

SIEMENS

SIPROTEC

Line Differential Protection 7SD80

Communication Module

Redundant IEC 60870-5-103

Bus Mapping

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NOTE

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

Disclaimer of Liability

We have checked the contents of this manual against the hardware and software described. However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors or omissions contained in the information given

The information given in this document is reviewed regularly and any necessary corrections will be included in subsequent editions. We appreciate any suggested improvements.

We reserve the right to make technical improvements without notice.

Document release: 01.00.01
Edition 07.2011

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Preface

Purpose of this Manual

The manual is divided into the following topics:

- Notes to SIPROTEC Objects
- Redundant IEC 60870-5-103 Device Profile
- Bus Mapping

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 plants.

Additional Literature

This manual describes the redundant IEC 60870-5-103 Device Profile of the SIPROTEC devices.

The following additional manuals inform you about the redundant IEC 60870-5-103 and the function, operation, assembly, and commissioning of the SIPROTEC devices:

Manual	Contents	Order number
Distance protection SIPROTEC 7SD80	Function, operation, assembly, and commissioning of the SIPROTEC device 7SD80	C53000-G1140-C474-1
IEC 60870-5-103 Communication Database	Redundant IEC 60870-5-103 communication database of the SIPROTEC devices	C53000-L2540-A301-1

IEC 60870-5-103 Specification

The IEC 60870-5-103 specification and the structure of the IEC 60870-5-103 messages are defined in:

- > International Standard IEC 60870-5-103
Transmission protocols-
Companion standard for the informative interface of protection equipment
Edition 1997-12
Reference number CEI/IEC 60870-5-103: 1997

Applicability of this Manual

This manual is valid for

- SIPROTEC 4 device 7SD80 version V4.60 or higher
- Redundant IEC 60870-5-103 communication module version 01.02.04 or higher



Note

The redundant IEC 60870-5-103 module is not for all SIPROTEC devices available. Check the manual of the device or contact your Siemens representative.

For device parameterization DIGSI 4 version 4.8 or higher and IEC 60870-5-103 standard mapping 3-1 have to be used.

Further support

If you have any further questions regarding 7SD80, please do not hesitate to contact your local Siemens representative.

Hotline

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

Phone: +49 (180) 524-7000
Fax: +49 (180) 524-2471
e-mail: support.energy@siemens.com

Training courses

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

Siemens AG
Siemens Power Academy

Humboldtstr. 59
90459 Nuremberg
Germany

Phone: +49 (911) 433-7415
Fax: +49 (911) 433-7929
e-mail: power-academy.energy@siemens.com
Internet: www.siemens.com/energy/power-academy

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:

Warning

indicates that death, severe personal injury, or substantial material damage can result if proper precautions are not taken.

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 electric equipment during operation. Non-observance of the safety rules can result in severe personal injury or material damage.

Only electrically 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 electrically qualified personnel under observance of all warnings and hints contained in this manual.

In particular the general election 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 material 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.

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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1 Notes to SIPROTEC Objects

This chapter contains notes for the use and evaluation of certain SIPROTEC objects which are available via IEC 60870-5-103 communication.

The description of the standard mapping contains the pre-allocation of the mapping file 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 environment.

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1.1 Indications

1.1.1 Alarm Summary Event



Note

Depending on the device composition and the existing protection packages not all of the indicated binary inputs or protection indications (and corresponding IEC 60870-5-103 Information numbers) may be available in the SIPROTEC device.

The "Alarm summary event" (Adr. 160) is indicated, if at least one of the following internal alarms assumes the ON status:

- "Failure Battery empty",
- "Error Board 0", "Error Board 1", "Error Board 2", "Error Board 3", "Error Board 4", "Error Board 5"
- "Failure: Current Balance", "Failure: Voltage Balance",
- "Failure: Voltage absent".

Reference

Refer to chapter 3.2.13.

1.1.2 Stop Data Transmission

The functionality "Stop data transmission" is not supported via IEC 60870-5-103 communication. If "Stop data transmission" is active nevertheless data via IEC 60870-5-103 will be transmitted furthermore.

Refer to chapter 3.2.13.

1.2 Commands



Note

The allocation of the standard relays to the switching devices and to the binary outputs is defined during parameterization of the SIPROTEC devices.

Depending on the device composition there may be less than the indicated standard relays (and corresponding IEC 60870-5-103 Information numbers) 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 parameterization software DIGSI 4.

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

Refer to chapter 3.1.2.

1.2.2 Changing the Settings Group

Switching on one settings group automatically switches off the current active settings group. Transmission of the value OFF is insignificant for the change of the settings group and is refused by the device.

A change of the settings group is only possible via IEC 60870-5-103 if the parameter **Change to Another settings group** (parameter address = 302) has the value "Protocol".

Refer to chapter 3.1.2 to the command for changing the settings group. The indication for a change of a settings group is shown in chapter 3.1.2.

1.3 Measured Values



Note

Depending on the device composition not all of the indicated analog inputs (and corresponding IEC 60870-5-103 mapping entry) may be available in the SIPROTEC device.

For the transmission of measured values, the compatible range and the private range can be used. Are there several measurement telegrams parameterised then these are transferred cyclically after each other.



Note

If all parameterised measurement telegrams aren't transferred, the parameter **Scanning period (in ms) for measurements** must be put on a greater value.

The range of the values which can be transmitted is mostly +/-240 % or +/-2.4 of the rated value. The value in data unit 9 has 13 bit (1 sign, 12 bit data). That means that +/- 4096 indicates +/- 240% of the measured value.

Changes of the scaling of the measured values are possible in adaptation to the concrete installation environment (ref. to manual "IEC 60870-5-103 Communication database").

2 IEC 60870-5-103 Interoperability

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Redundant IEC 60870-5-103

DEVICE PROFILE DOCUMENT

Vendor Name: **SIEMENS AG**

Device Name: **7SD80**

2.1 Physical Layer

2.1.1 Electrical Interface

- EIA RS-485
- Number of loads _____ for one protection equipment

2.1.2 Optical Interface

- Glass fibre
- Plastic fibre
- F-SMA type connector
- BFOC/2,5 type connector

2.1.3 Transmission Speed

- 2 400 bit/s
- 4 800 bit/s
- 9 600 bit/s
- 19 200 bit/s
- 38 400 bit/s
- 57 600 bit/s

2.2 Link Layer

There are no choices for the link layer.

2.3 Application Layer

2.3.1 Transmission Mode for Application Data

Mode 1 (least significant octet first), as defined in 4.10 of IEC 60870-5-4, is used exclusively in this companion standard.

2.3.2 Common Address of ASDU

- One Common Address of ASDU (identical with station address)
- More than one Common Address of ASDU

2.3.3 Selection of Standard Information Numbers in Monitor Direction

2.3.3.1 System Functions in Monitor Direction

INF	Semantics
<input type="checkbox"/> <0>	End of general interrogation
<input type="checkbox"/> <0>	Time synchronization
<input type="checkbox"/> <2>	Reset FCB
<input type="checkbox"/> <3>	Reset CU
<input checked="" type="checkbox"/> <4>	Reset Device
<input checked="" type="checkbox"/> <5>	Initial Start

2.3.3.2 Status Indications in Monitor Direction

INF	Semantics
<input checked="" type="checkbox"/> <16>	Auto-recloser active
<input type="checkbox"/> <17>	Teleprotection active
<input checked="" type="checkbox"/> <18>	Protection active
<input checked="" type="checkbox"/> <19>	LED reset
<input checked="" type="checkbox"/> <20>	Stop data transmission
<input checked="" type="checkbox"/> <21>	Test mode
<input checked="" type="checkbox"/> <22>	Setting calculation is running
<input checked="" type="checkbox"/> <23>	Setting Group A active
<input checked="" type="checkbox"/> <24>	Setting Group B active
<input checked="" type="checkbox"/> <25>	Setting Group C active
<input checked="" type="checkbox"/> <26>	Setting Group D active
<input checked="" type="checkbox"/> <27>	>Annunciation 1
<input checked="" type="checkbox"/> <28>	>Annunciation 2
<input checked="" type="checkbox"/> <29>	>Annunciation 3
<input checked="" type="checkbox"/> <30>	>Annunciation 4

2.3.3.3 Supervision Indications in Monitor Direction

INF	Semantics
<input checked="" type="checkbox"/>	<32> Fail I supervision
<input checked="" type="checkbox"/>	<33> Fail V supervision
<input checked="" type="checkbox"/>	<35> Fail phase sequence supervision
<input type="checkbox"/>	<36> Fail trip circuit
<input checked="" type="checkbox"/>	<37> Emergency mode
<input checked="" type="checkbox"/>	<38> Fail Feeder VT
<input type="checkbox"/>	<39> Teleprotection disturbed
<input checked="" type="checkbox"/>	<46> Alarm summary event
<input checked="" type="checkbox"/>	<47> Error summary alarm

2.3.3.4 Fault Indications in Monitor Direction

INF	Semantics
<input checked="" type="checkbox"/>	<64> Relay pick-up phase A
<input checked="" type="checkbox"/>	<65> Relay pick-up phase B
<input checked="" type="checkbox"/>	<66> Relay pick-up phase C
<input checked="" type="checkbox"/>	<67> Relay pick-up G
<input checked="" type="checkbox"/>	<68> Relay trip
<input type="checkbox"/>	<69> Relay trip command phase A
<input type="checkbox"/>	<70> Relay trip command phase B
<input type="checkbox"/>	<71> Relay trip command phase C
<input type="checkbox"/>	<72> Trip I>> (back-up operation)
<input type="checkbox"/>	<73> Fault location X in ohms
<input type="checkbox"/>	<74> Fault forward/line
<input type="checkbox"/>	<75> Fault reverse/busbar
<input type="checkbox"/>	<76> Teleprotection signal transmitted
<input type="checkbox"/>	<77> Teleprotection signal received
<input type="checkbox"/>	<78> Zone 1
<input type="checkbox"/>	<79> Zone 2
<input type="checkbox"/>	<80> Zone 3
<input type="checkbox"/>	<81> Zone 4
<input type="checkbox"/>	<82> Zone 5
<input type="checkbox"/>	<83> Zone 6
<input checked="" type="checkbox"/>	<84> Relay pick-up
<input type="checkbox"/>	<85> Busbar trip
<input type="checkbox"/>	<86> Trip measuring system A
<input type="checkbox"/>	<87> Trip measuring system B
<input type="checkbox"/>	<88> Trip measuring system C
<input type="checkbox"/>	<89> Trip measuring system G
<input type="checkbox"/>	<90> Trip I>
<input type="checkbox"/>	<91> Trip I>>
<input type="checkbox"/>	<92> Trip IN>
<input type="checkbox"/>	<93> Trip IN>>

2.3.3.5 Auto-Reclosure Indications in Monitor Direction

INF	Semantics
<input checked="" type="checkbox"/>	<128> Close command by AR
<input type="checkbox"/>	<129> Close command 2nd cycle
<input type="checkbox"/>	<130> AR not ready

2.3.3.6 Measurands in Monitor Direction

INF	Semantics
<input type="checkbox"/>	<144> Measurand I
<input type="checkbox"/>	<145> Measurands I, V
<input type="checkbox"/>	<146> Measurands I, V, P, Q
<input type="checkbox"/>	<147> Measurands IN, VEN
<input type="checkbox"/>	<148> Measurands IA,B,C, VA,B,C, P, Q, f

2.3.3.7 Generic Functions in Monitor Direction

INF	Semantics
<input type="checkbox"/>	<240> Read headings of all defined groups
<input type="checkbox"/>	<241> Read values or attributes of all entries of one group
<input type="checkbox"/>	<243> Read directory of a single entry
<input type="checkbox"/>	<244> Read value or attribute of a single entry
<input type="checkbox"/>	<245> End of general interrogation of generic data
<input type="checkbox"/>	<249> Write entry with confirmation
<input type="checkbox"/>	<250> Write entry with execution
<input type="checkbox"/>	<251> Write entry aborted

2.3.4 Selection of Standard Information Numbers in Control Direction

2.3.4.1 System Functions in Control Direction

INF Semantics

- <0> Initiation of general interrogation
- <0> Time synchronization

2.3.4.2 General Commands in Control Direction

INF Semantics

- <16> Auto-recloser active
- <17> Teleprotection on/off
- <18> Protection active
- <19> LED reset
- <20> Stop data transmission
- <21> Test mode
- <23> Setting Group A active
- <24> Setting Group B active
- <25> Setting Group C active
- <26> Setting Group D active

2.3.4.3 Generic Functions in Control Direction

INF Semantics

- <240> Read headings of all defined groups
- <241> Read values or attributes of all entries of one group
- <243> Read directory of a single entry
- <244> Read value or attribute of a single entry
- <245> General interrogation of generic data
- <248> Write entry
- <249> Write entry with confirmation
- <250> Write entry with execution
- <251> Write entry abort

2.3.5 Basic Application Functions

- Test mode
- Blocking of monitor direction
- Disturbance data
- Generic services

2.3.6 Miscellaneous

Measurand	Max. MVAL = rated value times	
	1,2	or 2,4
Current A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Current B	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Current C	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage A-G	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage B-G	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage C-G	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Active power P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Reactive power Q	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Frequency f	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage A - B	<input type="checkbox"/>	<input checked="" type="checkbox"/>

3 Point List

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3.1 General Command (Control Direction)

3.1.1 Double Point Command

ASDU	Function Type	Information Number	Name	Description	Adr.
20	240	160	52Breaker	Breaker switch	-
20	240	161	Disc.Swit.	Disconnect switch	-
20	240	162	Q2 Op/Ci	Q2 Open / Close	-
20	240	163	Q9 Op/Ci	Q9 Open / Close	-
20	240	164	GndSwit.	Ground switch	-
20	240	175	Fan ON/OFF	Fan ON/OFF	-

3.1.2 Single Point Command

ASDU	Function Type	Information Number	Name	Description	Adr.
20	192	16	79 ON	79: Auto-recloser is switched ON	-
20	192	18	ProtActive	At Least 1 Protection Funct. is Active	-
20	192	19	Reset LED	Reset LED	-
20	192	21	Test mode	Test mode	-
20	192	23	P-GrpA act	Setting Group A is active	-
20	192	24	P-GrpB act	Setting Group B is active	-
20	192	25	P-GrpC act	Setting Group C is active	-
20	192	26	P-GrpD act	Setting Group D is active	-
20	92	107	Commiss.87	87 Set Commissioning state of 87	-
20	92	106	Test 87	87 Set test state of 87	-

3.2 Indications in Monitor Direction

3.2.1 Automatic Reclosure Status

ASDU	Function Type	Information Number	Name	Description	Adr.
1	40	1	>79 ON	>79 ON	2701
1	40	2	>79 OFF	>79 OFF	2702
1	40	3	> BLOCK 79	>BLOCK 79	2703
2	40	11	>79 Start	>79 External start of internal A/R	2711
2	40	16	>79 TRIP 3p	>79: External 3pole trip for AR start	2716
2	40	22	>79 RemoteClose	>79: Remote Close signal	2727
1	40	33	>BLOCK 3pole AR	>79: Block 3pole AR-cycle	2738
1	40	37	>BLK 1.AR-cycle	>79: Block 1st AR-cycle	2742
1	40	38	>BLK 2.AR-cycle	>79: Block 2nd AR-cycle	2743
1	40	81	79 OFF	79: Auto recloser is switched OFF	2781
1	40	83	79 is blocked	79: Auto recloser is blocked	2783
1	40	87	CB not ready	79: Circuit breaker 1 not ready	2787
1	40	88	79 T-CBreadyExp	79: CB ready monitoring window expired	2788
1	40	101	79 in progress	79 - in progress	2801
1	40	118	79 Evolving Flt	79: Evolving fault recognition	2818
2	40	129	79 Remote Close	79 Remote close signal send	2894
2	40	149	79 Tdead 3pTrip	79 dead time after 3pole trip running	2840
1	40	153	79 Close1.Cyc3p	79: Close command after 3pole, 1st cycle	2853
2	40	155	79 1stCyc. run.	79 1st cycle running	2844
2	40	157	79 2ndCyc. run.	79 2nd cycle running	2845
1	40	160	79 1.CycZoneRel	79 1st cycle zone extension release	2889
1	40	161	79 T-Recl. run.	79: Reclaim time is running	2861
1	40	162	79 Successful	79 - cycle successful	2862
1	40	169	79 2.CycZoneRel	79 2nd cycle zone extension release	2890

Indications in Monitor Direction

ASDU	Function Type	Information Number	Name	Description	Adr.
2	40	171	79 TRIP 3pole	79: TRIP command 3pole	2871
2	40	174	79 T-Start Exp	79: Start-signal monitoring time expired	2809
2	40	175	79 TdeadMax Exp	79: Maximum dead time expired	2810
2	40	197	79 Td. evol.Flt	79 dead time after evolving fault	2821
2	192	128	79 Close	79 - Close command	2851
1	192	129	79 Close 2.Cyc	79: Close command 2nd cycle	2854
1	192	130	79 not ready	79: Auto recloser is not ready	2784

3.2.2 DDT Direct Trip

ASDU	Function Type	Information Number	Name	Description	Adr.
1	51	21	DTT OFF	Direct Transfer Trip is switched OFF	4421
1	51	22	DTT BLOCK)	Direct Transfer Trip is BLOCKED	4422
1	51	35	DTT TRIP ØABC	DTT TRIP command Phases ABC	4435

3.2.3 Backup Time Overcurrent Protection

ASDU	Function Type	Information Number	Name	Description	Adr.
1	64	4	>BLOCK 50-B1	>BLOCK 50-B1 Backup OverCurrent	7104
1	64	5	>BLOCK 50-B2	>BLOCK 50-B2 Backup OverCurrent	7105
1	64	6	>BLOCK 51-B	>BLOCK 51-B Backup OverCurrent	7106
1	64	7	>BLOCK 50N-B1	>BLOCK 50N-B1 Backup OverCurrent	7107
1	64	8	>BLOCK 50N-B2	>BLOCK 50N-B2 Backup OverCurrent	7108
1	64	9	>BLOCK 51N	>BLOCK 51N Backup OverCurrent	7109
1	64	10	>5X-B InstTRIP	>50(N)/51(N) Backup O/C InstantaneousTrip	7110
1	64	30	>BLOCK 50-STUB	>BLOCK 50-STUB Backup OverCurrent	7130
1	64	32	>BLOCK 50N-STUB	>BLOCK 50N-STUB Backup OverCurrent	7132
1	64	52	5X-B BLOCK	50(N)/51(N) Backup O/C is BLOCKED	7152
1	64	53	5X-B ACTIVE	50(N)/51(N) Backup O/C is ACTIVE	7153
2	64	61	5X-B PICKUP	50(N)/51(N) Backup O/C PICKED UP	7161
2	64	62	5X-B Pickup ØA	50(N)/51(N) Backup O/C PICKUP Phase A	7162
2	64	63	5X-B Pickup ØB	50(N)/51(N) Backup O/C PICKUP Phase B	7163
2	64	64	5X-B Pickup ØC	50(N)/51(N) Backup O/C PICKUP Phase C	7164
2	64	65	5X-B Pickup Gnd	50(N)/51(N) Backup O/C PICKUP GROUND	7165
2	64	91	50(N)-B1 PICKUP	50(N)-B1 Pickup	7191
2	64	92	50(N)-B2 PICKUP	50(N)-B2 Pickup	7192
2	64	93	51(N)-B PICKUP	51(N)-B Pickup	7193
2	64	101	50-STUB PICKUP	50-STUB Pickup	7201
2	64	111	5X-B TRIP	50(N)/51(N)-B General TRIP command	7211
2	64	121	50(N)-B1 TRIP	50(N)-B1 TRIP	7221
2	64	122	50(N)-B2 TRIP	50(N)-B2 TRIP	7222
2	64	123	51(N)-B TRIP	51(N)-B TRIP	7223
2	64	135	50-STUB TRIP	50-STUB TRIP	7235

3.2.4 Frequency Protection

ASDU	Function Type	Information Number	Name	Description	Adr.
1	70	176	>BLOCK 81O/U	>BLOCK 81O/U; ON = 1, OFF = 0	5203
1	70	177	>BLOCK 81-1	>BLOCK 81-1; ON = 1, OFF = 0	5206
1	70	178	>BLOCK 81-2	>BLOCK 81-2; ON = 1, OFF = 0	5207
1	70	179	>BLOCK 81-3	>BLOCK 81-3; ON = 1, OFF = 0	5208
1	70	180	>BLOCK 81-4	>BLOCK 81-4; ON = 1, OFF = 0	5209
1	70	181	81 OFF	81 OFF; ON = 1, OFF = 0	5211
1	70	182	81 BLOCKED	81 BLOCKED; ON = 1, OFF = 0	5212
1	70	183	81 ACTIVE	81 ACTIVE; ON = 1, OFF = 0	5213
1	70	230	81-1 picked up	81-1 picked up; ON = 1, OFF = 0	5232
1	70	231	81-2 picked up	81-2 picked up; ON = 1, OFF = 0	5233
2	70	232	81-3 picked up	81-3 picked up; ON = 1, OFF = 0	5234
2	70	233	81-4 picked up	81-4 picked up; ON = 1, OFF = 0	5235
2	70	234	81-1 TRIP	81-1 TRIP; ON = 1, OFF = 0	5236
2	70	235	81-2 TRIP	81-2 TRIP; ON = 1, OFF = 0	5237
2	70	236	81-3 TRIP	81-3 TRIP; ON = 1, OFF = 0	5238
2	70	237	81-4 TRIP	81-4 TRIP; ON = 1, OFF = 0	5239
1	70	238	81 UnderV Blk	81 Undervoltage Block	5215

3.2.5 Voltage Protection

ASDU	Function Type	Information Number	Name	Description	Adr.
1	73	15	59-Vphg OFF	59-Vphg Overvolt. is switched OFF	10215
1	73	16	59-Vphg BLK	59-Vphg Overvolt. is BLOCKED	10216
1	73	17	59-Vphph OFF	59-Vphph Overvolt. is switched OFF	10217
1	73	18	59-Vphph BLK	59-Vphph Overvolt. is BLOCKED	10218
1	73	19	59-3V0 OFF	59-3V0 Overvolt. is switched OFF	10219
1	73	20	59-3V0 BLK	59-3V0 Overvolt. is BLOCKED	10220
1	73	21	59-V1 OFF	59-V1 Overvolt. is switched OFF	10221
1	73	22	59-V1 BLK	59-V1 Overvolt. is BLOCKED	10222
1	73	23	59-V2 OFF	59-V2 Overvolt. is switched OFF	10223
1	73	24	59-V2 BLK	59-V2 Overvolt. is BLOCKED	10224
1	73	25	27-Vphg OFF	27-Vphg Undervolt. is switched OFF	10225
1	73	26	27-Vphg BLK	27-Vphg Undervolt. is BLOCKED	10226
1	73	27	27-Vphph OFF	27-Vphph Undervolt. is switched OFF	10227
1	73	28	27-Vphph BLK	27-Vphph Undervolt. is BLOCKED	10228
1	73	29	27-V1 OFF	27-V1 Undervolt. is switched OFF	10229
1	73	30	27-V1 BLK)	27-V1 Undervolt. is BLOCKED	10230
1	73	31	27/59 ACTIVE	27/59 Voltage protection is ACTIVE	10231
2	73	40	59-1-Vpg Pickup	59-1-Vphg Pickup	10240
2	73	41	59-2-Vphg Pickup	59-2-Vphg Pickup	10241
2	73	42	59-Vpg PU A	59-Vphg Pickup A	10242
2	73	43	59-Vpg PU B	59-Vphg Pickup B	10243
2	73	44	59-Vpg PU C	59-Vphg Pickup C	10244
2	73	47	59-Vpg TRIP	59-Vphg TRIP command	10247
2	73	55	59-1-Vpp Pickup	59-1-Vphph Pickup	10255
2	73	56	59-2-Vpp Pickup	59-2-Vpp Pickup	10256
2	73	57	59-Vpp PickupAB)	59-Vphph Pickup A-B	10257

Indications in Monitor Direction

ASDU	Function Type	Information Number	Name	Description	Adr.
2	73	58	59-Vpp PickupBC	59-Vphph Pickup B-C	10258
2	73	59	59-Vpp PickupCA	59-Vphph Pickup C-A	10259
2	73	62	59-Vpp TRIP	59-Vphph TRIP command	10262
2	73	70	59-1-3V0 Pickup	59-1-3V0 Pickup	10270
2	73	71	59-2-3V0 Pickup	59-2-3V0 Pickup	10271
2	73	74	59-3V0 TRIP	59-3V0 TRIP command	10274
2	73	80	59-1-V1 Pickup	59-1-V1 Pickup	10280
2	73	81	59-2-V1 Pickup	59-2-V1 Pickup	10281
1	73	84	59-V1 TRIP	59-V1 TRIP command	10284
1	73	90	59-V2 TRIP	59-V2 TRIP command	10290
2	73	91	59-2-V2 Pickup	59-2-V2 Pickup	10291
2	73	94	59-V2 TRIP	59-V2 TRIP command	10294
2	73	100	27-1-V1 Pickup	27-1-V1 Pickup	10300
2	73	101	27-2-V1 Pickup	27-2-V1 Pickup	10301
2	73	104	27-V1 TRIP	27-V1 TRIP command	10304
2	73	110	27-1-Vpg Pickup	27-1-Vpg Pickup	10310
2	73	111	27-2-Vpg Pickup	27-2-Vpg Pickup	10311
2	73	112	27-Vpg PU A	27-Vphg Pickup A	10312
2	73	113	27-Vpg PU B	27-Vphg Pickup B	10313
2	73	114	27-Vpg PU C	27-Vphg Pickup C	10314
2	73	117	27-Vpg TRIP	27-Vphg TRIP command	10317
2	73	125	27-1-Vpp Pickup	27-1-Vphph Pickup	10325
2	73	126	27-1-Vphph Pickup	27-2-Vphph Pickup	10326
2	73	127	27-Vpp PU AB	27-Vphph Pickup A-B	10327
2	73	128	27-Vpp PU BC	27-Vphph Pickup B-C	10328
2	73	129	27-Vpp PU CA	27-Vphph Pickup C-A	10329
2	73	132	27-Vpp TRIP	27-Vphph TRIP command	10332

ASDU	Function Type	Information Number	Name	Description	Adr.
2	73	133	59-1-Vpg PU A	59-1-Vphg Pickup A	10248
2	73	134	59-1-Vpg PU B	59-1-Vphg Pickup B	10249
2	73	135	59-1-Vpg PU C	59-1-Vphg Pickup C	10250
2	73	136	59-2-Vpg PU A	59-2-Vphg Pickup A	10251
2	73	137	59-2-Vpg PU B	59-2-Vphg Pickup B	10252
2	73	138	59-2-Vpg PU C	59-2-Vphg Pickup C	10253
2	73	139	59-1-Vpp PU AB	59-1-Vphph Pickup A-B	10263
2	73	140	59-1-Vpp PU BC	59-1-Vphph Pickup B-C	10264
2	73	141	59-1-Vpp PU CA	59-1-Vphph Pickup C-A	10265
2	73	142	59-2-Vpp PU AB	59-2-Vphph Pickup A-B	10266
2	73	143	59-2-Vpp PU BC	59-2-Vphph Pickup B-C	10267
2	73	144	59-2-Vpp PU CA	59-2-Vphph Pickup C-A	10268
2	73	145	27-1-Vpg PU A	27-1-Vphg Pickup A	10318
2	73	146	27-1-Vpg PU B	27-1-Vphg Pickup B	10319
2	73	147	27-1-Vpg PU C	27-1-Vphg Pickup C	10320
2	73	148	27-2-Vpg PU A	27-2-Vphg Pickup A	10321
2	73	149	27-2-Vpg PU B	27-2-Vphg Pickup B	10322
2	73	150	27-2-Vpg PU C	27-2-Vphg Pickup C	10323
2	73	151	27-1-Vpp PU AB	27-1-Vphph Pickup A-B	10333
2	73	152	27-1-Vpp PU BC	27-1-Vphph Pickup B-C (27-1-Vpp PU BC)	10334
2	73	153	27-1-Vpp PU CA	27-1-Vphph Pickup C-A	10335
2	73	154	27-2-Vpp PU AB	27-2-Vphph Pickup A-B	10336
2	73	155	27-2-Vpp PU BC	27-2-Vphph Pickup B-C	10337
2	73	156	27-2-Vpp PU CA	27-2-Vphph Pickup C-A	10338

3.2.6 InRushRestraint

ASDU	Function Type	Information Number	Name	Description	Adr.
1	92	89	2nd Harmonic A	Diff: Tolerance invalid in phase A	3102
1	92	90	2nd Harmonic B	Diff: Tolerance invalid in phase B	3103
1	92	91	2nd Harmonic C	Diff: Tolerance invalid in phase C	3104

3.2.7 Protection Data Interface

ASDU	Function Type	Information Number	Name	Description	Adr.
1	93	136	PDI FO Datafailure	Prot Interface FO: Total receipt. failure	3230
1	93	138	PDI CU Datafailure	Prot Interface CU: Total receipt. failure	3232

3.2.8 Diff.-Topology

ASDU	Function Type	Information Number	Name	Description	Adr.
1	92	106	Test 87	87 Set test state of 87	3190
1	92	107	Commiss.87	87 Set Commissioning state of 87	3191
1	92	108	Test 87 remote	87 Remote relay in test state	3192
1	92	109	Comm. 87 active	87 Commissioning state is active	3193
1	93	191	Master Login	Master in Login state	3491
1	93	192	Slave Login	Slave in Login state	3492

3.2.9 Remote Signal

ASDU	Function Type	Information Number	Name	Description	Adr.
1	93	158	Rem.Sig 1 Rx	Remote signal 1 received	3573
1	93	159	Rem.Sig 2 Rx	Remote signal 2 received	3574
1	93	160	Rem.Sig 3 Rx	Remote signal 3 received	3575
1	93	161	Rem.Sig 4 Rx	Remote signal 4 received	3576
1	93	162	Rem.Sig 5 Rx	Remote signal 5 received	3577
1	93	163	Rem.Sig 6 Rx	Remote signal 6 received	3578
1	93	164	Rem.Sig 7 Rx	Remote signal 7 received	3579
1	93	165	Rem.Sig 8 Rx	Remote signal 8 received	3580
1	93	166	Rem.Sig 9 Rx	Remote signal 9 received	3581
1	93	167	Rem.Sig 10 Rx	Remote signal 10 received	3582
1	93	168	Rem.Sig 11 Rx	Remote signal 11 received	3583
1	93	169	Rem.Sig 12 Rx	Remote signal 12 received	3584
1	93	170	Rem.Sig 13 Rx	Remote signal 13 received	3585
1	93	171	Rem.Sig 14 Rx	Remote signal 14 received	3586
1	93	172	Rem.Sig 15 Rx	Remote signal 15 received	3587
1	93	173	Rem.Sig 16 Rx	Remote signal 16 received	3588

3.2.10 Testing

ASDU	Function Type	Information Number	Name	Description	Adr.
1	153	28	CB1-TESTtripABC	CB1-TEST TRIP command ABC	7328
1	153	29	CB1-TEST close	CB1-TEST CLOSE command	7329
1	153	45	CB-TEST running	CB-TEST is in progress	7345

3.2.11 50BF Breaker Failure Protection

ASDU	Function Type	Information Number	Name	Description	Adr.
1	166	103	>BLOCK 50BF	>BLOCK 50BF	1403
1	166	151	50BF OFF	50BF is switched OFF	1451
1	166	152	50BF BLOCK	50BF is BLOCKED	1452
1	166	153	50BF ACTIVE	50BF is ACTIVE	1453
2	166	161	50BF Start	50BF Breaker failure protection started	1461
2	192	85	50BF BusTrip	50BF Busbar trip	1494

3.2.12 Thermal Overload Protection

ASDU	Function Type	Information Number	Name	Description	Adr.
1	167	3	>49 O/L BLOCK	>BLOCK 49 Overload Protection; ON = 1, OFF = 0	1503
1	167	11	49 O / L OFF	49 Overload Protection is OFF; ON = 1, OFF = 0	1511
1	167	12	49 O/L BLOCK	49 Overload Protection is BLOCKED; ON = 1, OFF = 0	1512
1	167	13	49 O/L ACTIVE	49 Overload Protection is ACTIVE; ON = 1, OFF = 0	1513
1	167	15	49 O/L I Alarm	Overload Current Alarm (I alarm); ON = 1, OFF = 0	1515
1	167	16	49 O/L Θ Alarm	49 Overload Alarm! Near Thermal Trip; ON = 1, OFF = 0	1516
1	167	17	49 Windings O/L	49 Winding Overload; ON = 1, OFF = 0	1517
2	167	21	49 Th O/L TRIP	49 Thermal Overload TRIP; ON = 1, OFF = 0	1521

3.2.13 Internal Mode Status

ASDU	Function Type	Information Number	Name	Description	Adr.
1	101	1	>Door open	>Cabinet door open	-
1	101	2	>CB wait	>CB waiting for Spring charged	-
1	135	53	>Test mode	>Test mode	15
1	135	54	>DataStop	>Stop data transmission	16
1	135	81	Device OK	Device is Operational and Protecting	51
1	135	97	Resume	Resume	67
1	135	130	Event Lost	Event lost	110
1	135	136	Flag Lost	Flag Lost	113
1	135	137	Broken Iwire L1	Alarm: Broken current-wire detected L1	290
1	135	138	Broken Iwire L2	Alarm: Broken current-wire detected L2	291
1	135	139	Broken Iwire L3	Alarm: Broken current-wire detected L3	292
1	135	145	Chatter ON	Chatter ON	125
1	135	171	Error Board 1	Error Board 1	183
1	135	172	Error Board 2	Error Board 2	184
1	135	173	Error Board 3	Error Board 3	185
1	135	174	Error Board 4	Error Board 4	186
1	135	175	Error Board 5	Error Board 5	187
1	135	178	Error A/D-conv.	Error: A/D converter	181
1	135	180	Error neutralCT	Error: Neutral CT different from MLFB	194
1	135	181	Alarm adjustm.	Alarm: Analog input adjustment invalid	193
1	135	183	Fail I balance	Failure: Current Balance	163
1	135	186	Fail V balance	Failure: Voltage Balance	167
1	135	187	Fail V absent	Failure: Voltage absent	168
1	135	188	VT FuseFail>10s	VT Fuse Failure (alarm >10s)	169
1	135	193	Fail Battery	Failure: Battery empty	177
1	135	196	Fuse Fail M.OFF	Fuse Fail Monitor is switched OFF	196

Indications in Monitor Direction

ASDU	Function Type	Information Number	Name	Description	Adr.
1	135	197	MeasSup OFF	Measurement Supervision is switched OFF	197
1	135	210	Error Board 0	Error Board 0	190
1	150	6	>Manual Close	>Manual close signal	356
1	150	7	>Blk Man. Close	>Block manual close cmd. from external	357
1	150	35	>Lockout SET	>Lockout SET	385
1	150	36	>Lockout RESET	>Lockout RESET	386
1	150	71	>Bkr1 Ready	>Breaker 1 READY (for AR,CB-Test)	371
1	150	78	>52a 3p Closed	>52a Bkr. aux. contact (3pole closed)	379
1	150	79	>52b 3p Open	>52b Bkr. aux. contact (3pole open)	380
1	150	80	>52a Bkr1 3p Cl	>52a Bkr1 aux. 3pClosed (for AR,CB-Test)	410
1	150	81	>52b Bkr1 3p Op	>52b Bkr1 aux. 3p Open (for AR,CB-Test)	411
1	150	180	Definitive TRIP	Relay Definitive TRIP	536
1	150	211	Man.Clos.Detect	Manual close signal detected	561
1	150	212	Man.Close Cmd	CB CLOSE command for manual closing	562
1	170	53	74TC OFF	74TC Trip circuit supervision OFF	6861
1	192	4	Reset Device	Reset Device	55
1	192	5	Initial Start	Initial Start of Device	56
1	192	18	ProtActive	At Least 1 Protection Funct. is Active	52
1	192	19	Reset LED	Reset LED	-
1	192	20	DataStop	Data stop transmission	-
1	192	21	Test mode	Test mode	-
1	192	22	Settings Calc.	Setting calculation is running	70
1	192	23	P-GrpA act	Setting Group A is active	-
1	192	24	P-GrpB act	Setting Group B is active	-
1	192	25	P-GrpC act	Setting Group C is active	-
1	192	26	P-GrpD act	Setting Group D is active	-
1	192	32	Fail I Superv.	Failure: General Current Supervision	161

ASDU	Function Type	Information Number	Name	Description	Adr.
1	192	33	Fail V Superv.	Failure: General Voltage Supervision	164
1	192	35	Fail Ph. Seq.	Failure: Phase Sequence	171
1	192	36	74TC Trip cir.	74TC Failure Trip Circuit	6865
1	192	37	Emer. mode	Emergency mode	2054
1	192	38	>FAIL:Feeder VT	>Failure: Feeder VT (MCB tripped)	361
1	192	46	Alarm Sum Event	Alarm Summary Event	160
1	192	47	Error Sum Alarm	Error with a summary alarm	140
2	192	64	Relay PICKUP ØA	Relay PICKUP Phase A	503
2	192	65	Relay PICKUP ØB	Relay PICKUP Phase B	504
2	192	66	Relay PICKUP ØC	Relay PICKUP Phase C	505
2	192	67	Relay PICKUP G	Relay PICKUP GROUND	506
2	192	68	Relay TRIP	Relay GENERAL TRIP command	511
2	192	84	Relay PICKUP	Relay PICKUP	501

3.2.14 Control Switches Return Position Indication (Double Point Commands)

ASDU	Function Type	Information Number	Name	Description	Adr.
1	240	160	52Breaker	52 Breaker	-
1	240	161	Disc.Swit.	Disconnect Switch	-
1	240	164	GndSwit.	Ground Switch	-
1	240	162	Q2 Op/Cl	Q2 Open/Close	-
1	240	163	Q9 Op/Cl	Q9 Open/Close	-
1	240	175	Fan ON/OFF	Fan ON/OFF	-

3.2.15 Output Channels Return Position Indication (Single Point Commands)

ASDU	Function Type	Information Number	Name	Description	Adr.
1	240	181	>Err Mot V	>Error Motor Voltage	-
1	240	182	>ErrCntrlV	>Error Control Voltage	-
1	240	183	>SF6-Loss	>SF6-Loss	-
1	240	184	>Err Meter	>Error Meter	-
1	240	185	>Tx Temp.	>Transformer Temperature	-
1	240	186	>Tx Danger	>Transformer Danger	-

3.2.16 Free Channels

ASDU	Function Type	Information Number	Name	Description	Adr.
1	192	27	>Annunc. 1	>User defined annunciation 1	11
1	192	28	>Annunc. 2	>User defined annunciation 2	12
1	192	29	>Annunc. 3	>User defined annunciation 3	13
1	192	30	>Annunc. 4	>User defined annunciation 4	14

3.3 Measurements

3.3.1 ASDU9 (Measurements I)

Function Type	Information Number	Position	Name	Description	Adr.
134	122	7	PI FO TD	Prot. Interf. FO: Transmission delay	7751
134	122	8	FO A/h	Prot. Interf. FO: Availability per hour	7754
134	122	9	PI Cu TD	Prot. Interf. Cu: Transmission delay	7752
134	122	10	Cu A/h	Prot. Interf. Cu: Availability per hour	7756
134	129	1	Ia =	Ia	601
134	129	2	Ib =	Ib	602
134	129	3	Ic =	Ic	603
134	129	4	Va =	Va	621
134	129	5	Vb =	Vb	622
134	129	6	Vc =	Vc	623
134	129	7	P =	P (active power)	641
134	129	8	Q =	Q (reactive power)	642
134	129	9	Freq=	Frequency	644
134	129	10	Va-b=	Va-b	624
134	129	11	Vb-c=	Vb-c	625
134	129	12	Vc-a=	Vc-a	626
134	129	13	PF =	Power Factor	643
134	129	14	3I0 =	3I0 (zero sequence)	610

3.3.2 Time Tagged Measurements

ASDU	Function Type	Information Number	Name	Description	Adr.
4	150	177	(0)Ia=	Trip Current phase a	533
4	150	178	(0)Ib=	Trip Current phase b	534
4	150	179	(0)Ic=	Trip Current phase c	535

3.3.3 Energy Measurement

ASDU	Function Type	Information Number	Name	Description	Adr.
4	133	51	Wp+=	Wp Forward	924
4	133	52	Wq+=	Wq Forward	925
	133	53	Wp-=	Wp Reverse	926
	133	54	Wq-=	Wq Reverse	927
	133	55	active) (Wp(puls)	Pulsed Energy Wp	888
4	133	56	reactive) (Wq(puls)	Pulsed Energy Wq	889

3.4 Settings



Note

The settings which can be read and written are given in the following table. The setting options are indicated in column "Generic identification data". The GID range of a numeric parameter isn't directly equal to the setting range of this parameter in 7SD538 manual.

The formula for the GID is "setting value in the manual * factor" (the factor isn't fixed for each parameter and changes the GID into an integer value). E.g. the setting range of parameter A is 1.00 to 5.00, so the factor is 100 and the GID range is 100 to 500. Setting range of parameter B is 1.0 to 5.0, so the factor is 10 and the GID range is 10 to 50.

For writing parameters KOD is fixed to 1: "Actual value" and GDD Datatype is fixed to 4: "Integer", Datasize is fixed to 4 and Number is fixed to 1.

GIN = Generic Identification Number

For the position and format of the GIN within the telegram please refer to the official IEC 60870-5-103 standard.

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
1	0	1103	FullScaleVolt.		
1	1	1104	FullScaleCurr.		
1	2	1107	P,Q sign	25243 not reversed 25242 reversed	
1	3	1134	Line Closure	12607 only with ManCI 25143 I OR V or ManCI 25144 52a OR I or M/C 25142 I or Man.Close	
1	4	1135	Reset Trip CMD	25145 CurrentOpenPole 25146 Current AND 52a 25232 Pickup Reset	
1	5	1201	PCC-Protection	22 ON 23 OFF	
1	6	1202	ldyn>		
1	7	1203	ldyn close>		
1	8	1204	lsteady>		
1	9	1205	lallow>		
1	10	1206	Trip Delay		
1	11	1207	Man. Close	30946 DELAYED 30947 UNDELAYED	

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
	12	1208	T EF detect		
1	13	1214	Inrush blocking	24 NO 25 YES	
1	14	1221	ECD Protection	22 ON 23 OFF 12700 Alarm only	
1	15	1222	I-DIFF>		
1	16	1226	3V0>		
1	17	1227	Vph-g min		
1	18	1228	Vph-g max		
1	19	1229	3I0>		
1	20	1230	T ECD det.		
1	21	1231	T ECD trip		
1	22	1233	CT Err. I1		
1	23	1234	CT Err. F1		
1	24	1235	CT Err. I2		
1	25	1236	CT Err. F2		
1	26	1237	Inrush blocking	24 NO 25 YES	
1	27	1301	I-TRIP SEND	24 NO 25 YES	
1	28	1302	I-TRIP RECEIVE	25258 Alarm only 25260 Trip	
1	29	1303	TD-ITRIP BI		
1	30	1304	T-ITRIP PROL BI		
1	31	1305	Iph rel.Trip		
1	32	1306	3I0 rel.Trip		
1	33	4501	PDI FO	22 ON 23 OFF	
1	34	4502	PDI FO TER		
1	35	4503	PDI FO level		

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
1	36	4601	PDI Cu	22 ON 23 OFF	
1	37	4602	PDI Cu TER		
1	38	4603	PDI Cu mode	25600 01 25601 02 25604 03 25605 04 25609 05 25613 06	
1	39	4604	PDI Cu level		
1	40	4605	PDI Cu S/N		
1	41	4701	ID OF MASTER		
1	42	4702	ID OF SLAVE		
1	43	4710	LOCAL RELAY	25263 Master 25264 Slave	
1	44	2201	Direct Trip(DT)	22 ON 23 OFF	
1	45	2202	Trip Time DELAY		
1	46	2203	lph rel.Trip		
1	47	2204	3I0 rel.Trip		
1	48	2301	INRUSH REST.	22 ON 23 OFF	
1	49	2302	2nd HARMONIC		
1	50	2303	CROSS BLOCK	24 NO 25 YES	
1	51	2305	MAX INRUSH PEAK		
1	52	2310	CROSSB 2HM		
1	53	2610	Op.Mode50(N)-B1	22 ON 25262 Only Emer. prot 23 OFF	
1	54	2613	50-B1 PICKUP		
1	55	2614	50-B1 DELAY		
1	56	2615	50-B1 Inrush	24 NO 25 YES	

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
1	57	2616	50N-B1 PICKUP		
1	58	2617	50N-B1 DELAY		
1	59	2618	50(N)-B1 Pil/BI	24 NO 25 YES	
1	60	2620	Op.Mode50(N)-B2	22 ON 25262 Only Emer. prot 23 OFF	
1	61	2623	50-B2 PICKUP		
1	62	2624	50-B2 DELAY		
1	63	2625	50-B2 Inrush	24 NO 25 YES	
1	64	2626	50N-B2 PICKUP		
1	65	2627	50N-B2 DELAY		
1	66	2628	50(N)-B2 Pil/BI	24 NO 25 YES	
1	67	2630	Op.Mode 51(N)-B	22 ON 25262 Only Emer. prot 23 OFF	
1	68	2633	51-B PICKUP		
1	69	2634	51-B TD IEC		
1	70	2635	51-B TD ANSI		
1	71	2636	51-B AddT-DELAY		
1	72	2637	51-B Inrush	24 NO 25 YES	
1	73	2638	51N-B PICKUP		
1	74	2639	51N-B TD IEC		
1	75	2640	51N-B TD ANSI		
1	76	2641	51N-B AddTdelay		
1	77	2644	51(N)-B PilotBI	24 NO 25 YES	

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
1	78	2642	IEC Curve	12559 Normal Inverse 12560 Very Inverse 12561 Extremely Inv. 25126 LongTimeInverse	
1	79	2643	ANSI Curve	12808 Inverse 12809 Short Inverse 12810 Long Inverse 12811 Moderately Inv. 12812 Very Inverse 12813 Extremely Inv. 12814 Definite Inv.	
1	80	2650	50(N)-STUB OpMo	22 ON 25262 Only Emer. prot 23 OFF	
1	81	2651	50-STUB PICKUP		
1	82	2652	50-STUB DELAY		
1	83	2653	50-STUB Inrush	24 NO 25 YES	
1	84	2654	50N-STUB PICKUP		
1	85	2655	50N-STUB DELAY		
1	86	2656	50STUB Pilot/BI	24 NO 25 YES	
1	87	2610	Op.Mode67(N)-B1	22 ON 25262 Only Emer. prot 23 OFF	
1	88	2611	67(N)-B1 Dir	12516 Non-Directional 12514 Forward 12515 Reverse	
1	89	2612	67(N)-B1 on FFM	12516 Non-Directional 30948 BLOCKED	
1	90	2613	67-B1 PICKUP		
1	91	2614	67-B1 DELAY		
1	92	2615	67-B1 Inrush	24 NO 25 YES	
1	93	2616	67N-B1 PICKUP		
1	94	2617	67N-B1 DELAY		
1	95	2618	67(N)-B1 Pil/BI	24 NO 25 YES	

Settings

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
1	96	2620	Op.Mode67(N)-B2	22 ON 25262 Only Emer. prot 23 OFF	
1	97	2621	67(N)-B2 Dir.	12516 Non-Directional 12514 Forward 12515 Reverse	
1	98	2622	67(N)-B2 on FFM	12516 Non-Directional 30948 BLOCKED	
1	99	2623	67-B2 PICKUP		
1	100	2624	67-B2 DELAY		
1	101	2625	67-B2 Inrush	24 NO 25 YES	
1	102	2626	67N-B2 PICKUP		
1	103	2627	67N-B2 DELAY		
1	104	2628	67(N)-B2 Pil/BI	24 NO 25 YES	
1	105	2630	Op.Mode67(N)TOC	22 ON 25262 Only Emer. prot 23 OFF	
1	106	2631	67(N)-TOC Dir.	12516 Non-Directional 12514 Forward 12515 Reverse	
1	107	2632	67(N)-TOCon FFM	12516 Non-Directional 30948 BLOCKED	
1	108	2633	67-TOC PICKUP		
1	109	2634	67-TOC TD IEC		
1	110	2635	67-TOC TD ANSI		
1	111	2636	67-TOC AddTDel.		
1	112	2637	67-TOC Inrush	24 NO 25 YES	
1	113	2638	67N-TOC PICKUP		
1	114	2639	67N-TOC TD IEC		
1	115	2640	67N-TOC TD ANSI		
1	116	2641	67N-TOC AddTDel		

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
1	117	2642	IEC Curve	12559 Normal Inverse 12560 Very Inverse 12561 Extremely Inv. 25126 LongTimeInverse	
1	118	2643	ANSI Curve	12808 Inverse 12809 Short Inverse 12810 Long Inverse 12811 Moderately Inv. 12812 Very Inverse 12813 Extremely Inv. 12814 Definite Inv.	
1	119	2644	67(N)TOC PII/BI	24 NO 25 YES	
1	120	2901	MEASURE. SUPERV	22 ON 23 OFF	
1	121	2910	FUSE FAIL MON.	22 ON 23 OFF	
1	122	2915	V-Supervision	25230 w/ CURR.SUP 25231 w/ I> & 52a 23 OFF	
1	123	2931	BROKEN WIRE	23 ON 22 OFF 25258 Alarm only	
1	124	2933	FAST Σ I SUPERV	22 ON 23 OFF	
1	125	4001	FCT 74TC	22 ON 23 OFF	
1	126	4002	No. of BI		
1	127	4003	Alarm Delay		
1	128	4201	FCT 49	23 OFF 22 ON 12700 Alarm Only	
1	129	4202	49 K-FACTOR		
1	130	4203	TIME CONSTANT		
1	131	4204	49 ⊖ ALARM		
1	132	4205	I ALARM		
1	133	4206	CALC. METHOD	12701 ⊖ max 12702 Average ⊖ 12703 ⊖ from I _{max}	

Settings

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
1	134	3401	FCT 79	22 ON 23 OFF	
1	135	3402	52? 1.TRIP	25 YES 24 NO	
1	136	3403	T-RECLAIM		
1	137	3404	BLOCK MC Dur.		
1	138	3406	EV. FLT. RECOG.	25215 with PICKUP 25216 with TRIP	
1	139	3407	EV. FLT. MODE	25011 Stops 79 25166 starts 3p AR	
1	140	3408	T-Start MONITOR		
1	141	3409	CB TIME OUT		
1	142	3410	RemoteCl. Delay		
1	143	3420	AR WITH DIFF	25 YES 24 NO	
1	144	3423	AR w/ INT.TRIP	25 YES 24 NO	
1	145	3424	AR w/ DTT	25 YES 24 NO	
1	146	3425	AR w/ 50(N)-B	25 YES 24 NO	
1	147	3450	1.AR:START	25 YES 24 NO	
1	148	3451	1.AR:ActionTime		
1	152	3457	1.AR:Dead 3Trip		
1	153	3458	1.AR:DeadT.EV.		
1	154	3459	1.AR:52? CLOSE	25 YES 24 NO	
1	155	3461	2.AR:START	25 YES 24 NO	
1	156	3462	2.AR:ActionTime		
1	160	3468	2.AR:Dead 3Trip		
1	161	3469	2.AR:DeadT.EV.		

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
1	162	3470	2.AR:52? CLOSE	25 YES 24 NO	
1	163	3901	FCT 50BF Break.	22 ON 23 OFF	
1	164	3902	50BF PICKUP		
1	165	3905	50BF-1 Delay 3p		
1	166	3906	50BF-2 Delay		
1	167	3907	T3-BkrDefective		
1	168	3908	Trip BkrDefect.	24 NO 25190 with Local trip 25191 with Bus trip 25192 w/Local&Bustrip	
1	169	3909	Chk BRK CONTACT	24 NO 25 YES	
1	170	3912	50NBF PICKUP		
1	171	3913	T2StartCriteria	25509 With exp. of T1 25510 Parallel withT1	
1	172	3921	End Flt. elem.	22 ON 23 OFF	
1	173	3922	EndFault Delay		
1	174	3931	PoleDiscrepancy	22 ON 23 OFF	
1	175	3932	T-PoleDiscrep.		
1	176	3601	81 O/U FREQ. f1	25235 ON: Alarm only 25236 ON: with Trip 23 OFF	
1	177	3602	81-1 PICKUP		$f_{nom} = 50 \text{ Hz}$
1	178	3603	81-1 PICKUP		$f_{nom} = 60 \text{ Hz}$
1	179	3604	81-1 DELAY		
1	180	3611	81 O/U FREQ. f2	25235 ON: Alarm only 25236 ON: with Trip 23 OFF	
1	181	3612	81-2 PICKUP		$f_{nom} = 50 \text{ Hz}$
1	182	3613	81-2 PICKUP		$f_{nom} = 60 \text{ Hz}$

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
1	183	3614	81-2 DELAY		
1	184	3621	81 O/U FREQ. f3	25235 ON: Alarm only 25236 ON: with Trip 23 OFF	
1	185	3622	81-3 PICKUP		f _{nom} = 50 Hz
1	186	3623	81-3 PICKUP		f _{nom} = 60 Hz
1	187	3624	81-3 DELAY		
1	188	3631	81 O/U FREQ. f4	25235 ON: Alarm only 25236 ON: with Trip 23 OFF	
1	189	3632	81-4 PICKUP		
1	190	3633	81-4 PICKUP		f _{nom} = 50 Hz
1	191	3634	81-4 DELAY		f _{nom} = 60 Hz
1	192	3701	59-Vph-g Mode	23 OFF 12700 Alarm Only 22 ON 25188 V>Alarm V>>Trip	
1	193	3702	59-1-Vph PICKUP		
1	194	3703	59-1-Vph DELAY		
1	195	3704	59-2-Vph PICKUP		
1	196	3705	59-2-Vph DELAY		
1	197	3711	59-Vph-ph Mode	23 OFF 12700 Alarm Only 22 ON 25188 V>Alarm V>>Trip	
1	198	3712	59-1-Vpp PICKUP		
1	199	3713	59-1-Vpp DELAY		
1	200	3714	59-2-Vpp PICKUP		
1	201	3715	59-2-Vpp DELAY		
1	202	3721	59G-3V0 (or Vx)	23 OFF 12700 Alarm Only 22 ON 25188 V>Alarm V>>Trip	
1	203	3722	59G-1-3V0PICKUP		

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
1	204	3723	59G-1-3V0 DELAY		
1	205	3724	59G-2-3V0PICKUP		
1	206	3725	59G-2-3V0 DELAY		
1	207	3731	59-V1 Mode	23 OFF 12700 Alarm Only 22 ON 25188 V>Alarm V>>Trip	
1	208	3732	59-1-V1 PICKUP		
1	209	3733	59-1-V1 DELAY		
1	210	3734	59-2-V1 PICKUP		
1	211	3735	59-2-V1 DELAY		
1	212	3741	59-V2 Mode	23 OFF 12700 Alarm Only 22 ON 25188 V>Alarm V>>Trip	
1	213	3742	59-1-V2 PICKUP		
1	214	3743	59-1-V2 DELAY		
1	215	3744	59-2-V2 PICKUP		
1	216	3745	59-2-V2 DELAY		
1	217	3751	27-Vph-g Mode	23 OFF 12700 Alarm Only 22 ON 25189 V<Alarm V<<Trip	
1	218	3752	27-1-Vph PICKUP		
1	219	3753	27-1-Vph DELAY		
1	220	3754	27-2-Vph PICKUP		
1	221	3755	27-2-Vph DELAY		
1	222	3758	CURR.SUP 27-Vph	22 ON 23 OFF	
1	223	3761	27-Vph-ph Mode	23 OFF 12700 Alarm Only 22 ON 25189 V<Alarm V<<Trip	
1	224	3762	27-1-Vpp PICKUP		

GIN		Adr.	Name	Generic Identification Data	
Group	Entry				
1	225	3763	27-1-Vpp DELAY		
1	226	3764	27-2-Vpp PICKUP		
1	227	3765	27-2-Vpp DELAY		
1	228	3768	CURR.SUP 27-Vpp	22 ON 23 OFF	
1	229	3771	27-V1 Mode	23 OFF 12700 Alarm Only 22 ON 25189 V<Alarm V<<Trip	
1	230	3772	27-1-V1 PICKUP		
1	231	3773	27-1-V1 DELAY		
1	232	3774	27-2-V1 PICKUP		
1	233	3775	27-2-V1 DELAY		
1	234	3778	CURR.SUP. 27-V1	22 ON 23 OFF	

Glossary

AR

Automatic Recloser

CFC

Continuous Function Chart

DC

Double Command

DIGSI 4

Parameterization system for SIPROTEC devices

DP

Double-Point Indication

IEC

International **E**lectrotechnical **C**ommission

GID

Generic Identification Data

GIN

Generic Identification Number

Input data input direction

Data from the IEC 60870-5-103 **slave to the IEC 60870-5-103 master**.

Mapping

Allocation of the SIPROTEC data objects to the IEC 60870-5-103 protocol.

Output data output direction

Data from the IEC 60870-5-103 **master to the IEC 60870-5-103 slave**.

RTU

Remote Terminal Unit

SC

Single Command

SP

Single-Point Indication

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