

SIPROTEC

Line Differential Protection 7SD610

Communication module

Modbus
Bus mapping

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The information in this manual is checked periodically, and necessary corrections will be included in future editions. We appreciate any suggested improvements.

We reserve the right to make technical improvements without notice.

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Preface

Purpose of this manual

The manual describes the register map organization of the Modbus slave of the SIPROTEC device 7SD610 and is divided into the following topics:

- Modbus register map → Chapter 1.

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

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

Modbus communication profile documentation

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

Manual	Order number
SIPROTEC Communication module, Modbus - Communication profile	C53000-L1840-C001-03

Modbus specification

The Modbus specification with a detailed explanation of the Modbus protocol is contained in:

- Modbus over Serial Line Specification & Implementation guide
<http://www.modbus.org>
- Modbus Application Protocol Specification
<http://www.modbus.org>

Validity

This manual is valid for the SIPROTEC devices:

- 7SD610 (firmware version 4.60 or higher)

with

- Modbus communication module version V04.00.05 or higher



Note:

Only communication modules from HW-Rev. 4 (ref. to “SIPROTEC Communication module, Modbus - Communication profile”) may be used with the 7SD610 devices.

For device parameterization have to be used:

- DIGSI 4.70 or higher
- Modbus standard mapping 3-1

Additional Support

For questions regarding SIPROTEC4 devices, please contact your Siemens representative.

Training courses

Individual course offerings may be found in our Training Catalog and questions can be directed to our Training Centre. Please contact your Siemens representative.

Target audience

Protection engineers, commissioning engineers, personnel concerned with adjustment, checking and service of selective protective equipment, automatic and control facilities and personnel of electrical facilities and power plants.



Warning!

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

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

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

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

QUALIFIED PERSONNEL

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

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

Typographic and graphical conventions

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

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

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

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

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



Revision index

Listing of the changes between the editions of this manual:

Modified chapters / pages	Edition	Reasons of modification
	V01.00	First edition, Doc.-No.: C53000-L2240-A314-1 2006-12-13



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Modbus register map

This chapter describes the register map organization of the Modbus slave of the SIPROTEC device 7SD610.

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1.1 Explanations

There is one standard mapping (Standard mapping 3-1) available for the SIPROTEC devices 7SD610.

Standard mapping 3-1

The Standard mapping 3-1 contains:

- Coil Status registers:
 - 4 Double commands incl. 4 Double-point indications as checkback indication
 - 13 Single commands incl. 13 Single-point indications as checkback indication
 - 8 Single-point indications / Exception Flags
- Input Status registers:
 - 132 Single-point indications
- Input registers
 - 21 Measured values
- Holding registers
 - System information
 - Time synchronization
 - 16 Single-point indications / Diagnostic Register
 - 9 Statistic values
 - Event recorder (Sequence of Events)

Register map

Chapters 1.2 to 1.5 define the mapping of the data objects of the SIPROTEC device 7SD610 to the associated Modbus registers.



Note:

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

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

The listed SIPROTEC data objects are sorted by register numbers (starting with 1), e.g.:

Register	Designation of the SIPROTEC objects	Comments	Scaling (32767 corresponds to...)	Internal object no.
30001	Ia =	Ia	3276.7 A	601

The measured value "Ia" is assigned to register 30001 (Input register).

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10035	87 Gen. Fault	1 = 87 Fault detection	3132

The single-point indication "87 Gen. Fault" is assigned to the Input Status register 10035.



Note:

- The description of the standard mappings contains the pre-allocation of the mapping files *at delivery or at first assignment* of a mapping in DIGSI to the SIPROTEC device.
 - Changes of the allocation and the scaling of the measured values are possible in adaptation to the concrete installation environment.
You find information about this in the manual "SIPROTEC Communication module, Modbus - Communication profile" (ref. to page 3).
 - The definition of the data types (single-point indication, measured value etc.) are contained in the manual "SIPROTEC Communication module, Modbus - Communication profile" (ref. to page 3).
-

1.2 Coil Status registers (0X references)

The Coil Status register block allows the Modbus master:

- command outputs through the output relays of the SIPROTEC device (external commands),
- manipulation of taggings (internal commands),
- reading the checkback indication and/or the status of output relays as well as taggings.



Note:

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

1.2.1 Registers 00001 to 00008: Double commands

- User-defined double commands with double-point indication as checkback indication can be routed on these position as “Source/Destination system interface” using the **DIGSI Configuration matrix**.
- Please also ref. to the chap. “Double command / Double-point indication” in the manual “SIPROTEC Communication module, Modbus - Communication profile”.

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
00001	<user-defined> ON	not pro-allocated	-
00002	<user-defined> OFF		
00003	<user-defined> ON	not pro-allocated	-
00004	<user-defined> OFF		
00005	<user-defined> ON	not pro-allocated	-
00006	<user-defined> OFF		
00007	<user-defined> ON	not pro-allocated	-
00008	<user-defined> OFF		

1.2.2 Registers 00009 to 00016: Single commands and Taggings

- User-defined single commands with checkback indication or taggings can be routed on these position as “Source/Destination system interface” using the **DIGSI Configuration matrix**.

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
00009	<user-defined>	not pre-allocated	-
00010	<user-defined>	not pre-allocated	-
00011	<user-defined>	not pre-allocated	-
00012	<user-defined>	not pre-allocated	-
00013	<user-defined>	not pre-allocated	-
00014	<user-defined>	not pre-allocated	-
00015	<user-defined>	not pre-allocated	-
00016	<user-defined>	not pre-allocated	-

1.2.3 Registers 00017 to 00021: Internal commands

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
00017	Command: ModeREMOTE	Control mode REMOTE 0 = Set to LOCKED 1 = Set to UNLOCKED	-
	Indication: ModeREMOTE	Control mode REMOTE 0 = LOCKED 1 = UNLOCKED	
00018	Command: Setting Group A	0 = not permitted 1 = Activation of setting group A	-
	Indication: Setting Group A	0 = Setting group A is not active 1 = Setting group A is active	
00019	Command: Setting Group B	0 = not permitted 1 = Activation of setting group B	-
	Indication: Setting Group B	0 = Setting group B is not active 1 = Setting group B is active	
00020	Command: Setting Group C	0 = not permitted 1 = Activation of setting group C	-
	Indication: Setting Group C	0 = Setting group C is not active 1 = Setting group C is active	
00021	Command: Setting Group D	0 = not permitted 1 = Activation of setting group D	-
	Indication: Setting Group D	0 = Setting group D is not active 1 = Setting group D is active	



Changing the setting group:

- In order to change the setting group, the value "1" = ON must be transmitted to the corresponding register.
- Switching ON one setting group automatically switches OFF the current active setting group.
- Transmission of the value "0" = 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 Modbus if the parameter **Change to Another Setting Group** (parameter address = 302) has the value **Protocol**.

1.2.4 Registers 00257 to 00264: Exception Flags

- Registers are write-protected.¹
- The contents of these registers are also readable using function "Read Exception Status" (function code 7).
- Installation-specific SIPROTEC objects can be routed on these register positions using parameterization system DIGSI.

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
00257	<user-defined>	not pre-allocated	-
00258	<user-defined>	not pre-allocated	-
00259	<user-defined>	not pre-allocated	-
00260	<user-defined>	not pre-allocated	-
00261	<user-defined>	not pre-allocated	-
00262	<user-defined>	not pre-allocated	-
00263	<user-defined>	not pre-allocated	-
00264	<user-defined>	not pre-allocated	-

1. A write access is rejected with exception code 03 (ILLEGAL_DATA_VALUE).

1.3 Input Status registers (1X references)

The Input Status register block allows the Modbus master to scan the current status of the input channels as well as the annunciations generated in the SIPROTEC device (e.g. protection annunciations, status annunciations).



Note:

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

1.3.1 Registers 10001 to 10016: User-defined annunciations

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

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10001	<user-defined>	not pre-allocated	-
10002	<user-defined>	not pre-allocated	-
10003	<user-defined>	not pre-allocated	-
10004	<user-defined>	not pre-allocated	-
10005	<user-defined>	not pre-allocated	-
10006	<user-defined>	not pre-allocated	-
10007	<user-defined>	not pre-allocated	-
10008	<user-defined>	not pre-allocated	-
10009	<user-defined>	not pre-allocated	-
10010	<user-defined>	not pre-allocated	-
10011	<user-defined>	not pre-allocated	-
10012	<user-defined>	not pre-allocated	-
10013	<user-defined>	not pre-allocated	-
10014	<user-defined>	not pre-allocated	-
10015	<user-defined>	not pre-allocated	-
10016	<user-defined>	not pre-allocated	-

1.3.2 Registers 10017 to 10031: Instantaneous SOFT

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10017	50HS OFF	1 = 50HS SOTF-O/C is switched OFF	4271
10018	50HS BLOCK	1 = 50HS SOTF-O/C is BLOCKED	4272
10019	50HS ACTIVE	1 = 50HS SOTF-O/C is ACTIVE	4273
10020	50HS PICKUP	1 = 50HS PICKED UP	4281
10021	50HS Pickup ØA	1 = 50HS Pickup Phase A	4282
10022	50HS Pickup ØB	1 = 50HS Pickup Phase B	4283
10023	50HS Pickup ØC	1 = 50HS Pickup Phase C	4284
10024	50HS-2 Pickup A	1 = 50HS Stage 2 Pickup Phase A	4285
10025	50HS-2 Pickup B	1 = 50HS Stage 2 Pickup Phase B	4286
10026	50HS-2 Pickup C	1 = 50HS Stage 2 Pickup Phase C	4287
10027	50HS TRIP 1pA	1 = 50HS SOTF-O/C TRIP - Only A	4289
10028	50HS TRIP 1pB	1 = 50HS SOTF-O/C TRIP - Only B	4290
10029	50HS TRIP 1pC	1 = 50HS SOTF-O/C TRIP - Only C	4291
10030	50HS TRIP 1pole	1 = 50HS SOTF-O/C TRIP 1pole	4292
10031	50HS TRIP ØABC	1 = 50HS SOTF-O/C TRIP command Phases ABC	4295

1.3.3 Registers 10032 to 10044: Differential Protection

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10032	87 is OFF	1 = 87 is switched off	3149
10033	87 is blocked	1 = 87 is blocked	3148
10034	87 active	1 = 87 Active	3120
10035	87 Gen. Fault	1 = 87 Fault detection	3132
10036	87 Fault in A	1 = 87 Fault detection in phase A	3133
10037	87 Fault in B	1 = 87 Fault detection in phase B	3134
10038	87 Fault in C	1 = 87 Fault detection in phase C	3135
10039	87 Ground Fault	1 = 87 Ground fault detection	3136
10040	87 General TRIP	1 = 87 General TRIP	3141
10041	87 TRIP 1pole A	1 = 87 TRIP - Only A	3142
10042	87 TRIP 1pole B	1 = 87 TRIP - Only B	3143
10043	87 TRIP 1pole C	1 = 87 TRIP - Only C	3144
10044	87 TRIP ABC	1 = 87 TRIP ABC	3145

1.3.4 Registers 10045 to 10075: Auto Reclosing Function

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10045	79 ON	1 = 79 Auto recloser is switched ON	2782
10046	79 not ready	1 = 79: Auto recloser is not ready	2784
10047	CB not ready	1 = 79: Circuit breaker 1 not ready	2787
10048	79 T-CBreadyExp	1 = 79: CB ready monitoring window expired	2788
10049	79 in progress	1 = 79 - in progress	2801
10050	79 T-Start Exp	1 = 79: Start-signal monitoring time expired	2809
10051	79 TdeadMax Exp	1 = 79: Maximum dead time expired	2810
10052	79 Evolving Flt	1 = 79: Evolving fault recognition	2818
10053	79 Program1pole	1 = 79 is set to operate after 1p trip only	2820
10054	79 Td. evol.Flt	1 = 79 dead time after evolving fault	2821
10055	79 Tdead 1pTrip	1 = 79 dead time after 1pole trip running	2839
10056	79 Tdead 3pTrip	1 = 79 dead time after 3pole trip running	2840
10057	79 1stCyc. run.	1 = 79 1st cycle running	2844
10058	79 2ndCyc. run.	1 = 79 2nd cycle running	2845
10059	79 3rdCyc. run.	1 = 79 3rd cycle running	2846
10060	79 4thCyc. run.	1 = 79 4th or higher cycle running	2847
10061	79 ADT run.	1 = 79 cycle is running in ADT mode	2847
10062	79 Close	1 = 79 - Close command	2851
10063	79 Close1.Cyc1p	1 = 79: Close command after 1pole, 1st cycle	2852
10064	79 Close1.Cyc3p	1 = 79: Close command after 3pole, 1st cycle	2853
10065	79 Close 2.Cyc	1 = 79: Close command 2nd cycle (and higher)	2854
10066	79 T-Recl. run.	1 = 79: Reclaim time is running	2861
10067	79 Successful	1 = 79 - cycle successful	2862
10068	79 1p Trip Perm	1 = 79: 1pole trip permitted by internal AR	2864
10069	79 TRIP 3pole	1 = 79: TRIP command 3pole	2871
10070	79 1.CycZoneRel	1 = 79 1st cycle zone extension release	2889
10071	79 2.CycZoneRel	1 = 79 2nd cycle zone extension release	2890
10072	79 3.CycZoneRel	1 = 79 3rd cycle zone extension release	2891
10073	79 4.CycZoneRel	1 = 79 4th cycle zone extension release	2892
10074	79 Zone Release	1 = 79 zone extension (general)	2893
10075	79 Remote Close	1 = 79 Remote close signal send	2894

1.3.5 Registers 10076 to 10081: Direct Transfer Trip

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10076	DTT OFF	1 = Direct Transfer Trip is switched OFF	4421
10077	DTT BLOCK	1 = Direct Transfer Trip is BLOCKED	4422
10078	DTT TRIP 1p. ØA	1 = DTT TRIP command - Only Phase A	4432
10079	DTT TRIP 1p. ØB	1 = DTT TRIP command - Only Phase B	4433
10080	DTT TRIP 1p. ØC	1 = DTT TRIP command - Only Phase C	4434
10081	DTT TRIP ØABC	1 = DTT TRIP command Phases ABC	4435

1.3.6 Registers 10082 to 10102: Time Overcurrent Protection

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10082	5X-B OFF	1 = 50(N)/51(N) Backup O/C is switched OFF	7151
10083	5X-B BLOCK	1 = 50(N)/51(N) Backup O/C is BLOCKED	7152
10084	5X-B ACTIVE	1 = 50(N)/51(N) Backup O/C is ACTIVE	7153
10085	5X-B PICKUP	1 = 50(N)/51(N) Backup O/C PICKED UP	7161
10086	5X-B Pickup ØA	1 = 50(N)/51(N) Backup O/C PICKUP Phase A	7162
10087	5X-B Pickup ØB	1 = 50(N)/51(N) Backup O/C PICKUP Phase B	7163
10088	5X-B Pickup ØC	1 = 50(N)/51(N) Backup O/C PICKUP Phase C	7164
10089	5X-B Pickup Gnd	1 = 50(N)/51(N) Backup O/C PICKUP GROUND	7165
10090	50(N)-B1 PICKUP	1 = 50(N)-B1 Pickup	7191
10091	50(N)-B2 PICKUP	1 = 50(N)-B2 Pickup	7192
10092	51(N)-B PICKUP	1 = 51(N)-B Pickup	7193
10093	50-STUB PICKUP	1 = 50-STUB Pickup	7201
10094	5X-B TRIP	1 = 50(N)/51(N)-B General TRIP command	7211
10095	5X-B TRIP 1p.ØA	1 = 50(N)/51(N)-B TRIP - Only Phase A	7212
10096	5X-B TRIP 1p.ØB	1 = 50(N)/51(N)-B TRIP - Only Phase B	7213
10097	5X-B TRIP 1p.ØC	1 = 50(N)/51(N)-B TRIP - Only Phase C	7214
10098	5X-B TRIP ABC	1 = 50(N)/51(N)-B TRIP Phases ABC	7215
10099	50(N)-B1 TRIP	1 = 50(N)-B1 TRIP	7221
10100	50(N)-B2 TRIP	1 = 50(N)-B2 TRIP	7222
10101	51(N)-B TRIP	1 = 51(N)-B TRIP	7223
10102	50-STUB TRIP	1 = 50-STUB TRIP	7225

1.3.7 Registers 10103 to 10109: Thermal Overload Protection

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10103	49 O/L OFF	1 = 49 Overload Protection is OFF	1511
10104	49 O/L BLOCK	1 = 49 Overload Protection is BLOCKED	1512
10105	49 O/L ACTIVE	1 = 49 Overload Protection is ACTIVE	1513
10106	49 O/L I Alarm	1 = 49 Overload Current Alarm (I alarm)	1515
10107	49 O/L Theta Alarm	1 = 49 Overload Alarm! Near Thermal Trip	1516
10108	49 Winding O/L	1 = 49 Winding Overload	1517
10109	49 Th O/L TRIP	1 = 49 Thermal Overload TRIP	1521

1.3.8 Registers 10110 to 10115: Circuit Breaker Test

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10110	CB1-TESTtrip ØA	1 = CB1-TEST TRIP command - Only Phase A	7325
10111	CB1-TESTtrip ØB	1 = CB1-TEST TRIP command - Only Phase B	7326
10112	CB1-TESTtrip ØC	1 = CB1-TEST TRIP command - Only Phase C	7327
10113	CB1-TESTtripABC	1 = CB1-TEST TRIP command ABC	7328
10114	CB1-TEST close	1 = CB1-TEST CLOSE command	7329
10115	CB-TEST running	1 = CB-TEST is in progress	7345

1.3.9 Registers 10116 to 10123: Measurement Supervision

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10116	Fail I Superv.	1 = Failure: General Current Supervision	161
10117	Fail I balance	1 = Failure: Current Balance	163
10118	Fail V Superv.	1 = Failure: General Voltage Supervision	164
10119	Fail Sum V Ph-G	1 = Failure: Voltage summation Phase-Ground	165
10120	MeasSup OFF	1 = Measurement Supervision is switched OFF	197
10121	Broken Iwire L1	1 = Alarm: Broken current-wire detected L1	290
10122	Broken Iwire L2	1 = Alarm: Broken current-wire detected L2	291
10123	Broken Iwire L3	1 = Alarm: Broken current-wire detected L3	292

1.3.10 Registers 10024 to 10030: Pickup and Trip Indications

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10124	Relay PICKUP ØA	1 = Relay PICKUP Phase A	503
10125	Relay PICKUP ØB	1 = Relay PICKUP Phase B	504
10126	Relay PICKUP ØC	1 = Relay PICKUP Phase C	505
10127	Relay PICKUP G	1 = Relay PICKUP GROUND	506
10128	Relay TRIP ØA	1 = Relay TRIP command Phase A	507
10129	Relay TRIP ØB	1 = Relay TRIP command Phase B	508
10130	Relay TRIP ØC	1 = Relay TRIP command Phase C	509

1.3.11 Registers 10131 to 10132: Control Authority

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
10131	Cntrl Auth	1 = Control Authority (0 = Remote, 1 = Local)	-
10132	ModeLOCAL	1 = Controlmode LOCAL (0 = Locked, 1 = Unlocked)	-

1.4 Input registers (3X references)

The Input register block allows the Modbus master to read the values of the analog inputs of the SIPROTEC device (recorded measured values).



Note:

- Depending on the device composition not all of the indicated analog inputs (and corresponding Modbus registers) may be available in the SIPROTEC device.
- Changes of the scaling of the measured values are possible in adaption to the concrete installation environment.

You find information about this in the manual “SIPROTEC Communication module, Modbus - Communication profile” (ref. to page 3).

Register	Designation of the SIPROTEC objects	Comments	Scaling (32767 corresponds to ...)	Internal object no.
30001	Ia =	Ia	3276.7 A	601
30002	Ib =	Ib	3276.7 A	602
30003	Ic =	Ic	3276.7 A	603
30004	3I0 =	3I0 (zero sequence)	3276.7 A	610
30005	Freq =	Frequency	327.67 Hz	644
30006	IDiff A =	IDiff A (% Operational nominal current)	327.67 %	7742
30007	IDiff B =	IDiff B (% Operational nominal current)	327.67 %	7743
30008	IDiff C =	IDiff C (% Operational nominal current)	327.67 %	7744
30009	IRest A =	IRest A (% Operational nominal current)	327.67 %	7745
30010	IRest B =	IRest B (% Operational nominal current)	327.67 %	7746
30011	IRest C =	IRest C (% Operational nominal current)	327.67 %	7747
30012	PI1A/m =	Prot. Interface 1: Availability per min.	327.67 %	7753
30013	PI2A/m =	Prot. Interface 1: Availability per hour	327.67 %	7754
30014	<user-defined>	not pre-allocated	-	-
30015	<user-defined>	not pre-allocated	-	-
30016	<user-defined>	not pre-allocated	-	-
30017	<user-defined>	not pre-allocated	-	-
30018	<user-defined>	not pre-allocated	-	-
30019	<user-defined>	not pre-allocated	-	-
30020	<user-defined>	not pre-allocated	-	-
30021	<user-defined>	not pre-allocated	-	-

1.5 Holding registers (4X references)

The Holding register block allows the Modbus master to read metered statistic values, system and diagnostic information as well as to execute time synchronization of the SIPROTEC device.

Holding registers are also used for reading the Sequence of Events recorder entries.



Note:

Depending on the device composition not all of the indicated statistic values (and corresponding Modbus registers) may be available in the SIPROTEC device.

1.5.1 Registers 40001 to 40036: System information

- Registers are write-protected.¹

Register	Designation of the SIPROTEC objects	Comments
40001 - 40008	Hardware designation of the communication module (string, max. 16 characters)	"AME-GEN" for AME module, "AMO-GEN" for AMO module
40009 - 40010	Communication module software revision	<u>Example:</u> Register 40009 = 0001H, register 40010 = 0205H → Revision 1.2.5
40011 - 40026	MLFB (order number) of the SIPROTEC device (string, max. 32 characters)	<u>Example:</u> "7SD61015BB993BJ1----0D2B-----"
40027 - 40034	Date and time of mapping data generation (string, max. 16 characters)	<u>Example:</u> "140106095747330" corresponds to → Date: Jan. 14th, 2006 → Time: 09 hours, 57 min., 47 sec. and 330 milliseconds
40035 - 40036	Number of selected standard mapping, Revision of mapping data	MSB of register 40035: → Number of selected standard mapping LSB of register 40035 and value of register 40036: → Revision of mapping data <u>Example:</u> Register 40035 = 3102H, register 40036 = 0304H → Standard mapping 3-1, Revision 2.3.4

1. A write access is rejected with exception code 03 (ILLEGAL_DATA_VALUE).

1.5.2 Registers 40065 to 40069: Time synchronization

- Ref. to chap. "Time synchronization" in the manual "SIPROTEC Communication module, Modbus - Communication profile" for additional notes regarding methods of time synchronization and Time/Date data type.

Register	Designation of the SIPROTEC objects	Comments
40065	Milliseconds	Time/Date transfer registers
40066	Hours / Minutes	
40067	Month / Day	
40068	Time/Date status byte / Year	
40069	"Set Time and Date"	available only, if time synchronization is configured with use of the "Set Time and Date" register

1.5.3 Register 40129: Diagnosis

- Registers are write-protected.¹
- The contents of these registers are also readable using function "Diagnostics" (function code 7), subfunction "Return Diagnostic Register" (subfunction code 2).
- Ref. to chap. "Bus specific parameters" in the manual "SIPROTEC Communication module, Modbus - Communication profile" regarding signalization of "Data invalid" (register 40129/2¹⁵).

Register	Designation of the SIPROTEC objects	Comments	Internal object no.
40129/2 ⁰	Device OK	1 = Update of the device replica in the SIPROTEC device completed after initial start or restart	51
40129/2 ¹	Settings Calc.	1 = Settings calculation is running	70
40129/2 ²	ProtActive	1 = At least one protection function is active	52
40129/2 ³	Error Sum Alarm	1 = Error with a summary alarm ON	140
40129/2 ⁴	Alarm Sum Event	1 = Alarm summary event ON	160
40129/2 ⁵	Relay PICKUP	1 = Relay PICKUP (group signal)	501
40129/2 ⁶	Relay TRIP	1 = Relay GENERAL TRIP command	511
40129/2 ⁷	Data stop	1 = Stop data transmission is active	-
40129/2 ⁸	Test mode	1 = Test mode is active	-
40129/2 ⁹	<user-defined>	not pre-allocated	-
40129/2 ¹⁰	<user-defined>	not pre-allocated	-
40129/2 ¹¹	<user-defined>	not pre-allocated	-
40129/2 ¹²	PI1 Data fault	1 = Prot Interface 1: Recept. of faulty data	3229
40129/2 ¹³	PI1 Datafailure	1 = Prot Interface 1: Total receipt. failure	3230
40129/2 ¹⁴	PI1 TD alarm	1 = Prot Int 1: Transmission delay too high	3239
40129/2 ¹⁵	Data invalid	1 = Data in the Modbus message are invalid. (This indication is created by the Modbus slave; not available in DIGSI and not relocatable.)	-

1. A write access is rejected with exception code 03 (ILLEGAL_DATA_VALUE).

1.5.4 Registers 40301 to 40318: Statistic values

- Registers are write-protected.¹
- Installation-specific statistic values can be routed on these register positions as “Destination system interface” using the **DIGSI Configuration matrix**.

Register	Designation of the SIPROTEC objects	Comments	Scaling (1000 corresponds to ...)	Internal object no.
40301 - 40302	# TRIPs PhA =	Number of breaker TRIP commands, Ph A	1000 TRIPs	1001
40303 - 40304	# TRIPs PhB =	Number of breaker TRIP commands, Ph B	1000 TRIPs	1002
40305 - 40306	# TRIPs PhC =	Number of breaker TRIP commands, Ph C	1000 TRIPs	1003
40307 - 40308	Sum Ia =	Accumulation of interrupted current Ph A	10.00 kA	1027
40309 - 40310	Sum Ib =	Accumulation of interrupted current Ph B	10.00 kA	1028
40311 - 40312	Sum Ic =	Accumulation of interrupted current Ph C	10.00 kA	1029
40313 - 40314	<user-defined>	not pre-allocated	-	-
40315 - 40316	<user-defined>	not pre-allocated	-	-
40317 - 40318	<user-defined>	not pre-allocated	-	-

1. A write access is rejected with exception code 03 (ILLEGAL_DATA_VALUE).

1.5.5 Registers 40601 to 40626: Event recorder (Sequence of Events)

- Registers are write-protected (with the exception of “SOE_Control”).¹
- Information regarding the individual information in the handshake register, the data type “Message block” and the evaluation of Event recorder entries you find in the manual “SIPROTEC Communication module, Modbus - Communication profile” (ref. to page 3).
- Only the annunciation “Data invalid” (ref. to chap. 1.5.3) is routed per default to the Event recorder.
Further annunciations can be added to the Event recorder using DIGSI (ref. to chap. “Customization of the allocations” in the manual “SIPROTEC Communication module, Modbus - Communication profile”).

Register	Designation	Comments
40601	No. of Event recorder entries	Number of Event recorder entries which still were not read
40602	“SOE_Control”	Handshake register (read/write access)
40603	Message block #1	Register type / Bit offset #1
40604		Register address #1
40605		Message cause / Indication type #1
40606		Value #1
40607 - 40610		Time stamp #1
40611		Message block #2
40612	Register address #2	
40613	Message cause / Indication type #2	
40614	Value #2	
40615 - 40618	Time stamp #2	
40619	Message block #3	
40620		Register address #3
40621		Message cause / Indication type #3
40622		Value #3
40623 - 40626		Time stamp #3



1. A write access is rejected with exception code 03 (ILLEGAL_DATA_VALUE).

Glossary

AME	Universal asynchronous communication module with (electrical) isolated RS485 interface for the SIPROTEC devices from Siemens.
AMO	Universal asynchronous communication module with fibre-optical interface for the SIPROTEC devices from Siemens.
DIGSI	Parameterization system / parameterization software for SIPROTEC devices
LSB	Least Significant Byte
Mapping	Allocation of the SIPROTEC data objects to the positions in the Modbus register map.
MSB	Most Significant Byte



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