MRU4 – IEC60870-5-103
HighPROTEC

Data point list

Manual DOK-TD-MRU4IDE

Table of Contents

This manual applies to devices (version):

Version 3.0.c

Build: 28192

Physical layer

Electrical interface

- [x] EIA RS-485
- [x] Number of loads for one equipment: 32

Optical interface

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

Transmission speed

- [x] 9600 bit/s
- [x] 19200 bit/s
- [x] 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

- [x] One common address of ADSU (identical with station address)
- [ ] More than one common address of ASDU

Selection of standard information numbers in monitor direction

System functions in monitor direction

- [x] 0 = End of general interrogation
- [x] 0 = Time synchronization
- [x] 2 = Reset FCB
- [x] 3 = Reset CU
- [x] 4 = Start/Restart
- [x] 5 = Power on

Measurands in monitor direction

- ☐ 144 Measurand I
- ☐ 145 Measurands I,V
- ☐ 146 Measurand I, V,P,Q
- ☐ 147 Measurands I_N, V_{EN}
- ☒ 148 Measurands $IL_{1,2,3}$, $V_{L1,2,3}$, P, Q, f

Generic functions in monitor direction

- ☐ 240 Read headings of all defined groups
- ☐ 241 Read values of all entries of one group
- ☐ 243 Read directory of a single entry
- ☐ 244 Read value of a single entry
- ☐ 245 End of general interrogation of generic data
- ☐ 249 Write entry with confirmation
- ☐ 250 Write entry with execution
- ☐ 251 Write entry aborted

Selection of standard information numbers in control direction

System functions in control direction

- ☒ 0 = Initiation of general interrogation
- ☒ 0 Time synchronization

General commands in control direction

- [x] 16 Auto-recloser on/off
- [x] 17 Teleprotection on/off
- [x] 18 Protection on/off
- [x] 19 LED reset
- [x] 23 Activate characteristic 1
- [x] 24 Activate characteristic 2
- [x] 25 Activate characteristic 3
- [x] 26 Activate characteristic 4

Generic functions in control direction

- [ ] 240 Read headings of all defined groups
- [ ] 241 Read values of all entries of one group
- [ ] 243 Read directory of a single entry
- [ ] 244 Read value 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

Basic application functions

- [ ] Test mode
- [ ] Blocking of monitor direction
- [x] Disturbance data
- [ ] Generic services
- [x] Private data

Miscellaneous

Measurand	max. value = rated value x	
	1.2	**2.4**
Current L_1	☐	☒
Current L_2	☐	☒
Current L_3	☐	☒
Voltage L_{1-E}	☐	☒
Voltage L_{2-E}	☐	☒
Voltage L_{3-E}	☐	☒
Voltage $L_1 – L_2$	☐	☒
Active power P	☐	☒
Reactive power Y	☐	☒
Frequency f	☒	☐

Data Points List

Signals

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Prot	active	1	163	18	GI	Signal: active
PSet-Switch	min 1 param changed	1	163	22	GI	Signal: At least one parameter has been changed
DI Slot X1	DI 1	1	163	27	GI	Signal: Digital Input
DI Slot X1	DI 2	1	163	28	GI	Signal: Digital Input
DI Slot X1	DI 3	1	163	29	GI	Signal: Digital Input
DI Slot X1	DI 4	1	163	30	GI	Signal: Digital Input
VTS	Alarm	1	163	33	GI	Signal: Alarm Voltage Transformer Measuring Circuit Supervision
SSV	System Error	1	163	46	GI	Signal: Device Failure
Prot	Alarm L1	2	163	64	GI	Signal: General-Alarm L1
Prot	Alarm L2	2	163	65	GI	Signal: General-Alarm L2
Prot	Alarm L3	2	163	66	GI	Signal: General-Alarm L3
Prot	Alarm G	2	163	67	GI	Signal: General-Alarm - Earth fault
Prot	Trip	2	163	68		Signal: General Trip
Prot	Trip L1	2	163	69		Signal: General Trip L1
Prot	Trip L2	2	163	70		Signal: General Trip L2
Prot	Trip L3	2	163	71		Signal: General Trip L3
Prot	Alarm	2	163	84	GI	Signal: General Alarm

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
CBF - 62BF	Alarm	2	163	85		Signal: Circuit Breaker Failure
ReCon	Blo by Meas Ciruit Superv	1	37	40	GI	Signal: Module blocked by measuring cirucuit supervision
ReCon	active	1	37	50	GI	Signal: active
ReCon	Release Energy Resource	1	37	111	GI	Signal: Release Energy Resource.
IEC 103	Failure Event lost	1	100	100		Failure event lost
V012[1] - 47	active	1	103	50	GI	Signal: active
V012[2] - 47	active	1	103	51	GI	Signal: active
V012[3] - 47	active	1	103	52	GI	Signal: active
V012[4] - 47	active	1	103	53	GI	Signal: active
V012[5] - 47	active	1	103	54	GI	Signal: active
V012[6] - 47	active	1	103	55	GI	Signal: active
V012[1] - 47	Blo TripCmd	1	103	60	GI	Signal: Trip Command blocked
V012[2] - 47	Blo TripCmd	1	103	61	GI	Signal: Trip Command blocked
V012[3] - 47	Blo TripCmd	1	103	62	GI	Signal: Trip Command blocked
V012[4] - 47	Blo TripCmd	1	103	63	GI	Signal: Trip Command blocked
V012[5] - 47	Blo TripCmd	1	103	64	GI	Signal: Trip Command blocked
V012[6] - 47	Blo TripCmd	1	103	65	GI	Signal: Trip Command blocked
V012[1] - 47	TripCmd	2	103	92		Signal: Trip Command
V012[2] - 47	TripCmd	2	103	93		Signal: Trip Command
V012[3] - 47	TripCmd	2	103	94		Signal: Trip Command
V012[4] - 47	TripCmd	2	103	95		Signal: Trip Command
V012[5] - 47	TripCmd	2	103	96		Signal: Trip Command

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
V012[6] - 47	TripCmd	2	103	97		Signal: Trip Command
V012[1] - 47	Alarm	2	103	102	GI	Signal: Alarm voltage asymmetry
V012[2] - 47	Alarm	2	103	103	GI	Signal: Alarm voltage asymmetry
V012[3] - 47	Alarm	2	103	104	GI	Signal: Alarm voltage asymmetry
V012[4] - 47	Alarm	2	103	105	GI	Signal: Alarm voltage asymmetry
V012[5] - 47	Alarm	2	103	106	GI	Signal: Alarm voltage asymmetry
V012[6] - 47	Alarm	2	103	107	GI	Signal: Alarm voltage asymmetry
V[1] - 27, 59	active	1	104	50	GI	Signal: active
V[2] - 27, 59	active	1	104	51	GI	Signal: active
V[3] - 27, 59	active	1	104	52	GI	Signal: active
V[4] - 27, 59	active	1	104	53	GI	Signal: active
VG[1] - 27A, 59N,A	active	1	104	54	GI	Signal: active
VG[2] - 27A, 59N,A	active	1	104	55	GI	Signal: active
V[5] - 27, 59	active	1	104	56	GI	Signal: active
V[6] - 27, 59	active	1	104	57	GI	Signal: active
V[1] - 27, 59	Blo TripCmd	1	104	60	GI	Signal: Trip Command blocked
V[2] - 27, 59	Blo TripCmd	1	104	61	GI	Signal: Trip Command blocked
V[3] - 27, 59	Blo TripCmd	1	104	62	GI	Signal: Trip Command blocked
V[4] - 27, 59	Blo TripCmd	1	104	63	GI	Signal: Trip Command blocked
VG[1] - 27A, 59N,A	Blo TripCmd	1	104	64	GI	Signal: Trip Command blocked
VG[2] - 27A, 59N,A	Blo TripCmd	1	104	65	GI	Signal: Trip Command blocked
V[5] - 27, 59	Blo TripCmd	1	104	66	GI	Signal: Trip Command blocked
V[6] - 27, 59	Blo TripCmd	1	104	67	GI	Signal: Trip Command blocked

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
V[1] - 27, 59	TripCmd	2	104	90		Signal: Trip Command
V[2] - 27, 59	TripCmd	2	104	91		Signal: Trip Command
V[3] - 27, 59	TripCmd	2	104	92		Signal: Trip Command
V[4] - 27, 59	TripCmd	2	104	93		Signal: Trip Command
VG[1] - 27A, 59N,A	TripCmd	2	104	94		Signal: Trip Command
VG[2] - 27A, 59N,A	TripCmd	2	104	95		Signal: Trip Command
V[5] - 27, 59	TripCmd	2	104	96		Signal: Trip Command
V[6] - 27, 59	TripCmd	2	104	97		Signal: Trip Command
V[1] - 27, 59	Alarm	2	104	100	GI	Signal: Alarm voltage stage
V[2] - 27, 59	Alarm	2	104	101	GI	Signal: Alarm voltage stage
V[3] - 27, 59	Alarm	2	104	102	GI	Signal: Alarm voltage stage
V[4] - 27, 59	Alarm	2	104	103	GI	Signal: Alarm voltage stage
VG[1] - 27A, 59N,A	Alarm	2	104	104	GI	Signal: Alarm Residual Voltage Supervision-stage
VG[2] - 27A, 59N,A	Alarm	2	104	105	GI	Signal: Alarm Residual Voltage Supervision-stage
V[5] - 27, 59	Alarm	2	104	106	GI	Signal: Alarm voltage stage
V[6] - 27, 59	Alarm	2	104	107	GI	Signal: Alarm voltage stage
f[1] - 81	active	1	105	50	GI	Signal: active
f[2] - 81	active	1	105	51	GI	Signal: active
f[3] - 81	active	1	105	52	GI	Signal: active
f[4] - 81	active	1	105	53	GI	Signal: active
f[5] - 81	active	1	105	54	GI	Signal: active
f[6] - 81	active	1	105	55	GI	Signal: active

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
f[1] - 81	Blo TripCmd	1	105	60	GI	Signal: Trip Command blocked
f[2] - 81	Blo TripCmd	1	105	61	GI	Signal: Trip Command blocked
f[3] - 81	Blo TripCmd	1	105	62	GI	Signal: Trip Command blocked
f[4] - 81	Blo TripCmd	1	105	63	GI	Signal: Trip Command blocked
f[5] - 81	Blo TripCmd	1	105	64	GI	Signal: Trip Command blocked
f[6] - 81	Blo TripCmd	1	105	65	GI	Signal: Trip Command blocked
f[1] - 81	TripCmd	2	105	90		Signal: Trip Command
f[2] - 81	TripCmd	2	105	91		Signal: Trip Command
f[3] - 81	TripCmd	2	105	92		Signal: Trip Command
f[4] - 81	TripCmd	2	105	93		Signal: Trip Command
f[5] - 81	TripCmd	2	105	94		Signal: Trip Command
f[6] - 81	TripCmd	2	105	95		Signal: Trip Command
f[1] - 81	Alarm	2	105	100	GI	Signal: Alarm Frequency Protection (collective signal)
f[2] - 81	Alarm	2	105	101	GI	Signal: Alarm Frequency Protection (collective signal)
f[3] - 81	Alarm	2	105	102	GI	Signal: Alarm Frequency Protection (collective signal)
f[4] - 81	Alarm	2	105	103	GI	Signal: Alarm Frequency Protection (collective signal)
f[5] - 81	Alarm	2	105	104	GI	Signal: Alarm Frequency Protection (collective signal)
f[6] - 81	Alarm	2	105	105	GI	Signal: Alarm Frequency Protection (collective signal)

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
f[1] - 81	Alarm df/dt | DF/DT	2	105	110	GI	Alarm instantaneous or average value of the rate-of-frequency-change
f[2] - 81	Alarm df/dt | DF/DT	2	105	111	GI	Alarm instantaneous or average value of the rate-of-frequency-change
f[3] - 81	Alarm df/dt | DF/DT	2	105	112	GI	Alarm instantaneous or average value of the rate-of-frequency-change
f[4] - 81	Alarm df/dt | DF/DT	2	105	113	GI	Alarm instantaneous or average value of the rate-of-frequency-change
f[5] - 81	Alarm df/dt | DF/DT	2	105	114	GI	Alarm instantaneous or average value of the rate-of-frequency-change
f[6] - 81	Alarm df/dt | DF/DT	2	105	115	GI	Alarm instantaneous or average value of the rate-of-frequency-change
f[1] - 81	Alarm delta phi	2	105	120	GI	Signal: Alarm Vector Surge
f[2] - 81	Alarm delta phi	2	105	121	GI	Signal: Alarm Vector Surge
f[3] - 81	Alarm delta phi	2	105	122	GI	Signal: Alarm Vector Surge
f[4] - 81	Alarm delta phi	2	105	123	GI	Signal: Alarm Vector Surge
f[5] - 81	Alarm delta phi	2	105	124	GI	Signal: Alarm Vector Surge
f[6] - 81	Alarm delta phi	2	105	125	GI	Signal: Alarm Vector Surge
f[1] - 81	Trip df/dt | DF/DT	2	105	130		Signal: Trip df/dt or DF/DT
f[2] - 81	Trip df/dt | DF/DT	2	105	131		Signal: Trip df/dt or DF/DT
f[3] - 81	Trip df/dt | DF/DT	2	105	132		Signal: Trip df/dt or DF/DT
f[4] - 81	Trip df/dt | DF/DT	2	105	133		Signal: Trip df/dt or DF/DT
f[5] - 81	Trip df/dt | DF/DT	2	105	134		Signal: Trip df/dt or DF/DT
f[6] - 81	Trip df/dt | DF/DT	2	105	135		Signal: Trip df/dt or DF/DT
f[1] - 81	Trip delta phi	2	105	140		Signal: Trip Vector Surge

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
f[2] - 81	Trip delta phi	2	105	141		Signal: Trip Vector Surge
f[3] - 81	Trip delta phi	2	105	142		Signal: Trip Vector Surge
f[4] - 81	Trip delta phi	2	105	143		Signal: Trip Vector Surge
f[5] - 81	Trip delta phi	2	105	144		Signal: Trip Vector Surge
f[6] - 81	Trip delta phi	2	105	145		Signal: Trip Vector Surge
CBF - 62BF	active	1	108	50	GI	Signal: active
CBF - 62BF	running	1	108	60	GI	Signal: CBF-Module started
CBF - 62BF	Trigger1-I	1	108	100	GI	Module Input: Trigger that will start the CBF
CBF - 62BF	Trigger2-I	1	108	101	GI	Module Input: Trigger that will start the CBF
CBF - 62BF	Trigger3-I	1	108	102	GI	Module Input: Trigger that will start the CBF
CBF - 62BF	Lockout	1	108	106	GI	Signal: Lockout
CBF - 62BF	Waiting for Trigger	1	108	107	GI	Waiting for Trigger
ExP[1]	active	1	114	50	GI	Signal: active
ExP[2]	active	1	114	51	GI	Signal: active
ExP[3]	active	1	114	52	GI	Signal: active
ExP[4]	active	1	114	53	GI	Signal: active
ExP[1]	Blo TripCmd	1	114	60	GI	Signal: Trip Command blocked
ExP[2]	Blo TripCmd	1	114	61	GI	Signal: Trip Command blocked
ExP[3]	Blo TripCmd	1	114	62	GI	Signal: Trip Command blocked
ExP[4]	Blo TripCmd	1	114	63	GI	Signal: Trip Command blocked
ExP[1]	TripCmd	2	114	90		Signal: Trip Command
ExP[2]	TripCmd	2	114	91		Signal: Trip Command
ExP[3]	TripCmd	2	114	92		Signal: Trip Command

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
ExP[4]	TripCmd	2	114	93		Signal: Trip Command
ExP[1]	Alarm	2	114	100	GI	Signal: Alarm
ExP[2]	Alarm	2	114	101	GI	Signal: Alarm
ExP[3]	Alarm	2	114	102	GI	Signal: Alarm
ExP[4]	Alarm	2	114	103	GI	Signal: Alarm
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
BO Slot X2	BO 1	1	123	160	GI	Signal: Binary Output Relay
BO Slot X2	BO 2	1	123	161	GI	Signal: Binary Output Relay
BO Slot X2	BO 3	1	123	162	GI	Signal: Binary Output Relay
BO Slot X2	BO 4	1	123	163	GI	Signal: Binary Output Relay
BO Slot X2	BO 5	1	123	164	GI	Signal: Binary Output Relay
Logics	LE1.Gate Out	1	162	160	GI	Signal: Output of the logic gate
Logics	LE1.Timer Out	1	162	161	GI	Signal: Timer Output
Logics	LE1.Out	1	162	162	GI	Signal: Latched Output (Q)
Logics	LE1.Gate In1-I	1	162	163	GI	State of the module input: Assignment of the Input Signal
Logics	LE1.Gate In2-I	1	162	164	GI	State of the module input: Assignment of the Input Signal
Logics	LE1.Gate In3-I	1	162	165	GI	State of the module input: Assignment of the Input Signal

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Logics	LE1.Gate In4-I	1	162	166	GI	State of the module input: Assignment of the Input Signal
Logics	LE2.Gate Out	1	162	167	GI	Signal: Output of the logic gate
Logics	LE2.Timer Out	1	162	168	GI	Signal: Timer Output
Logics	LE2.Out	1	162	169	GI	Signal: Latched Output (Q)
Logics	LE2.Gate In1-I	1	162	170	GI	State of the module input: Assignment of the Input Signal
Logics	LE2.Gate In2-I	1	162	171	GI	State of the module input: Assignment of the Input Signal
Logics	LE2.Gate In3-I	1	162	172	GI	State of the module input: Assignment of the Input Signal
Logics	LE2.Gate In4-I	1	162	173	GI	State of the module input: Assignment of the Input Signal
Logics	LE3.Gate Out	1	162	174	GI	Signal: Output of the logic gate
Logics	LE3.Timer Out	1	162	175	GI	Signal: Timer Output
Logics	LE3.Out	1	162	176	GI	Signal: Latched Output (Q)
Logics	LE3.Gate In1-I	1	162	177	GI	State of the module input: Assignment of the Input Signal
Logics	LE3.Gate In2-I	1	162	178	GI	State of the module input: Assignment of the Input Signal
Logics	LE3.Gate In3-I	1	162	179	GI	State of the module input: Assignment of the Input Signal
Logics	LE3.Gate In4-I	1	162	180	GI	State of the module input: Assignment of the Input Signal
Logics	LE4.Gate Out	1	162	181	GI	Signal: Output of the logic gate
Logics	LE4.Timer Out	1	162	182	GI	Signal: Timer Output

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Logics	LE4.Out	1	162	183	GI	Signal: Latched Output (Q)
Logics	LE4.Gate In1-I	1	162	184	GI	State of the module input: Assignment of the Input Signal
Logics	LE4.Gate In2-I	1	162	185	GI	State of the module input: Assignment of the Input Signal
Logics	LE4.Gate In3-I	1	162	186	GI	State of the module input: Assignment of the Input Signal
Logics	LE4.Gate In4-I	1	162	187	GI	State of the module input: Assignment of the Input Signal
Logics	LE5.Gate Out	1	162	188	GI	Signal: Output of the logic gate
Logics	LE5.Timer Out	1	162	189	GI	Signal: Timer Output
Logics	LE5.Out	1	162	190	GI	Signal: Latched Output (Q)
Logics	LE5.Gate In1-I	1	162	191	GI	State of the module input: Assignment of the Input Signal
Logics	LE5.Gate In2-I	1	162	192	GI	State of the module input: Assignment of the Input Signal
Logics	LE5.Gate In3-I	1	162	193	GI	State of the module input: Assignment of the Input Signal
Logics	LE5.Gate In4-I	1	162	194	GI	State of the module input: Assignment of the Input Signal
Logics	LE6.Gate Out	1	162	195	GI	Signal: Output of the logic gate
Logics	LE6.Timer Out	1	162	196	GI	Signal: Timer Output
Logics	LE6.Out	1	162	197	GI	Signal: Latched Output (Q)
Logics	LE6.Gate In1-I	1	162	198	GI	State of the module input: Assignment of the Input Signal

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Logics	LE6.Gate In2-I	1	162	199	GI	State of the module input: Assignment of the Input Signal
Logics	LE6.Gate In3-I	1	162	200	GI	State of the module input: Assignment of the Input Signal
Logics	LE6.Gate In4-I	1	162	201	GI	State of the module input: Assignment of the Input Signal
Logics	LE7.Gate Out	1	162	202	GI	Signal: Output of the logic gate
Logics	LE7.Timer Out	1	162	203	GI	Signal: Timer Output
Logics	LE7.Out	1	162	204	GI	Signal: Latched Output (Q)
Logics	LE7.Gate In1-I	1	162	205	GI	State of the module input: Assignment of the Input Signal
Logics	LE7.Gate In2-I	1	162	206	GI	State of the module input: Assignment of the Input Signal
Logics	LE7.Gate In3-I	1	162	207	GI	State of the module input: Assignment of the Input Signal
Logics	LE7.Gate In4-I	1	162	208	GI	State of the module input: Assignment of the Input Signal
Logics	LE8.Gate Out	1	162	209	GI	Signal: Output of the logic gate
Logics	LE8.Timer Out	1	162	210	GI	Signal: Timer Output
Logics	LE8.Out	1	162	211	GI	Signal: Latched Output (Q)
Logics	LE8.Gate In1-I	1	162	212	GI	State of the module input: Assignment of the Input Signal
Logics	LE8.Gate In2-I	1	162	213	GI	State of the module input: Assignment of the Input Signal
Logics	LE8.Gate In3-I	1	162	214	GI	State of the module input: Assignment of the Input Signal

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Logics	LE8.Gate In4-I	1	162	215	GI	State of the module input: Assignment of the Input Signal
Logics	LE9.Gate Out	1	162	216	GI	Signal: Output of the logic gate
Logics	LE9.Timer Out	1	162	217	GI	Signal: Timer Output
Logics	LE9.Out	1	162	218	GI	Signal: Latched Output (Q)
Logics	LE9.Gate In1-I	1	162	219	GI	State of the module input: Assignment of the Input Signal
Logics	LE9.Gate In2-I	1	162	220	GI	State of the module input: Assignment of the Input Signal
Logics	LE9.Gate In3-I	1	162	221	GI	State of the module input: Assignment of the Input Signal
Logics	LE9.Gate In4-I	1	162	222	GI	State of the module input: Assignment of the Input Signal
Logics	LE10.Gate Out	1	162	223	GI	Signal: Output of the logic gate
Logics	LE10.Timer Out	1	162	224	GI	Signal: Timer Output
Logics	LE10.Out	1	162	225	GI	Signal: Latched Output (Q)
Logics	LE10.Gate In1-I	1	162	226	GI	State of the module input: Assignment of the Input Signal
Logics	LE10.Gate In2-I	1	162	227	GI	State of the module input: Assignment of the Input Signal
Logics	LE10.Gate In3-I	1	162	228	GI	State of the module input: Assignment of the Input Signal
Logics	LE10.Gate In4-I	1	162	229	GI	State of the module input: Assignment of the Input Signal
Logics	LE11.Gate Out	1	163	160	GI	Signal: Output of the logic gate
Logics	LE11.Timer Out	1	163	161	GI	Signal: Timer Output

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Logics	LE11.Out	1	163	162	GI	Signal: Latched Output (Q)
Logics	LE11.Gate In1-I	1	163	163	GI	State of the module input: Assignment of the Input Signal
Logics	LE11.Gate In2-I	1	163	164	GI	State of the module input: Assignment of the Input Signal
Logics	LE11.Gate In3-I	1	163	165	GI	State of the module input: Assignment of the Input Signal
Logics	LE11.Gate In4-I	1	163	166	GI	State of the module input: Assignment of the Input Signal
Logics	LE12.Gate Out	1	163	167	GI	Signal: Output of the logic gate
Logics	LE12.Timer Out	1	163	168	GI	Signal: Timer Output
Logics	LE12.Out	1	163	169	GI	Signal: Latched Output (Q)
Logics	LE12.Gate In1-I	1	163	170	GI	State of the module input: Assignment of the Input Signal
Logics	LE12.Gate In2-I	1	163	171	GI	State of the module input: Assignment of the Input Signal
Logics	LE12.Gate In3-I	1	163	172	GI	State of the module input: Assignment of the Input Signal
Logics	LE12.Gate In4-I	1	163	173	GI	State of the module input: Assignment of the Input Signal
Logics	LE13.Gate Out	1	163	174	GI	Signal: Output of the logic gate
Logics	LE13.Timer Out	1	163	175	GI	Signal: Timer Output
Logics	LE13.Out	1	163	176	GI	Signal: Latched Output (Q)
Logics	LE13.Gate In1-I	1	163	177	GI	State of the module input: Assignment of the Input Signal

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Logics	LE13.Gate In2-I	1	163	178	GI	State of the module input: Assignment of the Input Signal
Logics	LE13.Gate In3-I	1	163	179	GI	State of the module input: Assignment of the Input Signal
Logics	LE13.Gate In4-I	1	163	180	GI	State of the module input: Assignment of the Input Signal
Logics	LE14.Gate Out	1	163	181	GI	Signal: Output of the logic gate
Logics	LE14.Timer Out	1	163	182	GI	Signal: Timer Output
Logics	LE14.Out	1	163	183	GI	Signal: Latched Output (Q)
Logics	LE14.Gate In1-I	1	163	184	GI	State of the module input: Assignment of the Input Signal
Logics	LE14.Gate In2-I	1	163	185	GI	State of the module input: Assignment of the Input Signal
Logics	LE14.Gate In3-I	1	163	186	GI	State of the module input: Assignment of the Input Signal
Logics	LE14.Gate In4-I	1	163	187	GI	State of the module input: Assignment of the Input Signal
Logics	LE15.Gate Out	1	163	188	GI	Signal: Output of the logic gate
Logics	LE15.Timer Out	1	163	189	GI	Signal: Timer Output
Logics	LE15.Out	1	163	190	GI	Signal: Latched Output (Q)
Logics	LE15.Gate In1-I	1	163	191	GI	State of the module input: Assignment of the Input Signal
Logics	LE15.Gate In2-I	1	163	192	GI	State of the module input: Assignment of the Input Signal
Logics	LE15.Gate In3-I	1	163	193	GI	State of the module input: Assignment of the Input Signal

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Logics	LE15.Gate In4-I	1	163	194	GI	State of the module input: Assignment of the Input Signal
Logics	LE16.Gate Out	1	163	195	GI	Signal: Output of the logic gate
Logics	LE16.Timer Out	1	163	196	GI	Signal: Timer Output
Logics	LE16.Out	1	163	197	GI	Signal: Latched Output (Q)
Logics	LE16.Gate In1-I	1	163	198	GI	State of the module input: Assignment of the Input Signal
Logics	LE16.Gate In2-I	1	163	199	GI	State of the module input: Assignment of the Input Signal
Logics	LE16.Gate In3-I	1	163	200	GI	State of the module input: Assignment of the Input Signal
Logics	LE16.Gate In4-I	1	163	201	GI	State of the module input: Assignment of the Input Signal
Logics	LE17.Gate Out	1	163	202	GI	Signal: Output of the logic gate
Logics	LE17.Timer Out	1	163	203	GI	Signal: Timer Output
Logics	LE17.Out	1	163	204	GI	Signal: Latched Output (Q)
Logics	LE17.Gate In1-I	1	163	205	GI	State of the module input: Assignment of the Input Signal
Logics	LE17.Gate In2-I	1	163	206	GI	State of the module input: Assignment of the Input Signal
Logics	LE17.Gate In3-I	1	163	207	GI	State of the module input: Assignment of the Input Signal
Logics	LE17.Gate In4-I	1	163	208	GI	State of the module input: Assignment of the Input Signal
Logics	LE18.Gate Out	1	163	209	GI	Signal: Output of the logic gate
Logics	LE18.Timer Out	1	163	210	GI	Signal: Timer Output

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Logics	LE18.Out	1	163	211	GI	Signal: Latched Output (Q)
Logics	LE18.Gate In1-I	1	163	212	GI	State of the module input: Assignment of the Input Signal
Logics	LE18.Gate In2-I	1	163	213	GI	State of the module input: Assignment of the Input Signal
Logics	LE18.Gate In3-I	1	163	214	GI	State of the module input: Assignment of the Input Signal
Logics	LE18.Gate In4-I	1	163	215	GI	State of the module input: Assignment of the Input Signal
Logics	LE19.Gate Out	1	163	216	GI	Signal: Output of the logic gate
Logics	LE19.Timer Out	1	163	217	GI	Signal: Timer Output
Logics	LE19.Out	1	163	218	GI	Signal: Latched Output (Q)
Logics	LE19.Gate In1-I	1	163	219	GI	State of the module input: Assignment of the Input Signal
Logics	LE19.Gate In2-I	1	163	220	GI	State of the module input: Assignment of the Input Signal
Logics	LE19.Gate In3-I	1	163	221	GI	State of the module input: Assignment of the Input Signal
Logics	LE19.Gate In4-I	1	163	222	GI	State of the module input: Assignment of the Input Signal
Logics	LE20.Gate Out	1	163	223	GI	Signal: Output of the logic gate
Logics	LE20.Timer Out	1	163	224	GI	Signal: Timer Output
Logics	LE20.Out	1	163	225	GI	Signal: Latched Output (Q)
Logics	LE20.Gate In1-I	1	163	226	GI	State of the module input: Assignment of the Input Signal

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Logics	LE20.Gate In2-I	1	163	227	GI	State of the module input: Assignment of the Input Signal
Logics	LE20.Gate In3-I	1	163	228	GI	State of the module input: Assignment of the Input Signal
Logics	LE20.Gate In4-I	1	163	229	GI	State of the module input: Assignment of the Input Signal
Intertripping	active	1	166	50	GI	Signal: active
Intertripping	TripCmd	2	166	90		Signal: Trip Command
Intertripping	Alarm	2	166	100	GI	Signal: Alarm
delta phi - 78V	active	1	169	50	GI	Signal: active
delta phi - 78V	TripCmd	2	169	90		Signal: Trip Command
delta phi - 78V	Alarm	2	169	100	GI	Signal: Alarm Frequency Protection (collective signal)
LVRT[1] - 27	active	1	170	50	GI	Signal: active
LVRT[2] - 27	active	1	170	51	GI	Signal: active
LVRT[1] - 27	TripCmd	2	170	90		Signal: Trip Command
LVRT[2] - 27	TripCmd	2	170	91		Signal: Trip Command
LVRT[1] - 27	Alarm	2	170	100	GI	Signal: Alarm voltage stage
LVRT[2] - 27	Alarm	2	170	101	GI	Signal: Alarm voltage stage
df/dt - 81R	active	1	175	50	GI	Signal: active
df/dt - 81R	TripCmd	2	175	90		Signal: Trip Command
df/dt - 81R	Alarm	2	175	100	GI	Signal: Alarm Frequency Protection (collective signal)
SysA	active	1	182	50	GI	Signal: active

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
SysA	Alarm V THD	2	182	108	GI	Signal: Alarm Total Harmonic Distortion Voltage
SysA	Trip V THD	2	182	98		Signal: Trip Total Harmonic Distortion Voltage
TCS - 74TC	active	1	241	50	GI	Signal: active
TCS - 74TC	ExBlo	1	241	80		Signal: External Blocking
TCS - 74TC	Alarm	1	241	100	GI	Signal: Alarm Trip Circuit Supervision
TCS - 74TC	Not Possible	1	241	110	GI	Not possible because no state indicator assigned to the breaker.
SG[1]	Operations Alarm	1	242	104	GI	Signal: Service Alarm, too many Operations
Sync - 25	active	1	244	50	GI	Signal: active
Sync - 25	ExBlo	1	244	80		Signal: External Blocking
Sync - 25	AngleDiffTooHigh	1	244	110	GI	Signal: Phase Angle difference between bus and line voltages too high.
Sync - 25	Sys-in-Sync	1	244	111	GI	Signal: Bus and line voltages are in synchronism according to the system synchronism criteria.
Sync - 25	LiveBus	1	244	112	GI	Signal: Live-Bus flag: 1=Live-Bus, 0=Voltage is below the LiveBus threshold
Sync - 25	LiveLine	1	244	113	GI	Signal: Live Line flag: 1=Live-Line, 0=Voltage is below the LiveLine threshold
Sync - 25	SlipTooHigh	1	244	114	GI	Signal: Frequency difference (slip frequency) between bus and line voltages too high.
Sync - 25	Ready to Close	1	244	115	GI	Signal: Ready to Close

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Sync - 25	SynchronFailed	1	244	116	GI	Signal: This signal indicates a failed synchronization. It is set for 5s when the circuit breaker is still open after the Synchron-Run-timer has timed out.
Sync - 25	VDiffTooHigh	1	244	117	GI	Signal: Voltage difference between bus and line too high.
Ctrl	SG Disturb	1	246	32	GI	Minimum one Switchgear is disturbed.
Ctrl	SG Indeterm	1	246	33	GI	Minimum one Switchgear is moving (Position cannot be determined).
SG[1]	Removed-I	1	246	34	GI	State of the module input: The withdrawable circuit breaker is Removed
SG[1]	CES SG removed	1	246	35	GI	Signal: Command Execution Supervision: Switching Command unsuccessful, Switchgear removed.
SG[1]	Removed	1	246	36	GI	Signal: The withdrawable circuit breaker is Removed
SG[1]	SCmd OFF-I	1	246	110	GI	State of the module input: Switching OFF Command, e.g. the state of the Logics or the state of the digital input
SG[1]	SCmd ON-I	1	246	111	GI	State of the module input: Switching ON Command, e.g. the state of the Logics or the state of the digital input
SG[1]	Position Ind manipul	1	246	112	GI	Signal: Position Indicators faked
SG[1]	Prot ON	1	246	113	GI	Signal: ON Command issued by the Prot module
SG[1]	TripCmd	2	246	114		Signal: Trip Command

Module ***(- ANSI / IEEE Device Number)***	***Subgroups*** ***Names*** ***Functions***	***Function Type*** ***ASDU***	***Function*** ***(FUN)***	***Information*** ***Number (INF)***	***Device*** ***Interrogation***	***Description***
SG[1]	OFF Cmd	1	246	115		Signal: OFF Command issued to the switchgear. Depending on the setting the signal may include the OFF command of the Prot module.
SG[1]	ON Cmd	1	246	116		Signal: ON Command issued to the switchgear. Depending on the setting the signal may include the ON command of the Prot module.
SG[1]	CES succesf	1	246	117	GI	Signal: Command Execution Supervision: Switching command executed successfully.
SG[1]	Interl OFF	1	246	118	GI	Signal: One or more IL_Off inputs are active.
SG[1]	Interl ON	1	246	119	GI	Signal: One or more IL_On inputs are active.
SG[1]	Ready	1	246	120	GI	Signal: Circuit breaker is ready for operation.
Scada Cmd	PS 1	1	163	23	GI	Signal: Parameter Set 1
Scada Cmd	PS 2	1	163	24	GI	Signal: Parameter Set 2
Scada Cmd	PS 3	1	163	25	GI	Signal: Parameter Set 3
Scada Cmd	PS 4	1	163	26	GI	Signal: Parameter Set 4
SG[1]	Pos	1	131	32	GI	Signal: Circuit Breaker Position (0 = Indeterminate, 1 = OFF, 2 = ON, 3 = Disturbed)

Measuring Values

Module ***(- ANSI / IEEE Device Number)***	***Subgroup*** ***Names*** **Functions**	***Function type*** **ASDU**	***Function code*** **(FUN)**	***Information*** **Number (INF)**	***Factor***	***Position***	***Description***
VT	VL1 [%]	9	163	148	2.4	3	Measured value: Phase-to-neutral voltage (fundamental)
VT	VL2 [%]	9	163	148	2.4	4	Measured value: Phase-to-neutral voltage (fundamental)
VT	VL3 [%]	9	163	148	2.4	5	Measured value: Phase-to-neutral voltage (fundamental)
VT	f [%]	9	163	148	1.2	8	Measured value: Frequency
Measured Values	VL1 [%]	9	150	148	2.4	5	Measured value: Phase-to-neutral voltage (fundamental)
Measured Values	VL2 [%]	9	150	148	2.4	6	Measured value: Phase-to-neutral voltage (fundamental)
Measured Values	VL3 [%]	9	150	148	2.4	7	Measured value: Phase-to-neutral voltage (fundamental)
Measured Values	VX meas [%]	9	150	148	2.4	8	Measured value (measured): VX measured (fundamental)
Measured Values	VG calc [%]	9	150	148	2.4	9	Measured value (calculated): VG (fundamental)
Measured Values	VL12 [%]	9	150	148	2.4	10	Measured value: Phase-to-phase voltage (fundamental)

Module ***(- ANSI / IEEE Device Number)***	***Subgroup Names*** **Functions**	***Function type*** **ASDU**	***Function code*** **(FUN)**	***Information*** **Number (INF)**	***Factor***	***Position***	***Description***
Measured Values	VL23 [%]	9	150	148	2.4	11	Measured value: Phase-to-phase voltage (fundamental)
Measured Values	VL31 [%]	9	150	148	2.4	12	Measured value: Phase-to-phase voltage (fundamental)
Measured Values	f [%]	9	150	148	1.2	16	Measured value: Frequency

Module ***(- ANSI / IEEE Device Number)***	***Subgroups Names Functions***	***Function Type ASDU***	***Function (FUN)***	***Information Number (INF)***	***Device Interrogation***	***Description***
VT	VL12	4	92	190		Measured value: Phase-to-phase voltage (fundamental)
VT	VL23	4	92	191		Measured value: Phase-to-phase voltage (fundamental)
VT	VL31	4	92	192		Measured value: Phase-to-phase voltage (fundamental)
VT	VL1	4	92	193		Measured value: Phase-to-neutral voltage (fundamental)
VT	VL2	4	92	194		Measured value: Phase-to-neutral voltage (fundamental)
VT	VL3	4	92	195		Measured value: Phase-to-neutral voltage (fundamental)
VT	VX meas	4	92	196		Measured value (measured): VX measured (fundamental)

Commands

Module (- ANSI / IEEE Device Number)	*Subgroups Names Functions*	*Function Type ASDU*	*Function (FUN)*	*Information Number (INF)*	*Device Interrogation*	*Description*
Scada Cmd	Ack LED	20	163	19		Signal: LEDs acknowledgement
Scada Cmd	PS 1	20	163	23	GI	Signal: Parameter Set 1
Scada Cmd	PS 2	20	163	24	GI	Signal: Parameter Set 2
Scada Cmd	PS 3	20	163	25	GI	Signal: Parameter Set 3
Scada Cmd	PS 4	20	163	26	GI	Signal: Parameter Set 4
Scada Cmd	Scada Cmd 1	20	130	15		Scada Command
Scada Cmd	Scada Cmd 2	20	130	16		Scada Command
Scada Cmd	Scada Cmd 3	20	130	17		Scada Command
Scada Cmd	Scada Cmd 4	20	130	18		Scada Command
Scada Cmd	Scada Cmd 5	20	130	19		Scada Command
Scada Cmd	Scada Cmd 6	20	130	20		Scada Command
Scada Cmd	Scada Cmd 7	20	130	21		Scada Command
Scada Cmd	Scada Cmd 8	20	130	22		Scada Command
Scada Cmd	Scada Cmd 9	20	130	23		Scada Command
Scada Cmd	Scada Cmd 10	20	130	24		Scada Command
Scada Cmd	Ack BO	20	130	40		Signal: Acknowledgement of the Binary Outputs
Scada Cmd	Ack TripCmd	20	130	41		Signal: Reset Trip Command
SG[1]	Pos	20	131	32	GI	Signal: Circuit Breaker Position (0 = Indeterminate, 1 = OFF, 2 = ON, 3 = Disturbed)

Analog Traces

Module	***IEC60870-5-103 Channel Number***	***Desc***
V L1 / V L12	5	Analog trace V L1 / V L12
V L2 / V L23	6	Analog trace V L2 / V L23
V L3 / V L31	7	Analog trace V L3 / V L31
VX	8	Analog trace VX

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