



**MRA4 – IEC60870-5-103**  
**HighPROTEC**

Data point list

**Manual DOK-TD-MRA4IDE**

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This manual applies to devices (version):

Version 3.4.a

Build: 35595

## 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

- 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

- |  |  |
|--|--|
| <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

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### 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 <sub>N</sub> , V <sub>EN</sub> |
| <input checked="" type="checkbox"/> 148 Measurands I <sub>L1,2,3</sub> , V <sub>L1,2,3</sub> , P, Q, f |  |

### Generic functions in monitor direction

- |   |  |
|---|--|
| <input type="checkbox"/> 240 Read headings of all defined groups          | <input type="checkbox"/> 241 Read values of all entries of one group |
| <input type="checkbox"/> 243 Read directory of a single entry             | <input type="checkbox"/> 244 Read value 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                     |

### 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 |
|---|--|

## Application layer

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### General commands in control direction

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> 16 Auto-recloser on/off          | <input checked="" type="checkbox"/> 17 Teleprotection on/off     |
| <input checked="" type="checkbox"/> 18 Protection on/off             | <input checked="" type="checkbox"/> 19 LED reset                 |
| <input checked="" type="checkbox"/> 20 Blocking of Monitor Direction | <input checked="" type="checkbox"/> 21 Test mode                 |
| <input checked="" type="checkbox"/> 23 Activate characteristic 1     | <input checked="" type="checkbox"/> 24 Activate characteristic 2 |
| <input checked="" type="checkbox"/> 25 Activate characteristic 3     | <input checked="" type="checkbox"/> 26 Activate characteristic 4 |

### Generic functions in control direction

- |  |  |
|--|--|
| <input type="checkbox"/> 240 Read headings of all defined groups   | <input type="checkbox"/> 241 Read values of all entries of one group |
| <input type="checkbox"/> 243 Read directory of a single entry      | <input type="checkbox"/> 244 Read value of a single entry            |
| <input type="checkbox"/> 245 General interrogation of generic data | <input type="checkbox"/> 248 Write entry                             |
| <input type="checkbox"/> 249 Write entry with confirmation         | <input type="checkbox"/> 250 Write entry with execution              |
| <input type="checkbox"/> 251 Write entry abort                     |  |

### Basic application functions

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Test mode        | <input checked="" type="checkbox"/> Blocking of monitor direction |
| <input checked="" type="checkbox"/> Disturbance data | <input type="checkbox"/> Generic services                         |
| <input checked="" type="checkbox"/> Private data     |   |

Application layer

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Miscellaneous

Measurand	max. value = rated value x	
	1.2	2.4
Current L <sub>1</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Current L <sub>2</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Current L <sub>3</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L <sub>1-E</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L <sub>2-E</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L <sub>3-E</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L <sub>1</sub> – L <sub>2</sub>	<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"/>

## Data Points List

### Signals

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
AR - 79	active	1	160	16	GI	Signal: active
Prot	active	1	160	18	GI	Signal: active
IEC 103	Block MD active	1	160	20	GI	Signal: The blocking of IEC103 transmission in monitor direction has been activated.
IEC 103	Test mode active	1	160	21	GI	Signal: IEC103 communication has been switched over into Test Mode.
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 - 60L	Alarm	1	160	32	GI	Signal: Alarm Current Transformer Measuring Circuit Supervision
SSV	System Error	1	160	46	GI	Signal: Device Failure
Prot	IG meas dir fwd	1	160	51	GI	Signal: Ground fault (measured) forward
Prot	IG meas dir rev	1	160	52	GI	Signal: Ground fault (measured) reverse direction
Prot	Alarm L1	2	160	64	GI	Signal: General-Alarm L1
Prot	Alarm L2	2	160	65	GI	Signal: General-Alarm L2



Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
Prot	Alarm L3	2	160	66	GI	Signal: General-Alarm L3
Prot	Alarm G	2	160	67	GI	Signal: General-Alarm - Earth fault
Prot	Trip	2	160	68		Signal: General Trip
Prot	Trip L1	2	160	69		Signal: General Trip L1
Prot	Trip L2	2	160	70		Signal: General Trip L2
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 - 50BF, 62BF	Alarm	2	160	85		Signal: Circuit Breaker Failure
I[1] - 50, 51	TripCmd	2	160	90		Signal: Trip Command
I[2] - 50, 51	TripCmd	2	160	91		Signal: Trip Command
IG[1] - 50N, 51N	TripCmd	2	160	92		Signal: Trip Command
IG[2] - 50N, 51N	TripCmd	2	160	93		Signal: Trip Command
AR - 79	CB ON Cmd	1	160	128		Signal: CB switch ON Command
AR - 79	Blo	1	160	130	GI	Signal: Auto Reclosure is blocked
Ctrl	Local	1	160	160	GI	Switching Authority: Local
AR - 79	Ready	1	34	124	GI	Signal: Ready to shoot
AR - 79	running	1	34	125	GI	Signal: Auto Reclosing running
AR - 79	successful	1	34	128	GI	Signal: Auto Reclosing successful
AR - 79	failed	1	34	129	GI	Signal: Auto Reclosing failure
AR - 79	Shot 1	1	34	139	GI	Shot Control

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
AR - 79	Shot 2	1	34	140	GI	Shot Control
AR - 79	Shot 3	1	34	141	GI	Shot Control
AR - 79	Shot 4	1	34	142	GI	Shot Control
AR - 79	Shot 5	1	34	143	GI	Shot Control
AR - 79	Shot 6	1	34	144	GI	Shot Control
Q->&V<	Fuse Fail VT Blo	1	35	40	GI	Signal: Blocked by Fuse Failure (VT)
Q->&V<	active	1	35	50	GI	Signal: active
Q->&V<	Alarm	1	35	100	GI	Signal: Alarm Reactive Power Undervoltage Protection
Q->&V<	Decoupling Distr. Generator	1	35	120	GI	Signal: Decoupling of the (local) Energy Generator/Resource
Q->&V<	Decoupling PCC	1	35	121	GI	Signal: Decoupling at the Point of Common Coupling
UFLS	Fuse Fail VT Blo	1	36	40	GI	Signal: Blocked by Fuse Failure (VT)
UFLS	active	1	36	50	GI	Signal: active
UFLS	Trip	1	36	111	GI	Signal: Signal: Trip
UFLS	Alarm	1	36	112	GI	Signal: Alarm P->&f<
ReCon[1]	Blo by Meas Circuit Superv	1	37	40	GI	Signal: Module blocked by measuring circuit supervision
ReCon[1]	active	1	37	50	GI	Signal: active
ReCon[1]	Release Energy Resource	1	37	111	GI	Signal: Release Energy Resource.
ReCon[1]	V Ext Release PCC-I	1	37	112	GI	Module input state: Release signal is being generated by the PCC (External Release)

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
ReCon[2]	Blo by Meas Circuit Superv	1	38	40	GI	Signal: Module blocked by measuring circuit supervision
ReCon[2]	active	1	38	50	GI	Signal: active
ReCon[2]	Release Energy Resource	1	38	111	GI	Signal: Release Energy Resource.
ReCon[2]	V Ext Release PCC-I	1	38	112	GI	Module input state: Release signal is being generated by the PCC (External Release)
IEC 103	Failure Event lost	1	100	100		Failure event lost
I[1] - 50, 51	active	1	101	50	GI	Signal: active
I[2] - 50, 51	active	1	101	51	GI	Signal: active
I[3] - 50, 51	active	1	101	52	GI	Signal: active
I[4] - 50, 51	active	1	101	53	GI	Signal: active
I[5] - 50, 51	active	1	101	54	GI	Signal: active
I[6] - 50, 51	active	1	101	55	GI	Signal: active
IG[1] - 50N, 51N	active	1	101	56	GI	Signal: active
IG[2] - 50N, 51N	active	1	101	57	GI	Signal: active
IG[3] - 50N, 51N	active	1	101	58	GI	Signal: active
IG[4] - 50N, 51N	active	1	101	59	GI	Signal: active
I[1] - 50, 51	Blo TripCmd	1	101	60	GI	Signal: Trip Command blocked
I[2] - 50, 51	Blo TripCmd	1	101	61	GI	Signal: Trip Command blocked
I[3] - 50, 51	Blo TripCmd	1	101	62	GI	Signal: Trip Command blocked
I[4] - 50, 51	Blo TripCmd	1	101	63	GI	Signal: Trip Command blocked
I[5] - 50, 51	Blo TripCmd	1	101	64	GI	Signal: Trip Command blocked
I[6] - 50, 51	Blo TripCmd	1	101	65	GI	Signal: Trip Command blocked

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
IG[1] - 50N, 51N	Blo TripCmd	1	101	66	GI	Signal: Trip Command blocked
IG[2] - 50N, 51N	Blo TripCmd	1	101	67	GI	Signal: Trip Command blocked
IG[3] - 50N, 51N	Blo TripCmd	1	101	68	GI	Signal: Trip Command blocked
IG[4] - 50N, 51N	Blo TripCmd	1	101	69	GI	Signal: Trip Command blocked
I[3] - 50, 51	TripCmd	2	101	92		Signal: Trip Command
I[4] - 50, 51	TripCmd	2	101	93		Signal: Trip Command
I[5] - 50, 51	TripCmd	2	101	94		Signal: Trip Command
I[6] - 50, 51	TripCmd	2	101	95		Signal: Trip Command
IG[3] - 50N, 51N	TripCmd	2	101	98		Signal: Trip Command
IG[4] - 50N, 51N	TripCmd	2	101	99		Signal: Trip Command
I[1] - 50, 51	Alarm	2	101	100	GI	Signal: Alarm
I[2] - 50, 51	Alarm	2	101	101	GI	Signal: Alarm
I[3] - 50, 51	Alarm	2	101	102	GI	Signal: Alarm
I[4] - 50, 51	Alarm	2	101	103	GI	Signal: Alarm
I[5] - 50, 51	Alarm	2	101	104	GI	Signal: Alarm
I[6] - 50, 51	Alarm	2	101	105	GI	Signal: Alarm
IG[1] - 50N, 51N	Alarm	2	101	106	GI	Signal: Alarm IG
IG[2] - 50N, 51N	Alarm	2	101	107	GI	Signal: Alarm IG
IG[3] - 50N, 51N	Alarm	2	101	108	GI	Signal: Alarm IG
IG[4] - 50N, 51N	Alarm	2	101	109	GI	Signal: Alarm IG
ThR - 49	active	1	102	50	GI	Signal: active
ThR - 49	Blo TripCmd	1	102	60	GI	Signal: Trip Command blocked
ThR - 49	TripCmd	2	102	90		Signal: Trip Command

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
ThR - 49	Alarm	2	102	100	GI	Signal: Alarm Thermal Overload
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
I2>[1] - 46	active	1	103	56	GI	Signal: active
I2>[2] - 46	active	1	103	57	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
I2>[1] - 46	Blo TripCmd	1	103	66	GI	Signal: Trip Command blocked
I2>[2] - 46	Blo TripCmd	1	103	67	GI	Signal: Trip Command blocked
I2>[1] - 46	TripCmd	2	103	90		Signal: Trip Command
I2>[2] - 46	TripCmd	2	103	91		Signal: Trip Command
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

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
V012[5] - 47	TripCmd	2	103	96		Signal: Trip Command
V012[6] - 47	TripCmd	2	103	97		Signal: Trip Command
I2>[1] - 46	Alarm	2	103	100	GI	Signal: Alarm Negative Sequence
I2>[2] - 46	Alarm	2	103	101	GI	Signal: Alarm Negative Sequence
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

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
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
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

Data Points List

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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
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)



Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
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)
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

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
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
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 - 50BF, 62BF	active	1	108	50	GI	Signal: active
CBF - 50BF, 62BF	running	1	108	60	GI	Signal: CBF-Module started
CBF - 50BF, 62BF	Trigger1-I	1	108	100	GI	Module Input: Trigger that will start the CBF
CBF - 50BF, 62BF	Trigger2-I	1	108	101	GI	Module Input: Trigger that will start the CBF
CBF - 50BF, 62BF	Trigger3-I	1	108	102	GI	Module Input: Trigger that will start the CBF
CBF - 50BF, 62BF	Lockout	1	108	106	GI	Signal: Lockout
CBF - 50BF, 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

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
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
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
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
PQS[1] - 32, 37	active	1	116	50	GI	Signal: active
PQS[2] - 32, 37	active	1	116	51	GI	Signal: active
PQS[3] - 32, 37	active	1	116	52	GI	Signal: active
PQS[4] - 32, 37	active	1	116	53	GI	Signal: active
PQS[5] - 32, 37	active	1	116	54	GI	Signal: active
PQS[6] - 32, 37	active	1	116	55	GI	Signal: active
PF[1] - 55	active	1	116	56	GI	Signal: active
PF[2] - 55	active	1	116	57	GI	Signal: active
PQS[1] - 32, 37	Blo TripCmd	1	116	60	GI	Signal: Trip Command blocked
PQS[2] - 32, 37	Blo TripCmd	1	116	61	GI	Signal: Trip Command blocked

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
PQS[3] - 32, 37	Blo TripCmd	1	116	62	GI	Signal: Trip Command blocked
PQS[4] - 32, 37	Blo TripCmd	1	116	63	GI	Signal: Trip Command blocked
PQS[5] - 32, 37	Blo TripCmd	1	116	64	GI	Signal: Trip Command blocked
PQS[6] - 32, 37	Blo TripCmd	1	116	65	GI	Signal: Trip Command blocked
PF[1] - 55	Blo TripCmd	1	116	66	GI	Signal: Trip Command blocked
PF[2] - 55	Blo TripCmd	1	116	67	GI	Signal: Trip Command blocked
PQS[1] - 32, 37	TripCmd	2	116	90		Signal: Trip Command
PQS[2] - 32, 37	TripCmd	2	116	91		Signal: Trip Command
PQS[3] - 32, 37	TripCmd	2	116	92		Signal: Trip Command
PQS[4] - 32, 37	TripCmd	2	116	93		Signal: Trip Command
PQS[5] - 32, 37	TripCmd	2	116	94		Signal: Trip Command
PQS[6] - 32, 37	TripCmd	2	116	95		Signal: Trip Command
PF[1] - 55	TripCmd	2	116	96		Signal: Trip Command
PF[2] - 55	TripCmd	2	116	97		Signal: Trip Command
PQS[1] - 32, 37	Alarm	2	116	100	GI	Signal: Alarm Power Protection
PQS[2] - 32, 37	Alarm	2	116	101	GI	Signal: Alarm Power Protection
PQS[3] - 32, 37	Alarm	2	116	102	GI	Signal: Alarm Power Protection
PQS[4] - 32, 37	Alarm	2	116	103	GI	Signal: Alarm Power Protection
PQS[5] - 32, 37	Alarm	2	116	104	GI	Signal: Alarm Power Protection
PQS[6] - 32, 37	Alarm	2	116	105	GI	Signal: Alarm Power Protection
PF[1] - 55	Alarm	2	116	106	GI	Signal: Alarm Power Factor
PF[2] - 55	Alarm	2	116	107	GI	Signal: Alarm Power Factor
PF[1] - 55	Compensator	2	116	110	GI	Signal: Compensation Signal

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
PF[2] - 55	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
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	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
BO Slot X2	BO 6	1	123	165	GI	Signal: Binary Output Relay
BO Slot X5	BO 1	1	123	166	GI	Signal: Binary Output Relay
BO Slot X5	BO 2	1	123	167	GI	Signal: Binary Output Relay
BO Slot X5	BO 3	1	123	168	GI	Signal: Binary Output Relay
BO Slot X5	BO 4	1	123	169	GI	Signal: Binary Output Relay

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
BO Slot X5	BO 5	1	123	170	GI	Signal: Binary Output Relay
BO Slot X5	BO 6	1	123	171	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	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	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	LE4.Gate Out	1	162	181	GI	Signal: Output of the logic gate
Logics	LE4.Timer Out	1	162	182	GI	Signal: Timer Output
Logics	LE4.Out	1	162	183	GI	Signal: Latched Output (Q)
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	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	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)

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
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	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	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	LE11.Gate Out	1	163	160	GI	Signal: Output of the logic gate
Logics	LE11.Timer Out	1	163	161	GI	Signal: Timer Output
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)

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
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
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



Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
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
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

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
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
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)

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
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
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)

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
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
P - 32R	active	1	173	50	GI	Signal: active
P - 32R	TripCmd	2	173	90		Signal: Trip Command
P - 32R	Alarm	2	173	100	GI	Signal: Alarm Power Protection
Q - 32	active	1	174	50	GI	Signal: active
Q - 32	TripCmd	2	174	90		Signal: Trip Command
Q - 32	Alarm	2	174	100	GI	Signal: Alarm Power Protection
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)
IH2	active	1	180	50	GI	Signal: active
IH2	Blo L1	1	180	60		Signal: Blocked L1
IH2	Blo L2	1	180	61		Signal: Blocked L2
IH2	Blo L3	1	180	62		Signal: Blocked L3
IH2	Blo IG meas	1	180	63		Signal: Blocking of the ground (earth) protection module (measured ground current)

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
IH2	3-ph Blo	1	180	64		Signal: Inrush was detected in at least one phase - trip command blocked.
IH2	Blo IG calc	1	180	65		Signal: Blocking of the ground (earth) protection module (calculated ground current)
SysA	active	1	182	50	GI	Signal: active
SysA	Alarm Watt Power	2	182	100	GI	Signal: Alarm permitted Active Power exceeded
SysA	Alarm VAr Power	2	182	101	GI	Signal: Alarm permitted Reactive Power exceeded
SysA	Alarm VA Power	2	182	102	GI	Signal: Alarm permitted Apparent Power exceeded
SysA	Alarm Watt Demand	2	182	103	GI	Signal: Alarm averaged Active Power exceeded
SysA	Alarm VAr Demand	2	182	104	GI	Signal: Alarm averaged Reactive Power exceeded
SysA	Alarm VA Demand	2	182	105	GI	Signal: Alarm averaged Apparent Power exceeded
SysA	Alm Current Demd	2	182	106	GI	Signal: Alarm averaged demand current
SysA	Alarm I THD	2	182	107	GI	Signal: Alarm Total Harmonic Distortion Current
SysA	Alarm V THD	2	182	108	GI	Signal: Alarm Total Harmonic Distortion Voltage
SysA	Trip Watt Power	2	182	90		Signal: Trip permitted Active Power exceeded
SysA	Trip VAr Power	2	182	91		Signal: Trip permitted Reactive Power exceeded

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
SysA	Trip VA Power	2	182	92		Signal: Trip permitted Apparent Power exceeded
SysA	Trip Watt Demand	2	182	93		Signal: Trip averaged Active Power exceeded
SysA	Trip VAr Demand	2	182	94		Signal: Trip averaged Reactive Power exceeded
SysA	Trip VA Demand	2	182	95		Signal: Trip averaged Apparent Power exceeded
SysA	Trip Current Demand	2	182	96		Signal: Trip averaged demand current
SysA	Trip I THD	2	182	97		Signal: Trip Total Harmonic Distortion Current
SysA	Trip V THD	2	182	98		Signal: Trip Total Harmonic Distortion Voltage
PQSCr	Cr OflwW Wp Net	1	183	30		Signal: Counter Wp Net will overflow soon
PQSCr	Cr OflwW Wp-	1	183	31		Signal: Counter Wp- will overflow soon
PQSCr	Cr OflwW Wp+	1	183	32		Signal: Counter Wp+ will overflow soon
PQSCr	Cr OflwW Wq Net	1	183	33		Signal: Counter Wq Net will overflow soon
PQSCr	Cr OflwW Wq-	1	183	34		Signal: Counter Wq- will overflow soon
PQSCr	Cr OflwW Wq+	1	183	35		Signal: Counter Wq+ will overflow soon
PQSCr	Cr OflwW Ws Net	1	183	36		Signal: Counter Ws Net will overflow soon
PQSCr	Cr Oflw Wp-	1	183	37		Signal: Counter Overflow Wp-
PQSCr	Cr Oflw Wp+	1	183	38		Signal: Counter Overflow Wp+
PQSCr	Cr Oflw Wq-	1	183	39		Signal: Counter Overflow Wq-
PQSCr	Cr Oflw Wq+	1	183	40		Signal: Counter Overflow Wq+

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
PQSCr	Cr Oflw Wp Net	1	183	41		Signal: Counter Overflow Wp Net
PQSCr	Cr Oflw Wq Net	1	183	42		Signal: Counter Overflow Wq Net
PQSCr	Cr Oflw Ws Net	1	183	43		Signal: Counter Overflow Ws Net
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
SG[1]	WearLevel Alarm	1	242	130	GI	Signal: Threshold for the Alarm
SG[1]	WearLevel Lockout	1	242	131	GI	Signal: Threshold for the Lockout Level
LOP	active	1	243	50	GI	Signal: active
LOP	ExBlo	1	243	80	GI	Signal: External Blocking
LOP	Alarm	1	243	100	GI	Signal: Alarm Loss of Potential
LOP	LOP Blo	1	243	110	GI	Signal: Loss of Potential blocks other elements.
LOP	Ex FF EVT	1	243	111	GI	Signal: Alarm Fuse Failure Earth Voltage Transformers
LOP	Ex FF VT	1	243	112	GI	Signal: Ex FF VT
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.

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
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
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]	Prot ON	1	246	113		Signal: ON Command issued by the Prot module
SG[1]	TripCmd	2	246	114		Signal: Trip Command
SG[1]	Ready	1	246	120	GI	Signal: Circuit breaker is ready for operation.
Scada Cmd	PS 1	1	160	23	GI	Signal: Parameter Set 1
Scada Cmd	PS 2	1	160	24	GI	Signal: Parameter Set 2
Scada Cmd	PS 3	1	160	25	GI	Signal: Parameter Set 3



Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
Scada Cmd	PS 4	1	160	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

<b>Module</b> ( - ANSI / IEEE Device Number )	<b>Subgroup Names</b> <b>Functions</b>	<b>Function type</b> <b>ASDU</b>	<b>Function code</b> <b>(FUN)</b>	<b>Information</b> <b>Number (INF)</b>	<b>Factor</b>	<b>Position</b>	<b>Description</b>
CT	IL1 [%]	9	160	148	2.4	0	Measured value: Phase current (fundamental)
CT	IL2 [%]	9	160	148	2.4	1	Measured value: Phase current (fundamental)
CT	IL3 [%]	9	160	148	2.4	2	Measured value: Phase current (fundamental)
VT	VL1 [%]	9	160	148	2.4	3	Measured value: Phase-to-neutral voltage (fundamental)
VT	VL2 [%]	9	160	148	2.4	4	Measured value: Phase-to-neutral voltage (fundamental)
VT	VL3 [%]	9	160	148	2.4	5	Measured value: Phase-to-neutral voltage (fundamental)
PQSCr	P [%]	9	160	148	2.4	6	Measured value (calculated): Active power (P- = Fed Active Power, P+ = Consumpted Active Power) (fundamental)
PQSCr	Q [%]	9	160	148	2.4	7	Measured value (calculated): Reactive power (Q- = Fed Reactive Power, Q+ = Consumpted Reactive Power) (fundamental)

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroup Names Functions</b>	<b>Function type ASDU</b>	<b>Function code (FUN)</b>	<b>Information Number (INF)</b>	<b>Factor</b>	<b>Position</b>	<b>Description</b>
VT	f [%]	9	160	148	1.2	8	Measured value: Frequency
Measured Values	IL1 [%]	9	150	148	2.4	0	Measured value: Phase current (fundamental)
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 (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)

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroup Names Functions</b>	<b>Function type ASDU</b>	<b>Function code (FUN)</b>	<b>Information Number (INF)</b>	<b>Factor</b>	<b>Position</b>	<b>Description</b>
Measured Values	VL12 [%]	9	150	148	2.4	10	Measured value: Phase-to-phase voltage (fundamental)
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	P [%]	9	150	148	2.4	13	Measured value (calculated): Active power (P- = Fed Active Power, P+ = Consumted Active Power) (fundamental)
Measured Values	Q [%]	9	150	148	2.4	14	Measured value (calculated): Reactive power (Q- = Fed Reactive Power, Q+ = Consumted Reactive Power) (fundamental)
Measured Values	cos phi [%]	9	150	148	1.0	15	Measured value (calculated): Power factor: Sign Convention: sign(PF) = sign(P )
Measured Values	f [%]	9	150	148	1.2	16	Measured value: Frequency

## Fault Values

<b>Module</b> ( - ANSI / IEEE Device Number )	<b>Subgroups</b> <b>Names</b> <b>Functions</b>	<b>Function Type</b> <b>ASDU</b>	<b>Function</b> <b>(FUN)</b>	<b>Information</b> <b>Number (INF)</b>	<b>Device</b> <b>Interrogation</b>	<b>Description</b>
CT	IL1	4	92	150		Measured value: Phase current (fundamental)
CT	IL2	4	92	151		Measured value: Phase current (fundamental)
CT	IL3	4	92	152		Measured value: Phase current (fundamental)
CT	IG meas	4	92	186		Measured value (measured): IG (fundamental)
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)

## Energy Values

<b>Module</b> ( - ANSI / IEEE Device Number )	<b>Subgroups</b> <b>Names</b> <b>Functions</b>	<b>Function Type</b> <b>ASDU</b>	<b>Function</b> <b>(FUN)</b>	<b>Information</b> <b>Number (INF)</b>	<b>Device</b> <b>Interrogation</b>	<b>Description</b>
Measured Values	Wp+	195	177	20		Positive Active Power is consumed active energy
Measured Values	Wp-	195	177	21		Negative Active Power (Fed Energy)
Measured Values	Wq+	195	177	22		Positive Reactive Power is consumed Reactive Energy
Measured Values	Wq-	195	177	23		Negative Reactive Power (Fed Energy)

The unit of measurement for the energy values is always kWh, independent of the setting "Energy Units" [Device Para / Measurem Display / General settings]. Therefore we recommend to adapt this setting, i. e. change the "Energy Units" setting to kWh. Otherwise the precision of the measurement value might decrease.

**Function type ASDU 195:**

Type identification	195
Variable structure qualifier	129
Cause of transmission	1 or 7
Device address	
Function type	See Data point table
Information number	See Data point table
Data byte 1.1	Counter value1 (currently not used)
Data byte 1.2	
Data byte 1.3	
Data byte 1.4	
Data byte 2.1	Counter value 2
Data byte 2.2	
Data byte 2.3	
Data byte 2.4	
ms	Timestamp
min	
h	

## Commands

<b>Module</b> ( - ANSI / IEEE Device Number )	<b>Subgroups</b> <b>Names</b> <b>Functions</b>	<b>Function Type</b> <b>ASDU</b>	<b>Function</b> <b>(FUN)</b>	<b>Information</b> <b>Number (INF)</b>	<b>Device</b> <b>Interrogation</b>	<b>Description</b>
Scada Cmd	Ack LED	20	160	19		Signal: LEDs acknowledgement
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		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

<b>Module</b>	<b>IEC60870-5-103 Channel Number</b>	<b>Desc</b>
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 / 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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