



SEG

**MRA4 – IEC60870-5-103
HighPROTEC**

Data point list

Manual

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This manual applies to devices (version):

Build: 6656

Physical layer

Electrical interface

EIA RS-485

Number of loads for one equipment: 32

Optical interface

Glass fibre

F-SMA type connector

Plastic fibre

BFOC/2,5 type connector

Transmission speed

9600 bit/s

19200 bit/s

38400 bit/s

Link Layer

There are no choices for the link layer

Application layer

Transmission mode for application data Mode 1 (least significant octet first) as defined in 4.10 of IEC 60870-5-4

Common address of ADSU

- | | |
|--|---|
| <input checked="" type="checkbox"/> One common address of ADSU
(identical with station address) | <input type="checkbox"/> More than one common address of ASDU |
|--|---|

Selection of standard information numbers in monitor direction

System functions in monitor direction

- | | |
|--|--|
| <input checked="" type="checkbox"/> 0 = End of general interrogation | <input checked="" type="checkbox"/> 0 = Time synchronization |
| <input checked="" type="checkbox"/> 2 = Reset FCB | <input checked="" type="checkbox"/> 3 = Reset CU |
| <input checked="" type="checkbox"/> 4 = Start/Restart | <input checked="" type="checkbox"/> 5 = Power on |

Application layer

Measurands in monitor direction

- | | |
|--|---|
| <input type="checkbox"/> 144 Measurand I | <input type="checkbox"/> 145 Measurands I,V |
| <input type="checkbox"/> 146 Measurand I, V,P,Q | <input type="checkbox"/> 147 Measurands I _N ,
V _{EN} |
| <input checked="" type="checkbox"/> 148 Measurands I _{L1,2,3} , V _{L1,2,3} , P, Q, f | |

Generic functions in monitor direction

- | | |
|------------------------------|--|
| <input type="checkbox"/> 240 | <input type="checkbox"/> 241 Read values of all entries of one group |
| <input type="checkbox"/> 243 | <input type="checkbox"/> 244 Read value of a single entry |
| <input type="checkbox"/> 245 | <input type="checkbox"/> 249 Write entry with confirmation |
| <input type="checkbox"/> 250 | <input type="checkbox"/> 251 Write entry aborted |

Selection of standard information numbers in control direction

System functions in control direction

- | | |
|---|--|
| <input checked="" type="checkbox"/> 0 = Initiation of general interrogation | <input checked="" type="checkbox"/> 0 Time synchronization |
|---|--|

General commands in control direction

16 Auto-recloser on/off

18 Protection on/off

23 Activate characteristic 1

25 Activate characteristic 3

17 Teleprotection on/off

19 LED reset

24 Activate characteristic 2

26 Activate characteristic 4

Generic functions in control direction

240 Read headings of all defined groups

243 Read directory of a single entry

245 General interrogation of generic data

249 Write entry with confirmation

251 Write entry abort

241 Read values of all entries of one group

244 Read value of a single entry

248 Write entry

250 Write entry with execution

Application layer

Basic application functions

Test mode

Disturbance data

Private data

Blocking of monitor direction

Generic services

Miscellaneous

Measurand	max. value = rated value x	
	1.2	2.4
Current L ₁	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Current L ₂	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Current L ₃	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L _{1-E}	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L _{2-E}	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L _{3-E}	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L ₁ – L ₂	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Active power P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Reactive power Y	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Frequency f	<input checked="" type="checkbox"/>	<input type="checkbox"/>

IEC60870-5-103 – Data Points List

Signals

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
AR	active	1	160	16	GI	Signal: active
Prot	active	1	160	18	GI	Signal: active
PSet-Switch	min 1 param changed	1	160	22	GI	Signal: At least one parameter has been changed
DI Slot X1	DI 1	1	160	27	GI	Signal: Digital Input
DI Slot X1	DI 2	1	160	28	GI	Signal: Digital Input
DI Slot X1	DI 3	1	160	29	GI	Signal: Digital Input
DI Slot X1	DI 4	1	160	30	GI	Signal: Digital Input
CTS	Alarm	1	160	32	GI	Signal: Alarm Current Transformer Measuring Circuit Supervision
VTS	Alarm	1	160	33	GI	Signal: Alarm Voltage Transformer Measuring Circuit Supervision
Prot	IG dir fwd	1	160	51	GI	Signal: Earth fault forward
Prot	IG rev dir	1	160	52	GI	Signal: Earth fault reverse direction
Prot	Alarm L1	2	160	64	GI	Signal: General-Alarm L1
Prot	Alarm L2	2	160	65	GI	Signal: General-Alarm L2
Prot	Alarm L3	2	160	66	GI	Signal: General-Alarm L3
Prot	Alarm G	2	160	67	GI	Signal: General-Alarm - Earth fault
CB	TripCmd	2	160	68		Signal: Trip Command
Prot	Trip L1	2	160	69		Signal: General Trip L1
Prot	Trip L2	2	160	70		Signal: General Trip L2

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
Prot	Trip L3	2	160	71		Signal: General Trip L3
Prot	I dir fwd	2	160	74		Signal: Phase current failure forward direction
Prot	I dir rev	2	160	75		Signal: Phase current failure reverse direction
Prot	Alarm	2	160	84	GI	Signal: General Alarm
CBF	Alarm	2	160	85		Signal: Circuit Breaker Failure
I[1]	TripCmd	2	160	90		Signal: Trip Command
I[2]	TripCmd	2	160	91		Signal: Trip Command
IG[1]	TripCmd	2	160	92		Signal: Trip Command
IG[2]	TripCmd	2	160	93		Signal: Trip Command
AR	CB ON Cmd	2	160	128		Signal: CB switch ON Command
AR	Abort Blo	2	160	130	GI	Signal: AR - The AR was aborted or blocked by an active function of the menu "Abort"
IEC 103	Failure Event lost	1	100	100		Failure event lost
I[1]	active	1	101	50	GI	Signal: active
I[2]	active	1	101	51	GI	Signal: active
I[3]	active	1	101	52	GI	Signal: active
I[4]	active	1	101	53	GI	Signal: active
I[5]	active	1	101	54	GI	Signal: active
I[6]	active	1	101	55	GI	Signal: active
IG[1]	active	1	101	56	GI	Signal: active
IG[2]	active	1	101	57	GI	Signal: active
IG[3]	active	1	101	58	GI	Signal: active

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
IG[4]	active	1	101	59	GI	Signal: active
I[1]	Blo TripCmd	1	101	60	GI	Signal: Trip Command blocked
I[2]	Blo TripCmd	1	101	61	GI	Signal: Trip Command blocked
I[3]	Blo TripCmd	1	101	62	GI	Signal: Trip Command blocked
I[4]	Blo TripCmd	1	101	63	GI	Signal: Trip Command blocked
I[5]	Blo TripCmd	1	101	64	GI	Signal: Trip Command blocked
I[6]	Blo TripCmd	1	101	65	GI	Signal: Trip Command blocked
IG[1]	Blo TripCmd	1	101	66	GI	Signal: Trip Command blocked
IG[2]	Blo TripCmd	1	101	67	GI	Signal: Trip Command blocked
IG[3]	Blo TripCmd	1	101	68	GI	Signal: Trip Command blocked
IG[4]	Blo TripCmd	1	101	69	GI	Signal: Trip Command blocked
I[3]	TripCmd	2	101	92		Signal: Trip Command
I[4]	TripCmd	2	101	93		Signal: Trip Command
I[5]	TripCmd	2	101	94		Signal: Trip Command
I[6]	TripCmd	2	101	95		Signal: Trip Command
IG[3]	TripCmd	2	101	98		Signal: Trip Command
IG[4]	TripCmd	2	101	99		Signal: Trip Command
I[1]	Alarm	2	101	100	GI	Signal: Alarm
I[2]	Alarm	2	101	101	GI	Signal: Alarm
I[3]	Alarm	2	101	102	GI	Signal: Alarm
I[4]	Alarm	2	101	103	GI	Signal: Alarm
I[5]	Alarm	2	101	104	GI	Signal: Alarm
I[6]	Alarm	2	101	105	GI	Signal: Alarm
IG[1]	Alarm	2	101	106	GI	Signal: Alarm IG

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
IG[2]	Alarm	2	101	107	GI	Signal: Alarm IG
IG[3]	Alarm	2	101	108	GI	Signal: Alarm IG
IG[4]	Alarm	2	101	109	GI	Signal: Alarm IG
ThR	active	1	102	50	GI	Signal: active
ThR	Blo TripCmd	1	102	60	GI	Signal: Trip Command blocked
ThR	TripCmd	2	102	90		Signal: Trip Command
ThR	Alarm	2	102	100	GI	Signal: Alarm Thermal Overload
V 012 [1]	active	1	103	50	GI	Signal: active
V 012 [2]	active	1	103	51	GI	Signal: active
V 012 [3]	active	1	103	52	GI	Signal: active
V 012 [4]	active	1	103	53	GI	Signal: active
V 012 [5]	active	1	103	54	GI	Signal: active
V 012 [6]	active	1	103	55	GI	Signal: active
I2>[1]	active	1	103	56	GI	Signal: active
I2>[2]	active	1	103	57	GI	Signal: active
V 012 [1]	Blo TripCmd	1	103	60	GI	Signal: Trip Command blocked
V 012 [2]	Blo TripCmd	1	103	61	GI	Signal: Trip Command blocked
V 012 [3]	Blo TripCmd	1	103	62	GI	Signal: Trip Command blocked
V 012 [4]	Blo TripCmd	1	103	63	GI	Signal: Trip Command blocked
V 012 [5]	Blo TripCmd	1	103	64	GI	Signal: Trip Command blocked
V 012 [6]	Blo TripCmd	1	103	65	GI	Signal: Trip Command blocked
I2>[1]	Blo TripCmd	1	103	66	GI	Signal: Trip Command blocked
I2>[2]	Blo TripCmd	1	103	67	GI	Signal: Trip Command blocked
I2>[1]	TripCmd	2	103	90		Signal: Trip Command

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
I2>[2]	TripCmd	2	103	91		Signal: Trip Command
V 012 [1]	TripCmd	2	103	92		Signal: Trip Command
V 012 [2]	TripCmd	2	103	93		Signal: Trip Command
V 012 [3]	TripCmd	2	103	94		Signal: Trip Command
V 012 [4]	TripCmd	2	103	95		Signal: Trip Command
V 012 [5]	TripCmd	2	103	96		Signal: Trip Command
V 012 [6]	TripCmd	2	103	97		Signal: Trip Command
I2>[1]	Alarm	2	103	100	GI	Signal: Alarm Negative Sequence
I2>[2]	Alarm	2	103	101	GI	Signal: Alarm Negative Sequence
V 012 [1]	Alarm	2	103	102	GI	Signal: Alarm voltage asymmetry
V 012 [2]	Alarm	2	103	103	GI	Signal: Alarm voltage asymmetry
V 012 [3]	Alarm	2	103	104	GI	Signal: Alarm voltage asymmetry
V 012 [4]	Alarm	2	103	105	GI	Signal: Alarm voltage asymmetry
V 012 [5]	Alarm	2	103	106	GI	Signal: Alarm voltage asymmetry
V 012 [6]	Alarm	2	103	107	GI	Signal: Alarm voltage asymmetry
V[1]	active	1	104	50	GI	Signal: active
V[2]	active	1	104	51	GI	Signal: active
V[3]	active	1	104	52	GI	Signal: active
V[4]	active	1	104	53	GI	Signal: active
VE[1]	active	1	104	54	GI	Signal: active
VE[2]	active	1	104	55	GI	Signal: active
V[1]	Blo TripCmd	1	104	60	GI	Signal: Trip Command blocked
V[2]	Blo TripCmd	1	104	61	GI	Signal: Trip Command blocked
V[3]	Blo TripCmd	1	104	62	GI	Signal: Trip Command blocked

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
V[4]	Blo TripCmd	1	104	63	GI	Signal: Trip Command blocked
VE[1]	Blo TripCmd	1	104	64	GI	Signal: Trip Command blocked
VE[2]	Blo TripCmd	1	104	65	GI	Signal: Trip Command blocked
V[1]	TripCmd	2	104	90		Signal: Trip Command
V[2]	TripCmd	2	104	91		Signal: Trip Command
V[3]	TripCmd	2	104	92		Signal: Trip Command
V[4]	TripCmd	2	104	93		Signal: Trip Command
VE[1]	TripCmd	2	104	94		Signal: Trip Command
VE[2]	TripCmd	2	104	95		Signal: Trip Command
V[1]	Alarm	2	104	100	GI	Signal: Alarm voltage stage
V[2]	Alarm	2	104	101	GI	Signal: Alarm voltage stage
V[3]	Alarm	2	104	102	GI	Signal: Alarm voltage stage
V[4]	Alarm	2	104	103	GI	Signal: Alarm voltage stage
VE[1]	Alarm	2	104	104	GI	Signal: Alarm Residual Voltage Supervision-stage
VE[2]	Alarm	2	104	105	GI	Signal: Alarm Residual Voltage Supervision-stage
f[1]	active	1	105	50	GI	Signal: active
f[2]	active	1	105	51	GI	Signal: active
f[3]	active	1	105	52	GI	Signal: active
f[4]	active	1	105	53	GI	Signal: active
f[5]	active	1	105	54	GI	Signal: active
f[6]	active	1	105	55	GI	Signal: active
f[1]	Blo TripCmd	1	105	60	GI	Signal: Trip Command blocked

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
f[2]	Blo TripCmd	1	105	61	GI	Signal: Trip Command blocked
f[3]	Blo TripCmd	1	105	62	GI	Signal: Trip Command blocked
f[4]	Blo TripCmd	1	105	63	GI	Signal: Trip Command blocked
f[5]	Blo TripCmd	1	105	64	GI	Signal: Trip Command blocked
f[6]	Blo TripCmd	1	105	65	GI	Signal: Trip Command blocked
f[1]	TripCmd	2	105	90		Signal: Trip Command
f[2]	TripCmd	2	105	91		Signal: Trip Command
f[3]	TripCmd	2	105	92		Signal: Trip Command
f[4]	TripCmd	2	105	93		Signal: Trip Command
f[5]	TripCmd	2	105	94		Signal: Trip Command
f[6]	TripCmd	2	105	95		Signal: Trip Command
f[1]	Alarm	2	105	100	GI	Signal: Alarm Frequency Protection (collective signal)
f[2]	Alarm	2	105	101	GI	Signal: Alarm Frequency Protection (collective signal)
f[3]	Alarm	2	105	102	GI	Signal: Alarm Frequency Protection (collective signal)
f[4]	Alarm	2	105	103	GI	Signal: Alarm Frequency Protection (collective signal)
f[5]	Alarm	2	105	104	GI	Signal: Alarm Frequency Protection (collective signal)
f[6]	Alarm	2	105	105	GI	Signal: Alarm Frequency Protection (collective signal)
f[1]	Alarm df/dt DF/DT	2	105	110	GI	Alarm instantaneous or average value of the rate-of-frequency- change

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
f[2]	Alarm df/dt DF/DT	2	105	111	GI	Alarm instantaneous or average value of the rate-of-frequency-change
f[3]	Alarm df/dt DF/DT	2	105	112	GI	Alarm instantaneous or average value of the rate-of-frequency-change
f[4]	Alarm df/dt DF/DT	2	105	113	GI	Alarm instantaneous or average value of the rate-of-frequency-change
f[5]	Alarm df/dt DF/DT	2	105	114	GI	Alarm instantaneous or average value of the rate-of-frequency-change
f[6]	Alarm df/dt DF/DT	2	105	115	GI	Alarm instantaneous or average value of the rate-of-frequency-change
f[1]	Alarm delta phi	2	105	120	GI	Signal: Alarm Vector Surge
f[2]	Alarm delta phi	2	105	121	GI	Signal: Alarm Vector Surge
f[3]	Alarm delta phi	2	105	122	GI	Signal: Alarm Vector Surge
f[4]	Alarm delta phi	2	105	123	GI	Signal: Alarm Vector Surge
f[5]	Alarm delta phi	2	105	124	GI	Signal: Alarm Vector Surge
f[6]	Alarm delta phi	2	105	125	GI	Signal: Alarm Vector Surge
f[1]	Trip df/dt DF/DT	2	105	130		Signal: Trip df/dt or DF/DT
f[2]	Trip df/dt DF/DT	2	105	131		Signal: Trip df/dt or DF/DT
f[3]	Trip df/dt DF/DT	2	105	132		Signal: Trip df/dt or DF/DT
f[4]	Trip df/dt DF/DT	2	105	133		Signal: Trip df/dt or DF/DT
f[5]	Trip df/dt DF/DT	2	105	134		Signal: Trip df/dt or DF/DT
f[6]	Trip df/dt DF/DT	2	105	135		Signal: Trip df/dt or DF/DT

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
f[1]	Trip delta phi	2	105	140		Signal: Trip delta phi
f[2]	Trip delta phi	2	105	141		Signal: Trip delta phi
f[3]	Trip delta phi	2	105	142		Signal: Trip delta phi
f[4]	Trip delta phi	2	105	143		Signal: Trip delta phi
f[5]	Trip delta phi	2	105	144		Signal: Trip delta phi
f[6]	Trip delta phi	2	105	145		Signal: Trip delta phi
CBF	active	1	108	50	GI	Signal: active
CBF	running	1	108	60	GI	Signal: CBF-Module started
ExpP[1]	active	1	114	50	GI	Signal: active
ExpP[2]	active	1	114	51	GI	Signal: active
ExpP[3]	active	1	114	52	GI	Signal: active
ExpP[4]	active	1	114	53	GI	Signal: active
ExpP[1]	Blo TripCmd	1	114	60	GI	Signal: Trip Command blocked
ExpP[2]	Blo TripCmd	1	114	61	GI	Signal: Trip Command blocked
ExpP[3]	Blo TripCmd	1	114	62	GI	Signal: Trip Command blocked
ExpP[4]	Blo TripCmd	1	114	63	GI	Signal: Trip Command blocked
ExpP[1]	TripCmd	2	114	90		Signal: External Trip Command
ExpP[2]	TripCmd	2	114	91		Signal: External Trip Command
ExpP[3]	TripCmd	2	114	92		Signal: External Trip Command
ExpP[4]	TripCmd	2	114	93		Signal: External Trip Command
ExpP[1]	Alarm	2	114	100	GI	Signal: External Alarm
ExpP[2]	Alarm	2	114	101	GI	Signal: External Alarm
ExpP[3]	Alarm	2	114	102	GI	Signal: External Alarm
ExpP[4]	Alarm	2	114	103	GI	Signal: External Alarm

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
SOTF	active	1	115	50	GI	Signal: active
CLPU	active	1	115	51	GI	Signal: active
CLPU	enabled	2	115	91		Signal: Cold Load enabled
SOTF	AR Blo	2	115	100	GI	Signal: Blocked by AR
CLPU	detected	2	115	101	GI	Signal: Cold Load detected
PQS [1]	active	1	116	50	GI	Signal: active
PQS [2]	active	1	116	51	GI	Signal: active
PQS [3]	active	1	116	52	GI	Signal: active
PQS [4]	active	1	116	53	GI	Signal: active
PQS [5]	active	1	116	54	GI	Signal: active
PQS [6]	active	1	116	55	GI	Signal: active
PF[1]	active	1	116	56	GI	Signal: active
PF[2]	active	1	116	57	GI	Signal: active
PQS [1]	Blo TripCmd	1	116	60	GI	Signal: Trip Command blocked
PQS [2]	Blo TripCmd	1	116	61	GI	Signal: Trip Command blocked
PQS [3]	Blo TripCmd	1	116	62	GI	Signal: Trip Command blocked
PQS [4]	Blo TripCmd	1	116	63	GI	Signal: Trip Command blocked
PQS [5]	Blo TripCmd	1	116	64	GI	Signal: Trip Command blocked
PQS [6]	Blo TripCmd	1	116	65	GI	Signal: Trip Command blocked
PF[1]	Blo TripCmd	1	116	66	GI	Signal: Trip Command blocked
PF[2]	Blo TripCmd	1	116	67	GI	Signal: Trip Command blocked
PQS [1]	TripCmd	2	116	90		Signal: Trip Command
PQS [2]	TripCmd	2	116	91		Signal: Trip Command
PQS [3]	TripCmd	2	116	92		Signal: Trip Command

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
PQS [4]	TripCmd	2	116	93		Signal: Trip Command
PQS [5]	TripCmd	2	116	94		Signal: Trip Command
PQS [6]	TripCmd	2	116	95		Signal: Trip Command
PF[1]	TripCmd	2	116	96		Signal: Trip Command
PF[2]	TripCmd	2	116	97		Signal: Trip Command
PQS [1]	Alarm	2	116	100	GI	Signal: Alarm Power Protection
PQS [2]	Alarm	2	116	101	GI	Signal: Alarm Power Protection
PQS [3]	Alarm	2	116	102	GI	Signal: Alarm Power Protection
PQS [4]	Alarm	2	116	103	GI	Signal: Alarm Power Protection
PQS [5]	Alarm	2	116	104	GI	Signal: Alarm Power Protection
PQS [6]	Alarm	2	116	105	GI	Signal: Alarm Power Protection
PF[1]	Alarm	2	116	106	GI	Signal: Alarm Power Factor
PF[2]	Alarm	2	116	107	GI	Signal: Alarm Power Factor
PF[1]	Compensator	2	116	110	GI	Signal: Compensation Signal
PF[2]	Compensator	2	116	111	GI	Signal: Compensation Signal
DI Slot X1	DI 5	1	121	27	GI	Signal: Digital Input
DI Slot X1	DI 6	1	121	28	GI	Signal: Digital Input
DI Slot X1	DI 7	1	121	29	GI	Signal: Digital Input
DI Slot X1	DI 8	1	121	30	GI	Signal: Digital Input
DI Slot X6	DI 1	1	121	31	GI	Signal: Digital Input
DI Slot X6	DI 2	1	121	32	GI	Signal: Digital Input
DI Slot X6	DI 3	1	121	33	GI	Signal: Digital Input
DI Slot X6	DI 4	1	121	34	GI	Signal: Digital Input
DI Slot X6	DI 5	1	121	35	GI	Signal: Digital Input

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
DI Slot X6	DI 6	1	121	36	GI	Signal: Digital Input
DI Slot X6	DI 7	1	121	37	GI	Signal: Digital Input
DI Slot X6	DI 8	1	121	38	GI	Signal: Digital Input
BO Slot X2	BO 1	1	122	19	GI	Signal: Binary Output Relay
BO Slot X2	BO 2	1	122	20	GI	Signal: Binary Output Relay
BO Slot X2	BO 3	1	122	21	GI	Signal: Binary Output Relay
BO Slot X2	BO 4	1	122	22	GI	Signal: Binary Output Relay
BO Slot X2	BO 5	1	122	23	GI	Signal: Binary Output Relay
BO Slot X2	BO 6	1	122	24	GI	Signal: Binary Output Relay
BO Slot X5	BO 1	1	122	25	GI	Signal: Binary Output Relay
BO Slot X5	BO 2	1	122	26	GI	Signal: Binary Output Relay
BO Slot X5	BO 3	1	122	27	GI	Signal: Binary Output Relay
BO Slot X5	BO 4	1	122	28	GI	Signal: Binary Output Relay
BO Slot X5	BO 5	1	122	29	GI	Signal: Binary Output Relay
BO Slot X5	BO 6	1	122	30	GI	Signal: Binary Output Relay
CB	Ack TripCmd	1	131	27		Signal: Acknow TripCmd
CB	Res Sum trip	1	131	28		Signal: Reset summation of the tripping currents
CB	Ready	2	240	19	GI	Signal: Circuit breaker is ready for operation.
CB	Pos	200	240	160	GI	Signal: Circuit Breaker Position (0 = Indeterminate, 1 = OFF, 2 = ON, 3 = Disturbed)

Measuring Values

Module	Subgroup Names Functions	Function type ASDU	Function code (FUN)	Information Number (INF)	Factor	Position	Description
Measured values	IL1 [%]	9	160	148	2.4	0	Measured value: Phase current (fundamental)
Measured values	IL2 [%]	9	160	148	2.4	1	Measured value: Phase current (fundamental)
Measured values	IL3 [%]	9	160	148	2.4	2	Measured value: Phase current (fundamental)
Measured values	VL1 [%]	9	160	148	2.4	3	Measured value: Phase-to-neutral voltage
Measured values	VL2 [%]	9	160	148	2.4	4	Measured value: Phase-to-neutral voltage
Measured values	VL3 [%]	9	160	148	2.4	5	Measured value: Phase-to-neutral voltage
Measured values	P [%]	9	160	148	2.4	6	Measured value (calculated): Active power (P+ = Fed Active Power, P- = Consumpted Active Power)
Measured values	Q [%]	9	160	148	2.4	7	Measured value (calculated): Reactive power (Q+ = Fed Reactive Power, Q- = Consumpted Reactive Power)
Measured values	f [%]	9	160	148	1.2	8	Measured value: Frequency
Measured values	IL1 [%]	9	150	148	2.4	0	Measured value: Phase current (fundamental)

Module	Subgroup Names Functions	Function type ASDU	Function code (FUN)	Information Number (INF)	Factor	Position	Description
Measured values	IL2 [%]	9	150	148	2.4	1	Measured value: Phase current (fundamental)
Measured values	IL3 [%]	9	150	148	2.4	2	Measured value: Phase current (fundamental)
Measured values	IG meas [%]	9	150	148	2.4	3	Measured value (measured): IG (fundamental)
Measured values	IG calc [%]	9	150	148	2.4	4	Measured value (calculated): IG (fundamental)
Measured values	VL1 [%]	9	150	148	2.4	5	Measured value: Phase-to-neutral voltage
Measured values	VL2 [%]	9	150	148	2.4	6	Measured value: Phase-to-neutral voltage
Measured values	VL3 [%]	9	150	148	2.4	7	Measured value: Phase-to-neutral voltage
Measured values	VE meas [%]	9	150	148	2.4	8	Measured value (measured): VE measured
Measured values	VE calc [%]	9	150	148	2.4	9	Measured value (calculated): VE
Measured values	VL12 [%]	9	150	148	2.4	10	Measured value: Phase-to-phase voltage
Measured values	VL23 [%]	9	150	148	2.4	11	Measured value: Phase-to-phase voltage

Module	Subgroup Names Functions	Function type ASDU	Function code (FUN)	Information Number (INF)	Factor	Position	Description
Measured values	VL31 [%]	9	150	148	2.4	12	Measured value: Phase-to-phase voltage
Measured values	P [%]	9	150	148	2.4	13	Measured value (calculated): Active power (P+ = Fed Active Power, P- = Consumted Active Power)
Measured values	Q [%]	9	150	148	2.4	14	Measured value (calculated): Reactive power (Q+ = Fed Reactive Power, Q- = Consumted Reactive Power)
Measured values	cos phi [%]	9	150	148	1.0	15	Measured value (calculated): Power factor
Measured values	f [%]	9	150	148	1.2	16	Measured value: Frequency

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
Fault measurement	IL1	4	92	150		Measured value: Phase current (fundamental)
Fault measurement	IL2	4	92	151		Measured value: Phase current (fundamental)
Fault measurement	IL3	4	92	152		Measured value: Phase current (fundamental)
Fault measurement	IG meas	4	92	186		Measured value (measured): IG (fundamental)
Fault measurement	VL12	4	92	190		Measured value: Phase-to-phase voltage
Fault measurement	VL23	4	92	191		Measured value: Phase-to-phase voltage
Fault measurement	VL31	4	92	192		Measured value: Phase-to-phase voltage
Fault measurement	VL1	4	92	193		Measured value: Phase-to-neutral voltage
Fault measurement	VL2	4	92	194		Measured value: Phase-to-neutral voltage
Fault measurement	VL3	4	92	195		Measured value: Phase-to-neutral voltage
Fault measurement	VE meas	4	92	196		Measured value (measured): VE measured

Commands

Module	Subgroups Names Functions	Function Type ASDU	Function code (FUN)	Information Number (INF)	Device Interrogation	Description
Scada Cmd	Ack LED	20	160	19	GI	Signal: LEDs acknowledgment
Scada Cmd	PS 1	20	160	23	GI	Signal: Parameter Set 1
Scada Cmd	PS 2	20	160	24	GI	Signal: Parameter Set 2
Scada Cmd	PS 3	20	160	25	GI	Signal: Parameter Set 3
Scada Cmd	PS 4	20	160	26	GI	Signal: Parameter Set 4
Scada Cmd	Scada Cmd 1	20	130	15	GI	Scada Command
Scada Cmd	Scada Cmd 2	20	130	16	GI	Scada Command
Scada Cmd	Scada Cmd 3	20	130	17	GI	Scada Command
Scada Cmd	Scada Cmd 4	20	130	18	GI	Scada Command
Scada Cmd	Scada Cmd 5	20	130	19	GI	Scada Command
Scada Cmd	Scada Cmd 6	20	130	20	GI	Scada Command
Scada Cmd	Scada Cmd 7	20	130	21	GI	Scada Command
Scada Cmd	Scada Cmd 8	20	130	22	GI	Scada Command
Scada Cmd	Scada Cmd 9	20	130	23	GI	Scada Command
Scada Cmd	Scada Cmd 10	20	130	24	GI	Scada Command
Scada Cmd	Ack BO	20	130	40	GI	Signal: Acknowledgment of the Binary Outputs
Scada Cmd	Ack TripCmd	20	130	41	GI	Signal: Reset Trip Command

Analog Traces

Module	IEC60870-5-103 Channel Number	Description
I L1	1	Analog trace I L1
I L2	2	Analog trace I L2
I L3	3	Analog trace I L3
IG	4	Analog trace IG
V L1	5	Analog trace V L1
V L2	6	Analog trace V L2
V L3	7	Analog trace V L3
VE	8	Analog trace VE

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