

TECHNICAL REPORT

TECHNICAL INFORMATION REPORT

TITLE: INTEROPERABILITY GUIDE – 7SR224

Description of the 60870-5-101 interoperability

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ISSUE HISTORY

Issue No.	Comments / Changes
1	First issue
2	Second Issue – Corrected Table in section 2.4.3.7 for Types 20, 48-51, 110-113 and 120-126.

RELATED DOCUMENTS

[1] IEC60870-5-101 – Transmission Protocols – Companion Standard for the informative interface of protection equipment

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1. INTRODUCTION

Information within this guide only defines the interoperability of the product as defined by section 8 of IEC60870-5-101. Additional features are available, please consult the full manual for further details.

This companion standard presents sets of parameters and alternatives from which subsets have to be selected to implement particular telecontrol systems. Certain parameter values, such as the number of octets in the COMMON ADDRESS of ASDUs represent mutually exclusive alternatives. This means that only one value of the defined parameters is admitted per system. Other parameters, such as the listed set of different process information in command and in monitor direction allow the specification of the complete set or subsets, as appropriate for given applications. This Clause summarizes the parameters of the previous Clauses to facilitate a suitable selection for a specific application. If a system is composed of equipment stemming from different manufacturers it is necessary that all partners agree on the selected parameters.

The selected parameters should be marked in the white boxes as follows:

- Function or ASDU is not used
- Function or ASDU is used as standardized (default)
- Function or ASDU is used in reverse mode
- Function or ASDU is used in standard and reverse mode

The possible selection (blank, \surd , R, or B) is specified for each specific Clause or parameter.

NOTE In addition, the full specification of a system may require individual selection of certain parameters for certain parts of the system, such as the individual selection of scaling factors for individually addressable measured values.

8.1 System or device

(system-specific parameter, indicate the station's function by marking one of the following with " \surd ")

- System definition
- Controlling station definition (master)
- Controlled station definition (slave)

2. INTEROPERABILITY

2.1 Network Configuration

- Point to point configuration
- Multiple point to point configuration
- Multipoint-party line configuration
- Multipoint-star configuration

2.2 Physical Layer

2.2.1 Transmission Speed (Control direction)

Unbalanced interchange circuit V.24/V.28	Unbalanced interchange circuit V.24/V.28	Balanced interchange circuit x.24/x.27
Standard	Recommended if >1200 bit/s	
<input checked="" type="checkbox"/> 75 bit/s	<input checked="" type="checkbox"/> 2400 bit/s	<input checked="" type="checkbox"/> 75 bit/s
<input type="checkbox"/> 100 bit/s	<input checked="" type="checkbox"/> 4800 bit/s	<input type="checkbox"/> 100 bit/s
<input checked="" type="checkbox"/> 110 bit/s	<input checked="" type="checkbox"/> 9600 bit/s	<input checked="" type="checkbox"/> 110 bit/s
<input checked="" type="checkbox"/> 150 bit/s	<input checked="" type="checkbox"/> 19200 bit/s	<input checked="" type="checkbox"/> 150 bit/s
<input type="checkbox"/> 200 bit/s	<input checked="" type="checkbox"/> 38400 bit/s	<input type="checkbox"/> 200 bit/s
<input checked="" type="checkbox"/> 300 bit/s		<input checked="" type="checkbox"/> 300 bit/s
<input checked="" type="checkbox"/> 600 bit/s		<input checked="" type="checkbox"/> 600 bit/s
<input checked="" type="checkbox"/> 1200 bit/s		<input checked="" type="checkbox"/> 1200 bit/s
		<input type="checkbox"/> 2400 bit/s
		<input checked="" type="checkbox"/> 4800 bit/s
		<input checked="" type="checkbox"/> 9600 bit/s
		<input checked="" type="checkbox"/> 19200 bit/s
		<input checked="" type="checkbox"/> 38400 bit/s
		<input type="checkbox"/> 56000 bit/s
		<input type="checkbox"/> 64000 bit/s

2.2.2 Transmission Speed (Monitor direction)

Unbalanced interchange circuit V.24/V.28	Unbalanced interchange circuit V.24/V.28	Balanced interchange circuit x.24/x.27
Standard	Recommended if >1200 bit/s	
<input checked="" type="checkbox"/> 75 bit/s	<input checked="" type="checkbox"/> 2400 bit/s	<input checked="" type="checkbox"/> 75 bit/s
<input type="checkbox"/> 100 bit/s	<input checked="" type="checkbox"/> 4800 bit/s	<input type="checkbox"/> 100 bit/s
<input checked="" type="checkbox"/> 110 bit/s	<input checked="" type="checkbox"/> 9600 bit/s	<input checked="" type="checkbox"/> 110 bit/s
<input checked="" type="checkbox"/> 150 bit/s	<input checked="" type="checkbox"/> 19200 bit/s	<input checked="" type="checkbox"/> 150 bit/s
<input type="checkbox"/> 200 bit/s	<input checked="" type="checkbox"/> 38400 bit/s	<input type="checkbox"/> 200 bit/s
<input checked="" type="checkbox"/> 300 bit/s		<input checked="" type="checkbox"/> 300 bit/s
<input checked="" type="checkbox"/> 600 bit/s		<input checked="" type="checkbox"/> 600 bit/s
<input checked="" type="checkbox"/> 1200 bit/s		<input checked="" type="checkbox"/> 1200 bit/s
		<input type="checkbox"/> 2400 bit/s
		<input checked="" type="checkbox"/> 4800 bit/s
		<input checked="" type="checkbox"/> 9600 bit/s
		<input checked="" type="checkbox"/> 19200 bit/s
		<input checked="" type="checkbox"/> 38400 bit/s
		<input type="checkbox"/> 56000 bit/s
		<input type="checkbox"/> 64000 bit/s

2.3 Link Layer

2.3.1 Link Transmission procedure

- Balanced transmission
- Unbalanced transmission

2.3.2 Address Field of the Link

- Not present (balanced transmission only)
- One octet
- Two octets

- Structured
- Unstructured

2.3.3 Frame Length

255 Maximum length L (number of octets)

Configurable Time during which repetitions are permitted (Trp) or number of repetitions

When using an unbalanced link layer, the following ASDU types are returned in class 2 messages (low priority) with the indicated causes of transmission:

The standard assignment of ASDUs to class 2 messages is used as follows:

Type identification	Cause of transmission
9, 11, 13, 21	<1>

- A special assignment of ASDUs to class 2 messages is used as follows:

Type identification	Cause of transmission
1, 3, 5, 7, 9, 11, 13, 20, 21, 110, 111, 112	<2>

Note: In response to a class 2 poll, a controlled station may respond with class 1 data when there is no class 2 data available.

2.4 Application Layer

Transmission mode for application data

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

2.4.1 Common Address of ASDU (System-specific Parameter)

- One octet
- Two octets

2.4.2 Information Object Address (System-specific Parameter)

- One octet
- Two octets
- Three octets
- Structured
- Unstructured

2.4.3 Cause of transmission

- One octet
- Two octets (with originator address) Set to zero in case of no originator address
- Selection of standard information numbers in monitor direction

2.4.3.1 Process Information in monitor direction

INF	Semantics	
<input checked="" type="checkbox"/> <1>	Single point information	M_SP_NA_1
<input checked="" type="checkbox"/> <2>	Single point information with time tag	M_SP_TA_1
<input checked="" type="checkbox"/> <3>	Double point information	M_DP_NA_1
<input checked="" type="checkbox"/> <4>	Double point information with time tag	M_DP_TA_1
<input checked="" type="checkbox"/> <5>	Step position information	M_ST_NA_1

<input checked="" type="checkbox"/>	<6>	Step position information with time tag	M_ST_TA_1
<input checked="" type="checkbox"/>	<7>	Bit string of 32 bit	M_BO_NA_1
<input checked="" type="checkbox"/>	<8>	Bit string of 32 bit with time tag	M_BO_TA_1
<input checked="" type="checkbox"/>	<9>	Measured value, normalized value	M_ME_NA_1
<input checked="" type="checkbox"/>	<10>	Measured value, normalized value with time tag	M_ME_TA_1
<input checked="" type="checkbox"/>	<11>	Measured value, scaled value	M_ME_NB_1
<input checked="" type="checkbox"/>	<12>	Measured value, scaled value with time tag	M_ME_TB_1
<input checked="" type="checkbox"/>	<13>	Measured value, short floating point number	M_ME_NC_1
<input checked="" type="checkbox"/>	<14>	Measured value, short floating point number with time tag	M_ME_TC_1
<input checked="" type="checkbox"/>	<15>	Integrated totals	M_IT_NA_1
<input checked="" type="checkbox"/>	<16>	Integrated totals with time tag	M_IT_TA_1
<input checked="" type="checkbox"/>	<17>	Event of protection equipment with time tag	M_EP_TA_1
<input checked="" type="checkbox"/>	<18>	Packed start of events of protection equipment with time tag	M_EP_TB_1
<input checked="" type="checkbox"/>	<19>	Packed output circuit information of protection equipment with time tag	M_EP_TC_1
<input type="checkbox"/>	<20>	Packed single point information with status change detection	M_PS_NA_1
<input checked="" type="checkbox"/>	<21>	Measured value, normalized value without quality descriptor	M_ME_ND_1
<input checked="" type="checkbox"/>	<30>	Single point information with time tag CP56Time2A	M_SP_TB_1
<input checked="" type="checkbox"/>	<31>	Double point information with time tag CP56Time2A	M_DP_TB_1
<input checked="" type="checkbox"/>	<32>	Step position information with time tag CP56Time2A	M_ST_TB_1
<input checked="" type="checkbox"/>	<33>	Bit string of 32 bit with time tag CP56Time2A	M_BO_TB_1
<input checked="" type="checkbox"/>	<34>	Measured value, normalized value with time tag CP56Time2A	M_ME_TD_1
<input checked="" type="checkbox"/>	<35>	Measured value, scaled value with time tag CP56Time2A	M_ME_TE_1
<input checked="" type="checkbox"/>	<36>	Measured value, short floating point number with time tag CP56Time2A	M_ME_TF_1
<input checked="" type="checkbox"/>	<37>	Integrated totals with time tag CP56Time2A	M_IT_TB_1
<input checked="" type="checkbox"/>	<38>	Packed start of events of protection equipment with time tag CP56Time2A	M_EP_TD_1
<input checked="" type="checkbox"/>	<39>	Packed output circuit information of protection equipment with time tag CP56Time2A	M_EP_TE_1
<input checked="" type="checkbox"/>	<40>	Event of protection equipment with time tag CP56Time2A	M_EP_TF_1

2.4.3.2 Process Information in control direction

INF	Semantics		
<input checked="" type="checkbox"/>	<45>	Single command	C_SC_NA_1
<input checked="" type="checkbox"/>	<46>	Double command	C_DC_NA_1
<input checked="" type="checkbox"/>	<47>	Regulating step command	C_RC_NA_1
<input type="checkbox"/>	<48>	Set point command, normalized value	C_SE_NA_1
<input type="checkbox"/>	<49>	Set point command, scaled value	C_SE_NB_1
<input type="checkbox"/>	<50>	Set point command, short floating point number	C_SE_NC_1
<input type="checkbox"/>	<51>	Bitstring of 32 bits	C_BO_NA_1

2.4.3.3 System Information in monitor direction

INF	Semantics		
<input checked="" type="checkbox"/>	<70>	End of initialization	ME_EI_NA_1

2.4.3.4 System Information in control direction

INF	Semantics		
<input checked="" type="checkbox"/>	<100>	Interrogation command	C_IC_NA_1
<input checked="" type="checkbox"/>	<101>	Counter interrogation	C_CI_NA_1
<input checked="" type="checkbox"/>	<102>	Read command	C_RD_NA_1

<input checked="" type="checkbox"/>	<103>	Clock synchronisation command	C_CS_NA_1
<input checked="" type="checkbox"/>	<104>	Test command	C_TS_NB_1
<input checked="" type="checkbox"/>	<105>	Reset process command	C_RP_NC_1
<input checked="" type="checkbox"/>	<106>	Delay acquisition command	C_CD_NA_1

2.4.3.5 Parameter in Control direction

INF	Semantics		
<input type="checkbox"/>	<110>	Parameter of measured value, normalised value	P_ME_NA_1
<input type="checkbox"/>	<111>	Parameter of measured value, scaled value	P_ME_NB_1
<input type="checkbox"/>	<112>	Parameter of measured value, short floating point value	P_ME_NC_1
<input type="checkbox"/>	<113>	Parameter activation	P_AC_NA_1

2.4.3.6 File Transfer

INF	Semantics		
<input type="checkbox"/>	<120>	File ready	F_FR_NA_1
<input type="checkbox"/>	<121>	Section ready	F_SR_NA_1
<input type="checkbox"/>	<122>	Call directory, select file, call file, call section	F_SC_NA_1
<input type="checkbox"/>	<123>	Last section, last segment	F_LS_NA_1
<input type="checkbox"/>	<124>	Ack file, ack section	F_AF_NA_1
<input type="checkbox"/>	<125>	Segment	F_SG_NA_1
<input type="checkbox"/>	<126>	Directory	F_DR_TA_1

2.4.3.7 Type Identification and cause of transmission assignments

Shaded boxes are not required.

Blank = function or ASDU is not used.

Mark type identification/cause of transmission combinations:

“X” if used only in the standard direction;

“R” if used only in the reverse direction;

“B” if used in both directions.

Type identification		Cause of transmission																		
		periodic, cyclic	background scan	spontaneous	initialized	request or requested	activation	activation confirmation	deactivation	deactivation confirmation	activation termination	return info caused by a remote cmd	return info caused by a local cmd	file transfer	interrogated by group <number>	request by group <n> counter request	unknown type identification	unknown cause of transmission	unknown common address of ASDU	unknown information object address
		1	2	3	4	5	6	7	8	9	10	11	12	13	20 to 36	37 to 41	44	45	46	47
<1>	M_SP_NA_1		X	X		X						X	X		X					
<2>	M_SP_TA_1			X		X						X	X							
<3>	M_DP_NA_1		X	X		X						X	X		X					
<4>	M_DP_TA_1			X		X						X	X							

Type identification		Cause of transmission																			
		periodic, cyclic	background scan	spontaneous	initialized	request or requested	activation	activation confirmation	deactivation	deactivation confirmation	activation termination	return info caused by a remote cmd	return info caused by a local cmd	file transfer	interrogated by group <number>	request by group <n> counter request	unknown type identification	unknown cause of transmission	unknown common address of ASDU	unknown information object address	
		1	2	3	4	5	6	7	8	9	10	11	12	13	20 to 36	37 to 41	44	45	46	47	
<5>	M_ST_NA_1		X	X		X						X	X		X						
<6>	M_ST_TA_1			X		X						X	X								
<7>	M_BO_NA_1		X	X		X										X					
<8>	M_BO_TA_1			X		X															
<9>	M_ME_NA_1	X	X	X		X										X					
<10>	M_ME_TA_1			X		X															
<11>	M_ME_NB_1	X	X	X		X										X					
<12>	M_ME_TB_1			X		X															
<13>	M_ME_NC_1	X	X	X		X										X					
<14>	M_ME_TC_1			X		X															
<15>	M_IT_NA_1			X													X				
<16>	M_IT_TA_1			X													X				
<17>	M_EP_TA_1			X																	
<18>	M_EP_TB_1			X																	
<19>	M_EP_TC_1			X																	
<20>	M_PS_NA_1																				
<21>	M_ME_ND_1	X	X	X		X										X					
<30>	M_SP_TB_1			X		X						X	X								
<31>	M_DP_TB_1			X		X						X	X								
<32>	M_ST_TB_1			X		X						X	X								
<33>	M_BO_TB_1			X		X															
<34>	M_ME_TD_1			X		X															
<35>	M_ME_TE_1			X		X															
<36>	M_ME_TF_1			X		X															
<37>	M_IT_TB_1			X													X				
<38>	M_EP_TD_1			X																	
<39>	M_EP_TE_1			X																	
<40>	M_EP_TF_1			X																	
<45>	C_SC_NA_1						X	X	X	X	X						X	X	X	X	X
<46>	C_DC_NA_1						X	X	X	X	X						X	X	X	X	X
<47>	C_RC_NA_1						X	X	X	X	X						X	X	X	X	X
<48>	C_SE_NA_1																X	X	X	X	X
<49>	C_SE_NB_1																X	X	X	X	X
<50>	C_SE_NC_1																X	X	X	X	X
<51>	C_BO_NA_1																X	X	X	X	X
<70>	M_EI_NA_1*				X																
<100>	C_IC_NA_1						X	X	X	X	X						X	X	X	X	X

Type identification		Cause of transmission																		
		periodic, cyclic background scan	spontaneous initialized	request or requested	activation	activation confirmation	deactivation	deactivation confirmation	activation termination	return info caused by a remote cmd	return info caused by a local cmd	file transfer	interrogated by group <number>	request by group <n> counter request	unknown type identification	unknown cause of transmission	unknown common address of ASDU	unknown information object address		
		1	2	3	4	5	6	7	8	9	10	11	12	13	20 to 36	37 to 41	44	45	46	47
<101>	C_CI_NA_1						X	X			X						X	X	X	X
<102>	C_RD_NA_1				X												X	X	X	X
<103>	C_CS_NA_1		X				X	X									X	X	X	X
<104>	C_TS_NA_1						X	X									X	X	X	X
<105>	C_RP_NA_1						X	X									X	X	X	X
<106>	C_CD_NA_1		X				X	X									X	X	X	X
<110>	P_ME_NA_1																X	X	X	X
<111>	P_ME_NB_1																X	X	X	X
<112>	P_ME_NC_1																X	X	X	X
<113>	P_AC_NA_1																X	X	X	X
<120>	F_FR_NA_1																X		X	
<121>	F_SR_NA_1																X		X	
<122>	F_SC_NA_1																X		X	
<123>	F_LS_NA_1																X		X	
<124>	F_AF_NA_1																X		X	
<125>	F_SG_NA_1																X		X	
<126>	F_DR_TA_1*																			

* Blank or X only

2.5 Basic Application Functions

2.5.1 Station initialization

- Remote initialization

2.5.2 Cyclic data transmission

- Cyclic data transmission

2.5.3 Read procedure

- Read procedure

2.5.4 Spontaneous transmission

- Spontaneous transmission

2.5.5 Double transmission of information objects with cause of transmission

- Single-point information M_SP_NA_1, M_SP_TA_1, M_SP_TB_1 and M_PS_NA_1

- Double-point information M_DP_NA_1, M_DP_TA_1 and M_DP_TB_1
- Step position information M_ST_NA_1, M_ST_TA_1 and M_ST_TB_1
- Bitstring of 32 bit M_BO_NA_1, M_BO_TA_1 and M_BO_TB_1
- Measured value, normalised value M_ME_NA_1, M_ME_TA_1, M_ME_ND_1 and M_ME_TD_1
- Measured value, scaled value M_ME_NB_1, M_ME_TB_1 and M_ME_TE_1
- Measured value, short floating point number M_ME_NC_1, M_ME_TC_1 and M_ME_TF_1

2.5.6 Station interrogation

- Global
- Group 1
- Group 2
- Group 3
- Group 4
- Group 5
- Group 6
- Group 7
- Group 8
- Group 9
- Group 10
- Group 11
- Group 12
- Group 13
- Group 14
- Group 15
- Group 16

2.5.7 Clock synchronization

- Clock synchronization
- Day of week used
- RES1, GEN (time tag substituted/ not substituted) used
- SU-bit (summertime) used

2.5.8 Command transmission (Object specific parameter)

- Direct command transmission
- Direct set-point command transmission
- Select and execute command
- Select and execute set point command
- C_SE ACTTERM used
- No additional definition
- Short-pulse duration
- Long-pulse duration
- Persistent output

2.5.9 Transmission of integrated totals (Station or object specific parameter)

- Mode A: local freeze with spontaneous
- Mode B: local freeze with counter
- Mode C: freeze and transmit by counter interrogation

- Mode D: freeze and counter interrogation command, frozen values reported spontaneously
- Counter read
- Counter freeze without reset
- Counter freeze with reset
- Counter reset
- General request counter
- Request counter group 1
- Request counter group 2
- Request counter group 3
- Request counter group 4

2.5.10 Parameter loading (Object specific parameter)

- Threshold value
- Smoothing factor
- Low limit for transmission of measured value
- High limit for transmission of measured value

2.5.11 Parameter activation (Object specific parameter)

- Act/deact of persistent cyclic or periodic transmission of the addressed object

2.5.12 Test procedure (Station specific parameter)

- Test procedure

2.5.13 File transfer (Station specific parameter)

File transfer in monitor direction only

- Transparent file
- Transmission of disturbance data of protection equipment
- Transmission of sequence of events
- Transmission of sequences of recorded analog values

File transfer in monitor control only

- Transparent file

2.5.14 Background scan (Station specific parameter)

- Background scan

2.5.15 Acquisition of transmission delay (Station specific parameter)

- Acquisition of transmission delay

2.6 Information Object Addresses (IOA)

The following table lists information object address (IOA) definitions together with a description of the message and default function type of that message. Definitions with shaded area are not available on all relay models.

The Default type is given below but all items are user configurable.

IOA	Description	Default Type
1	Data Lost	M_SP_TB_1
4	Remote Mode	M_SP_TB_1 C_SC_NA_1
5	Service Mode	M_SP_TB_1 C_SC_NA_1

IOA	Description	Default Type
6	Local Mode	M_SP_TB_1
		C_SC_NA_1
7	Local & Remote Mode	M_SP_TB_1
		C_SC_NA_1
12	Control Received	M_SP_TB_1
13	Command Received	M_SP_TB_1
14	Cold Start	M_SP_TB_1
15	Warm Start	M_SP_TB_1
16	Re-start	M_SP_TB_1
17	Trigger Storage	M_SP_TB_1
18	Clear Waveform Records	M_SP_TB_1
19	Clear Fault Records	M_SP_TB_1
20	Clear Event Records	M_SP_TB_1
21	Reset Demand metering	M_SP_TB_1
		C_SC_NA_1
22	27 Sag SARFI	M_SP_TB_1
23	59Swell SARFI	M_SP_TB_1
24	Reset SagSwell Count	M_SP_TB_1
25	Battery Test Pass	M_SP_TB_1
26	Battery Test Fail	M_SP_TB_1
27	Battery Ohms High	M_SP_TB_1
28	Battery Volts Low	M_SP_TB_1
29	Battery Volts High	M_SP_TB_1
30	Battery Healthy	M_SP_TB_1
31	Battery Recovery Fail	M_SP_TB_1
32	Battery Test	M_SP_TB_1
		C_SC_NA_1
33	Capacitor Ready	M_SP_TB_1
34	Capacitor Test Pass	M_SP_TB_1
35	Capacitor Test Fail	M_SP_TB_1
36	Capacitor Recovery Fail	M_SP_TB_1
37	Capacitor Test	M_SP_TB_1
		C_SC_NA_1
38	General Alarm 1	M_SP_TB_1
39	General Alarm 2	M_SP_TB_1
40	General Alarm 3	M_SP_TB_1
41	General Alarm 4	M_SP_TB_1
42	General Alarm 5	M_SP_TB_1
43	General Alarm 6	M_SP_TB_1
44	General Alarm 7	M_SP_TB_1
45	General Alarm 8	M_SP_TB_1
46	General Alarm 9	M_SP_TB_1
47	General Alarm 10	M_SP_TB_1
48	General Alarm 11	M_SP_TB_1
49	General Alarm 12	M_SP_TB_1
50	Quick Logic E1	M_SP_TB_1
51	Quick Logic E2	M_SP_TB_1
52	Quick Logic E3	M_SP_TB_1
53	Quick Logic E4	M_SP_TB_1
54	Quick Logic E5	M_SP_TB_1
55	Quick Logic E6	M_SP_TB_1
56	Quick Logic E7	M_SP_TB_1
57	Quick Logic E8	M_SP_TB_1
58	Quick Logic E9	M_SP_TB_1

IOA	Description	Default Type
59	Quick Logic E10	M_SP_TB_1
60	Quick Logic E11	M_SP_TB_1
61	Quick Logic E12	M_SP_TB_1
62	Quick Logic E13	M_SP_TB_1
63	Quick Logic E14	M_SP_TB_1
64	Quick Logic E15	M_SP_TB_1
65	Quick Logic E16	M_SP_TB_1
66	Quick Logic E17	M_SP_TB_1
67	Quick Logic E18	M_SP_TB_1
68	Quick Logic E19	M_SP_TB_1
69	Quick Logic E20	M_SP_TB_1
70	Quick Logic E21	M_SP_TB_1
71	Quick Logic E22	M_SP_TB_1
72	Quick Logic E23	M_SP_TB_1
73	Quick Logic E24	M_SP_TB_1
74	Quick Logic E25	M_SP_TB_1
75	Quick Logic E26	M_SP_TB_1
76	Quick Logic E27	M_SP_TB_1
77	Quick Logic E28	M_SP_TB_1
78	Quick Logic E29	M_SP_TB_1
79	Quick Logic E30	M_SP_TB_1
80	Quick Logic E31	M_SP_TB_1
81	Quick Logic E32	M_SP_TB_1
82	Function Key 1	M_SP_TB_1
83	Function Key 2	M_SP_TB_1
84	Function Key 3	M_SP_TB_1
85	Function Key 4	M_SP_TB_1
86	Function Key 5	M_SP_TB_1
87	Function Key 6	M_SP_TB_1
88	Function Key 7	M_SP_TB_1
89	Function Key 8	M_SP_TB_1
90	Function Key 9	M_SP_TB_1
91	Function Key 10	M_SP_TB_1
92	Function Key 11	M_SP_TB_1
93	Function Key 12	M_SP_TB_1
94	Function Key 13	M_SP_TB_1
95	Function Key 14	M_SP_TB_1
96	Function Key 15	M_SP_TB_1
97	Function Key 16	M_SP_TB_1
98	Function Key 17	M_SP_TB_1
99	Function Key 18	M_SP_TB_1
100	Function Key 19	M_SP_TB_1
101	Function Key 20	M_SP_TB_1
102	Function Key 21	M_SP_TB_1
103	Function Key 22	M_SP_TB_1
104	Function Key 23	M_SP_TB_1
105	Function Key 24	M_SP_TB_1
106	Function Key 25	M_SP_TB_1
107	Function Key 26	M_SP_TB_1
108	Function Key 27	M_SP_TB_1
109	Binary Input 1	M_SP_TB_1
110	Binary Input 2	M_SP_TB_1
111	Binary Input 3	M_SP_TB_1
112	Binary Input 4	M_SP_TB_1
113	Binary Input 5	M_SP_TB_1
114	Binary Input 6	M_SP_TB_1
115	Binary Input 7	M_SP_TB_1
116	Binary Input 8	M_SP_TB_1
117	Binary Input 9	M_SP_TB_1

IOA	Description	Default Type
118	Binary Input 10	M_SP_TB_1
119	Binary Input 11	M_SP_TB_1
120	Binary Input 12	M_SP_TB_1
121	Binary Input 13	M_SP_TB_1
122	Binary Input 14	M_SP_TB_1
123	Binary Input 15	M_SP_TB_1
124	Binary Input 16	M_SP_TB_1
125	Binary Input 17	M_SP_TB_1
126	Binary Input 18	M_SP_TB_1
127	Binary Input 19	M_SP_TB_1
128	Binary Input 20	M_SP_TB_1
129	Binary Input 21	M_SP_TB_1
130	Binary Input 22	M_SP_TB_1
131	Binary Input 23	M_SP_TB_1
132	Binary Input 24	M_SP_TB_1
133	Binary Input 25	M_SP_TB_1
134	Binary Input 26	M_SP_TB_1
135	Binary Input 27	M_SP_TB_1
136	Binary Input 28	M_SP_TB_1
137	Binary Input 29	M_SP_TB_1
138	Binary Input 30	M_SP_TB_1
139	Binary Input 31	M_SP_TB_1
140	Binary Input 32	M_SP_TB_1
141	Binary Input 33	M_SP_TB_1
142	Binary Input 34	M_SP_TB_1
143	Binary Input 35	M_SP_TB_1
144	Binary Input 36	M_SP_TB_1
145	Binary Input 37	M_SP_TB_1
146	Binary Input 38	M_SP_TB_1
147	Binary Input 39	M_SP_TB_1
148	Binary Input 40	M_SP_TB_1
149	Binary Input 41	M_SP_TB_1
150	Binary Input 42	M_SP_TB_1
151	Binary Input 43	M_SP_TB_1
152	Binary Input 44	M_SP_TB_1
153	Binary Input 45	M_SP_TB_1
154	Binary Input 46	M_SP_TB_1
155	Binary Input 47	M_SP_TB_1
156	Binary Input 48	M_SP_TB_1
157	Binary Input 49	M_SP_TB_1
158	Binary Input 50	M_SP_TB_1
159	Binary Input 51	M_SP_TB_1
160	Binary Input 52	M_SP_TB_1
161	Binary Input 53	M_SP_TB_1
162	Binary Input 54	M_SP_TB_1
163	Binary Input 55	M_SP_TB_1
164	Binary Input 56	M_SP_TB_1
165	Binary Input 57	M_SP_TB_1
166	Binary Input 58	M_SP_TB_1
167	Binary Input 59	M_SP_TB_1
168	Binary Input 60	M_SP_TB_1
169	Binary Input 61	M_SP_TB_1

IOA	Description	Default Type
170	Binary Input 62	M_SP_TB_1
171	Binary Input 63	M_SP_TB_1
172	Binary Input 64	M_SP_TB_1
173	Binary Output 1	M_SP_TB_1
		C_SC_NA_1
174	Binary Output 2	M_SP_TB_1
		C_SC_NA_1
175	Binary Output 3	M_SP_TB_1
		C_SC_NA_1
176	Binary Output 4	M_SP_TB_1
		C_SC_NA_1
177	Binary Output 5	M_SP_TB_1
		C_SC_NA_1
178	Binary Output 6	M_SP_TB_1
		C_SC_NA_1
179	Binary Output 7	M_SP_TB_1
		C_SC_NA_1
180	Binary Output 8	M_SP_TB_1
		C_SC_NA_1
181	Binary Output 9	M_SP_TB_1
		C_SC_NA_1
182	Binary Output 10	M_SP_TB_1
		C_SC_NA_1
183	Binary Output 11	M_SP_TB_1
		C_SC_NA_1
184	Binary Output 12	M_SP_TB_1
		C_SC_NA_1
185	Binary Output 13	M_SP_TB_1
		C_SC_NA_1
186	Binary Output 14	M_SP_TB_1
		C_SC_NA_1
187	Binary Output 15	M_SP_TB_1
		C_SC_NA_1
188	Binary Output 16	M_SP_TB_1
		C_SC_NA_1
189	Binary Output 17	M_SP_TB_1
		C_SC_NA_1
190	Binary Output 18	M_SP_TB_1
		C_SC_NA_1
191	Binary Output 19	M_SP_TB_1
		C_SC_NA_1
192	Binary Output 20	M_SP_TB_1
		C_SC_NA_1
193	Binary Output 21	M_SP_TB_1
		C_SC_NA_1
194	Binary Output 22	M_SP_TB_1
		C_SC_NA_1
195	Binary Output 23	M_SP_TB_1
		C_SC_NA_1
196	Binary Output 24	M_SP_TB_1
		C_SC_NA_1
197	Binary Output 25	M_SP_TB_1
		C_SC_NA_1
198	Binary Output 26	M_SP_TB_1
		C_SC_NA_1
199	Binary Output 27	M_SP_TB_1
		C_SC_NA_1
200	Binary Output 28	M_SP_TB_1
		C_SC_NA_1
201	Binary Output 29	M_SP_TB_1

IOA	Description	Default Type
		C_SC_NA_1
202	Binary Output 30	M_SP_TB_1
		C_SC_NA_1
203	Binary Output 31	M_SP_TB_1
		C_SC_NA_1
204	Binary Output 32	M_SP_TB_1
		C_SC_NA_1
205	Reset FCB	M_SP_TB_1
206	Reset CU	M_SP_TB_1
207	Start/Restart	M_SP_TB_1
208	Power On	M_SP_TB_1
209	Auto-reclose active (In/Out)	M_SP_TB_1
		C_SC_NA_1
210	LEDs reset (Reset Flag & Outputs)	M_SP_TB_1
		C_SC_NA_1
211	Settings changed	M_SP_TB_1
212	Settings Group 1 Select	M_SP_TB_1
		C_SC_NA_1
213	Settings Group 2 select	M_SP_TB_1
		C_SC_NA_1
214	Settings Group 3 Select	M_SP_TB_1
		C_SC_NA_1
215	Settings Group 4 Select	M_SP_TB_1
		C_SC_NA_1
216	Settings Group 5 Selected	M_SP_TB_1
		C_SC_NA_1
217	Settings Group 6 Selected	M_SP_TB_1
		C_SC_NA_1
218	Settings Group 7 Selected	M_SP_TB_1
		C_SC_NA_1
219	Settings Group 8 Selected	M_SP_TB_1
		C_SC_NA_1
220	Trip circuit fail	M_EP_TD_1
221	VT Fuse Failure	M_EP_TD_1
222	Earth Fault Forward/Line	M_EP_TD_1
223	Earth Fault Reverse/Busbar	M_EP_TD_1
224	Starter/Pick Up L1	M_EP_TD_1
225	Starter/Pick Up L2	M_EP_TD_1
226	Starter/Pick Up L3	M_EP_TD_1
227	Starter/Pick Up N	M_EP_TD_1
228	General Trip	M_EP_TD_1
229	Trip L1	M_EP_TD_1
230	Trip L2	M_EP_TD_1
231	Trip L3	M_EP_TD_1
232	Fault Impedance	M_EP_TD_1
233	Fault Forward/Line	M_EP_TD_1
234	Fault Reverse/Busbar	M_EP_TD_1
235	General Starter/Pick Up	M_EP_TD_1
236	Circuit breaker fail	M_EP_TD_1
237	Trip I>	M_EP_TD_1
238	Trip I>>	M_EP_TD_1
239	Trip In>	M_EP_TD_1
240	Trip In>>	M_EP_TD_1
241	CB on by auto reclose	M_EP_TD_1
242	Reclose blocked	M_EP_TD_1
243	51-1	M_EP_TD_1

IOA	Description	Default Type
244	50-1	M_EP_TD_1
245	51N-1	M_EP_TD_1
246	50N-1	M_EP_TD_1
247	51G-1	M_EP_TD_1
248	50G-1	M_EP_TD_1
249	51-2	M_EP_TD_1
250	50-2	M_EP_TD_1
251	51N-2	M_EP_TD_1
252	50N-2	M_EP_TD_1
253	51G-2	M_EP_TD_1
254	50G-2	M_EP_TD_1
255	51-3	M_EP_TD_1
256	50-3	M_EP_TD_1
257	51N-3	M_EP_TD_1
258	50N-3	M_EP_TD_1
259	51G-3	M_EP_TD_1
260	50G-3	M_EP_TD_1
261	51-4	M_EP_TD_1
262	50-4	M_EP_TD_1
263	51N-4	M_EP_TD_1
264	50N-4	M_EP_TD_1
265	51G-4	M_EP_TD_1
266	50G-4	M_EP_TD_1
267	50BF Stage 2	M_EP_TD_1
268	49 Thermal Alarm	M_EP_TD_1
269	49 Thermal Trip	M_EP_TD_1
270	51V-PhA	M_EP_TD_1
271	51V-PhB	M_EP_TD_1
272	51V-PhC	M_EP_TD_1
273	60 CT Supervision	M_EP_TD_1
274	51SEF-1	M_EP_TD_1
275	50SEF-1	M_EP_TD_1
276	51SEF-2	M_EP_TD_1
277	50SEF-2	M_EP_TD_1
278	51SEF-3	M_EP_TD_1
279	50SEF-3	M_EP_TD_1
280	51SEF-4	M_EP_TD_1
281	50SEF-4	M_EP_TD_1
282	SEF Out/In	M_SP_TB_1 C_SC_NA_1
283	46IT	M_EP_TD_1
284	46DT	M_EP_TD_1
285	64H	M_EP_TD_1
286	EF Out/In	M_SP_TB_1 C_SC_NA_1
287	SEF Forward/Line	M_EP_TD_1
288	SEF Reverse/Busbar	M_EP_TD_1
289	47-1	M_EP_TD_1
290	47-2	M_EP_TD_1
291	37-1	M_EP_TD_1
292	37-2	M_EP_TD_1
293	37G-1	M_EP_TD_1
294	37G-2	M_EP_TD_1
295	37SEF-1	M_EP_TD_1
296	37SEF-2	M_EP_TD_1

IOA	Description	Default Type
297	46BC	M_EP_TD_1
298	27/59-1	M_EP_TD_1
299	27/59-2	M_EP_TD_1
300	27/59-3	M_EP_TD_1
301	27/59-4	M_EP_TD_1
302	59NIT	M_EP_TD_1
303	59NDT	M_EP_TD_1
304	Vx27/59	M_EP_TD_1
305	81-1	M_EP_TD_1
306	81-2	M_EP_TD_1
307	81-3	M_EP_TD_1
308	81-4	M_EP_TD_1
309	81-5	M_EP_TD_1
310	81-6	M_EP_TD_1
311	81HBL2	M_EP_TD_1
312	Trip Circuit Fail 1	M_EP_TD_1
313	Trip Circuit Fail 2	M_EP_TD_1
314	Trip Circuit Fail 3	M_EP_TD_1
319	Close CB Failed	M_SP_TB_1
320	Open CB Failed	M_SP_TB_1
321	Reclaim	M_SP_TB_1
322	Lockout	M_SP_TB_1
323	Successful Close	M_SP_TB_1
324	Successful DAR Close	M_SP_TB_1
325	Successful Man Close	M_SP_TB_1
326	Hotline Working	M_SP_TB_1 C_SC_NA_1
327	Inst Protection Out	M_SP_TB_1 C_SC_NA_1
328	CB Total Trip Count	M_SP_TB_1
329	CB Delta Trip Count	M_SP_TB_1
330	CB Count to AR Block	M_SP_TB_1
331	Reset CB Trip Count Maint	M_SP_TB_1 C_SC_NA_1
332	Reset CB Trip Count Delta	M_SP_TB_1 C_SC_NA_1
333	Reset CB Trip Count Lockout	M_SP_TB_1 C_SC_NA_1
334	I ² t CB Wear	M_SP_TB_1
335	Reset I ² t CB Wear	M_SP_TB_1 C_SC_NA_1
336	79 AR In Progress	M_SP_TB_1
337	CB Frequent Ops Count	M_SP_TB_1
338	Reset CB Frequent Ops Count	M_SP_TB_1 M_SP_TB_1
339	CB LO Handle Ops Count	M_SP_TB_1
340	Reset CB LO Handle Ops Count	M_SP_TB_1 C_SC_NA_1
341	CB On By Manual Close	M_SP_TB_1
342	Cold Load Active	M_SP_TB_1
343	P/F Inst Protection Inhibited	M_EP_TD_1
344	E/F Inst Protection Inhibited	M_EP_TD_1
345	SEF Inst Protection Inhibited	M_EP_TD_1
346	Ext Inst Protection Inhibited	M_EP_TD_1
348	LOV Primed	M_SP_TB_1

IOA	Description	Default Type
349	LOV Trip	M_SP_TB_1
350	LOV Close	M_SP_TB_1
351	LOV Inhibit Fast Protection	M_SP_TB_1
352	LOV Force Fast Protection	M_SP_TB_1
353	LOV In Progress	M_SP_TB_1
354	LOV Backfeed Fail	M_SP_TB_1
355	LOV Successful	M_SP_TB_1
356	LOV 1x Trip and Lockout	M_SP_TB_1
357	LOV Fail	M_SP_TB_1
358	LOV-A Live	M_SP_TB_1
359	LOV-X Live	M_SP_TB_1
360	LOV Out	M_SP_TB_1
		C_SC_NA_1
361	Trip Time Alarm	M_SP_TB_1
362	Close Circuit Fail 1	M_SP_TB_1
363	Close Circuit Fail 2	M_SP_TB_1
364	Close Circuit Fail 3	M_SP_TB_1
365	Close Circuit Fail	M_SP_TB_1
366	Distance To Fault	M_SP_TB_1
367	Distance To Fault %	M_SP_TB_1
368	Fault Reactance	M_SP_TB_1
369	60 CTS-I	M_SP_TB_1
370	Act Energy Exp	M_SP_TB_1
371	Act Energy Imp	M_SP_TB_1
372	React Energy Exp	M_SP_TB_1
373	React Energy Imp	M_SP_TB_1
374	Reset Energy Meters	M_SP_TB_1
		C_SC_NA_1
375	Active Exp Meter Reset	M_SP_TB_1
376	Active Imp Meter Reset	M_SP_TB_1
377	Reactive Exp Meter Reset	M_SP_TB_1
378	Reactive Imp Meter Reset	M_SP_TB_1
379	CB Total Trip Count	M_SP_TB_1
380	CB Delta Trip Count	M_SP_TB_1
381	CB Count To AR Block	M_SP_TB_1
382	CB Freq Ops Count	M_SP_TB_1
383	LOV A Live	M_SP_TB_1
384	LOV B Live	M_SP_TB_1
385	LOV C Live	M_SP_TB_1
386	LOV X Live	M_SP_TB_1
387	LOV Y Live	M_SP_TB_1
388	LOV Z Live	M_SP_TB_1
389	LOV A	M_SP_TB_1
390	LOV B	M_SP_TB_1
391	LOV C	M_SP_TB_1
392	LOV X	M_SP_TB_1
393	LOV Y	M_SP_TB_1
394	LOV Z	M_SP_TB_1
395	CB LO Handle Ops Count	M_SP_TB_1
396	25 Check Sync	M_SP_TB_1
397	25 System Sync	M_SP_TB_1
398	25 Close On Zero	M_SP_TB_1
399	25 System Split	M_SP_TB_1
400	25 Live Line	M_SP_TB_1
401	25 Live Bus	M_SP_TB_1
402	25 Line U/V	M_SP_TB_1
403	25 Bus U/V	M_SP_TB_1
404	25 Voltage Dif >	M_SP_TB_1
405	25 CS Slip Freq >	M_SP_TB_1
406	25 SS Slip Freq >	M_SP_TB_1

IOA	Description	Default Type
407	25 COZ Slip Freq >	M_SP_TB_1
408	25 In Sync	M_SP_TB_1
409	25 CS In Progress	M_SP_TB_1
410	25 SS In Progress	M_SP_TB_1
411	25 COZ In Progress	M_SP_TB_1
412	25 System Split LO	M_SP_TB_1
413	60VTF-Bus	M_SP_TB_1
415	Man Override Sync	M_SP_TB_1
416	79 Override Sync	M_SP_TB_1
417	Dead Line Close	M_SP_TB_1
418	Dead Bus Close	M_SP_TB_1
419	Wattmetric Po>	M_SP_TB_1
420	Close CB-A Failed	M_SP_TB_1
421	Open CB-A Failed	M_SP_TB_1
422	CB-A Reclaim	M_SP_TB_1
423	CB-A Lockout	M_SP_TB_1
424	CB-A Successful Close	M_SP_TB_1
425	CB-A Successful DAR Close	M_SP_TB_1
426	CB-A Successful Man Close	M_SP_TB_1
427	CB-A Total Trip Count	M_SP_TB_1
428	CB-A Delta Trip Count	M_SP_TB_1
429	CB-A Count To AR Block	M_SP_TB_1
430	Reset CB-A Total Trip Count	M_SP_TB_1 C_SC_NA_1
431	Reset CB-A Delta Trip Count	M_SP_TB_1 C_SC_NA_1
432	Reset CB-A Count to AR Block	M_SP_TB_1 C_SC_NA_1
433	CB-A I ² t Wear	M_SP_TB_1
434	Reset CB-A I ² t Wear	M_SP_TB_1 C_SC_NA_1
435	CB-A 79 AR In progress	M_SP_TB_1
436	CB-A Frequent Ops Count	M_SP_TB_1
437	Reset CB-A Frequent Ops Count	M_SP_TB_1 C_SC_NA_1
438	CB-A LO Handle Ops Count	M_SP_TB_1
439	Reset CB-A LO Handle Ops Count	M_SP_TB_1 C_SC_NA_1
440	PhA Inst Protection Inhibited	M_SP_TB_1
441	CB-A Blocked By Interlocking	M_SP_TB_1
442	CB-A on by auto reclose	M_SP_TB_1
443	CB-A Trip & Reclose	M_SP_TB_1
444	50BF-1 Pole A	M_SP_TB_1
445	50BF-2 Pole A	M_SP_TB_1
446	CB-A Trip & Lockout	M_SP_TB_1 C_SC_NA_1
447	Cap-A Ready	M_SP_TB_1
448	Cap-A Test Pass	M_SP_TB_1
449	Cap-A Test Fail	M_SP_TB_1
450	Cap-A Recovery Fail	M_SP_TB_1
451	Cap-A Test	M_SP_TB_1
452	CB-A Deadtime Running	M_SP_TB_1
453	Close CB-B Failed	M_SP_TB_1
454	Open CB-B Failed	M_SP_TB_1
455	CB-B Reclaim	M_SP_TB_1
456	CB-B Lockout	M_SP_TB_1
457	CB-B Successful Close	M_SP_TB_1
458	CB-B Successful DAR Close	M_SP_TB_1
459	CB-B Successful Man Close	M_SP_TB_1
460	CB-B Total Trip Count	M_SP_TB_1

IOA	Description	Default Type
461	CB-B Delta Trip Count	M_SP_TB_1
462	CB-B Count To AR Block	M_SP_TB_1
463	Reset CB-B Total Trip Count	M_SP_TB_1
		C_SC_NA_1
464	Reset CB-B Delta Trip Count	M_SP_TB_1
		C_SC_NA_1
465	Reset CB-B Count to AR Block	M_SP_TB_1
		C_SC_NA_1
466	CB-B I ² t Wear	M_SP_TB_1
467	Reset CB-B I ² t Wear	M_SP_TB_1
		C_SC_NA_1
468	CB-B 79 AR In progress	M_SP_TB_1
469	CB-B Frequent Ops Count	M_SP_TB_1
470	Reset CB-B Frequent Ops Count	M_SP_TB_1
		C_SC_NA_1
471	CB-B LO Handle Ops Count	M_SP_TB_1
472	Reset CB-B LO Handle Ops Count	M_SP_TB_1
		C_SC_NA_1
473	PhB Inst Protection Inhibited	M_SP_TB_1
474	CB-B Blocked By Interlocking	M_SP_TB_1
475	CB-B on by auto reclose	M_SP_TB_1
476	CB-B Trip & Reclose	M_SP_TB_1
477	50BF-1 Pole B	M_SP_TB_1
478	50BF-2 Pole B	M_SP_TB_1
479	CB-B Trip & Lockout	M_SP_TB_1
		C_SC_NA_1
480	Cap-B Ready	M_SP_TB_1
481	Cap-B Test Pass	M_SP_TB_1
482	Cap-B Test Fail	M_SP_TB_1
483	Cap-B Recovery Fail	M_SP_TB_1
484	Cap-B Test	M_SP_TB_1
485	CB-B Deadtime Running	M_SP_TB_1
486	Close CB-C Failed	M_SP_TB_1
487	Open CB-C Failed	M_SP_TB_1
488	CB-C Reclaim	M_SP_TB_1
489	CB-C Lockout	M_SP_TB_1
490	CB-C Successful Close	M_SP_TB_1
491	CB-C Successful DAR Close	M_SP_TB_1
492	CB-C Successful Man Close	M_SP_TB_1
493	CB-C Total Trip Count	M_SP_TB_1
494	CB-C Delta Trip Count	M_SP_TB_1
495	CB-C Count To AR Block	M_SP_TB_1
496	Reset CB-C Total Trip Count	M_SP_TB_1
		C_SC_NA_1
497	Reset CB-C Delta Trip Count	M_SP_TB_1
		C_SC_NA_1
498	Reset CB-C Count to AR Block	M_SP_TB_1
		C_SC_NA_1
499	CB-C I ² t Wear	M_SP_TB_1
500	Reset CB-C I ² t Wear	M_SP_TB_1
		C_SC_NA_1
501	CB-C 79 AR In progress	M_SP_TB_1
502	CB-C Frequent Ops Count	M_SP_TB_1
503	Reset CB-C Frequent Ops Count	M_SP_TB_1
		C_SC_NA_1
504	CB-C LO Handle Ops Count	M_SP_TB_1
505	Reset CB-C LO Handle Ops Count	M_SP_TB_1
		C_SC_NA_1
506	PhC Inst Protection Inhibited	M_SP_TB_1
507	CB-C Blocked By Interlocking	M_SP_TB_1
508	CB-C on by auto reclose	M_SP_TB_1

IOA	Description	Default Type
509	CB-C Trip & Reclose	M_SP_TB_1
510	50BF-1 Pole C	M_SP_TB_1
511	50BF-2 Pole C	M_SP_TB_1
512	CB-C Trip & Lockout	M_SP_TB_1
		C_SC_NA_1
513	Cap-C Ready	M_SP_TB_1
514	Cap-C Test Pass	M_SP_TB_1
515	Cap-C Test Fail	M_SP_TB_1
516	Cap-C Recovery Fail	M_SP_TB_1
517	Cap-C Test	M_SP_TB_1
518	CB-C Deadtime Running	M_SP_TB_1
519	Pole Discrepancy	M_SP_TB_1
520	Three Pole Trip Select	M_SP_TB_1
521	Force 3Pole Trip	M_SP_TB_1
522	CB 1	M_DP_TB_1
		C_DC_NA_1
527	CB-A	M_DP_TB_1
		C_DC_NA_1
528	CB-B	M_DP_TB_1
		C_DC_NA_1
529	CB-C	M_DP_TB_1
		C_DC_NA_1
550	CB 1 Trip & Reclose	M_SP_TB_1
		C_SC_NA_1
551	CB 1 Trip & Lockout	M_SP_TB_1
		C_SC_NA_1
552	Mode A - 3PTrip3PLO	M_SP_TB_1
		C_SC_NA_1
553	Mode B - 1PTrip3PLO	M_SP_TB_1
		C_SC_NA_1
554	Mode C - 1PTrip1PLO	M_SP_TB_1
		C_SC_NA_1
555	Blocked by Interlocking	M_SP_TB_1
556	50BF-1	M_SP_TB_1
557	37-PhA	M_SP_TB_1
558	37-PhB	M_SP_TB_1
559	37-PhC	M_SP_TB_1
560	50 LC-1	M_SP_TB_1
561	50 LC-2	M_SP_TB_1
562	50G LC-1	M_SP_TB_1
563	50G LC-2	M_SP_TB_1
564	50SEF LC-1	M_SP_TB_1
565	50SEF LC-2	M_SP_TB_1
566	50BF-PhA	M_SP_TB_1
567	50BF-PhB	M_SP_TB_1
568	50BF-PhC	M_SP_TB_1
569	50BF-EF	M_SP_TB_1
570	79 Last Trip Lockout	M_SP_TB_1
571	Auto-reclose active	M_SP_TB_1
572	CB on by auto reclose	M_SP_TB_1
573	Battery Test Pass	M_SP_TB_1
574	Battery Test Fail	M_SP_TB_1
575	Battery Ohms High	M_SP_TB_1
576	Capacitor Test Pass	M_SP_TB_1
577	Capacitor Test Fail	M_SP_TB_1
578	Capacitor Recovery Fail	M_SP_TB_1
590	Ia Fault	M_ME_NC_1
591	Ib Fault	M_ME_NC_1
592	Ic Fault	M_ME_NC_1

IOA	Description	Default Type
593	Va Fault	M_ME_NC_1
594	Vb Fault	M_ME_NC_1
595	Vc Fault	M_ME_NC_1
596	In Fault	M_ME_NC_1
597	Ig Fault	M_ME_NC_1
598	Isef Fault	M_ME_NC_1
601	Frequency	M_ME_NB_1
602	Vab Primary	M_ME_NB_1
603	Vbc Primary	M_ME_NB_1
604	Vca Primary	M_ME_NB_1
605	Va Primary	M_ME_NB_1
606	Vb Primary	M_ME_NB_1
607	Vc Primary	M_ME_NB_1
608	Va Secondary	M_ME_NB_1
609	Vb Secondary	M_ME_NB_1
610	Vc Secondary	M_ME_NB_1
621	Vzps	M_ME_NB_1
622	Vpps	M_ME_NB_1
623	Vnps	M_ME_NB_1
627	Ia Primary	M_ME_NB_1
628	Ib Primary	M_ME_NB_1
629	Ic Primary	M_ME_NB_1
630	Ia Secondary	M_ME_NB_1
631	Ib Secondary	M_ME_NB_1
632	Ic Secondary	M_ME_NB_1
633	Ia Nominal	M_ME_NB_1
634	Ib Nominal	M_ME_NB_1
635	Ic Nominal	M_ME_NB_1
639	In Primary	M_ME_NB_1
640	In Secondary	M_ME_NB_1
641	In Nominal	M_ME_NB_1
642	Ig Primary	M_ME_NB_1
643	Ig Secondary	M_ME_NB_1
644	Ig Nominal	M_ME_NB_1
645	Izps Nominal	M_ME_NB_1
646	Ipps Nominal	M_ME_NB_1
647	Inps Nominal	M_ME_NB_1
651	Active Power A	M_ME_NB_1
652	Active Power B	M_ME_NB_1
653	Active Power C	M_ME_NB_1
654	P (3P)	M_ME_NB_1
655	Reactive Power A	M_ME_NB_1
656	Reactive Power B	M_ME_NB_1
657	Reactive Power C	M_ME_NB_1
658	Q (3P)	M_ME_NB_1
659	Apparent Power A	M_ME_NB_1
660	Apparent Power B	M_ME_NB_1
661	Apparent Power C	M_ME_NB_1
662	S (3P)	M_ME_NB_1
663	Power Factor A	M_ME_NB_1
664	Power Factor B	M_ME_NB_1
665	Power Factor C	M_ME_NB_1
666	Power Factor(3P)	M_ME_NB_1
667	Act Energy Exp	M_ME_NB_1
668	Act Energy Imp	M_ME_NB_1

IOA	Description	Default Type
669	React Energy Exp	M_ME_NB_1
670	React Energy Imp	M_ME_NB_1
671	Thermal Status Ph A	M_ME_NB_1
672	Thermal Status Ph B	M_ME_NB_1
673	Thermal Status Ph C	M_ME_NB_1
674	Fault Records	M_IT_TB_1
675	Event Records	M_IT_TB_1
676	Waveform Records	M_IT_TB_1
677	Vab Secondary	M_ME_NB_1
678	Vbc Secondary	M_ME_NB_1
679	Vca Secondary	M_ME_NB_1
680	Vn Primary	M_ME_NB_1
681	Vn Secondary	M_ME_NB_1
683	Vx Primary	M_ME_NB_1
684	Vx Secondary	M_ME_NB_1
686	I Phase A Max	M_ME_NB_1
687	I Phase B Max	M_ME_NB_1
688	I Phase C Max	M_ME_NB_1
689	P 3P Max	M_ME_NB_1
690	Q 3P Max	M_ME_NB_1
691	Ig Max	M_ME_NB_1
692	Isef Max	M_ME_NB_1
693	Isef Primary	M_ME_NB_1
694	Isef Secondary	M_ME_NB_1
695	Isef Nominal	M_ME_NB_1
696	Fault Distance Percent	M_ME_NB_1
697	Fault Reactance	M_ME_NB_1
698	Vy Primary	M_ME_NB_1
699	Vy Secondary	M_ME_NB_1
701	Vz Primary	M_ME_NB_1
702	Vz Secondary	M_ME_NB_1
704	Vxy Primary	M_ME_NB_1
705	Vyz Primary	M_ME_NB_1
706	Vzx Primary	M_ME_NB_1
707	Vxy Secondary	M_ME_NB_1
708	Vyz Secondary	M_ME_NB_1
709	Vzx Secondary	M_ME_NB_1
713	CB Total Trip Count	M_ME_NB_1
714	CB Delta Trip Count	M_ME_NB_1
715	CB Count To AR Block	M_ME_NB_1
716	CB Frequent Ops Count	M_ME_NB_1
717	CB LO Handle Ops	M_ME_NB_1
718	Sag SIARFI Pole1	M_ME_NB_1
719	Sag SMARFI Pole1	M_ME_NB_1
720	Sag STARFI Pole1	M_ME_NB_1
721	Sag SIARFI Pole2	M_ME_NB_1
722	Sag SMARFI Pole2	M_ME_NB_1
723	Sag STARFI Pole2	M_ME_NB_1
724	Sag SIARFI Pole3	M_ME_NB_1
725	Sag SMARFI Pole3	M_ME_NB_1
726	Sag STARFI Pole3	M_ME_NB_1
727	Interrupt Pole1	M_ME_NB_1
728	Interrupt Pole2	M_ME_NB_1
729	Interrupt Pole3	M_ME_NB_1
730	Swell SIARFI Pole1	M_ME_NB_1

IOA	Description	Default Type
731	Swell SMARFI Pole1	M_ME_NB_1
732	Swell STARFI Pole1	M_ME_NB_1
733	Swell SIARFI Pole2	M_ME_NB_1
734	Swell SMARFI Pole2	M_ME_NB_1
735	Swell STARFI Pole2	M_ME_NB_1
736	Swell SIARFI Pole3	M_ME_NB_1
737	Swell SMARFI Pole3	M_ME_NB_1
738	Swell STARFI Pole3	M_ME_NB_1
739	Bus Freq	M_ME_NB_1
740	Phase Diff	M_ME_NB_1
741	Slip Freq	M_ME_NB_1
742	Voltage Diff	M_ME_NB_1
743	Ia Last Trip	M_ME_NB_1
744	Ib Last Trip	M_ME_NB_1
745	Ic Last Trip	M_ME_NB_1
746	Va Last Trip	M_ME_NB_1
747	Vb Last Trip	M_ME_NB_1
748	Vc Last Trip	M_ME_NB_1
749	In Last Trip	M_ME_NB_1
750	Ig Last Trip	M_ME_NB_1
751	Isef Last Trip	M_ME_NB_1
801	Binary Inputs 1-8	M_BO_TB_1
802	Binary Inputs 9-16	M_BO_TB_1
803	Binary Inputs 17-24	M_BO_TB_1
804	Binary Inputs 25-32	M_BO_TB_1
805	Binary Outputs 1-8	M_BO_TB_1
806	Binary Outputs 9-16	M_BO_TB_1
807	Binary Outputs 17-24	M_BO_TB_1
808	Binary Outputs 25-32	M_BO_TB_1

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