C&S electric

IRI-Pro-V2

Over Current, Short Circuit & Earth Fault Relay

C&S Electric Limited

(1) Characteristics & Features

- Micro-controller based Numeric Relay.
- Digital filtering of the measured values to suppress the high frequency harmonics and transient DC components during short circuit.
- Selectable protective functions between: definite time over-current relay and inverse time over-current relay.
- Selectable inverse time characteristics according to BS142 and IEC 255-4:
  - Normal inverse 3.0
  - Normal inverse 1.3
  - Normal inverse 0.6
  - Very inverse
- Extremely inverse
- Two stage over-current time protection for phase current / earth fault current
- Separately selectable characteristic for Earth fault and phase fault
- Continuous self-supervision of software and hardware
- Wide operating ranges of the supply voltage [AC/DC] 24V-260V AC, 24V-360V DC
- Last five faults recording with real time stamping (Date-time stamp)
- Relay assignment configurable from HMI
- Relay reset configurable from HMI
- Primary current display with CT Ratio

(2) Design

2.1 Front Panel

The front panel of the protective device IRI-PRO comprises the following operational and indication elements:

- 1 LCD - Liquid Crystal Display (16 x 2)
- Five keypads- for parameter setting
- 8 LEDs for annunciation

2.2 LEDs

On the front panel there are 8 LEDs. Their functions are indicated by the appropriate inscriptions. On fault I>, I>>, Ie> & Ie>> LEDs with appropriate phase lamps L1/ L2 / L3 give the fault indication. Flashing of the green LED marked ON gives the indication of healthiness of relay in terms of watchdog.

2.3 Output Contacts

Relay 3 is fixed for CB tripping, common for all type of faults. Relay 1 and Relay 2 are user configurable for annunciations like OL / SC / E / EH /Self supervision. Reset function of all output contacts is individually programmable [Auto Reset / Manual Reset] from HMI. RESET DELAY is available with all output contacts but get disable in Manual Reset mode.

2.4 Power Supply

It has a universal auxiliary supply. The voltage range is 24V to 260V AC and 24V to 360VDC.Power supply connections are not polarized.

(3) Fault Recording

IRI-PRO records secondary current for last 5 Fault with real time stamp. It saves following information with CT current in non-volatile memory in following sequence.

Type of fault : SC/OL/E/EH
Faulty phase / Earth : L1/L2/L3/E (Secondary)
Value at Fault : L1, L2, L3, Ie Amps (True RMS recording guaranteed only if trip time >= 40msec)

(4) Reset Delay

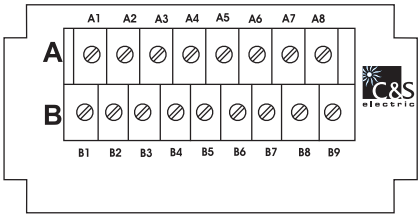
This parameter [RST-D] introduces a delay in opening of relay contacts, when the current goes below the dropout value for overload and short circuit & earth faults. This parameter will not work when manual reset mode is selected.

(5) Housing

The IRI-PRO is supplied in an individual housing for flush-mounting for installation in a DIN standard of 73x 135 mm.

(6) Terminal Description

There are two terminal blocks A & B. Block A is for current connection, while Block B is for Auxiliary & trip contact connection as per below table.



[A]

Terminal No.	Description
A1	L1 Current Transformer Phase
A2	L1 Current Transformer Neutral
A3	L2 Current Transformer Phase
A4	L2 Current Transformer Neutral
A5	L3 Current Transformer Phase
A6	L3 Current Transformer Neutral
A7	Earth CT1
A8	Earth CT2

[B]

Terminal No.	Description
B1	Relay-1 NO
B2	Relay-1 COMM
B3	Relay-2 NO
B4	Relay-2 COMM
B5	Relay-3 NO
B6	Relay-3 COMM
B7	Aux Supply Line (non polar)
B8	Aux Supply Line (non polar)
B9	Earth

(7) Trip Test

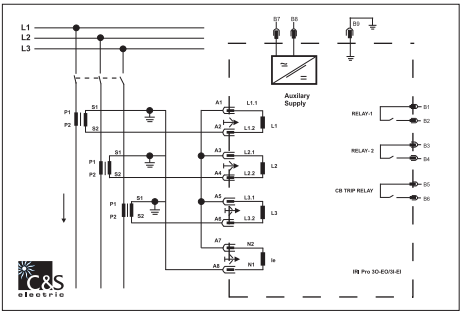
This feature allows the user to check contact operation. TRIP test can be used while commissioning the relay to see the operation of contacts of IRI-PRO. It is selectable from front LCD menu and becomes active only when currents are below all pickup levels and trip levels. Selecting trip test, gives the momentary operation of all three available contacts in IRI-PRO one by one with LED flashing indications.

(8) Contact Details

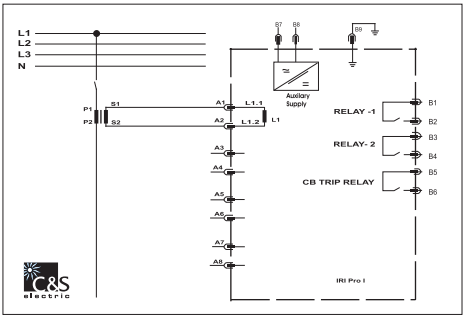
Number of Relays	3 (Relay 1, 2, 3)
Type of contact (Relay 1, 2, 3)	(SPST-NO, Type-A)
Assignment of contact	Relay-3 common for trip on I> and I>>, Ie> and Ie>>
	Relay-1 & 2 are configurable for O/L, S/C, E, EH, self supervision
Max. breaking capacity	1250VA / 150W resistive 500VA / 90W inductive
Max. breaking voltage	400V AC / 125V DC
Max. continuous current	8A
Max. making current (16ms)	50A

(9) Connection Diagram

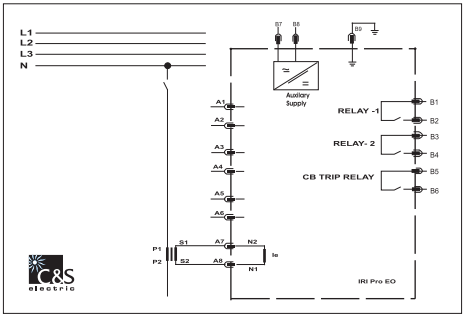
IRI-PRO-3I-EI/3O-EO



IRI-PRO-I



IRI-PRO-EO



(10) Technical Data

(10.1) Measuring Input

Rated Data	Rated current IN Rated frequency FN	1A & 5A 50 Hz
Power consumption in current circuit	At IN = 1A At IN = 5A	0.2 VA 0.1 VA
Thermal withstand capability in current circuit	for 1 Sec for 10 Sec continuously	100 x IN 20 x IN 4 x IN
Dropout Ratio		>96%
Returning Time		30ms
Minimum Operating Time		30ms

(10.2) Setting Ranges & Steps

Parameter	Display	Setting Range	Step
I>	I>	0.20-2.5xIN	0.05xIN
	t>	0.1-150s	0.01s
	ti>	0.01-1.500	0.005
I>>	I>>	0.5-25xIN	0.5xIN
	t>>	0.03-20s	0.01s
Ie>	Ie>	0.05-2.5xIN	0.05xIN
	te>	0.03-150s	0.01s
	tie	0.01-1.500	0.005
Ie>>	Ie>>	0.5-15xIN	0.05xIN
	tie>>	0.02-20s	0.01s
Reset Delay	RST-D	0-20s	0.1s
CT Ratio	CT Ratio	1-2500	1
Trip Time Tolerances	±5% +20mSec for VINV, NINV3.0/1.3 ±3%, ±20ms for DEFT (which ever is higher) ±7.5% or +30mSec (which ever is higher) for EINV, NINV0.6 Accuracy as per IEC255-3 in band of (I/Is>2 to I/Is<20) and Is>0.1 IN		
Pickup Tolerances	±5% from set value		

Normal Inverse 3.0

$$t = \frac{0.14}{(I/Is)^{0.02} - 1} \quad ti[s]$$

Normal Inverse 1.3

$$t = \frac{0.061}{(I/Is)^{0.02} - 1} \quad ti[s]$$

Normal Inverse 0.6

$$t = \frac{0.028}{(I/Is)^{0.02} - 1} \quad ti[s]$$

Very Inverse

$$t = \frac{13.5}{(I/Is) - 1} \quad ti[s]$$

Extremely Inverse

$$t = \frac{80}{(I/Is)^{2} - 1} \quad ti[s]$$

I = Injected current
Is = Pickup set level
ti = TMS for inverse characteristics
t = Definite delay in DEFT

!

!!! CAUTION !!!

O/L, S/C, E and EH protection are available with DISABLE in HMI

(11) Setting Procedure

Menu Frames

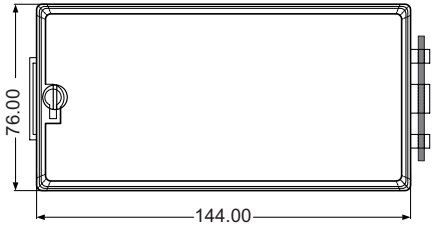
Menu 1 Default Page (Running Parameters)	Ir Iy Ib Ie XX .XX A (RMS)
Menu 2 (Pressing Enter Key)	#EDIT/VIEW MENU# <PROTECTION> <LAST FAULT1> <LAST FAULT2> <LAST FAULT3> <LAST FAULT4> <LAST FAULT5> <RELAY ASSIGN> <TRIP TEST> <EDIT RTC> <CHANG PASSWORD>
Menu 3 : (Pressing Enter Key on PROTECTION selection)	#EDIT# <CT -RATIO> <CHAR - P> <CHAR - E> I> ti> t> I>> t>> Ie> tie> te> Ie>> te>> RST- Delay
Menu 4 : (Pressing Enter Key on CHAR-P/E selection)	# CHAR P/E# DEFT EINV VINV NINV0.6 NINV1.3 NINV3.0 ‰BACK

Menu 5 : (ENTER Key on Relay Assignment)	OL - RELAY : RLY1 SC - RELAY : ----- E - RELAY : ---- EH - RELAY : ----- SUPERVISION - RELAY : ‰BACK
Menu 6: (ENTER Key on Relay Reset)	RELAY 1 : AUTO RELAY 2 : AUTO ‰BACK
Menu 7 (Presing Enter Key on FAULT 1,2,3,4,5 selection)	#TRIP# [F] Ir XX.XXA (Fault Current) [F] Iy XX.XXA (Fault Current) [F] Ib XX.XXA (Fault Current) [F] Ie XX.XXA (Fault Current) Trip OL : L1, L2, L3, E Trip SC : L1, L2, L3, E + [Date / Time Stamp) ‰BACK

ti : Time multiplier setting only for Inverse time characteristic
t : Timer setting only for definite time characteristic

(12) Dimensional Details

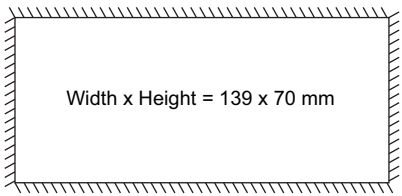
Front View



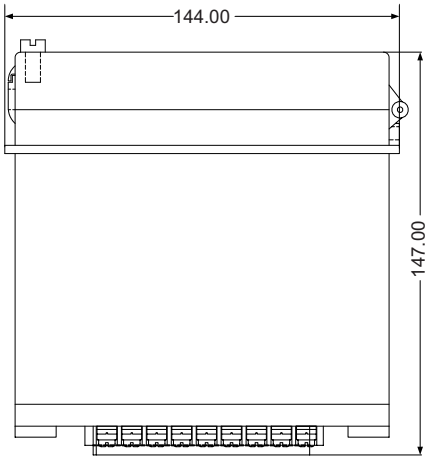
Panel cut out dimension

All dimensions in mm (Gen. Tol: ± 1.0mm)

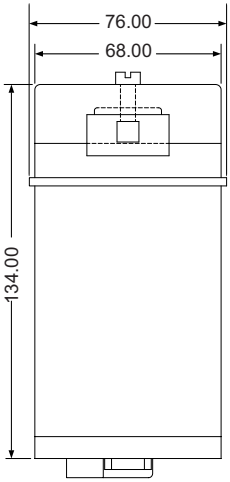
Installation Depth : 111 mm



Bottom View



Side View



(13) Order Form

IRI-PRO-V2	—	X	—	X	—	X

PROTECTION
EO : 1 E/F with High set
3O-EO : 3 O/C+1E/F without High set
3I-EI : 3 O/C+1E/F with High set
I1 : 1 O/C + High set

RATED CURRENT - PHASE (O/C element) In
1 : Rated 1 Amp
5 : Rated 5 Amp

RATED CURRENT - EARTH
1 : Rated 1 Amp
5 : Rated 5 Amp

Notes

The material in this catalogue is for general information and proper performance data and proper model selection. Although every attempt has been made to ensure that the information in this catalogue is correct. C&S reserves the right to change the design, material or specification contained in this catalogue without prior information.

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