at ☐ Configurable, range _0_to _255_	☒ None ☐ Configurable, range ____ to _____ (Fixed is not permitted)

Requires Data Link Layer Confirmation:

☐ Never
☐ Always
☐ Sometimes If 'Sometimes', when? _____
☒ Configurable If 'Configurable', how? by the protection data processing program DIGSI 4

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Requires Application Layer Confirmation:

- ☐ Never
- ☐ Always (not recommended)
- ☒ When reporting Event Data (Slave devices only)
- ☒ When sending multi-fragment responses (Slave devices only)
- ☐ Sometimes If 'Sometimes', when? _____
- ☒ Configurable If 'Configurable', how? by the protection data processing program DIGSI 4

Timeouts while waiting for:

	None	Fixed at	Variable	Configurable
Data Link Confirm	☐ None	☐ Fixed at _____	☐ Variable	☒ Configurable
Complete Appl. Fragment	☒ None	☐ Fixed at _____	☐ Variable	☐ Configurable
Application Confirm	☐ None	☐ Fixed at _____	☐ Variable	☒ Configurable
Complete Appl. Response	☒ None	☐ Fixed at _____	☐ Variable	☐ Configurable

Others: Default value are configurable by the protection data processing program DIGSI 4

Sends/Executes Control Operations:

	Never	Always	Sometimes	Configurable
WRITE Binary Outputs	☒ Never	☐ Always	☐ Sometimes	☐ Configurable
SELECT/OPERATE	☐ Never	☒ Always	☐ Sometimes	☐ Configurable
DIRECT OPERATE	☐ Never	☒ Always	☐ Sometimes	☐ Configurable
DIRECT OPERATE - NO ACK	☐ Never	☒ Always	☐ Sometimes	☐ Configurable
Count > 1	☒ Never	☐ Always	☐ Sometimes	☐ Configurable
Pulse On	☐ Never	☒ Always	☐ Sometimes	☐ Configurable
Pulse Off	☒ Never	☐ Always	☐ Sometimes	☐ Configurable
Latch On	☐ Never	☒ Always	☐ Sometimes	☐ Configurable
Latch Off	☐ Never	☒ Always	☐ Sometimes	☐ Configurable
Queue	☒ Never	☐ Always	☐ Sometimes	☐ Configurable
Clear Queue	☒ Never	☐ Always	☐ Sometimes	☐ Configurable

Note:
CONTROL RELAY OUTPUT BLOCK parameters (count, on-time, off-time) are ignored.

TimeSync Information:

a.) TimeSync Period
- ☐ Never
- ☐ Fixed at _____seconds
- ☒ Configurable, range ____1____to __86400_seconds

b.) Maximum time base drift over 10 minute interval: ____30__ms
c.) Maximum Internal Time Reference Error when set via DNP: _____1__ms
d.) Maximum Delay Measurement error: ____20__ms
e.) Maximum response time: ___100__ms
c.) Event data time-tag error – if different than (c):

Binary Input Change Events	_____ms
Counter Change Events	_____ms
Frozen Counter Change Events	_____ms
Analog Change Events	_____ms
Frozen Analog Change Events	_____ms

Reports Binary Input Change Events when no specific variation requested:	Reports time-tagged Binary Input Change Events when no specific variation requested:
☐ Never ☒ Only time-tagged ☐ Only non-time-tagged ☐ Configurable to send both, one or the other (attach explanation)	☐ Never ☒ Binary Input Change With Time ☐ Binary Input Change With Relative Time ☐ Configurable (attach explanation)
Sends Unsolicited Responses:	Sends Static Data in Unsolicited Responses:
☐ Never ☒ Configurable (Unsolicited data response mode are switched on/off via the configuration tool) ☐ Only certain objects ☐ Sometimes (attach explanation) ☒ ENABLE/DISABLE UNSOLICITED Function codes supported	☒ Never ☐ When Device Restarts ☐ When Status Flags Change No other options are permitted.
Default Counter Object/Variation:	Counters Roll Over at:
☐ No Counters Reported ☐ Configurable (attach explanation) ☒ Default Object ___20_____ Default Variation ___01_____ ☐ Point-by-point list attached Sends 32-Bit counters.	☐ No Counters Reported ☐ Configurable (attach explanation) ☐ 16 Bits ☒ 32 Bits ☐ Other Value _____ ☐ Point-by-point list attached
Sends Multi-Fragment Responses: ☒ Yes ☐ No	

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Point lists

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3.1 Functional Scope

Depending of the functional scope, some of the following described functions, annunciations, commands, measured and metered values are not available.

7SJ80

Table 3-1   7SJ80 Functional scope

No.	Function	Ref. to Chapter
103	Setting Group Change Option	3.2.14
104	Oscillographic Fault Records	-
112	50/51 (Charac. Phase) Overcurrent Protection	3.2.2
113	50N/51N (Charac. Ground) Overcurrent Protection	3.2.2
115	67, 67-TOC Directional Overcurrent Protection	3.2.4
116	67N, 67N-TOC Directional Overcurrent Protection	3.2.4
117	Cold Load Pickup	3.3.2
122	2nd Harmonic Inrush Restraint	3.2.3
127	50 1Ph Single Phase Overcurrent Protection	-
130	(sens.) Ground fault dir. characteristic	3.2.8
131	(sensitive) Ground fault	3.2.8
140	46 Negative Sequence Protection	3.2.5
142	49 Thermal Overload Protection	-
150	27, 59 Under/Overvoltage Protection	3.2.7
154	81 Over/Underfrequency Protection	3.2.6
161	25 Function group 1 Synchronism and Voltage Check	-
170	50BF Breaker Failure Protection	-
171	79 Auto-Reclose Function	3.2.1
172	52 Breaker Wear Monitoring	-
180	Fault Locator	-
181	Line Sections for Fault Locator	-
182	74TC Trip Circuit Supervision	3.2.11
192	Capacitive voltage measurement	-
617	Port B usage	-

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C53000-L2040-A320-2

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7SK80

Table 3-2   7SK80 Functional scope

No.	Function	Ref. to Chapter
103	Setting Group Change Option	3.2.14
104	Oscillographic Fault Records	-
112	50/51 (Charac. Phase) Overcurrent Protection	3.2.2
113	50N/51N (Charac. Ground) Overcurrent Protection	3.2.2
116	67N, 67N-TOC Directional Overcurrent Protection	3.2.4
117	Cold Load Pickup	3.3.2
122	2nd Harmonic Inrush Restraint	3.2.3
130	(sens.) Ground fault dir. characteristic	3.2.8
131	(sensitive) Ground fault	3.2.8
140	46 Negative Sequence Protection	3.2.5
141	48 Startup Supervision of Motors	3.2.10
142	49 Thermal Overload Protection	-
143	66 Startup Counter for Motors	3.2.9
144	Load Jam Protection	
150	27, 59 Under/Overvoltage Protection	3.2.7
154	81 Over/Underfrequency Protection	3.2.6
170	50BF Breaker Failure Protection	-
172	52 Breaker Wear Monitoring	-
182	74TC Trip Circuit Supervision	3.2.11
190	External Temperature Input	-
191	Ext. Temperature Input Connection Type	-
192	Capacitive voltage measurement	-
617	Port B usage	-

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7RW80

Table 3-3   7RW80 Functional scope

No.	Function	Ref. to Chapter
103	Setting Group Change Option	3.2.14
104	Oscillographic Fault Records	-
143	24 Overexcitation Protection	
146	Jump of Voltage Vector	-
150	27, 59 Under/Overvoltage Protection	3.2.7
152	VT Broken wire supervision	-
154	81 Over/Underfrequency Protection	3.2.6
155	Load Restoration	-
161	25 Function group 1 Synchronism and Voltage Check	-
182	74TC Trip Circuit Supervision	3.2.11
617	Port B usage	-

3.2 Binary Input Points

Binary Input Points
Static (Steady-State) Object Number: **1**
Change Event Object Number: **2**
Request Function Codes supported: **1 (read)**
Static Variation reported when variation 0 requested: **1 (Binary Input with status)**
Change Event Variation reported when variation 0 requested: **2 (Binary Input Change with Time)**

Point Index	Name	Description	Class
	3.2.1 Auto-Reclose Function		
0	>79 ON	>79 ON; Automatic reclosure ON; ON = 1, OFF = 0	3
1	CB is NOT ready	Circuit breaker is NOT ready; ON = 1, OFF = 0	2
2	79 DynBlock	79 – Auto-reclose is dynamically BLOCKED; ON = 1, OFF = 0	3
3	79 in progress	79 – in progress; ON = 1, OFF = 0	2
4	79 Close	79 – Close command; ON = 1	3
5	79 Successful	79 – cycle successful; ON = 1, OFF = 0	3
6	79 Lockout	79 – Lockout; ON = 1, OFF = 0	1
7	79 L_N Sequence	79-A/R single phase reclosing sequence; Program earthfault is running = 1, Program is deactivated = 0	3
8	79 L-L Sequence	79-A/R multi-phase reclosing sequence; ON = 1, OFF = 0	3
	3.2.2 Overcurrent Protection		
9	50/51 PH ACT	50/51 O/C is ACTIVE; ON = 1, OFF = 0	3
10	50N/51N ACT	50N/51N is ACTIVE; ON = 1, OFF = 0	3
11	50 (N) / 51 (N) PU	50(N)/51(N) O/C PICKUP; ON = 1, OFF = 0	2
12	50/51 Ph A PU	50/51 Phase A picked up; ON = 1, OFF = 0	2
13	50/51 Ph B PU	50/51 Phase B picked up; ON = 1, OFF = 0	2
14	50/51 Ph C PU	50/51 Phase C picked up; ON = 1, OFF = 0	2
15	50N/51NPickedup	50N/51N picked up; ON = 1, OFF = 0	2
16	50 (N)/51(N)TRIP	50(N)/51(N) TRIP; ON = 1	2
	3.2.3 InRush Function		
17	PhA InrushBlk	Phase A trip blocked by inrush detection; ON = 1, OFF = 0	3
18	PhB InrushBlk	Phase B trip blocked by inrush detection; ON = 1, OFF = 0	3
19	PhC InrushBlk	Phase C trip blocked by inrush detection; ON = 1, OFF = 0	3
20	INRUSH X-BLK	Cross blk: PhX blocked Phy; ON = 1, OFF = 0	3
	3.2.4 Directional Overcurrent Protection		
21	67 ACTIVE	67/67-TOC is ACTIVE; activate = 1, deactivate = 0	3
22	67N ACTIVE	67N/67N-TOC is ACTIVE; activate = 1, deactivate = 0	3
23	67/67N pickedup	67/67N picked up; ON = 1, OFF = 0	2
24	67 A picked up	67/67-TOC Phase A picked up; ON = 1, OFF = 0	2
25	67 B picked up	67/67-TOC Phase B picked up; ON = 1, OFF = 0	2
26	67 C picked up	67/67-TOC Phase C picked up; ON = 1, OFF = 0	2

Binary Input Points
Static (Steady-State) Object Number: **1**
Change Event Object Number: **2**
Request Function Codes supported: **1 (read)**
Static Variation reported when variation 0 requested: **1 (Binary Input with status)**
Change Event Variation reported when variation 0 requested: **2 (Binary Input Change with Time)**

Point Index	Name	Description	Class
27	67N picked up	67N/67N-TOC picked up; ON = 1, OFF = 0	2
28	67/67N TRIP	67/67N TRIP; ON = 1, OFF = 0	2
	3.2.5	**Negative Sequence Protection**	
29	46 ACTIVE	46 is ACTIVE; ON = 1, OFF = 0	3
30	46-2 picked up	46-2 picked up; ON = 1, OFF = 0	2
31	46-TOC pickedup	46-TOC picked up; ON = 1, OFF = 0	2
32	46 TRIP	46 TRIP picked up; ON = 1, OFF = 0	2
33	46-1 picked up	46-1 picked up; ON = 1, OFF = 0	2
	3.2.6	**Over/Underfrequency Protection**	
34	81 ACTIVE	81 ACTIVE; ON = 1, OFF = 0	3
35	81-1 picked up	81-1 picked up; ON = 1, OFF = 0	2
36	81-2 picked up	81-2 picked up; ON = 1, OFF = 0	2
37	81-1 TRIP	81-1 TRIP; ON = 1, OFF = 0	2
38	81-2 TRIP	81-2 TRIP; ON = 1, OFF = 0	2
	3.2.7	**Under/Overvoltage Protection**	
39	27 ACTIVE	27 Undervoltage protection is ACTIVE; ON = 1, OFF = 0	3
40	27-1 picked up	27-1 Undervoltage picked up; ON = 1, OFF = 0	2
41	27-1 TRIP	27-1 Undervoltage TRIP; ON = 1, OFF = 0	2
42	59 ACTIVE	59-Overvoltage protection is ACTIVE; ON = 1, OFF = 0	3
43	59-1 picked up	59 picked up; ON = 1, OFF = 0	2
44	59-1 TRIP	59 TRIP; ON = 1, OFF = 0	2
	3.2.8	**(sensitive) Ground Fault Protection**	
45	50Ns/67Ns ACT	50Ns/67Ns is ACTIVE; ON = 1, OFF = 0	3
46	64 Pickup	64 displacement voltage pick up; ON = 1, OFF = 0	2
47	64 Trip	64 displacement voltage element TRIP; ON = 1, OFF = 0	2
48	50Ns-2 Pickup	50Ns-2 Pickup; ON = 1, OFF = 0	2
49	50Ns-2 TRIP	50Ns-2 TRIP; ON = 1, OFF = 0	2
50	50Ns-1 Pickup	50Ns-1 Pickup; ON = 1, OFF = 0	2
51	50Ns-1 TRIP	50Ns-1 TRIP; ON = 1, OFF = 0	2
52	Sens. Gnd Ph A	Sensitive Ground fault picked up in Ph A; ON = 1, OFF = 0	2
53	Sens. Gnd Ph B	Sensitive Ground fault picked up in Ph B; ON = 1, OFF = 0	2
54	Sens. Gnd Ph C	Sensitive Ground fault picked up in Ph C; ON = 1, OFF = 0	2
55	SensGnd Forward	Sensitive Gnd fault in forward direction; ON = 1, OFF = 0	2
56	SensGnd Reverse	Sensitive Gnd fault in reverse direction; ON = 1, OFF = 0	2

Binary Input Points
Static (Steady-State) Object Number: **1**
Change Event Object Number: **2**
Request Function Codes supported: **1 (read)**
Static Variation reported when variation 0 requested: **1 (Binary Input with status)**
Change Event Variation reported when variation 0 requested: **2 (Binary Input Change with Time)**

Point Index	Name	Description	Class
	3.2.9 Startup Counter for Motor		
57	66 ACTIVE	66 Motor start protection ACTIVE; ON = 1, OFF = 0	3
58	66 TRIP	66 Motor start protection TRIP; ON = 1, OFF = 0	2
	3.2.10 Startup Supervision of Motors		
59	START-SUP ACT	Startup supervision is ACTIVE; ON = 1, OFF = 0	3
60	START-SUP TRIP	Startup supervision TRIP; ON = 1, OFF = 0	2
61	START-SUP pu	Startup supervision Pickup; ON = 1, OFF = 0	2
	3.2.11 Trip Circuit Supervision		
62	74TC ACTIVE	74TC Trip circuit supervision is ACTIVE; ON = 1, OFF = 0	3
63	FAIL: Trip cir.	74TCFailure Trip Circuit; ON = 1, OFF = 0	1
	3.2.12 Internal Mode Status		
64	Cntrl Auth	Control Authority; LOCAL=1, REMOTE=0	3
65	ModeLOCAL	Control mode LOCAL; UNLOCKED=1, LOCKED=0	3
66	Relay OK	Relay OK; ON = 1, OFF = 0	1
67	Running	Setting calculation is running; ON = 1, OFF = 0	3
68	ProtActive	At least one protection funct. is active; ON=1, OFF=0	2
69	Error Sum Alarm	Error with a summary alarm; ON = 1, OFF = 0 (ref. to chap. 1.1.1)	2
70	Alarm Sum Event	Alarm Summary Event; ON = 1, OFF = 0 (ref. to chap. 1.1.2)	2
71	Relay Pickup	Relay Pickup; ON = 1, OFF = 0	1
72	Relay TRIP	General TRIP of the relay; ON = 1	1
73	Test mode	Test mode; ON=1, OFF=0	3
	3.2.13 Control switches return position indication(double point commands)		
74	52 Breaker	input state of switch breaker; 0=open, 1=close	1
75	52 Breaker status	switch breaker failure status; 0=switch breaker position is open or close, 1= switch breaker is in an intermediate position or position state is incorrect.	1
76	Switch 1	input state of switch 1; 0=open, 1=close	1
77	switch 1 status	switch 1 failure status; 0= switch 1 position is open or close, 1= switch 1 is in an intermediate position or position state is incorrect.	1
78	Switch 2	input state of switch 2; 0=open, 1=close	1
79	switch 2 status	switch 2 failure status; 0= switch 1 position is open or close, 1= switch 1 is in an intermediate position or position state is incorrect.	1
80	Switch 3	input state of switch 3; 0=open, 1=close	1
81	switch 3 status	switch 3 failure status; 0= switch 2 position is open or close, 1= switch 2 is in an intermediate position or position state is incorrect.	1

Binary Input Points
Static (Steady-State) Object Number: **1**
Change Event Object Number: **2**
Request Function Codes supported: **1 (read)**
Static Variation reported when variation 0 requested: **1 (Binary Input with status)**
Change Event Variation reported when variation 0 requested: **2 (Binary Input Change with Time)**

Point Index	Name	Description	Class
82	Switch 4	input state of switch 4; 0=open, 1=close	1
83	switch 4 status	switch 4 failure status; 0= switch 3 position is open or close, 1= switch 3 is in an intermediate position or position state is incorrect.	1
84	Switch 5	input state of switch 5; 0=open, 1=close	1
85	switch 5 status	switch 5 failure status; 0= switch 4 position is open or close, 1= switch 4 is in an intermediate position or position state is incorrect.	1
86	Switch 6	input state of switch 6; 0=open, 1=close	1
87	switch 6 status	switch 6 failure status; 0= switch 5 position is open or close, 1= switch 5 is in an intermediate position or position state is incorrect.	1
88	Switch 7	input state of switch 7; 0=open, 1=close	1
89	switch 7 status	switch 7 failure status; 0= switch 6 position is open or close, 1= switch 6 is in an intermediate position or position state is incorrect.	1
90	Switch 8	input state of switch 8; 0=open, 1=close	1
91	switch 8 status	switch 8 failure status; 0= switch 6 position is open or close, 1= switch 6 is in an intermediate position or position state is incorrect.	1
	3.2.14 Internal controls		
92	Group A	Protection Parameter Group A; 0 = Group A is deactivated, 1= Group A is activated and Group B,C,D are deactivated.	1
93	Group B	Protection Parameter Group B; 0 = Group B is deactivated, 1= Group B is activated and Group A,C,D are deactivated.	1
94	Group C	Protection Parameter Group C; 0 = Group C is deactivated, 1= Group C is activated and Group A,B,D are deactivated.	1
95	Group D	Protection Parameter Group D; 0 = Group D is deactivated, 1= Group D is activated and Group A,B,C are deactivated.	1
96	ModeREMOTE	Control mode REMOTE; UNLOCKED=1, LOCKED=0	3
	3.2.15 Output channels return position indication (Single point commands)		
97	>switch 1	0 = Open (off), 1= Close (on)	1
98	>switch 2	0 = Open (off), 1= Close (on)	1
99	>switch 3	0 = Open (off), 1= Close (on)	1
100	>switch 4	0 = Open (off), 1= Close (on)	1
101	>switch 5	0 = Open (off), 1= Close (on)	1
102	>switch 6	0 = Open (off), 1= Close (on)	1
103	>switch 7	0 = Open (off), 1= Close (on)	1
104	>switch 8	0 = Open (off), 1= Close (on)	1
105	>switch 9	0 = Open (off), 1= Close (on)	1
106	>switch 10	0 = Open (off), 1= Close (on)	1
107	>switch 11	0 = Open (off), 1= Close (on)	1

Binary Input Points
Static (Steady-State) Object Number: **1**
Change Event Object Number: **2**
Request Function Codes supported: **1 (read)**
Static Variation reported when variation 0 requested: **1 (Binary Input with status)**
Change Event Variation reported when variation 0 requested: **2 (Binary Input Change with Time)**

Point Index	Name	Description	Class
108	>switch 12	0 = Open (off), 1= Close (on)	1
109	>switch 13	0 = Open (off), 1= Close (on)	1
110	>switch 14	0 = Open (off), 1= Close (on)	1
111	>switch 15	0 = Open (off), 1= Close (on)	1
112	>switch 16	0 = Open (off), 1= Close (on)	1
113	>switch 17	0 = Open (off), 1= Close (on)	1
114	>switch 18	0 = Open (off), 1= Close (on)	1
115	>switch 19	0 = Open (off), 1= Close (on)	1
116	>switch 20	0 = Open (off), 1= Close (on)	1
117	>switch 21	0 = Open (off), 1= Close (on)	1
118	>switch 22	0 = Open (off), 1= Close (on)	1
119	>switch 23	0 = Open (off), 1= Close (on)	1
120	>switch 24	0 = Open (off), 1= Close (on)	1
121	>switch 25	0 = Open (off), 1= Close (on)	1
	3.2.16 Internal controls		
122	<unnamed>[1]	User input 1	2
123	<unnamed>	User input 2	2
124	<unnamed>	User input 3	2
125	<unnamed>	User input 4	2
126	<unnamed>	User input 5	2
127	<unnamed>	User input 6	2
128	<unnamed>	User input 7	2
129	<unnamed>	User input 8	2
130	<unnamed>	User input 9	2
131	<unnamed>	User input 10	2
132	<unnamed>	User input 11	2
133	<unnamed>	User input 12	2
134	<unnamed>	User input 13	2
135	<unnamed>	User input 14	2
136	<unnamed>	User input 15	2
137	<unnamed>	User input 16	2
138	<unnamed>	User input 17	2
139	<unnamed>	User input 18	2
140	<unnamed>	User input 19	2

Binary Input Points
Static (Steady-State) Object Number: **1**
Change Event Object Number: **2**
Request Function Codes supported: **1 (read)**
Static Variation reported when variation 0 requested: **1 (Binary Input with status)**
Change Event Variation reported when variation 0 requested: **2 (Binary Input Change with Time)**

Point Index	Name	Description	Class
141	<unnamed>	User input 20	2
142	<unnamed>	User input 21	2
143	<unnamed>	User input 22	2
144	<unnamed>	User input 23	2
145	<unnamed>	User input 24	2
146	<unnamed>	User input 25	2
147	<unnamed>	User input 26	2
148	<unnamed>	User input 27	2
149	<unnamed>	User input 28	2
150	<unnamed>	User input 29	2
151	<unnamed>	User input 30	2
152	<unnamed>	User input 31	2
153	<unnamed>	User input 32	2
154	<unnamed>	User input 33	2
155	<unnamed>	User input 34	2
156	<unnamed>	User input 35	2
157	<unnamed>	User input 36	2
158	<unnamed>	User input 37	2
159	<unnamed>	User input 38	2
160	<unnamed>	User input 39	2

1The names are defined during indication allocation using parametrization softwareDIGSI 4

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3.3 Control Relay Output Blocks/Binary Output Status

Binary Output Status Points
Object Number: **10**
Request Function Codes supported: **1 (Read)**
Default Variation reported when variation 0 requested: **2 (Binary Output Status)**

Control Relay Output Blocks/Binary Output Status
Object Number: **12**
Request Function Codes supported: **3 (select), 4 (operate), 5 (direct operate), 6 (direct operate, no ack)**

Point In-dex	Name	Description	Supported Control Relay Output Block Fields
	3.3.1 External commands (Double point commands)		
0	52Breaker	Trip Breaker switch	Trip, Pulse On (On Time Fixed[1])
1	52Breaker	Close Breaker switch	Close, Pulse On (On Time Fixed)
2	Switch 1	Trip switch 1	Trip, Pulse On (On Time Fixed)
3	Switch 1	Close switch 1	Close, Pulse On (On Time Fixed)
4	Switch 2	Trip switch 2	Trip, Pulse On (On Time Fixed)
5	Switch 2	Close switch 2	Close, Pulse On (On Time Fixed)
6	Switch 3	Trip switch 3	Trip, Pulse On (On Time Fixed)
7	Switch 3	Close switch 3	Close, Pulse On (On Time Fixed)
8	Switch 4	Trip switch 4	Trip, Pulse On (On Time Fixed)
9	Switch 4	Close switch 4	Close, Pulse On (On Time Fixed)
10	Switch 5	Trip switch 5	Trip, Pulse On (On Time Fixed)
11	Switch 5	Close switch 5	Close, Pulse On (On Time Fixed)
12	Switch 6	Trip switch 6	Trip, Pulse On (On Time Fixed)
13	Switch 6	Close switch 6	Close, Pulse On (On Time Fixed)
14	Switch 7	Trip switch 7	Trip, Pulse On (On Time Fixed)
15	Switch 7	Close switch 7	Close, Pulse On (On Time Fixed)
16	Switch 8	Trip switch 8	Trip, Pulse On (On Time Fixed)
17	Switch 8	Close switch 8	Close, Pulse On (On Time Fixed)

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Binary Output Status Points
Object Number: **10**
Request Function Codes supported: **1 (Read)**
Default Variation reported when variation 0 requested: **2 (Binary Output Status)**

Control Relay Output Blocks/Binary Output Status
Object Number: **12**
Request Function Codes supported: **3 (select), 4 (operate), 5 (direct operate), 6 (direct operate, no ack)**

Point In-dex	Name	Description	Supported Control Relay Output Block Fields
	3.3.2 Internal commands		
18	Group A	Select parametergroup A and deactivate parametergroup B,C,D ref. to chap. 1.2.3	Latch On
19	Group B	Select parametergroup B and deactivate parametergroup A,C,D	Latch On
20	Group C	Select parametergroup C and deactivate parametergroup A,B,D	Latch On
21	Group D	Select parametergroup D and deactivate parametergroup A,B,C	Latch On
22	ModeREMOTE	Mode remote control; Latch On = UNLOCKED Lath Off = LOCKED (ref. to chap.1.2.2)	Latch On; Latch Off
	3.3.3 Output channel (user defined single point output commands) Please ref to chap. 1.2.1 for additional notes.		
23	Output 1[2]	Output channel 1	Latch On, Latch Off, Pulse On
24	Output 2	Output channel 2	Latch On, Latch Off, Pulse On
25	Output 3	Output channel 3	Latch On, Latch Off, Pulse On
26	Output 4	Output channel 4	Latch On, Latch Off, Pulse On
27	Output 5	Output channel 5	Latch On, Latch Off, Pulse On
28	Output 6	Output channel 6	Latch On, Latch Off, Pulse On
29	Output 7	Output channel 7	Latch On, Latch Off, Pulse On
30	Output 8	Output channel 8	Latch On, Latch Off, Pulse On
31	Output 9	Output channel 9	Latch On, Latch Off, Pulse On
32	Output 10	Output channel 10	Latch On, Latch Off, Pulse On
33	Output 11	Output channel 11	Latch On, Latch Off, Pulse On
34	Output 12	Output channel12	Latch On, Latch Off, Pulse On
35	Output 13	Output channel 13	Latch On, Latch Off, Pulse On

Binary Output Status Points
Object Number: **10**
Request Function Codes supported: **1 (Read)**
Default Variation reported when variation 0 requested: **2 (Binary Output Status)**

Control Relay Output Blocks/Binary Output Status
Object Number: **12**
Request Function Codes supported: **3 (select), 4 (operate), 5 (direct operate), 6 (direct operate, no ack)**

Point In-dex	Name	Description	Supported Control Relay Output Block Fields
36	Output 14	Output channel 14	Latch On, Latch Off, Pulse On
37	Output 15	Output channel 15	Latch On, Latch Off, Pulse On
38	Output 16	Output channel 16	Latch On, Latch Off, Pulse On
39	Output 17	Output channel 17	Latch On, Latch Off, Pulse On
40	Output 18	Output channel 18	Latch On, Latch Off, Pulse On
41	Output 19	Output channel 19	Latch On, Latch Off, Pulse On
42	Output 20	Output channel 20	Latch On, Latch Off, Pulse On
43	Output 21	Output channel 21	Latch On, Latch Off, Pulse On
44	Output 22	Output channel 22	Latch On, Latch Off, Pulse On
45	Output 23	Output channel 23	Latch On, Latch Off, Pulse On
46	Output 24	Output channel 24	Latch On, Latch Off, Pulse On
47	Output 25	Output channel 25	Latch On, Latch Off, Pulse On

1The On-Time is fixed within theSIPROTEC parameter package for each commond object. The Control Relay Output Block in-formation on-time will be ignored.
2The names are defined during indication allocation using parametrization softwareDIGSI 4

3.4   Counters

Counters
Static (Steady-State) Object Number: **20**
Change Event Object Number: **22**
Request Function Codes supported: **1 (read)**
Static Variation reported when variation 0 requested: **1 (32-Bit Counter with Flag)**
Change Event Variation reported when variation 0 requested: **1 (32-Bit Counter without Time)**

Point In-dex	Name	Description	Scaling(2^{32}-1 of the unsigned long-value corresponds to...)
0	Wp+=	Wp Forward (metered measurand derived from measured value)	2^{32}-1 impulses
1	Wq+=	Wq Forward (metered measurand derived from measured value)	2^{32}-1 impulses
2	Wp-=	Wp Reverse (metered measurand derived from measured value)	2^{32}-1 impulses
3	Wq-=	Wq Reverse (metered measurand derived from measured value)	2^{32}-1 impulses
4	Wp(puls) =	Pulsed Energy Wp (active)(metering impulses at binary input)	2^{32}-1 impulses
5	Wq(puls) =	Pulsed Energy Wq (reactive)(metering impulses at binary input)	2^{32}-1 impulses

3.5   Analog Inputs

Analog Inputs
Static (Steady-State) Object Number: **30**
Change Event Object Number: **32**
Request Function Codes supported: **1 (read)**
Static Variation reported when variation 0 requested: **02 (16-Bit Analog Input)**
Change Event Variation reported when variation 0 requested:**02 (Analog Change Event without Time)**

Point In-dex	Name	Description	Scaling(32767 corre-sponds to ...)	Default Change Event assigned Class
	3.5.1 Recorded measured values			
0	Ia=	Current phase a	3276.7 A	1
1	Ib=	Current phase b	3276.7 A	1
2	Ic=	Current phase c	3276.7 A	1
3	I0=	Current I0	3276.7 A	1
4	Va=	Voltage phase a	32.767 kV	1
5	Vb=	Voltage phase b	32.767 kV	1
6	Vc=	Voltage phase c	32.767 kV	1
7	Va-b=	Voltage phase a to phase b	32.767 kV	1
8	Vb-c=	Voltage phase b to phase c	32.767 kV	1
9	Vc-a=	Voltage phase c to phase a	32.767 kV	1
10	V=	Voltage Ground	32.767 kV	1
11	P=	Active power	32767 kW	1
12	Q=	Reactive power	32767 kVar	1
13	S=	Apparent power	32767 kVar	1
14	Freq=	frequency	327.67 Hz	1
15	cos φ=	power factor	3.2767	1
16	UsrMv1	user defined measurement	3276.7	1
17	UsrMv2	user defined measurement	3276.7	1
18	UsrMv3	user defined measurement	3276.7	1
19	UsrMv4	user defined measurement	3276.7	1
20	UsrMv5	user defined measurement	3276.7	1
21	UsrMv6	user defined measurement	3276.7	1
22	UsrMv7	user defined measurement	3276.7	1
23	UsrMv8	user defined measurement	3276.7	1
24	UsrMv9	user defined measurement	3276.7	1
25	UsrMv10	user defined measurement	3276.7	1
26	UsrMv11	user defined measurement	3276.7	1
27	UsrMv12	user defined measurement	3276.7	1
	3.5.2 Min/Max values			
28	Ia Min=	Current phase a minimum	3276.7 A	3

Analog Inputs
Static (Steady-State) Object Number: **30**
Change Event Object Number: **32**
Request Function Codes supported: **1 (read)**
Static Variation reported when variation 0 requested: **02 (16-Bit Analog Input)**
Change Event Variation reported when variation 0 requested:**02 (Analog Change Event without Time)**

Point Index	Name	Description	Scaling(32767 corresponds to ...)	Default Change Event assigned Class
29	Ia Max=	Current phase a maximum	3276.7 A	3
30	Ib Min=	Current phase b minimum	3276.7 A	3
31	Ib Max=	Current phase b maximum	3276.7 A	3
32	Ic Min=	Current phase c minimum	3276.7 A	3
33	Ic Max=	Current phase c maximum	3276.7 A	3
34	Va-n Min=	Voltage phase a minimum	32.767 kV	3
35	Va-nMax=	Voltage phase a maximum	32.767 kV	3
36	Vb-nMin=	Voltage phase b minimum	32.767 kV	3
37	Vb-nMax=	Voltage phase b maximum	32.767 kV	3
38	Vc-nMin=	Voltage phase c minimum	32.767 kV	3
39	Vc-nMax=	Voltage phase c maximum	32.767 kV	3
40	Vn Min=	Voltage neutral minimum	32.767 kV	3
41	Vn Max=	Voltage neutral maximum	32.767 kV	3
42	P Min=	Active power minimum	32767 kW	3
43	P Max=	Active power maximum	32767 kW	3
44	Q Min=	Reactive power minimum	32767 kVar	3
45	Q Max=	Reactive power maximum	32767 kVar	3
46	S Min=	Apparent power minimum	32767 kVar	3
47	S Max=	Apparent power maximum	32767 kVar	3
48	f Min=	frequency Minimum	327.67 Hz	3
49	f Max=	frequency Maximum	327.67 Hz	3
50	cos φ min=	Power factor minimum	3.2767	3
51	cos φ max=	Power factor maximum	3.2767	3

If Object 30 Variation 01 (32-Bit Analog Input) requesten, additional:

	3.5.3 Statistic values			
52	(0)Ia=	Trip Current phase a	32767 A	1
53	(0)Ib=	Trip Current phase b	32767 A	1
54	(0)Ic=	Trip Current phase c	32767 A	1
55	Sum Ia =	Accumulation of interrupted current Ph A	327.67 kA	3
56	Sum Ib =	Accumulation of interrupted current Ph B	327.67 kA	3
57	Sum Ic =	Accumulation of interrupted current Ph C	327.67 kA	3

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Analog Inputs
Static (Steady-State) Object Number: **30**
Change Event Object Number: **32**
Request Function Codes supported: **1 (read)**
Static Variation reported when variation 0 requested: **02 (16-Bit Analog Input)**
Change Event Variation reported when variation 0 requested:**02 (Analog Change Event without Time)**

Point In-dex	Name	Description	Scaling(32767 corre-sponds to ...)	Default Change Event assigned Class
58	Op. Hours=	Counter of operating hours	32767 h	1
59	<unnamed>	User input	2	3
60	<unnamed>	User input	2	3

SIPROTEC DNP 3.0 - Bus mapping / Point lists 7SJ80/7SK80/7RW80
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Glossary

AME	**A**synchronous interface **m**odule with (**e**lectrical) isolated RS485 interface for the SIPROTEC devices from Siemens.
AMO	**A**synchronous interface **m**odule with **o**ptical interface for the SIPROTEC devices from Siemens.
AR	**A**utomatic **R**ecloser
CFC	**C**ontinuous **F**unction **C**hart
DC	**D**ouble **C**ommand
DIGSI	Parameterization system for SIPROTEC devices
DNP	**D**istributed **N**etwork **P**rotocol
DP	**D**ouble-**p**oint Indication
Input data/ input direction	Data from the DNP **slave to the** DNP **master**.
Mapping	Allocation of the SIPROTEC data objects to the DNP point index.
Output data/ output direction	Data from the DNP **master to the** DNP **slave**.
RTU	**R**emote **T**erminal **U**nit
SC	**S**ingle **C**ommand
SP	**S**ingle-**p**oint Indication

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