DELAB

User Guide

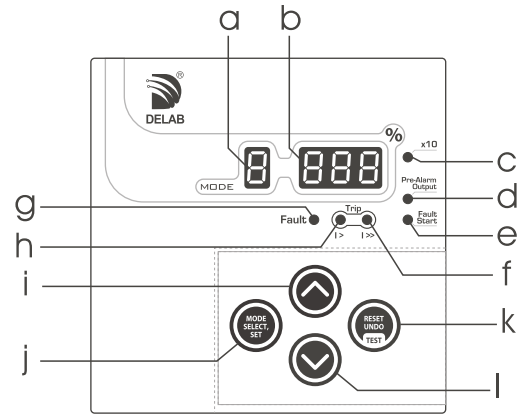
DP-31

(IDMT) Digital Earth Fault Relay

features

True RMS Measurement with SPARC[1] and DCOI[2] Algorithm
Fundamental Signal Detection[3]
Real Time Display of Earth Fault in (%)
6 Selectable IDMT Graphs + DTL
Fault / Io-set & hi-set Trip LED Indication
Fault Start Event Recording & LED Indication + Output[4]
Pre-Alarm LED Indication + Output[4]
Trip Event Memory (non-volatile 7 previous records)
Fault Start Event Memory (non-volatile 4 previous records)
Selectable Frequency (50 / 60 Hz)
Programmable Relay Output contact for K2
Last Trip Elapsed Time (up to 99days)
Software Lock to Prevent Unauthorized Setting
Complies with IEC-60255-26/27 ; BS EN 50121-5 Standards
ANSI Code: 50N, 51N
External Plug-in Module for :- A-01s / A-01sp (RS-485 MODBUS RTU) isolated type

Panel Overview



a. Single digit mode LED display
b. 3 digit data LED display
c. x 10
d. Pre-Alarm output indication
e. Fault start indication
f. Hi-set trip indication
g. Fault indication
h. Lo-set trip indication
i. Up button / Increment
j. Mode select / Set button
k. Reset / Undo / Test trip button
l. Down button / Decrement

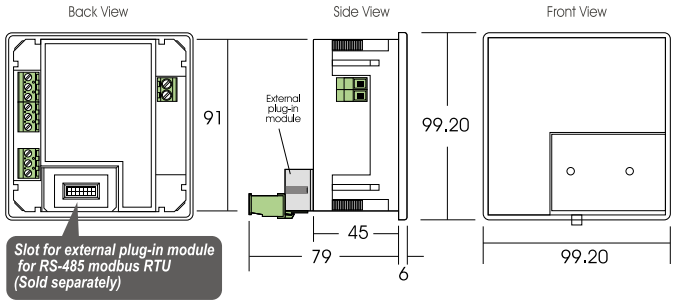
Technical Data

Aux Power	:	65 ~ 275 Vac (45 ~ 65 Hz); 90 ~ 300 Vdc (for model 220a)
		18 ~ 72 Vdc (for model 024d)
Current Input (In)	:	../5A or ../1A (depending on model CT.../5A or CT.../1A)
Fundamental Frequency	:	50 or 60 Hz (software selectable)
Burden	:	<0.3 VA @ In
Output Relay Rating	:	SPDT 5A, 250V AC/DC
Consumption	:	< 3 VA
Accuracy	:	Current protection threshold (±5%), Time delayed (+5% or 50ms)
Display	:	7-Segment LED (3 + 1digit)
Indication (LEDs)	:	x10, pre-alarm, fault start event, Io / hi-set trip, fault
Operating Temp.	:	0°C ~ +55°C
Humidity	:	56 days at 93%RH, 40°C non-condensing
IP Rating	:	IP54 (front panel)
Weight	:	230 g

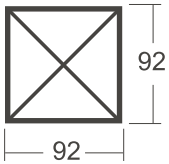
Parameter Setting Range

$I_e >$ (%) : Io-set trip	2% ~100% (step of 1%)
IDMT $I_e >$	6 IDMT+ DTL
TMs $I_e >$: Time multiplier for IDMT	0.05 ~ 1.00 (step of 0.01)
$t_e >$ (sec) : Io-set trip time delay for DTL	0.03s ~ 20.0s
	0.03s ~ 0.10s (step of 0.01s)
	0.10s ~ 1.00s (step of 0.02s)
	1.0s ~ 20.0s (step of 0.1s)
$I_e >>$ (%) : hi-set trip	OFF or 20% ~1000% (step of 10%)
$t_e >>$ (sec) : hi-set trip time delay	Instant or 0.02s ~ 0.50s (step of 0.01s)

Casing



Panel Cut-out
92 x 92



Note: All measurement in mm.

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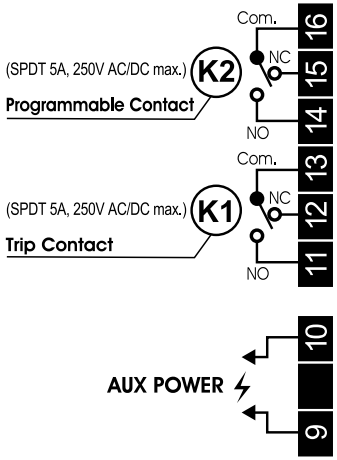
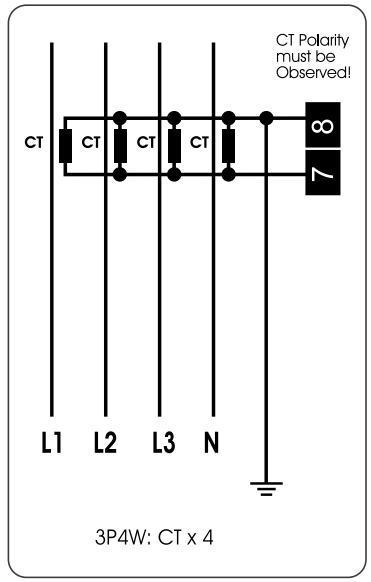
Note: Specification subject to change without prior notification
(please visit www.delab.com.my for latest specification)

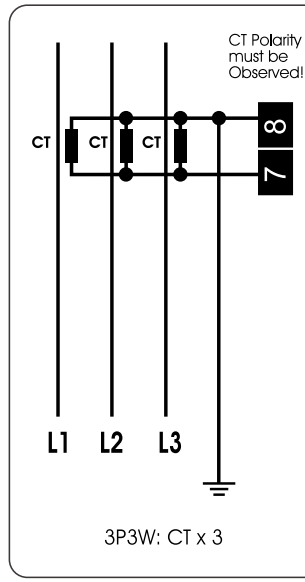
YouTube : Delab Scientific Sdn. Bhd.

Wiring

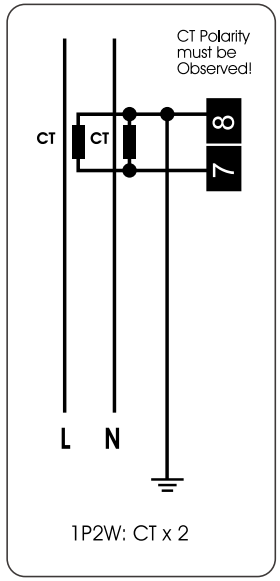




3P4W: CT x 4



3P3W: CT x 3

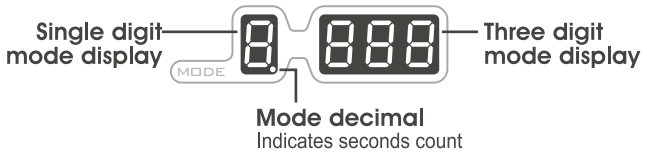


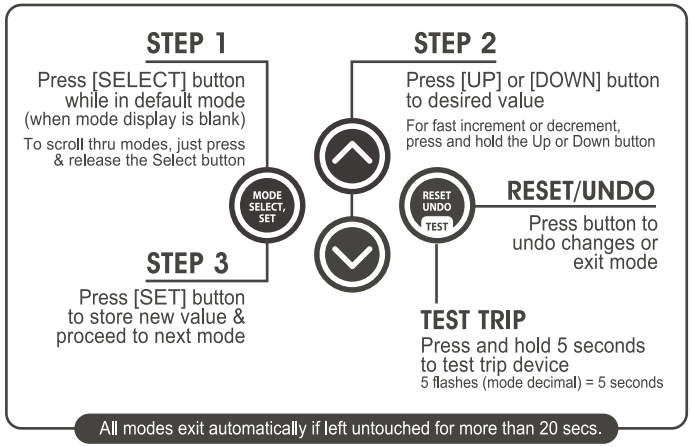
1P2W: CT x 2

Modes

Factory Setting	10	1 I_e> (%)	lo-set trip
PARAMETER SETTING	n3.0	2 IDMT I_e>	6 IDMT + DTL
	0.10	3 TM_s I_e> or t_e> (sec)	Time Multiplier or lo-set trip time delay
	400	4 I_e>> (%)	hi-set trip
	0.05	5 t_e>> (sec)	hi-set trip time delay
VIEWING INFO		b , E1 to E6 Trip memory	7 trip event memories (non-volatile)
		d Last trip elapsed time	Last trip elapsed time
		E1 to E4 Fault start memory	4 fault start event memories (non-volatile)
		FUEr Version	Firmware version
		FoPh Operation hours	Device operated in hours (x 1000 hr)
SPECIAL SETTING MODE	OFF	L Software lock	: Keypad lock : OFF or ON
	Lc	r1 Trip relay K1 response type	: Latching (Lc) or Non-latching (nLc)
	trP	r2 Output relay K2 function	: Programmable relay output
	nLc	r2 Trip relay K2 response type	: Latching (Lc) or Non-latching (nLc)
	50	Fr Network frequency	: Selectable as : 50 Hz or 60 Hz
	On	- Standby mode	: Running LED bar : ON or OFF
	non	PC Selection of plug-in module	: A-01s / A-01sp (RS485 modbus isolated type) or none
	1	Ad Modbus address	: Selectable from 1 ~ 247
	96	br Baud rate setting	: Selectable from 3, 6, 12, 24, 48, 96, 192, 288
	non	Pr Parity setting	: Selectable: None or Odd or Even
Factory Setting		End End program setting	: Save Changes and exit setting mode

Parameters Setting





All modes exit automatically if left untouched for more than 20 secs.

Info Viewing

b , E1 ~ E6
Tripped values for last 7 events

Press **[SELECT]** button until mode b or hold **[SELECT]** button for 1 second in any mode 1~5. Display will show the tripped value for the most recent tripped event.

Single flash : Indicate a lo-set trip
Double flash : Indicate a high-set trip

Manual tripped event will display a flashing trP. --- Indicate no tripping has occured.

Press **[SELECT]** button again to scroll thru mode E1 to E6. *(Auto skip to mode d if memory is empty)*

Skip directly to mode d:
Hold **[SELECT]** button for 1 second.

Clear trip event memory:
Hold **[RESET]** button for 3 seconds in mode b.

Press **[UNDO]** button to exit.

d View last trip elapsed time

Press **[SELECT]** button until mode d.
Display will show the elapsed time of last trip since last power up.

--- Indicate no tripping since last power up.

99h99n Display up to 99 Hour 99 min → 99d99h Display up to 99 Day 99 hour → our99d Over 99 Days

Press **[UNDO]** button to exit.

E1 ~ E4
Fault start event memory

Press **[SELECT]** button until mode E1.
If display shows ---. (No fault event has occured)
Press **[SELECT]** button again to scroll thru mode E2 to E4. *(Auto skip to next mode if no fault start event has occured)*

Clear fault start event memory:
Hold **[RESET]** button for 3 seconds in mode E1.

Press **[UNDO]** button to exit.

FUEr Firmware version

Press **[SELECT]** button until mode FUEr.
Display will show the firmware of the device.

Press **[UNDO]** button to exit.

FoPh Total operation hour

Press **[SELECT]** button until mode FoPh.
Display will show a value of (x1000 hr).

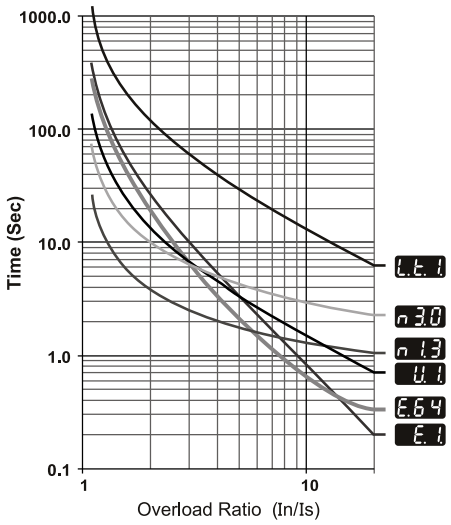
Press **[UNDO]** button to exit.

IDMT graph

Time graph based on Time Multiplier 1.0

Characteristics

- n3.0 Normal Inverse 3.0 /10
- n1.3 Normal Inverse 1.3 /10
- U.1 Very Inverse
- E.1 Extremely Inverse
- E.64 Extremely Inverse (0.64 sec)
- L.t.1 Long Time Inverse
- d.t.L. Definite Time



Special Setting Modes

When no mode is selected (mode display is blank) → Press 'SELECT & RESET' button simultaneously & hold for 5 seconds until mode L appears → OR Press 'UP or Down' button to modify parameters → Press 'SET' button to confirm & proceed to next mode

L Software keypad lock
OFF or On

r1 Trip relay K1 response type
Lc: Latching trip nLc: Non-Latching trip

r2 Output relay K2 function
trP : Tripping output (Lc / nLc)

Fault Start Output Function
LFS : Lo-set fault start signal output (Lc/nLc)
HFS : Hi-set fault start signal output (Lc/nLc)
AFS : Any fault start signal output (Lc/nLc)

Fault start event LED (e) indicates any detected fault events.
To clear event indication, press **[RESET]** button or scroll to mode E1 while no fault is present.
K2 output will be activated when there is any fault start event if programmed is being set as 'AFS'.
To latch fault events output, select r2 to Lc in trip relay K2 response type.

Device Failure Output Function
dUF : Device failure output (nLc only)
K2 automatically turns ON when device is functioning normally.

Circuit Breaker Failure Output Function
CbF : Circuit breaker failure output (nLc only)
Activates K2 output if fault still exists after 100 ms of trip event.

Pre-Alarm Output Function
A50 : > 50% of I_e > (Lc / nLc)
A90 : > 90% of I_e > (Lc / nLc)
If K2 is programmed to pre-alarm A50 / A90, *Pre-alarm output LED* (d) will indicate the status of K2. Set r2 to Lc in trip relay K2 response type if need to latch pre-alarm events.
Press [RESET] button to clear output.

r2 Trip relay K2 response type
Lc : Latching trip nLc : Non-Latching trip

Fr Electrical network system frequency
Electrical network frequency setting:
50: 50 Hz 60: 60 Hz

- Standby option
OFF : De-activate On : Activate
If set to on, after about 3 minutes of idle and no fault is detected, running LED bar will be displayed instead of the real time value. It automatically exits on fault detection or when any button is pressed. When device trips, standby mode is temporary de-activated until device is reset.
To toggle this setting, user can also press [**SELECT**] button when powering up the device.

PC Selection of plug-in module
A01 : A-01s / A-01sp non: None

Ad Modbus address
Selectable from 1~247

br Baud rate setting
Set the baud rate in a modbus communication between host computer and device. Selectable as: (3 = 300, 6 = 600, 12 = 1200, 24 = 2400, 48 = 4800, 96 = 9600, 192 = 19200 or 288 = 28800) bps

Pr Parity setting
non: None Odd: Odd Even: Even
Set the parity for Modbus communication between host computer and the unit.

End End setting
Press **[SELECT]** button to exit and save the setting or **[UNDO]** button to go back.