

MSCDN – MP2A

Capacitor unbalance protection

Document Release History

This document is issue 2010/02. The list of revisions up to and including this issue is:
Pre release

2010/02	Document reformat due to rebrand
05/02/2003	R5 Status inputs can now reset the Thermal elements to accelerate testing
27/01/2003	R4 Thermal time constant range corrected, 1 second is minimum step
08/01/2003	R3 Allowed for up to 27 SI and 29 OR in various tables Inhibits added to tables and diagrams
26/11/2002	R2 Thermal time ranges now in seconds Thermal setting range reduced Open circuit time range reduced R1, R2 open circuit separately identified now Metering text corrected Reylogic Diagrams updated Event tables updated
23/10/2002	R1 Revision history added

Software Revision History

26/02/2006	2621H80002R9	
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1 MSCDN-MP2A Relay Setting List

1.1 System Config Menu

Description	Range	Default	Setting
Active Group <i>Selects which settings group is currently activated</i>	1,2...4	1	
View/Edit Group <i>Selects which settings group is currently being displayed</i>	1,2...4	1	
Default Screens Timer <i>Selects the time delay after which, if no key presses have been detected, the relay will begin to poll through any screens which have been selected as default instruments screens</i>	OFF, 1,2,5,10,15,30,60 min	60 min	
Backlight timer <i>Controls when the LCD backlight turns off</i>	OFF, 1,2,5,10,15,30,60 min	5 Min	
Date	Date	1/1/1980	
Time	Time	00:00:00	
Clock Sync. From Status <i>Real time clock may be synchronised using a status input (See Clock Sync. in Status Input Menu)</i>	Disabled, Seconds, Minutes	Minutes	
Operating Mode <i>To allow access to change configuration files using Reylogic Toolbox the relay must be placed Out Of Service.</i>	Local, Remote, Local Or Remote, Out Of Service	Local Or Remote	
Change Password <i>Allows a 4 character alpha code to be entered as the password. Note that the display shows a password dependant encrypted code on the second line of the display</i>	AAAA...ZZZZ	"NONE" displayed as "NOT ACTIVE"	
Relay Identifier <i>An alphanumeric string shown on the LCD normally used to identify the circuit the relay is attached to or the relays purpose</i>	Up to 16 characters	MSCDN-MP2A	

1.2 CT/VT Config Menu

Description	Range	Default	Setting
R1 Input <i>Selects whether 1 or 5 Amp terminals are being used for resistor 1</i>	1,5 A	1 A	
R1 CT Ratio <i>Resistor R1 CT ratio to scale primary current instruments</i>	1:0.2...5000:7	2000:1	
R2 Input <i>Selects whether 1 or 5 Amp terminals are being used for resistor 2</i>	1,5 A	1 A	
R2 CT Ratio <i>Resistor R2 CT ratio to scale primary current instruments</i>	1:0.2...5000:7	2000:1	

1.3 Thermal Menu

Description	Range	Default	Setting
Gn R1 49 Thermal Overload <i>Selects whether the thermal overload protection element is enabled for Resistor R1</i>	Disabled, Enabled	Disabled	
Gn R1 49 Overload Setting <i>Pickup level</i>	0.1,0.11...3 xIn	1.05 xIn	
Gn R1 49 Time Constant <i>Thermal time constant</i>	1, 2...10000 s	10 s	
Gn R1 49 Capacity Alarm <i>Selects whether thermal capacity alarm enabled</i>	Disabled, 50,51...100 %	Disabled	
R1 49 Reset Therm State <i>Control that allows thermal state to be manually reset</i>	NO, YES	NO	
Gn R2 49 Thermal Overload <i>Selects whether the thermal overload protection element is enabled for Resistor R2</i>	Disabled, Enabled	Disabled	
Gn R2 49 Overload Setting <i>Pickup level</i>	0.1,0.11...3 xIn	1.05 xIn	
Gn R2 49 Time Constant <i>Thermal time constant</i>	1, 2...10000 s	10 s	
Gn R2 49 Capacity Alarm <i>Selects whether thermal capacity alarm enabled</i>	Disabled, 50,51...100 %	Disabled	
R2 49 Reset Therm State <i>Control that allows thermal state to be manually reset</i>	NO, YES	NO	

1.4 Open Circuit Menu

Description	Range	Default	Setting
Gn 50 OC <i>Selects whether the DTL Resistor Open Circuit Overcurrent element is enabled</i>	Disabled, Enabled	Disabled	
Gn 50 Setting <i>Pickup level</i>	0.01, 0.02...25 xIn	0.1 xIn	
Gn 50 Delay <i>Pickup delay</i>	0,0.01...10000 s	0.00	

1.5 Status Input Menu

Description	Range	Default	Setting
Aux I/P 1 Pickup Delay <i>Delay on pickup of DC Status input 1</i>	0.000,0.005...864000 s	0 s	
Aux I/P 2 Pickup Delay	0.000,0.005...864000 s	0 s	
Aux I/P 3 Pickup Delay	0.000,0.005...864000 s	0 s	
Aux I/P 4 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 5 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 6 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 7 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 8 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 9 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 10 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 11 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 12 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 13 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 14 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 15 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 16 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 17 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 18 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 19 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 20 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 21 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 22 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 23 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 24 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 25 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 26 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
Aux I/P 27 Pickup Delay ¹	0.000,0.005...864000 s	0 s	
R1 49 Inhibit <i>Selects which inputs inhibit the R1 49 element</i>	NONE, 1...27 ²	NONE	
R1 49 Reset <i>Selects which inputs reset the R1 49 element (useful during testing)</i>	NONE, 1...27 ²	NONE	
R2 49 Inhibit <i>Selects which inputs inhibit the R2 49 element</i>	NONE, 1...27 ²	NONE	
R2 49 Reset <i>Selects which inputs reset the R2 49 element (useful during testing)</i>	NONE, 1...27 ²	NONE	
50 OC Inhibit <i>Selects which inputs inhibit the 50 OC element</i>	NONE, 1...27 ²	NONE	
Trip Circuit Fail <i>Selects which inputs are monitoring trip circuits, inputs should normally also be selected as Inverted Inputs (see below)</i>	NONE, 1...27 ²	NONE	
Trigger Storage <i>Selects which inputs can trigger a waveform record</i>	NONE, 1...27 ²	NONE	
Clock Sync. <i>Selects which input is used to synchronise the real time clock</i>	NONE, 1...27 ²	NONE	
Inverted Inputs <i>Selects which inputs pickup when voltage is removed, often used when monitoring trip circuits.</i>	NONE, 1...27 ²	NONE	

1) Only when fitted.

2) 27 status inputs represents maximum configuration.

1.6 Reylogic Control Menu

Description	Range	Default	Setting
General Logic <i>Selects whether the logic diagram is enabled, if disabled then no outputs will be driven.</i>	Enable, Disable	Enable	

1.7 Reylogic Element Menu

Description	Range	Default	Setting
Trip Cct Pickup Delay	0,1...60000 ms	400 ms	

1.8 Output Relay Menu

Description	Range	Default	Setting
R1 49 Alarm <i>Resistor 1 Thermal capacity alarm operated</i>	NONE, 1...29 ¹	2	
R1 49 Trip <i>Resistor 1 Thermal capacity trip operated</i>	NONE, 1...29 ¹	4,5	
R2 49 Alarm <i>Resistor 2 Thermal capacity alarm operated</i>	NONE, 1...29 ¹	2	
R2 49 Trip <i>Resistor 2 Thermal capacity trip operated</i>	NONE, 1...29 ¹	4,5	
R1 50 <i>Resistor 1 Open Circuit DTL Overcurrent operated</i>	NONE, 1...29 ¹	3	
R2 50 <i>Resistor 2 Open Circuit DTL Overcurrent operated</i>	NONE, 1...29 ¹	3	
Phase A <i>A phase A element operated</i>	NONE, 1...29 ¹	NONE	
Phase B <i>A phase B element operated</i>	NONE, 1...29 ¹	NONE	
Phase C <i>A phase C element operated</i>	NONE, 1...29 ¹	NONE	
General Starter <i>A starter element is picked up</i>	NONE, 1...29 ¹	NONE	
General Trip <i>An element has operated. Useful when testing individual functions!</i>	NONE, 1...29 ¹	NONE	
Trip Circuit Fail <i>A trip circuit has failed, look at status input Leds to find out which one</i>	NONE, 1...29 ¹	NONE	
New Data Stored <i>The waveform recorder has stored new information Note: this is a pulsed output</i>	NONE, 1...29 ¹	NONE	
Aux I/P 1 Operated <i>DC Status 1 has operated</i>	NONE, 1...29 ¹	NONE	
Aux I/P 2 Operated	NONE, 1...29 ¹	NONE	
Aux I/P 3 Operated	NONE, 1...29 ¹	NONE	
Aux I/P 4 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 5 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 6 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 7 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 8 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 9 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 10 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 11 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 12 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 13 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 14 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 15 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 16 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 17 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 18 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 19 Operated ²	NONE, 1...29 ¹	NONE	

Description	Range	Default	Setting
Aux I/P 20 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 21 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 22 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 23 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 24 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 25 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 26 Operated ²	NONE, 1...29 ¹	NONE	
Aux I/P 27 Operated ²	NONE, 1...29 ¹	NONE	
Hand Reset Outputs <i>Relays selected, as Hand Reset will remain latched until manually reset from front panel or via communications link or by removing DC Supply. By default relays are Self Resetting and will reset when the driving signal is removed.</i>	NONE, 1...29 ¹	NONE	
Protection Healthy <i>Relays selected are energised whilst relay self-monitoring does NOT detect any hardware or software errors and DC Supply is healthy. A changeover contact or normally closed contact may be used to generate Protection Defective from this output</i>	NONE, 1...29 ¹	1	

1) 29 output relays represents maximum configuration.

2) Only when fitted.

1.9 LED Menu

Description	Range	Default	Setting
R1 49 Alarm <i>Resistor 1 Thermal capacity alarm operated</i>	NONE, 1...32	5, 17	
R1 49 Trip <i>Resistor 1 Thermal capacity trip operated</i>	NONE, 1...32	5, 18	
R2 49 Alarm <i>Resistor 2 Thermal capacity alarm operated</i>	NONE, 1...32	6, 17	
R2 49 Trip <i>Resistor 2 Thermal capacity trip operated</i>	NONE, 1...32	6, 18	
R1 50 <i>Resistor 1 Open Circuit DTL Overcurrent operated</i>	NONE, 1...32	5, 19	
R2 50 <i>Resistor 1 Open Circuit DTL Overcurrent operated</i>	NONE, 1...32	6, 19	
Phase A <i>A phase A element operated</i>	NONE, 1...32	2	
Phase B <i>A phase B element operated</i>	NONE, 1...32	3	
Phase C <i>A phase C element operated</i>	NONE, 1...32	4	
General Starter <i>A starter element is picked up</i>	NONE, 1...32	1	
General Trip <i>An element has operated. Useful when testing individual functions!</i>	NONE, 1...32	1	
Trip Circuit Fail <i>A trip circuit has failed, look at status input Leds to find out which one</i>	NONE, 1...32	20	
New Data Stored <i>The waveform recorder has stored new information Note: this is a pulsed output</i>	NONE, 1...32	NONE	
Aux I/P 1 Operated <i>DC Status 1 has operated</i>	NONE, 1...32	9	
Aux I/P 2 Operated	NONE, 1...32	10	
Aux I/P 3 Operated	NONE, 1...32	11	
Aux I/P 4 Operated ¹	NONE, 1...32	12	
Aux I/P 5 Operated ¹	NONE, 1...32	13	
Aux I/P 6 Operated ¹	NONE, 1...32	14	
Aux I/P 7 Operated ¹	NONE, 1...32	15	
Aux I/P 8 Operated ¹	NONE, 1...32	16	
Aux I/P 9 Operated ¹	NONE, 1...32	25	
Aux I/P 10 Operated ¹	NONE, 1...32	26	
Aux I/P 11 Operated ¹	NONE, 1...32	27	
Aux I/P 12 Operated ¹	NONE, 1...32	NONE	

Description	Range	Default	Setting
Aux I/P 13 Operated ¹	NONE, 1...32	NONE	
Aux I/P 14 Operated ¹	NONE, 1...32	NONE	
Aux I/P 15 Operated ¹	NONE, 1...32	NONE	
Aux I/P 16 Operated ¹	NONE, 1...32	NONE	
Aux I/P 17 Operated ¹	NONE, 1...32	NONE	
Aux I/P 18 Operated ¹	NONE, 1...32	NONE	
Aux I/P 19 Operated ¹	NONE, 1...32	NONE	
Aux I/P 20 Operated ¹	NONE, 1...32	NONE	
Aux I/P 21 Operated ¹	NONE, 1...32	NONE	
Aux I/P 22 Operated ¹	NONE, 1...32	NONE	
Aux I/P 23 Operated ¹	NONE, 1...32	NONE	
Aux I/P 24 Operated ¹	NONE, 1...32	NONE	
Aux I/P 25 Operated ¹	NONE, 1...32	NONE	
Aux I/P 26 Operated ¹	NONE, 1...32	NONE	
Aux I/P 27 Operated ¹	NONE, 1...32	NONE	
Self Reset LEDs <i>LEDs selected, as Self Reset will automatically reset when the driving signal is removed. By default all LEDs are Hand Reset and must be manually reset either locally via the front fascia or remotely via communications.</i>	NONE, 1...32	1	

1) Only when fitted.

1.10 Data Storage Menu

Description	Range	Default	Setting
Pre-Trigger Storage	10...90 %	20 %	
Data Record Duration <i>Waveform record length may be coordinated with the number of records that may be stored.</i>	4 Rec x 1 Sec, 2 Rec x 2 Sec, 1 Rec x 4 Sec	4 Rec x 1 Sec	

1.11 Communications Menu

Description	Range	Default	Setting
Station Address <i>IEC 60870-5-103 Station Address</i>	0...254	0	
IEC870 On Port <i>Selects which port to use for IEC 60870-5-103 communications</i>	None, Com1, Com2, Auto	Com1	
Line Switch Time <i>When IEC870 On Port is selected to Auto the communications ports are scanned for valid IEC 60870-5-103 communications frames. Once valid frames are detected the com port will remain selected. Subsequently if there are no valid frames received for the Line Switch Time period then the driver will assume the communications circuit has failed and will resume scanning the com ports.</i>	1,2,...60 s	30 s	
Com1 Baud Rate <i>Sets the communications baud rate for com port 1 (Rear upper Fibre optic port)</i>	75, 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	19200	
Com1 Parity <i>Selects whether parity information is used</i>	Even, Odd, None	Even	
Com1 Line Idle <i>Selects the communications line idle sense</i>	Light Off, Light On	Light Off	
Com1 Data Echo <i>Enables echoing of data from RX port to TX port when operating relays in a Fibre Optic ring configuration</i>	Off, On	Off	
Com2 Baud Rate <i>Sets the communications baud rate for com port 2 (Rear lower Fibre optic port AND Front Fascia RS232 port)</i>	75, 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	19200	
Com2 Parity <i>Selects whether parity information is used</i>	Even, Odd, None	None	
Com2 Line Idle <i>Selects the communications line idle sense</i>	Light Off, Light On	Light Off	
Com2 Data Echo <i>Enables echoing of data from RX port to TX port when operating relays in a Fibre Optic ring configuration</i>	Off, On	Off	
Com2 Direction	AUTO-DETECT, FRONT	AUTO-DETECT	

Description	Range	Default	Setting
Selects how Com2 is shared between the front fascia port and the rear fibre optic port. This allows interlocking to prevent remote access whilst an engineer is attached locally on site if IEC870 is on Com2 and Auto-detect is enabled	PORT, REAR PORT		

2 Instruments

INSTRUMENT	DESCRIPTION
[R1 METERS] --> press down <--	Start of resistor 1 meters
R1 Primary Currents 0.0 0.0 0.0 kA	Resistor 1 primary currents
R1 Nom Currents 0.00 0.00 0.00 xIn	Resistor 1 secondary nominal currents
R1 Thermal Status 0.0 0.0 0.0 %	Resistor 1 thermal status
[R2 METERS] --> press down <--	Start of resistor 2 meters
R2 Primary Currents 0.0 0.0 0.0 kA	Resistor 2 primary currents
R2 Nom Currents 0.00 0.00 0.00 xIn	Resistor 2 secondary nominal currents
R2 Thermal Status 0.0 0.0 0.0 %	Resistor 2 thermal status
[OPEN CCT METERS] --> press down <--	Start of resistor open circuit meters
Open Cct Currents 0.00 0.00 0.00 xIn	Resistor open circuit nominal currents
[MISC METERS] --> press down <--	Start of miscellaneous meters
Status Inputs 1-16 ---- - - - -	Displays the state of DC status inputs 1 to 16 ¹
Status Inputs 17-27 ---- - - - -	Displays the state of DC status inputs 17 to 27 ¹
Output Relays 1-16 ---- - - - -	Displays the state of output relays 1 to 16 ²
Output Relays 17-29 ---- - - - - -	Displays the state of output relays 17 to 29 ²
Time & Date 13/08/2002 10:16:11	Time and Date

1) Display is different when fewer status inputs are fitted

2) Display is different when fewer output relays are fitted

3 IEC 60870-5-103 Communications Information

3.1 IEC 60870-5-103 Semantics in monitor direction

FUN	INF	Description	GI	TYP	COT
60	1	IEC870 Active Com1	x	1	1,9
60	2	IEC870 Active Com2	x	1	1,9
60	3	Front Port OverRide	x	1	1,9
60	4	Remote Mode	x	1	1,9
60	5	Service Mode	x	1	1,9
60	6	Local Mode	x	1	1,9
60	7	Local & Remote	x	1	1,9
60	8	Real Time Clock Set	-	1	1
60	9	Real Time Clock Drift Corrected	-	1	1
60	10	Real Time Clock Not Synchronised	-	1	1
60	11	Real Time Clock Synchronised	-	1	1
60	128	Cold Start	-	1	1
60	129	Warm Start	-	1	1
60	130	Re-Start	-	1	1
60	135	Trigger Storage	-	1	1
70	1	Status Input 1	x	1	1,9
70	2	Status Input 2	x	1	1,9
70	3	Status Input 3	x	1	1,9
70	4	Status Input 4	x	1	1,9
70	5	Status Input 5	x	1	1,9
70	6	Status Input 6	x	1	1,9
70	7	Status Input 7	x	1	1,9
70	8	Status Input 8	x	1	1,9
70	9	Status Input 9	x	1	1,9
70	10	Status Input 10	x	1	1,9
70	11	Status Input 11	x	1	1,9
70	12	Status Input 12	x	1	1,9
70	13	Status Input 13	x	1	1,9
70	14	Status Input 14	x	1	1,9
70	15	Status Input 15	x	1	1,9
70	16	Status Input 16	x	1	1,9
70	17	Status Input 17	x	1	1,9
70	18	Status Input 18	x	1	1,9
70	19	Status Input 19	x	1	1,9
70	20	Status Input 20	x	1	1,9
70	21	Status Input 21	x	1	1,9
70	22	Status Input 22	x	1	1,9
70	23	Status Input 23	x	1	1,9
70	24	Status Input 24	x	1	1,9
70	25	Status Input 25	x	1	1,9
70	26	Status Input 26	x	1	1,9
70	27	Status Input 27	x	1	1,9

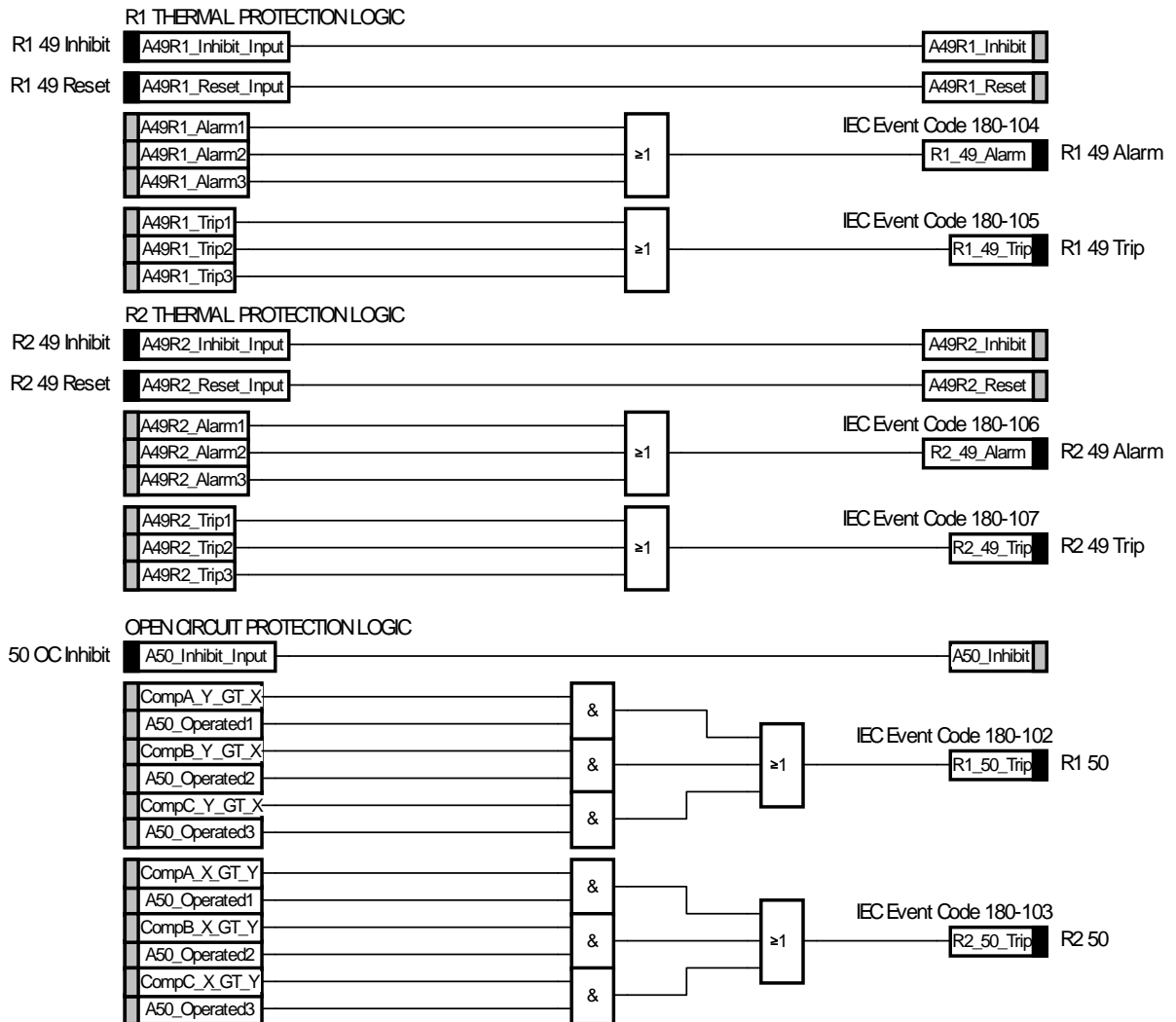
FUN	INF	Description	GI	TYP	COT
80	1	Plant Control Relay 1	x	1	1,9
80	2	Plant Control Relay 2	x	1	1,9
80	3	Plant Control Relay 3	x	1	1,9
80	4	Plant Control Relay 4	x	1	1,9
80	5	Plant Control Relay 5	x	1	1,9
80	6	Plant Control Relay 6	x	1	1,9
80	7	Plant Control Relay 7	x	1	1,9
80	8	Plant Control Relay 8	x	1	1,9
80	9	Plant Control Relay 9	x	1	1,9
80	10	Plant Control Relay 10	x	1	1,9
80	11	Plant Control Relay 11	x	1	1,9
80	12	Plant Control Relay 12	x	1	1,9
80	13	Plant Control Relay 13	x	1	1,9
80	14	Plant Control Relay 14	x	1	1,9
80	15	Plant Control Relay 15	x	1	1,9
80	16	Plant Control Relay 16	x	1	1,9
80	17	Plant Control Relay 17	x	1	1,9
80	18	Plant Control Relay 18	x	1	1,9
80	19	Plant Control Relay 19	x	1	1,9
80	20	Plant Control Relay 20	x	1	1,9
80	21	Plant Control Relay 21	x	1	1,9
80	22	Plant Control Relay 22	x	1	1,9
80	23	Plant Control Relay 23	x	1	1,9
80	24	Plant Control Relay 24	x	1	1,9
80	25	Plant Control Relay 25	x	1	1,9
80	26	Plant Control Relay 26	x	1	1,9
80	27	Plant Control Relay 27	x	1	1,9
80	28	Plant Control Relay 28	x	1	1,9
80	29	Plant Control Relay 29	x	1	1,9
180	0	GI End	-	8	10
180	0	Time Synchronisation	-	6	8
180	2	Reset FCB	-	2	3
180	3	Reset CU	-	2	4
180	4	Start/Restart	-	2	5
180	22	Settings changed	-	1	1
180	23	Setting G1 selected	x	1	1,9
180	24	Setting G2 selected	x	1	1,9
180	25	Setting G3 selected	x	1	1,9
180	26	Setting G4 selected	x	1	1,9
180	36	Trip Circuit Fail	x	1	1,9
180	64	Start/Pick-up L1	x	2	1,9
180	65	Start/Pick-up L2	x	2	1,9
180	66	Start/Pick-up L3	x	2	1,9
180	67	Start/Pick-up N	x	2	1,9
180	68	General Trip	-	2	1
180	69	Trip L1	-	2	1
180	70	Trip L2	-	2	1
180	71	Trip L3	-	2	1

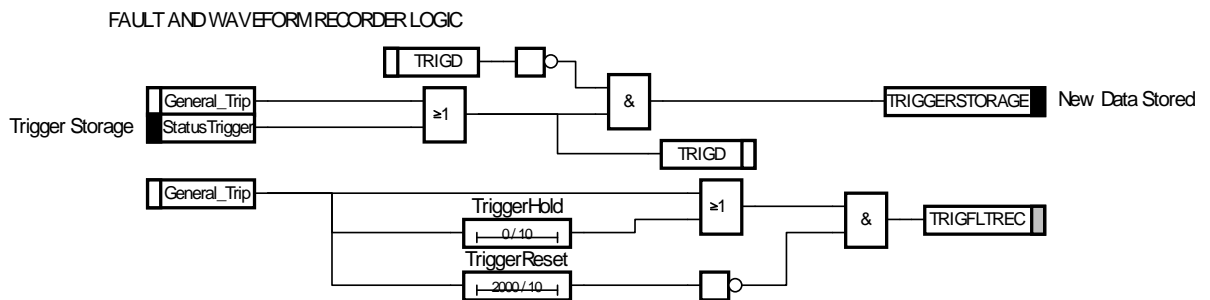
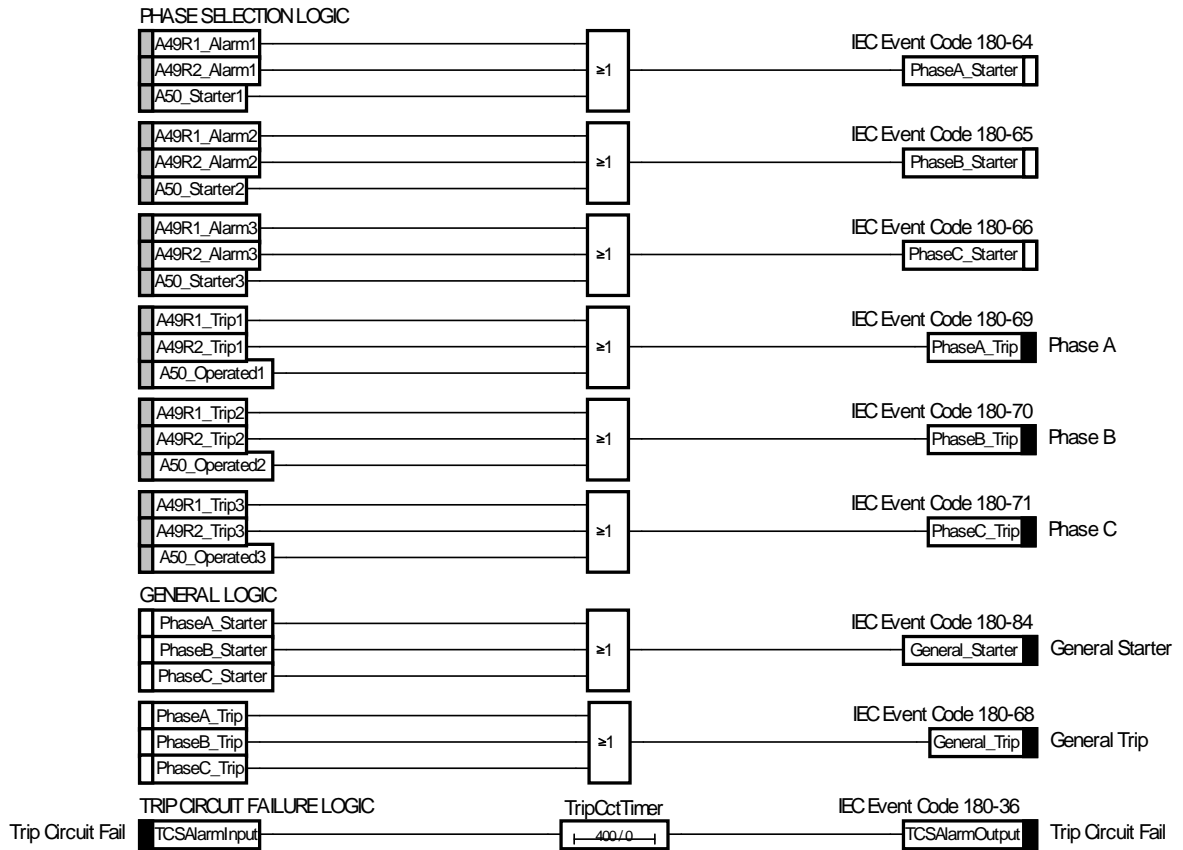
FUN	INF	Description	GI	TYP	COT
180	84	General Start/Pick-up	x	2	1,9
180	90	Trip I >	-	2	1
180	92	Trip In >	-	2	1
180	102	Resistor 1 Open Circuit	-	2	1
180	103	Resistor 2 Open Circuit	-	2	1
180	104	Resistor 1 Thermal Alarm	-	2	1
180	105	Resistor 1 Thermal Trip	-	2	1
180	106	Resistor 2 Thermal Alarm	-	2	1
180	107	Resistor 2 Thermal Trip	-	2	1

3.2 IEC 60870-5-103 Semantics in control direction

FUN	INF	Description	COM	TYP	COT
180	0	GI Initiation		7	9
180	0	Time Synchronisation		6	8
180	19	LED reset	ON	20	20

4 Reylogic Diagrams





5 Label Inserts

	MSCDN-MP2A	MSCDN-MP2A	
	R9	R9	
	Left	Right	
	27/04/2010 15:13:00	27/04/2010 15:13:00	
1	GENERAL STARTER	(49) THERMAL ALARM	17
2	PHASE A	(49) THERMAL TRIP	18
3	PHASE B	(50) RES. OPEN CCT	19
4	PHASE C	TRIP CIRCUIT FAIL	20
5	R1		21
6	R2		22
7			23
8			24
9	<i>AUX 1 I/P OPERATED</i>	<i>AUX 9 I/P OPERATED</i>	25
10	<i>AUX 2 I/P OPERATED</i>	<i>AUX 10 I/P OPERATED</i>	26
11	<i>AUX 3 I/P OPERATED</i>	<i>AUX 11 I/P OPERATED</i>	27
12	<i>AUX 4 I/P OPERATED</i>		28
13	<i>AUX 5 I/P OPERATED</i>		29
14	<i>AUX 6 I/P OPERATED</i>		30
15	<i>AUX 7 I/P OPERATED</i>		31
16	<i>AUX 8 I/P OPERATED</i>		32