

DP-34

(IDMT) Digital Combined Over Current & Earth Fault Relay

features

- True RMS Measurement with SPARC¹ and DCO² Algorithm
- Auto / Manual Scroll for Real Time Display of Phase Current and Earth Fault in %
- 6 Selectable IDMT Graphs + DTL
- Fault / lo-set & hi-set Trip LED Indication
- Fault Start Event Recording & LED Indication + Output³
- Pre-Alarm LED Indication + Output³
- Trip Event Memory (non-volatile 7 previous records for 3 phases + earth)
- Fault Start Event Memory (non-volatile 4 previous records with phase info)
- Selectable Frequency (50 / 60 Hz)
- Programmable Relay Output Contacts for K2, K3*, K4*
- Last Trip Elapsed Time (up to 99 days)

Software Lock to Prevent Unauthorized Setting

Accessible only with A-03s (plug-in module):

Programmable Digital Input -

(activated by digital input function) Dual Setting Parameters -

(activated by digital input function) Remote Reset Function -

Complies with: IEC-60255-26/27; BS EN 50121-5 Standards

ANSI Code: 50P, 50G, 51P, 51G

External Plug-in Module (Items sold separately)

A-01s/A-01sp : RS-485 MODBUS RTU (isolated type)

A-02s : RS-485 MODBUS RTU (isolated type)

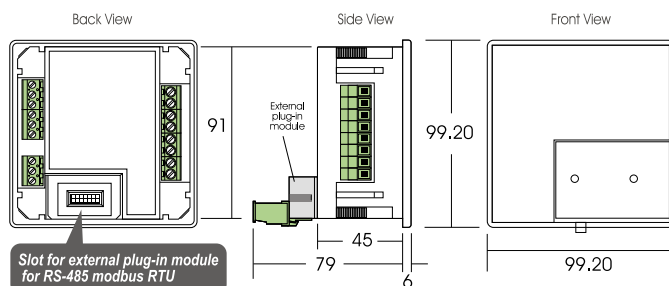
+ 1 output contact (K3*)

A-03s : RS-485 MODBUS RTU (isolated type)

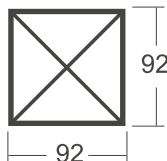
+ 2 output contacts (K3* & K4*)

+ 1 digital input

Casing



Panel Cut-out
92 x 92



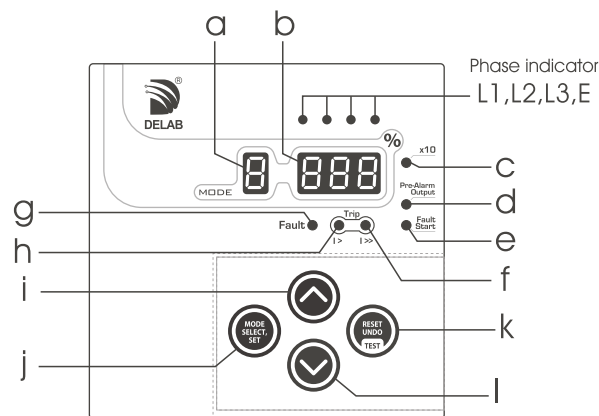
Note: All measurement in mm.

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

You Tube : Delab Scientific Sdn. Bhd.



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)
Fundamental Frequency	: 50 or 60 Hz (software selectable)
Current Input (In)	: ..5A or ..1A (depending on model : CT.../5A or CT.../1A)
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 + 1 digit)
Indication (LEDs)	: phase, x10, pre-alarm, fault start event, fault, lo / hi-set trip
Operating Temp.	: 0°C ~ +55°C
Humidity	: 56 days at 93%RH, 40°C non-condensing
IP Rating	: IP54 (front panel)
Weight	: 275 g

Parameter Setting Range

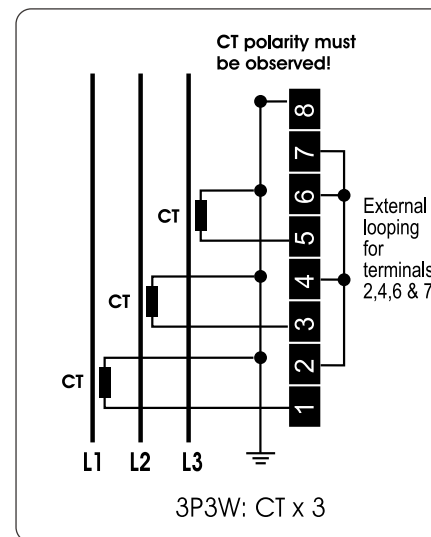
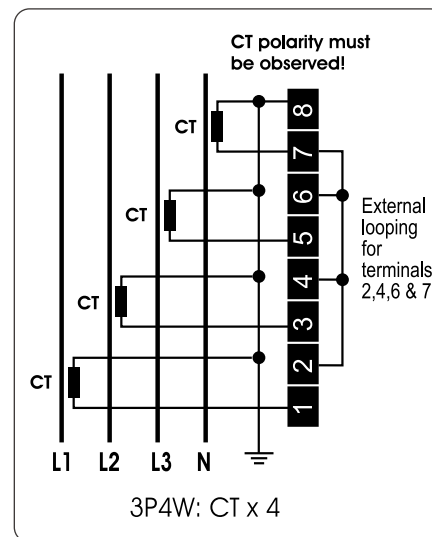
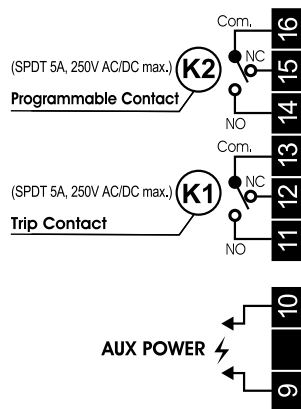
Phase Over Current

I _p > (%) : lo-set trip	2% to 200% (step of 1%)
IDMT I _p >	6 IDMT + DTL
TMs I _p > for IDMT	0.05 ~ 1.00 (step of 0.01)
t _p > (sec) :	0.03s ~ 20.0s
lo-set trip time delay for DTL	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 _p >> (%) : hi-set trip	OFF or 20% ~ 2000%
	20% ~ 1000% (step of 10%) 1000% ~ 2000% (step of 100%)
t _p >> (sec) :	Instant or
hi-set trip time delay	0.02s ~ 0.50s (step of 0.01s)

Earth Fault

I _e > (%) : lo-set trip	2% to 100% (step of 1%)
IDMT I _e >	6 IDMT + DTL
TMs I _e > for IDMT	0.05 ~ 1.00 (step of 0.01)
t _e > (sec) :	0.03s ~ 20.0s
lo-set trip time delay for DTL	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) :	Instant or
hi-set trip time delay	0.02s ~ 0.50s (step of 0.01s)

Wiring



Modes

Phase Over Current

1 $I_p > (\%)$: lo-set trip
 2 IDMT $I_p >$: 6 IDMT + DTL
 3 TMs $I_p > \text{or } t_p >$: Time Multiplier or lo-set trip time
 4 $I_p \gg (\%)$: hi-set trip
 5 $t_p \gg (\text{sec})$: hi-set trip time delay

Earth Fault

6 $I_e > (\%)$: lo-set trip
 7 IDMT $I_e >$: 6 IDMT + DTL
 8 TMs $I_e > \text{or } t_e >$: Time Multiplier or lo-set trip time
 9 $I_e \gg (\%)$: hi-set trip
 A $t_e \gg (\text{sec})$: hi-set trip time delay

Group A setting = Default setting of mode 1 to A
 To activate group B setting, user need to set the digital input function (in mode 0F) to A-B and then put a signal to digital input (60 ~ 130 Vdc). Access for mode 1 to A will now reference to **group B setting** indicated by a dot (mode decimal) on the single digit mode display.

VIEWING INFO

0.00 to 0.06 : 7 Trip event memories (non-volatile)
 0 : Last trip elapsed time
 0.0 to 0.4 : 4 Fault start event memories (non-volatile)

SPECIAL SETTING MODE

0 Software Lock : Keypad lock - OFF or ON
 0.0 Trip Relay K1 Response Type : Latching (Lc) or Non-latching (nLc)
 0.2 Output Relay K2 Function : Programmable relay output
 0.2 Trip Relay K2 Response Type : Latching (Lc) or Non-latching (nLc)
 0. Network Frequency : Selectable as - 50 Hz or 60 Hz
 Standby Mode : Running LED bar - ON or OFF
 0. Selection of Plug-in Module: Selectable as - None or A-01s / A-01sp or A-02s or A-03s
 0. Modbus Address : Selectable from 1 ~ 247
 0. Baud Rate Setting : Selectable from - 3, 6, 12, 24, 48, 96, 192, 288

0. Parity Setting : None or Odd or Even
 0.3 Output Relay K3 Function : Programmable [activated by A-02s or A-03s]
 0.3 Trip Relay K3 Response Type : Latching (Lc) or Non-latching (nLc)
 0.4 Output Relay K4 Function : Programmable [activated by A-03s]
 0.4 Trip Relay K4 Response Type : Latching (Lc) or Non-latching (nLc)
 0. Digital Input Function : [activated by A-03s] OFF / A-b / b-A / dtb / rSt
 0. Blocking Timer Selection : Selectable from - infinite, 0.1/ 0.2/ 0.3/ 0.5/ 1.0/ 1.5/ 2.0~10.0 sec
 End End program setting : Exit special setting mode

Parameters Setting

Single digit mode display MODE 0 Three digit mode display 000

Mode decimal
Seconds count / group B setting indication

STEP 1

Press [SELECT] button while in default mode (when mode display is blank)
 To scroll thru modes, just press & release the Select button

STEP 2

Press [UP] or [DOWN] button to desired value
 For fast increment or decrement, press and hold the Up or Down button

STEP 3

Press [SET] button to store new value & proceed to next mode

RESET/UNDO
 Press button to undo changes or exit mode

TEST TRIP
 Press and hold 5 seconds to test trip device
 5 flashes (mode decimal) = 5 seconds

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

Info Viewing

0.00 ~ 0.06

Tripped values for last 7 events

Press [SELECT] button until mode 0 or hold [SELECT] button for 1 second in any mode 0 ~ 0. 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

If display shows ---. (No trip event has occurred)
 Manual tripped event will display a flashing 0.0.0.

Press [SELECT] button again to scroll thru mode 0.0 to 0.6. (Auto skip to mode 0 if memory is empty)

Skip directly to mode 0 :
 Hold [SELECT] button for 1 second.

To clear trip event memory:
 Hold [RESET] button for 3 sec in mode 0.

Press [UNDO] button to exit.

0.00 ~ 0.04

Fault start event memory

Press [SELECT] button until mode 0.0.
 If display shows ---. (No fault event has occurred)
 Press [SELECT] button again to scroll thru mode 0.0 to 0.4. (Auto skip to next mode if no fault start event has occurred)

To clear fault start event memory:
 Hold [RESET] button for 3 sec in mode 0.0.
 Press [UNDO] button to exit.

0.00 ~ 0.04

Firmware version

Press [SELECT] button until mode 0.0.0.
 Display will show the firmware of the device.
 Press [UNDO] button to exit.

0.00 ~ 0.04

Total operation hour

Press [SELECT] button until mode 0.0.0.
 Display will show the total operated hour of the device.
 Press [UNDO] button to exit.

0.00 ~ 0.04

Manual Scroll

Press [UP/DOWN] button when mode display is blank. Display will show the individual phase value (L1, L2, L3, E) in real time. Continue pressing the [UP/DOWN] button to scroll thru the next phase. Press [UNDO] button to exit.

IDMT graph

Time graph based on Time Multiplier 1.0

Characteristics

0.30 Normal Inverse 3.0 / 10
 0.13 Normal Inverse 1.3 / 10
 0.1 Very Inverse
 0.1 Extremely Inverse
 0.64 Extremely Inverse (0.64 sec)
 0.1 Long Time Inverse
 0.1 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 0 appears

Press 'UP or Down' button to modify parameters

Press 'SET' button to confirm & proceed to next mode

mode 0 Software Keypad Lock [OFF / ON]

mode 0.0 Trip Relay K1 Response Type [Lc / nLc]

mode 0.2 Output Relay K2 Function [Refer to 0.2 for K2 function]

mode 0.2 Trip Relay K2 Response Type [Lc / nLc]

mode 0. Network Electrical Network System Frequency [50 Hz / 60 Hz]

mode 0 Standby Option (Running LED bar) [OFF: De-activate / ON: Activate]

If set to ON, after about 3 minutes of idle & 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.

mode 0. Selection of plug-in module [non / A01 / A02 / A03]

Select 0.2 for additional programmable output relay in order to activate 0.2 output relay K3 function.

Select 0.2 for 2 programmable output relays in order to activate 0.2 & 0.2 output relay (K3 & K4) function & digital input function 0.2.

mode 0. Modbus Address [Selectable from 1 ~ 247]

mode 0. Baud Rate Setting [Selectable]

Set the baud rate for Modbus communication between host computer and the unit. Selectable as:
 (3 = 300, 6 = 600, 12 = 1200, 24 = 2400, 48 = 4800, 96 = 9600, 192 = 19200 or 288 = 28800) bps

mode 0. Parity Setting [non / Odd / Even (Even)]

Set the parity for Modbus communication between host computer and the unit.

mode 0.3 Output Relay K3 Function [activated by A-02s / A-03s]

This function can only be activated by A-02s or A-03s (plug-in module) which is sold separately.
 (Refer to 0.2 for 0.2 output relay K3 function)

mode 0.3 Trip Relay K3 Response Type [Lc / nLc]

mode 0.4 Output Relay K4 Function [activated by A-03s only]

This function can only be activated by A-03s (plug-in module) which is sold separately.
 (Refer to 0.2 for 0.2 output relay K4 function)

mode 0.4 Trip Relay K4 Response Type [Lc / nLc]

mode 0. Digital Input Function [activated by A-03s only]

0FF De-activate Digital Input Function
 A-b Activate Group B Settings [Group A to Group B]
 b-A Activate Group A Settings [Group B to Group A]
 dtb Activate All Faults Blocking
 rSt Activate Remote Reset when Tripped

mode 0.6 Blocking Timer Selection [Selectable]

Selectable as: (0.6 = infinite, 0.1/ 0.2/ 0.3/ 0.5/ 1.0/ 1.5/ 2.0~10.0 seconds)
 Temporarily block trip timer of all faults from timeout.
 Only available if mode 0.6 is set as 0.6.

End End Setting

Press [SELECT] button to exit and save the settings or [UNDO] button to go back.

* Output Relay Function for K2 / K3 / K4

0.0 Tripping Output Function [Lc / nLc] 0.0 & 0.0 & 0.0

Fault Start Output Function

0.0 Lo-set Fault Start Signal Output (all phases) [Lc / nLc] 0.0 & 0.0 only
 0.0 Any Fault Start Signal Output (all phases) [Lc / nLc] 0.0 only
 0.0 Hi-set Fault Start Signal Output (all phases) [Lc / nLc] 0.0 only

E.g. K2 output will be activated when there is any fault start event if program is being set as 'AFS'.
 To latch fault events output, select 0.2 to Lc in trip relay K2 response type.

0.0 Earth Fault Start Signal Output [Lc / nLc] 0.0 only

Activated only if earth fault picked up

0.0 Phase Over Current Start Signal Output [Lc / nLc] 0.0 only

Activated only if phase over current picked up
 Fault start event LED indicates any detected fault events.
 To clear event indication, press [RESET] button or scroll to mode 0.0 while no fault is present.

0.0 Device Failure Output Function [nLc only] 0.0 only

K2 automatically turns ON when device is functioning normally.

0.0 Circuit Breaker Failure Output Function [nLc only] 0.0 only

Activates K2 output if fault still exists after 100 ms of trip event.

0.0 Pre-Alarm Output Function [Lc / nLc] 0.0 & 0.0 & 0.0

Phase > 90% of $I_p >$ Earth Fault > 50% of $I_e >$
 E.g. If K2 is programmed to pre-alarm 0.0, Pre-alarm output LED will indicate the status of K2. Set 0.2 to Lc in trip relay K2 response type if need to latch pre-alarm events.

0.0 Earth Fault Trip Output Function [Lc / nLc] 0.0 & 0.0 & 0.0

Activated only if earth fault trip

0.0 Phase Over Current Trip Output Function [Lc / nLc] 0.0 & 0.0 & 0.0

Activated only if phase over current trip

0.0 Lo-set Fault Trip Output Function [Lc / nLc] 0.0 & 0.0 only

Activated only if Lo-set fault trip for all phases

0.0 Hi-set Fault Trip Output Function [Lc / nLc] 0.0 & 0.0 only

Activated only if Hi-set fault trip for all phases
 Press [RESET] button to clear output.