7SG14 Duobias-M

Transformer 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
25/09/2006	R7 Reformatted to match other manual sections
23/09/2004	R6 87 Inhibit and 87HS Inhibit status inputs added Trip Cct Pickup Delay renamed to Trip Cct Fail Pickup delay to clarify its purpose.
07/05/2004	R5 Updated to Rev 12 firmware
17/03/2003	R4 Front labels colour coded and cat. no.s added
12/03/2003	R3 Corrected MENU Titles Overcurrent and E/F defaults modified
11/03/2003	R2 Overcurrent Element inhibits added
06/03/2003	R1 Revision history added W2 and W3 have been made identical to Winding 1 configuration so that 2 stage overcurrent and earth fault is available to all windings

Software Revision History

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1 Introduction

This relay settings section covers the following Duobias-M models:-

Model No	Cat No	Configuration No
Duobias-M-205-2W-E8-50Hz	DU3-202-*A-50	2661H80018R12a
Duobias-M-205-2W-STD-50Hz	DU3-202-**-50	2661H80028R12
Duobias-M-205-3W-STD-50Hz	DU3-302-**-50	2661H80027R12

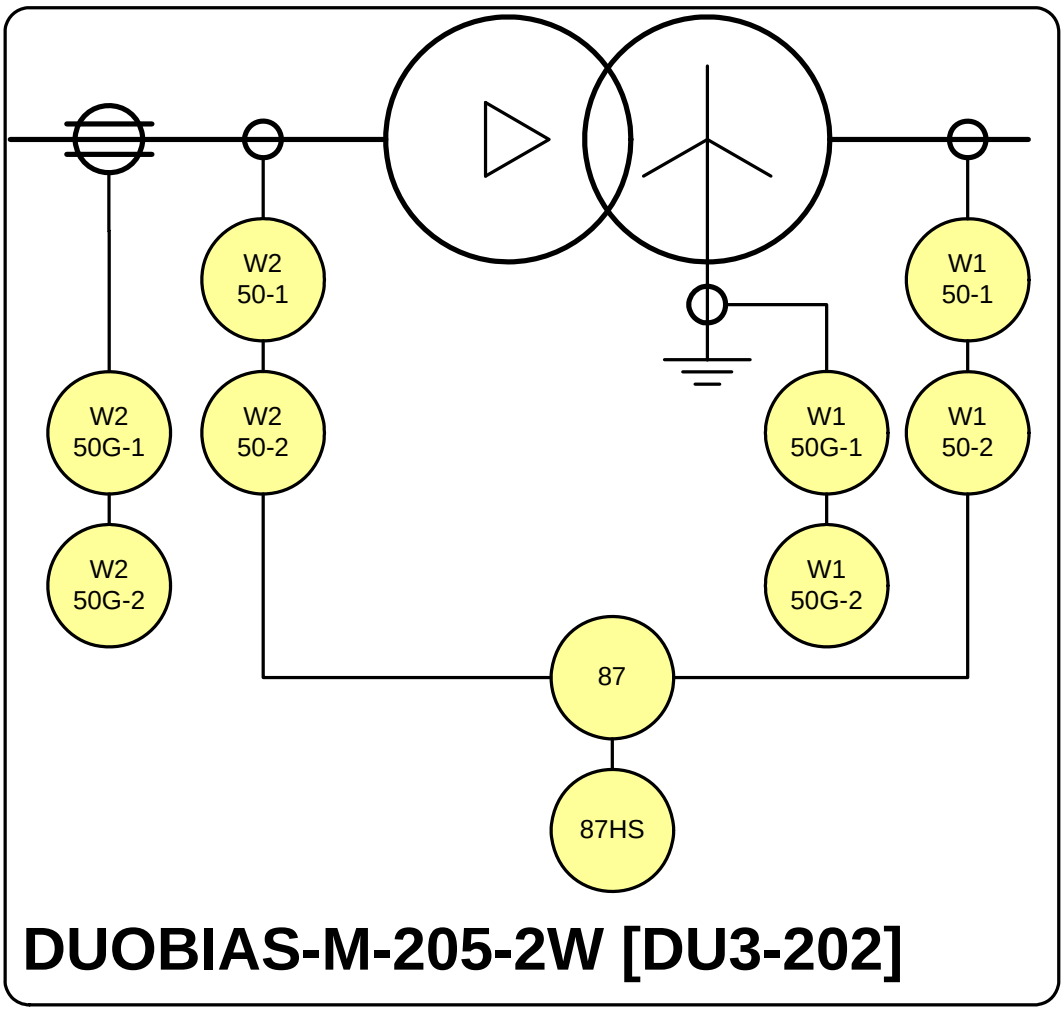

Figure 1 - Duobias-M-205-2W [DU3-202]

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2 DUOBIAS-M-205-2W/3w Relay Setting List

2.1 System Config Menu

Description	Range	Default	Setting
Active Group *Selects which settings group is currently activated*	1,2…4	1	
View/Edit Group *Selects which settings group is currently being displayed*	1,2…4	1	
Default Screens Timer *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*	OFF, 1,2,5,10,15,30,60 min	60 min	
Backlight timer *Controls when the LCD backlight turns off*	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 *Real time clock may be synchronised using a status input (See Clock Sync. in Status Input Menu)*	Disabled, Seconds,Minutes	Minutes	
Operating Mode *To allow access to change configuration files using Reylogic Toolbox the relay must be placed Out Of Service.*	Local, Remote, Local Or Remote, Out Of Service	Local Or Remote	
Change Password *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*	AAAA…ZZZZ	“NONE” displayed as “NOT ACTIVE”	
Relay Identifier *An alphanumeric string shown on the LCD normally used to identifier the circuit the relay is attached to or the relays purpose*	Up to 16 characters	DUOBIAS-M-205-nW	

2.2 CT/VT Config Menu

Description	Range	Default	Setting
W1 Input *Selects whether 1 or 5 Amp terminals are being used for winding 1*	1,5 A	1 A	
W1 CT Ratio *Winding 1 CT ratio to scale primary current instruments*	5:0.2…5000:7	2000:1	
W1 EF Input *Selects whether 1 or 5 Amp terminals are being used for winding 1 EF*	1,5 A	1 A	
W1 EF CT Ratio *Winding 1 EF CT ratio to scale primary current instruments*	5:0.2…5000:7	2000:1	
W2 Input *Selects whether 1 or 5 Amp terminals are being used for winding 2*	1,5 A	1 A	
W2 CT Ratio *Winding 2 CT ratio to scale primary current instruments*	5:0.2…5000:7	2000:1	
W2 EF Input	1,5 A	1 A	

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Description	Range	Default	Setting
Selects whether 1 or 5 Amp terminals are being used for winding 2 EF			
W2 EF CT Ratio *Winding 2 EF CT ratio to scale primary current instruments*	5:0.2…5000:7	2000:1	
W3 Input *Selects whether 1 or 5 Amp terminals are being used for winding 3*	1,5 A	1 A	
W3 CT Ratio *Winding 3 CT ratio to scale primary current instruments*	5:0.2…5000:7	2000:1	
W3 EF Input *Selects whether 1 or 5 Amp terminals are being used for winding 3 EF*	1,5 A	1 A	
W3 EF CT Ratio *Winding 3 EF CT ratio to scale primary current instruments*	5:0.2…5000:7	2000:1	

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2.3 Biased Differential Menu

Description	Range	Default	Setting
W1 Interposing CT Multiplier *Winding 1 scaling factor*	0.25,0.26…3.00 x	1.00 x	
W1 Interposing CT Connection *Winding 1 transformer vector group compensation and/or zero sequence filtering*	Yy0, Yd1, Yy2, Yd3, Yy4, Yd5, Yy6, Yd7, Yy8, Yd9, Yy10, Yd11, Ydy0	Yy0, 0°	
W2 Interposing CT Multiplier *Winding 2 scaling factor*	0.25,0.26…3.00 x	1.00 x	
W2 Interposing CT Connection *Winding 2 transformer vector group compensation and/or zero sequence filtering*	Yy0, Yd1, Yy2, Yd3, Yy4, Yd5, Yy6, Yd7, Yy8, Yd9, Yy10, Yd11, Ydy0	Yy0, 0°	
W3 Interposing CT Multiplier *Winding 3 scaling factor*	0.25,0.26…3.00 x	1.00 x	
W3 Interposing CT Connection *Winding 3 transformer vector group compensation and/or zero sequence filtering*	Yy0, Yd1, Yy2, Yd3, Yy4, Yd5, Yy6, Yd7, Yy8, Yd9, Yy10, Yd11, Ydy0	Yy0, 0°	
87 Inrush Inhibit *Selects whether the biased differential characteristic is inhibited from operating when magnetising inrush is detected*	Disabled, Enabled	Enabled	
87 Inrush Bias *Selects the bias method used for magnetising inrush* *Phase – Segregated, each phase blocks itself.* *Cross – Blocked, each phase can block the operation of other phases (Modular 1 method).* *Sum - Of Squares, each phase blocks itself using the square root of the sum of squares of the even harmonics.(Improves SOTF performance when REF not applied).*	Phase, Cross, Sum	Cross	
87 Inrush Setting *The magnetising inrush detector operates when the even harmonics in the differential operate current exceed a set percentage of the differential operate current*	0.1,0.11…0.50 xId	0.20 xId	
87 Bias Differential *Selects whether the transformer differential protection element is enabled*	Disabled, Enabled	Enabled	
87 Initial Setting *The initial unbiased pickup level*	0.1,0.15…2.00 xIn	0.2 xIn	
87 Bias Slope *The bias slope varies the pickup level to compensates for CT measuring errors and tap changer not mid tap errors as the through current (bias) increases*	0,0.05…0.7 x	0.2 x	
87 Bias Slope Limit *At this point in the characteristics the bias slope increases tot provide increased security when additional measuring errors are introduced due to CT saturation effects.*	1,2…20 xIn	4 xIn	
87 Delay *The operation of the differential may be delayed to cater for special system conditions e.g. for use on cable circuits a delay of 5ms is recommended*	0,0.005…1 s	0.005 s	
87HS Differential Highset	Disabled, Enabled	Disabled	

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Description	Range	Default	Setting
Selects whether the differential Highset element is enabled. Note this element is never blocked by magnetising inrush			
87HS Setting *the differential setting pickup setting*	1,2…30 xIn	4 xIn	
87HS Delay *the operation of the differential may be delayed to cater for special system conditions e.g. for use on cable circuits a delay of 5ms is recommended*	0,0.005…1 s	0.005 s	

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2.4 Winding 1 Menu

Description	Range	Default	Setting
G*n* W1 50-1 Element *Selects whether the winding 1 INST/DTL Stage 1 Overcurrent element is enabled*	Disabled, Enabled	Disabled	
G*n* W1 50-1 Setting *Pickup level*	0.01, 0.02…25 xIn	1 xIn	
G*n* W1 50-1 Delay *Pickup delay*	0,0.01…864000 s	1	
G*n* W1 50-2 Element *Selects whether the winding 1 INST/DTL Stage 2 Overcurrent element is enabled*	Disabled, Enabled	Disabled	
G*n* W1 50-2 Setting *Pickup level*	0.01, 0.02…25 xIn	4 xIn	
G*n* W1 50-2 Delay *Pickup delay*	0,0.01…864000 s	0.1	
G*n* W1 50G-1 Element *Selects whether the winding 1 INST/DTL Stage 1 Earth fault element is enabled*	Disabled, Enabled	Disabled	
G*n* W1 50G-1 Setting *Pickup level*	0.25, 0.26…25 xIn	1 xIn	
G*n* W1 50G-1 Delay *Pickup delay*	0,0.01…864000 s	1	
G*n* W1 50G-2 Element *Selects whether the winding 1 INST/DTL Stage 2 Earth fault element is enabled*	Disabled, Enabled	Disabled	
G*n* W1 50G-2 Setting *Pickup level*	0.25, 0.26…25 xIn	4 xIn	
G*n* W1 50G-2 Delay *Pickup delay*	0,0.01…864000 s	0.1	

2.5 Winding 2 Menu

Description	Range	Default	Setting
G*n* W2 50-1 Element *Selects whether the winding 2 INST/DTL Stage 1 Overcurrent element is enabled*	Disabled, Enabled	Disabled	
G*n* W2 50-1 Setting *Pickup level*	0.01, 0.02…25 xIn	1 xIn	
G*n* W2 50-1 Delay *Pickup delay*	0,0.01…864000 s	1	
G*n* W2 50-2 Element *Selects whether the winding 2 INST/DTL Stage 2 Overcurrent element is enabled*	Disabled, Enabled	Disabled	
G*n* W2 50-2 Setting *Pickup level*	0.01, 0.02…25 xIn	4 xIn	
G*n* W2 50-2 Delay *Pickup delay*	0,0.01…864000 s	0.1	
G*n* W2 50G-1 Element *Selects whether the winding 2 INST/DTL Stage 1 Earth fault element is enabled*	Disabled, Enabled	Disabled	
G*n* W2 50G-1 Setting *Pickup level*	0.25, 0.26…25 xIn	1 xIn	
G*n* W2 50G-1 Delay *Pickup delay*	0,0.01…864000 s	1	
G*n* W2 50G-2 Element *Selects whether the winding 2 INST/DTL Stage 2 Earth fault element is enabled*	Disabled, Enabled	Disabled	
G*n* W2 50G-2 Setting *Pickup level*	0.25, 0.26…25 xIn	4 xIn	
G*n* W2 50G-2 Delay *Pickup delay*	0,0.01…864000 s	0.1	

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2.6 Winding 3 Menu

Description	Range	Default	Setting
G*n* W3 50-1 Element *Selects whether the winding 3 INST/DTL Stage 1 Overcurrent element is enabled*	Disabled, Enabled	Disabled	
G*n* W3 50-1 Setting *Pickup level*	0.01, 0.02…25 xIn	1 xIn	
G*n* W3 50-1 Delay *Pickup delay*	0,0.01…864000 s	1	
G*n* W3 50-2 Element *Selects whether the winding 3 INST/DTL Stage 2 Overcurrent element is enabled*	Disabled, Enabled	Disabled	
G*n* W3 50-2 Setting *Pickup level*	0.01, 0.02…25 xIn	4 xIn	
G*n* W3 50-2 Delay *Pickup delay*	0,0.01…864000 s	0.1	
G*n* W3 50G-1 Element *Selects whether the winding 3 INST/DTL Stage 1 Earth fault element is enabled*	Disabled, Enabled	Disabled	
G*n* W3 50G-1 Setting *Pickup level*	0.25, 0.26…25 xIn	1 xIn	
G*n* W3 50G-1 Delay *Pickup delay*	0,0.01…864000 s	1	
G*n* W3 50G-2 Element *Selects whether the winding 3 INST/DTL Stage 2 Earth fault element is enabled*	Disabled, Enabled	Disabled	
G*n* W3 50G-2 Setting *Pickup level*	0.25, 0.26…25 xIn	4 xIn	
G*n* W3 50G-2 Delay *Pickup delay*	0,0.01…864000 s	0.1	

2.7 Status Input Menu

Description	Range	Default	Setting
Aux I/P 1 Pickup Delay *Delay on pickup of DC Status input 1*	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	
Inhibit 87	NONE, 1…27[2]	NONE	

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Description	Range	Default	Setting
Selects which inputs inhibit the 87 element			
Inhibit 87HS *Selects which inputs inhibit the 87HS element*	NONE, 1…27[2]	NONE	
Inhibit W1 50-1 *Selects which inputs inhibit the W1 50-1 element*	NONE, 1…27[2]	NONE	
Inhibit W1 50-2 *Selects which inputs inhibit the W1 50-2 element*	NONE, 1…27[2]	NONE	
Inhibit W1 50G-1 *Selects which inputs inhibit the W1 50G-1 element*	NONE, 1…27[2]	NONE	
Inhibit W1 50G-2 *Selects which inputs inhibit the W1 50G-2 element*	NONE, 1…27[2]	NONE	
Inhibit W2 50-1 *Selects which inputs inhibit the W2 50-1 element*	NONE, 1…27[2]	NONE	
Inhibit W2 50-2 *Selects which inputs inhibit the W2 50-2 element*	NONE, 1…27[2]	NONE	
Inhibit W2 50G-1 *Selects which inputs inhibit the W2 50G-1 element*	NONE, 1…27[2]	NONE	
Inhibit W2 50G-2 *Selects which inputs inhibit the W2 50G-2 element*	NONE, 1…27[2]	NONE	
Inhibit W3 50-1 *Selects which inputs inhibit the W3 50-1 element*	NONE, 1…27[2]	NONE	
Inhibit W3 50-2 *Selects which inputs inhibit the W3 50-2 element*	NONE, 1…27[2]	NONE	
Inhibit W3 50G-1 *Selects which inputs inhibit the W3 50G-1 element*	NONE, 1…27[2]	NONE	
Inhibit W3 50G-2 *Selects which inputs inhibit the W3 50G-2 element*	NONE, 1…27[2]	NONE	
Trip Circuit Fail *Selects which inputs are monitoring trip circuits, inputs should normally also be selected as Inverted Inputs (see below)*	NONE, 1…27[2]	NONE	
Trigger Storage *Selects which inputs can trigger a waveform record*	NONE, 1…27[2]	NONE	
Clock Sync. *Selects which input is used to synchronise the real time clock*	NONE, 1…27[2]	NONE	
Inverted Inputs *Selects which inputs pickup when voltage is removed, often used when monitoring trip circuits.*	NONE, 1…27[2]	NONE	

1) Only when fitted.

2) 27 status inputs represents maximum configuration.

2.8 Reylogic Control Menu

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

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2.9 Reylogic Element Menu

Description	Range	Default	Setting
Inhibit 87 Drop Off Delay *Delay before inhibit is removed from 87 element after Inhibit 87 is de-energised.*	0,1…60000 ms	10 ms	
Inhibit 87HS Drop Off Delay *Delay before inhibit is removed from 87HS element after Inhibit 87HS is de-energised.*	0,1…60000 ms	10 ms	
Trip Cct Fail Pickup Delay *Delay before trip circuit failure picks up. Used in conjunction with STATUS INPUT MENU/Trip Circuit Fail setting to configure how many trip circuits are being monitored.*	0,1…60000 ms	400 ms	

2.10 Output Relay Menu

Description	Range	Default	Setting
87 *Biased Differential operated*	NONE, 1…29[1]	4,5	
87HS *Differential Highset operated*	NONE, 1…29[1]	4,5	
W1 50-1 *Winding 1 INST/DTL Stage 1 Overcurrent operated*	NONE, 1…29[1]	4,5	
W1 50-2 *Winding 1 INST/DTL Stage 2 Overcurrent operated*	NONE, 1…29[1]	4,5	
W1 50G-1 *Winding 1 INST/DTL Stage 1Earth Fault operated*	NONE, 1…29[1]	4,5	
W1 50G-2 *Winding 1 INST/DTL Stage 2Earth Fault operated*	NONE, 1…29[1]	4,5	
W2 50-1 *Winding 2 INST/DTL Stage 1 Overcurrent operated*	NONE, 1…29[1]	4,5	
W2 50-2 *Winding 2 INST/DTL Stage 2 Overcurrent operated*	NONE, 1…29[1]	4,5	
W2 50G-1 *Winding 2 INST/DTL Stage 1Earth Fault operated*	NONE, 1…29[1]	4,5	
W2 50G-2 *Winding 2 INST/DTL Stage 2Earth Fault operated*	NONE, 1…29[1]	4,5	
W3 50-1 *Winding 3 INST/DTL Stage 1 Overcurrent operated*	NONE, 1…29[1]	4,5	
W3 50-2 *Winding 3 INST/DTL Stage 2 Overcurrent operated*	NONE, 1…29[1]	4,5	
W3 50G-1 *Winding 3 INST/DTL Stage 1Earth Fault operated*	NONE, 1…29[1]	4,5	
W3 50G-2 *Winding 3 INST/DTL Stage 2Earth Fault operated*	NONE, 1…29[1]	4,5	
Phase A *A phase A element operated*	NONE, 1…29[1]	NONE	
Phase B *A phase B element operated*	NONE, 1…29[1]	NONE	
Phase C *A phase C element operated*	NONE, 1…29[1]	NONE	

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Description	Range	Default	Setting
General Starter *A starter element is picked up*	NONE, 1…29[1]	NONE	
General Trip *An element has operated. Useful when testing individual functions!*	NONE, 1…29[1]	NONE	
Trip Circuit Fail *A trip circuit has failed, look at status input Leds to find out which one*	NONE, 1…29[1]	NONE	
New Data Stored *The waveform recorder has stored new information Note: this is a pulsed output*	NONE, 1…29[1]	NONE	
Aux I/P 1 Operated *DC Status 1 has operated*	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	
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 *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.*	NONE, 1…29[1]	NONE	
Protection Healthy *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*	NONE, 1…29[1]	1	

1) 29 output relays represents maximum configuration.

2) Only when fitted.

2.11 LED Menu

Description	Range	Default	Setting
87 *Biased Differential operated*	NONE, 1…32	17	
87HS *Differential Highset operated*	NONE, 1…32	18	

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Description	Range	Default	Setting
W1 50-1 *Winding 1 INST/DTL Stage 1 Overcurrent operated*	NONE, 1…32	5,19	
W1 50-2 *Winding 1 INST/DTL Stage 2 Overcurrent operated*	NONE, 1…32	5,20	
W1 50G-1 *Winding 1 INST/DTL Stage 1Earth Fault operated*	NONE, 1…32	5,21	
W1 50G-2 *Winding 1 INST/DTL Stage 2Earth Fault operated*	NONE, 1…32	5,22	
W2 50-1 *Winding 2 INST/DTL Stage 1 Overcurrent operated*	NONE, 1…32	6,19	
W2 50-2 *Winding 2 INST/DTL Stage 2 Overcurrent operated*	NONE, 1…32	6,20	
W2 50G-1 *Winding 2 INST/DTL Stage 1Earth Fault operated*	NONE, 1…32	6,21	
W2 50G-2 *Winding 2 INST/DTL Stage 2Earth Fault operated*	NONE, 1…32	6,22	
W3 50-1 *Winding 3 INST/DTL Stage 1 Overcurrent operated*	NONE, 1…32	7,19	
W3 50-2 *Winding 3 INST/DTL Stage 2 Overcurrent operated*	NONE, 1…32	7,20	
W3 50G-1 *Winding 3 INST/DTL Stage 1Earth Fault operated*	NONE, 1…32	7,21	
W3 50G-2 *Winding 3 INST/DTL Stage 2Earth Fault operated*	NONE, 1…32	7,22	
Phase A *A phase A element operated*	NONE, 1…32	2	
Phase B *A phase B element operated*	NONE, 1…32	3	
Phase C *A phase C element operated*	NONE, 1…32	4	
General Starter *A starter element is picked up. Useful when testing individual functions!*	NONE, 1…32	1	
General Trip *An element has operated. Useful when testing individual functions!*	NONE, 1…32	1	
Trip Circuit Fail *A trip circuit has failed, look at status inputs Leds to find out which one*	NONE, 1…32	23	
New Data Stored *The waveform recorder has stored new information*	NONE, 1…32	NONE	
Aux I/P 1 Operated *DC Status 1 has operated*	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	

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Description	Range	Default	Setting
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	
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 *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.*	NONE, 1…32	1	

1) Only when fitted.

2.12 Data Storage Menu

Description	Range	Default	Setting
Clear Faults	NO, YES	NO	
Clear Events	NO, YES	NO	
Pre-Trigger Storage	10…90 %	20 %	
Data Record Duration[1]	5 Recs x 1 Seconds, 2 Recs x 2 Seconds, 1 Recs x 5 Seconds	5 Recs x 1 Second	
Trigger Waveform	NO, YES	NO	
Clear Waveforms	NO, YES	NO	

2.13 Communications Menu

Description	Range	Default	Setting
Station Address *IEC 60870-5-103 Station Address*	0…254	0	
IEC870 On Port *Selects which port to use for IEC 60870-5-103 communications*	None, Com1, Com2, Auto	Com1	
Line Switch Time *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.*	1,2,…60 s	30 s	
Com1 Baud Rate *Sets the communications baud rate for com port 1 (Rear upper Fibre optic port)*	75, 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	19200	
Com1 Parity *Selects whether parity information is*	Even, Odd, None	Even	

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Description	Range	Default	Setting
used			
Com1 Line Idle *Selects the communications line idle sense*	Light Off, Light On	Light Off	
Com1 Data Echo *Enables echoing of data from RX port to TX port when operating relays in a Fibre Optic ring configuration*	Off, On	Off	
Com2 Baud Rate *Sets the communications baud rate for com port 2 (Rear lower Fibre optic port AND Front Fascia RS232 port)*	75, 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	19200	
Com2 Parity *Selects whether parity information is used*	Even, Odd, None	None	
Com2 Line Idle *Selects the communications line idle sense*	Light Off, Light On	Light Off	
Com2 Data Echo *Enables echoing of data from RX port to TX port when operating relays in a Fibre Optic ring configuration*	Off, On	Off	
Com2 Direction *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*	AUTO-DETECT, FRONT PORT, REAR PORT	AUTO-DETECT	

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3 Instruments

INSTRUMENT	DESCRIPTION
[WINDING 1 METERS] --> press down <--	Start of Winding 1 meters
W1 Primary Currents 0.0 0.0 0.0 Ka	Winding 1 primary currents
W1 Sec'y Currents 0.00 0.00 0.00 A	Winding 1 secondary currents
W1 Nom Currents 0.00 0.00 0.00 xIn	Winding 1 nominal currents
W1 Primary E/F 0.0 kA	Winding 1 primary earth fault current
W1 Sec'y E/F 0.00 A	Winding 1 secondary earth fault current
W1 Nom E/F 0.00 xIn	Winding 1 nominal earth fault current
[WINDING 2 METERS] --> press down <--	Start of Winding 2 meters
W2 Primary Currents 0.0 0.0 0.0 kA	Winding 2 primary currents
W2 Sec'y Currents 0.00 0.00 0.00 A	Winding 2 secondary currents
W2 Nom Currents 0.00 0.00 0.00 xIn	Winding 2 nominal currents
W2 Primary E/F 0.0 kA	Winding 2 primary earth fault current
W2 Sec'y E/F 0.00 A	Winding 2 secondary earth fault current
W2 Nom E/F 0.00 xIn	Winding 2 nominal earth fault current
[WINDING 3 METERS] --> press down <--	Start of Winding 3 meters
W3 Primary Currents 0.0 0.0 0.0 kA	Winding 3 primary currents
W3 Sec'y Currents 0.00 0.00 0.00 A	Winding 3 secondary currents
W3 Nom Currents 0.00 0.00 0.00 xIn	Winding 3 nominal currents
W3 Primary E/F 0.0 kA	Winding 3 primary earth fault current
W3 Sec'y E/F 0.00 A	Winding 3 secondary earth fault current
W3 Nom E/F 0.00 xIn	Winding 3 nominal earth fault current
[BIAS DIFF METERS] --> press down <--	Start of (87) Biased Differential meters
W1 Line Currents 0.00 0.00 0.00 xIn	Winding 1 measured currents
W2 Line Currents 0.00 0.00 0.00 xIn	Winding 2 measured currents
W3 Line Currents 0.00 0.00 0.00 xIn	Winding 3 measured currents
W1 Relay Currents 0.00 0.00 0.00 xIn	Winding 1 currents after Interposing CT correction factors applied
W2 Relay Currents 0.00 0.00 0.00 xIn	Winding 2 currents after Interposing CT correction factors applied
W3 Relay Currents 0.00 0.00 0.00 xIn	Winding 3 currents after Interposing CT correction factors applied
Operate Currents 0.00 0.00 0.00 xIn	Differential operate currents
Restrain Currents 0.00 0.00 0.00 xIn	Differential restrain currents
Mag Inrush Currents 0.00 0.00 0.00 xIn	Differential magnetising inrush currents (even harmonic content of operate currents but mainly 2nd harmonic content)

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INSTRUMENT	DESCRIPTION
[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

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4 IEC 60870-5-103 Communications Information

4.1 IEC 60870-5-103 Semantics in monitor direction

FUN	INF	Description	GI	TYP	COT
176	0	GI End	-	8	10
176	0	Time Synchronisation	-	6	8
176	2	Reset FCB	-	2	3
176	3	Reset CU	-	2	4
176	4	Start/Restart	-	2	5
176	22	Settings changed	-	1	1
176	23	Setting G1 selected	x	1	1,9
176	24	Setting G2 selected	x	1	1,9
176	25	Setting G3 selected	x	1	1,9
176	26	Setting G4 selected	x	1	1,9
176	27	Status Input 1	x	1	1,9
176	28	Status Input 2	x	1	1,9
176	29	Status Input 3	x	1	1,9
176	30	Status Input 4	x	1	1,9
176	36	Trip Circuit Fail	x	1	1,9
176	64	Start/Pick-up L1	x	2	1,9
176	65	Start/Pick-up L2	x	2	1,9
176	66	Start/Pick-up L3	x	2	1,9
176	67	Start/Pick-up N	x	2	1,9
176	68	General Trip	-	2	1
176	69	Trip L1	-	2	1
176	70	Trip L2	-	2	1
176	71	Trip L3	-	2	1
176	84	General Start/Pick-up	x	2	1,9
178	7	Biased Differential	-	2	1
178	8	Differential Highset	-	2	1
178	14	W1 Phase Fault Stage 1	-	2	1
178	15	W1 Phase Fault Stage 2	-	2	1
178	32	W1 Earth Fault Stage 1	-	2	1
178	33	W1 Earth Fault Stage 2	-	2	1
178	57	W2 Phase Fault Stage 1	-	2	1
178	58	W2 Phase Fault Stage 2	-	2	1
178	100	W2 Earth Fault Stage 1	-	2	1
178	101	W2 Earth Fault Stage 2	-	2	1
178	59	W3 Phase Fault Stage 1	-	2	1
178	69	W3 Phase Fault Stage 2	-	2	1
178	102	W3 Earth Fault Stage 1	-	2	1
178	103	W3 Earth Fault Stage 2	-	2	1
178	128	Cold Start	-	1	1
178	129	Warm Start	-	1	1
178	130	Re-Start	-	1	1
178	135	Trigger Storage	-	1	1
178	145	Status Input 5	x	1	1,9
178	146	Status Input 6	x	1	1,9

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FUN	INF	Description	GI	TYP	COT
178	147	Status Input 7	x	1	1,9
178	148	Status Input 8	x	1	1,9
178	149	Status Input 9	x	1	1,9
178	150	Status Input 10	x	1	1,9
178	151	Status Input 11	x	1	1,9
178	152	Status Input 12	x	1	1,9
178	153	Status Input 13	x	1	1,9
178	154	Status Input 14	x	1	1,9
178	155	Status Input 15	x	1	1,9
178	156	Status Input 16	x	1	1,9
178	157	Status Input 17	x	1	1,9
178	158	Status Input 18	x	1	1,9
178	159	Status Input 19	x	1	1,9
178	160	Status Input 20	x	1	1,9
178	161	Status Input 21	x	1	1,9
178	162	Status Input 22	x	1	1,9
178	163	Status Input 23	x	1	1,9
178	164	Status Input 24	x	1	1,9
178	165	Status Input 25	x	1	1,9
178	166	Status Input 26	x	1	1,9
178	167	Status Input 27	x	1	1,9
178	181	Plant Control Relay 1	x	1	1,9
178	182	Plant Control Relay 2	x	1	1,9
178	183	Plant Control Relay 3	x	1	1,9
178	184	Plant Control Relay 4	x	1	1,9
178	185	Plant Control Relay 5	x	1	1,9
178	186	Plant Control Relay 6	x	1	1,9
178	187	Plant Control Relay 7	x	1	1,9
178	188	Plant Control Relay 8	x	1	1,9
178	189	Plant Control Relay 9	x	1	1,9
178	190	Plant Control Relay 10	x	1	1,9
178	191	Plant Control Relay 11	x	1	1,9
178	192	Plant Control Relay 12	x	1	1,9
178	193	Plant Control Relay 13	x	1	1,9
178	194	Plant Control Relay 14	x	1	1,9
178	195	Plant Control Relay 15	x	1	1,9
178	196	Plant Control Relay 16	x	1	1,9
178	197	Plant Control Relay 17	x	1	1,9
178	198	Plant Control Relay 18	x	1	1,9
178	199	Plant Control Relay 19	x	1	1,9
178	200	Plant Control Relay 20	x	1	1,9
178	201	Plant Control Relay 21	x	1	1,9
178	202	Plant Control Relay 22	x	1	1,9
178	203	Plant Control Relay 23	x	1	1,9
178	204	Plant Control Relay 24	x	1	1,9
178	205	Plant Control Relay 25	x	1	1,9
178	206	Plant Control Relay 26	x	1	1,9
178	207	Plant Control Relay 27	x	1	1,9

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FUN	INF	Description	GI	TYP	COT
178	208	Plant Control Relay 29	x	1	1,9
178	209	Plant Control Relay 29	x	1	1,9

4.2 IEC 60870-5-103 Semantics in control direction

FUN	INF	Description	COM	TYP	COT
176	0	GI Initiation		7	9
176	0	Time Synchronisation		6	8
176	19	LED reset	ON	20	20

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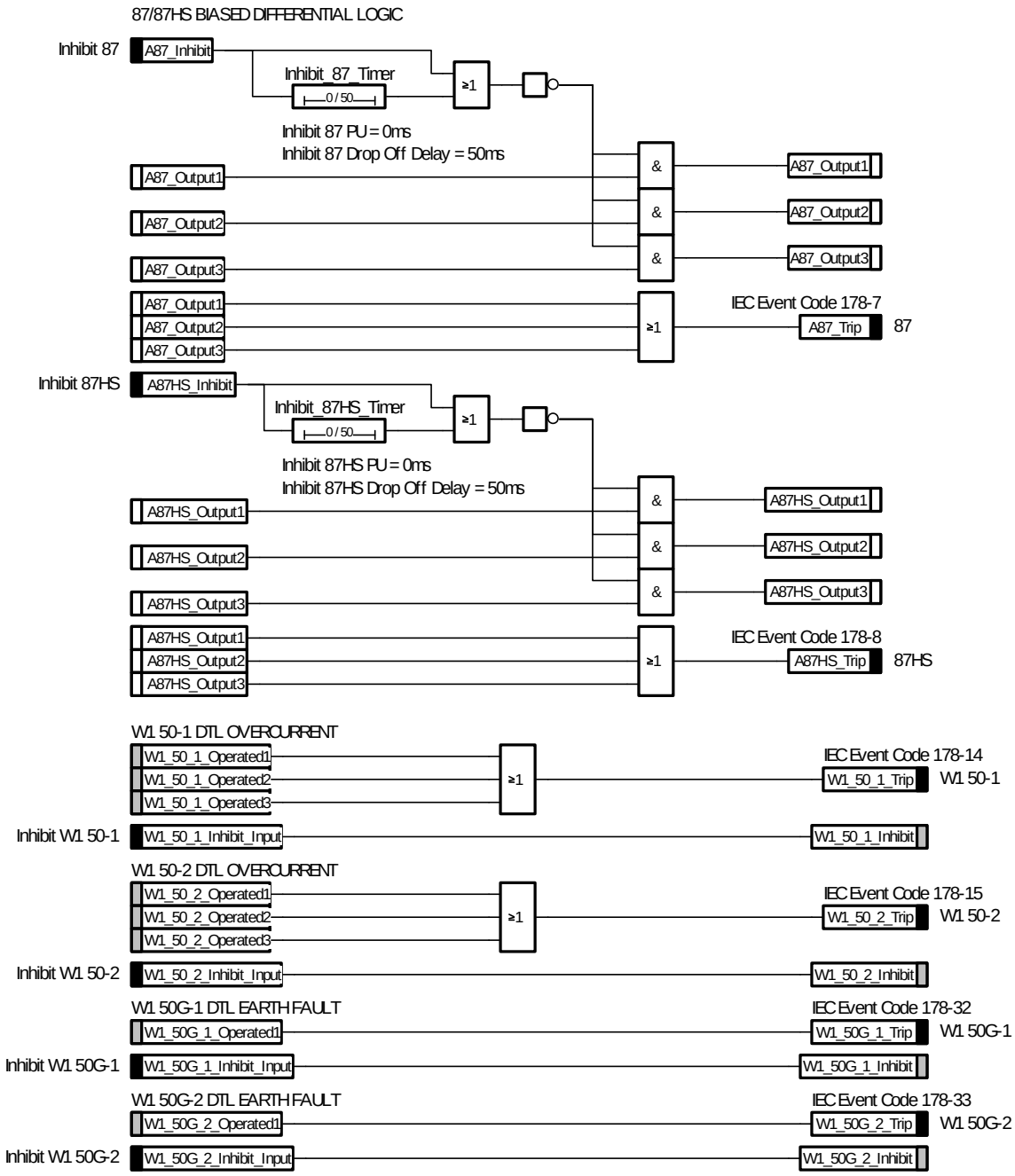
5 Reylogic Diagrams



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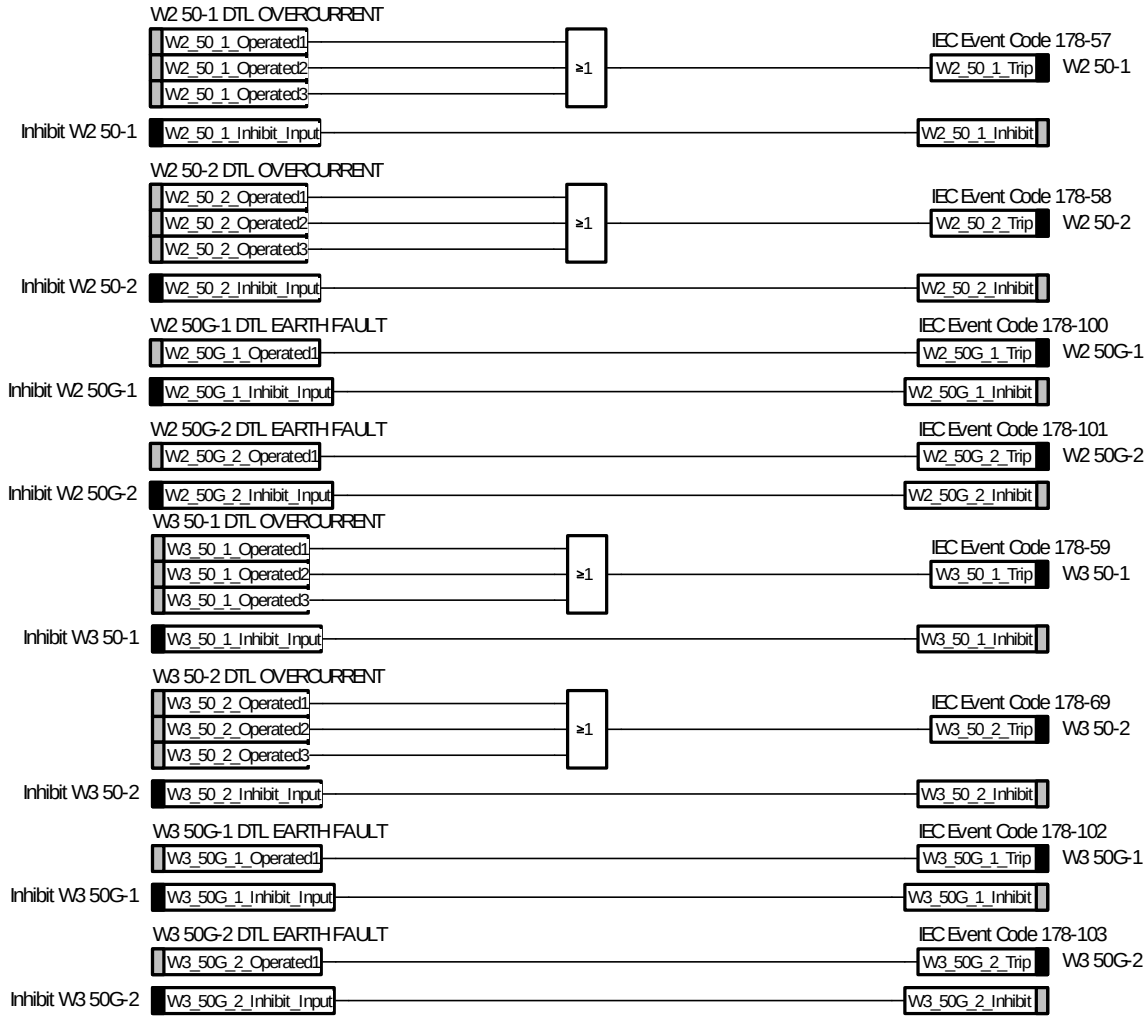

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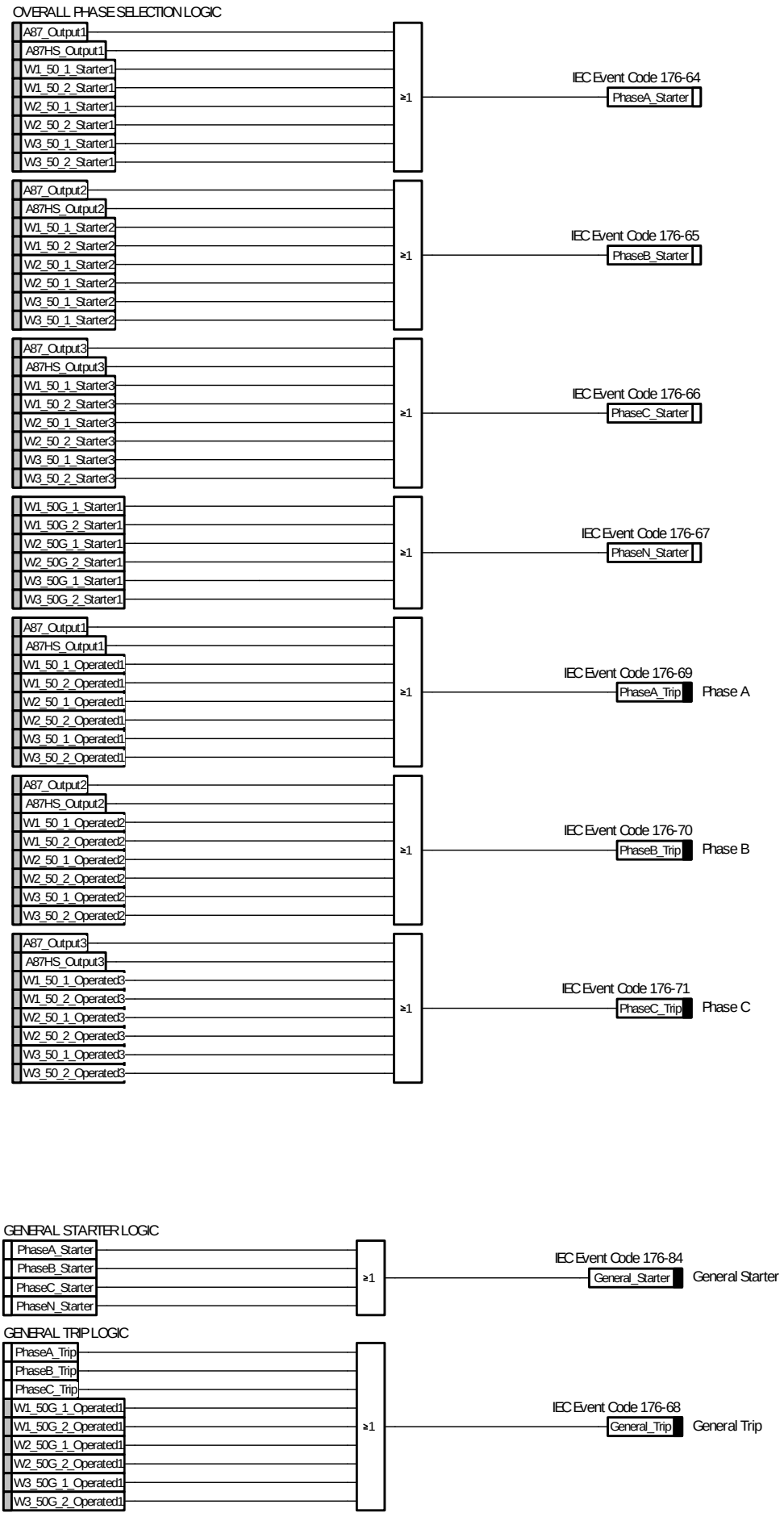

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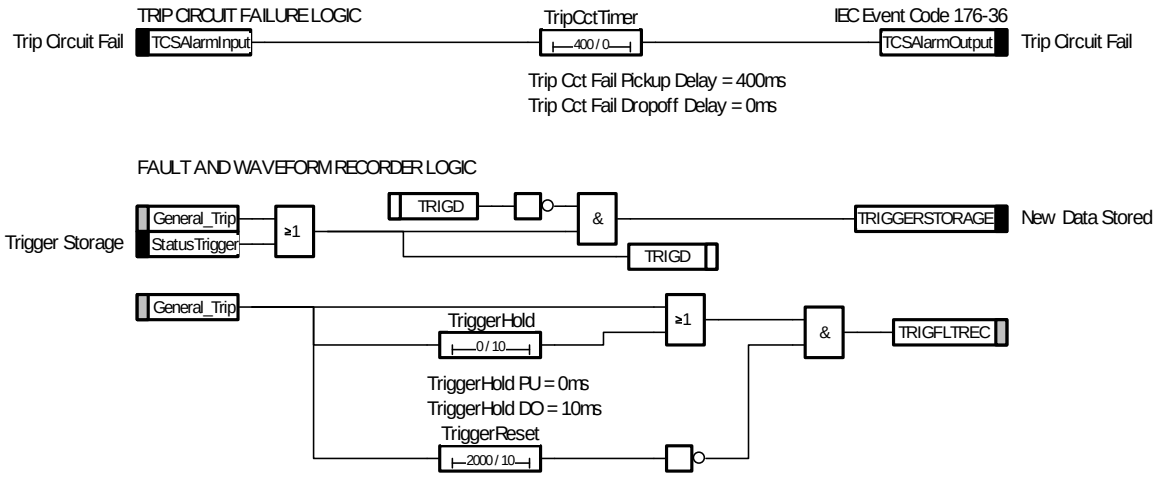

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6 Label Inserts

	DUOBIAS-M-205-2W-R12
	3i5o in E8 Case
	DU3-202--*A
	09/02/2010 09:28:00
1	GENERAL STARTER
2	PHASE A
3	PHASE B
4	PHASE C
5	(87) BIAS DIFFERENTIAL
6	(87HS) DIFF HIGHSET
7	(50-1) P/F Stage 1
8	(50-2) P/F Stage 2
9	(50G-1) E/F Stage 1
10	(50G-2) E/F Stage 2
11	W1
12	W2
13	TRIP CIRCUIT FAIL
14	AUX 1 I/P OPERATED
15	AUX 2 I/P OPERATED
16	AUX 3 I/P OPERATED

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	DUOBIAS-M-205-2W-R12	DUOBIAS-M-205-2W-R12	
	DU3-202-**	DU3-202-**	
	Left	Right	
	09/02/2010 09:28:00	09/02/2010 09:28:00	
1	GENERAL STARTER	(87) BIAS DIFFERENTIAL	17
2	PHASE A	(87HS) DIFF HIGHSET	18
3	PHASE B	(50-1) P/F Stage 1	19
4	PHASE C	(50-2) P/F Stage 2	20
5	W1	(50G-1) E/F Stage 1	21
6	W2	(50G-2) E/F Stage 2	22
7		TRIP CIRCUIT FAIL	23
8			24
9	AUX 1 I/P OPERATED	AUX 9 I/P OPERATED	25
10	AUX 2 I/P OPERATED	AUX 10 I/P OPERATED	26
11	AUX 3 I/P OPERATED	AUX 11 I/P OPERATED	27
12	AUX 4 I/P OPERATED		28
13	AUX 5 I/P OPERATED		29
14	AUX 6 I/P OPERATED		30
15	AUX 7 I/P OPERATED		31
16	AUX 8 I/P OPERATED		32

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	DUOBIAS-M-205-3W-R12	DUOBIAS-M-205-3W-R12	
	DU3-302-**	DU3-302-**	
	Left	Right	
	09/02/2010 09:28:00	09/02/2010 09:28:00	
1	GENERAL STARTER	(87) BIAS DIFFERENTIAL	17
2	PHASE A	(87HS) DIFF HIGHSET	18
3	PHASE B	(50-1) P/F Stage 1	19
4	PHASE C	(50-2) P/F Stage 2	20
5	W1	(50G-1) E/F Stage 1	21
6	W2	(50G-2) E/F Stage 2	22
7	W3	TRIP CIRCUIT FAIL	23
8			24
9	AUX 1 I/P OPERATED	AUX 9 I/P OPERATED	25
10	AUX 2 I/P OPERATED	AUX 10 I/P OPERATED	26
11	AUX 3 I/P OPERATED	AUX 11 I/P OPERATED	27
12	AUX 4 I/P OPERATED		28
13	AUX 5 I/P OPERATED		29
14	AUX 6 I/P OPERATED		30
15	AUX 7 I/P OPERATED		31
16	AUX 8 I/P OPERATED		32

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