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CSEnEX-I 150

Intelligent Measuring & Protection Device

CSEnEX
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Series



Over Current Protection Relay

Catalog



PMD Division

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1) Introduction

CSENEX Series offers a compact Multi-functional Over-current protection solution for Feeder, Generator, Motor & Transformer segment.

CSENEX-I Family of protective relays are numeric relays that provides multi protection and monitoring with reliable and fast protection solution in a single unit.

In this family of CSENEX series, the CSENEX-I 150 is an advanced feeder protection solution which has fast, sensitive and secure protection for feeder internal & external faults.

CSENEX-I offers different model based features to cover the wide range of user.

2) Features

- ❖ 1A & 5A rated CT input (programmable)
- ❖ Draw out with self CT shorting
- ❖ DI/DO programmable matrix
- ❖ Protection blocking through DI
- ❖ Three phase time over-current protection
- ❖ Three phase instantaneous protection
- ❖ Earth time over-current and earth instantaneous over current
- ❖ Circuit breaker failure detection
- ❖ Trip circuit supervision
- ❖ Cold Load pickup
- ❖ Harmonic Blocking
- ❖ Fault recorder
- ❖ Event recorder
- ❖ Communication (Local & Remote)

3) Application

The CSENEX-I relays have been designed for controlling, protecting and monitoring industrial, utility distribution networks and substations. They can also be used as part of a protection scheme for feeders, transformers and generators.

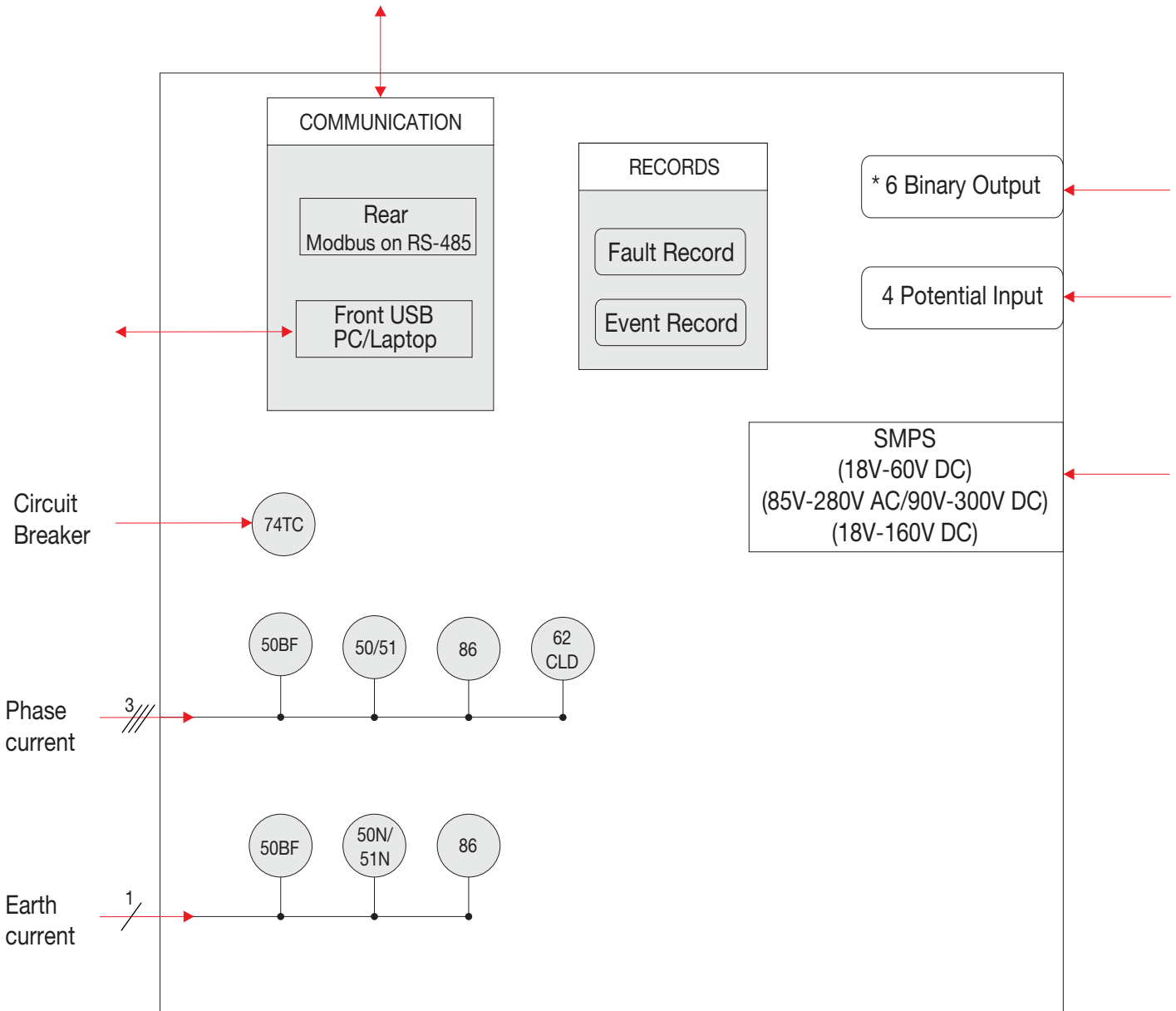
4) Hardware

- ❖ Measures true RMS with DFT filter
- ❖ 1A & 5A site selectable
- ❖ 4 Current analog inputs for phase & earth fault current
- ❖ CT Terminal with Self shorting
- ❖ Max. 4 Digital Inputs
- ❖ Max. 6 Digital Outputs
- ❖ 16 x 2 Alpha-numeric LCD
- ❖ RS-485 & USB communication
- ❖ 16 LEDs for Pickup & fault annunciation

5) Protection Features

- ❖ Three phase time over current protection (51)
- ❖ Three phase instantaneous protection (50)
- ❖ Earth time over-current (51N)
- ❖ Earth instantaneous over-current (50N)
- ❖ Circuit breaker failure protection (50BF)
- ❖ Harmonic Blocking (50H)
- ❖ Cold Load Pickup (62 CLD)
- ❖ Trip Circuit Supervision (74TC)

6) Functional Diagram



(Figure 1)

* Based on Ordering Information

Protection Function

Three Phase Over-current Protection (50/51)

The independent two stages are available for phase fault protection. For I> the user may independently select definite time delay or inverse time delay with different type of curves. The second Hi-Set stage can be configured with definite time only.

Earth Fault Protection (50N/51N)

The independent two stages are available for earth fault protection. For first stage (Ie>) the user can select definite time delay or inverse time delay with different type of curves. The second Hi-Set stage can be configured with definite time only.

Relay Latching (86)

Relay can be configured to Latch /Unlatch depending on configuration. (Latching is possible in presence of Auxiliary supply voltage only)

Circuit Breaker Failure Protection (50 BF)

The CB Failure Protection is based on supervision of phase and earth currents after tripping events. The test criteria is whether all phase currents have dropped to less than CBFP level within tCBFP. If one or more of the phase currents have not dropped to specified current within this time, CB failure is detected and the assigned output relay is activated.

Reset Delay

This parameter introduces a delay in opening of relay contacts, when the current goes below the drop out value for over current, short circuit, earth fault, earth high set etc. This parameter will not work when manual reset mode is selected.

Trip Circuit Supervision (74TC)

This feature continuously supervises trip circuit of both pre closing and post closing conditions in circuit breaker. It detects tripping mechanism failure like circuit breakage contact degeneration in wires, contacts and coils.

Note: Trip counter is incremented on the basis of getting trip command from relay and not on the basis of external mechanism (circuit breaker) operation.

Cold Load Pickup (62 CLD)

This function aims to avoid non-desired trips in the following situation: after being the line de-energized for a period of time and re-energized later, the load exceed the protection setting without the presence of a fault. This may be due to the fact that the “off” period of all the loads (furnaces, heaters, coolers etc.) is elapse and they are all connected at the same time, producing a strong inrush current in the line, but which can be supported within certain time. This phenomenon can occur not only at the moment of the breaker manual closing, after having remained open for a certain time, but also with the breaker permanently closed due to the operation of another upstream breaker.

What the function does is detecting when those conditions are given and changing the tripping settings during a programmable time.

The function is activated when the current in the 3 phases is below 0.08A, then the programmed time starts to run to determine that the load is “cold” (this time can be 0, what means that any circuit breaker opening could lead to the cold load situation). Once that time has expired and the current has not exceed again 0.15A, the protection usual setting values are replaced by the cold load pickup ones. When any of the phase current exceed 0.15A a counter with programmable time starts, during which the setting are the cold load pickup ones. When expiring this time, the settings are again the usual ones.

Harmonic Blocking

To avoid any nuisance tripping, CSENEX-I provides harmonic detection & protection blocking feature. Relay will hold the tripping for a set time, If harmonic is present with protection pickup. Blocking time is configurable in the relay.

NOTE: Trip Test is available in HMI to check all LEDs and Digital Output (Relay)

7) Fault Record

CSENEX-I records last 10 faults in its non volatile memory with it's Date & time stamp. Each record has the following information:

Fault Format

[F]IL1 : 00.00A
 [F]IL2 : 00.00A
 [F]IL3 : 00.00A
 [F]Ie : 00.00A
 HOUR MIN : HH:MM
 SEC mSEC : Sec:mSec
 DATE : DD:MM:YY
 F-TYPE : FAULT TYPE

Where

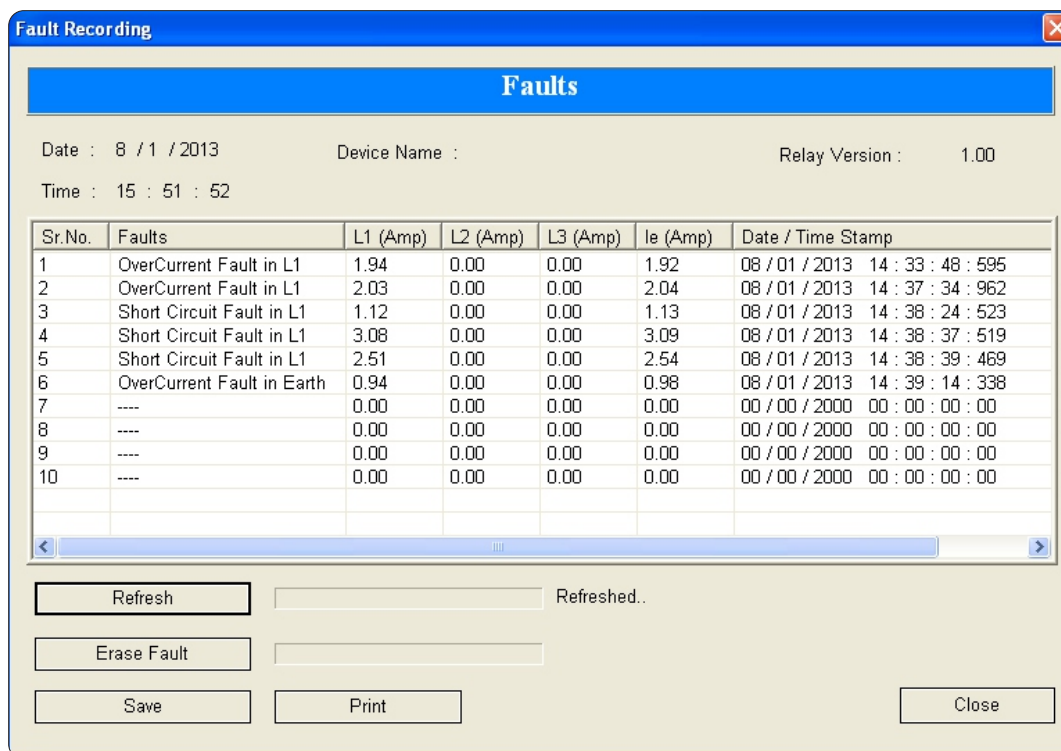
[F][ILx] Magnitude of phase current's.

[F]Ie Magnitude earth fault current's

F-Type Origin of fault (over current etc.)

whenever the available memory space is exhausted the new fault automatically over writes the oldest fault. When the relay trips the description of fault in the feeder will appears on the LCD screen automatically and by pressing 'i' key one can easily get all the detailed information of that fault.

The user can view the fault record either via the front USB interface software or remotely via the RS-485 communication. (See figure-2)



Sr.No.	Faults	L1 (Amp)	L2 (Amp)	L3 (Amp)	Ie (Amp)	Date / Time Stamp
1	OverCurrent Fault in L1	1.94	0.00	0.00	1.92	08 / 01 / 2013 14 : 33 : 48 : 595
2	OverCurrent Fault in L1	2.03	0.00	0.00	2.04	08 / 01 / 2013 14 : 37 : 34 : 962
3	Short Circuit Fault in L1	1.12	0.00	0.00	1.13	08 / 01 / 2013 14 : 38 : 24 : 523
4	Short Circuit Fault in L1	3.08	0.00	0.00	3.09	08 / 01 / 2013 14 : 38 : 37 : 519
5	Short Circuit Fault in L1	2.51	0.00	0.00	2.54	08 / 01 / 2013 14 : 38 : 39 : 469
6	OverCurrent Fault in Earth	0.94	0.00	0.00	0.98	08 / 01 / 2013 14 : 39 : 14 : 338
7	----	0.00	0.00	0.00	0.00	00 / 00 / 2000 00 : 00 : 00 : 00
8	----	0.00	0.00	0.00	0.00	00 / 00 / 2000 00 : 00 : 00 : 00
9	----	0.00	0.00	0.00	0.00	00 / 00 / 2000 00 : 00 : 00 : 00
10	----	0.00	0.00	0.00	0.00	00 / 00 / 2000 00 : 00 : 00 : 00

(Figure 2) (Fault Data Recording on PC software)

8) Event Record

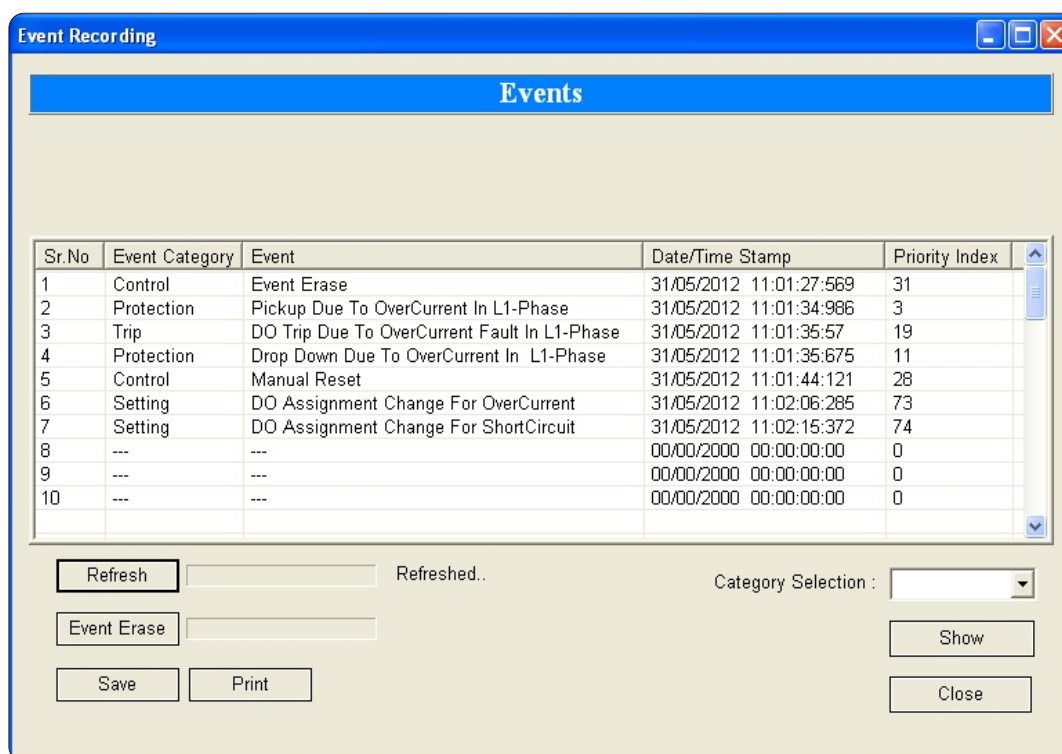
The unit stores in non volatile memory the last 10 events. When the available memory space is exhausted, the new event automatically overwrites the oldest event which can be retrieved from a PC, with the following format:

EVENT : EVENT NUMBER
 HOUR : HH:MM
 SEC mSEC : SEC:mSEC
 DATE : DD/MM/YY
 E-TYPE : TYPE OF EVENT

- ❖ Date and time of the event
- ❖ Descriptive text of the even

The user can view event records via the front USB interface software (See Figure-3)

*Description of event number available in event list or in front end software, Pickup & Trip events are recorded.



(Figure 3) (Event Data Recording on PC Software)

Output Contacts

No. of digital outputs : 06 Nos. (configurable)
 Type of outputs : Relay
 Programmable (DO Assignment) : Yes
 Relay reset type : Programmable (Auto/Manual)

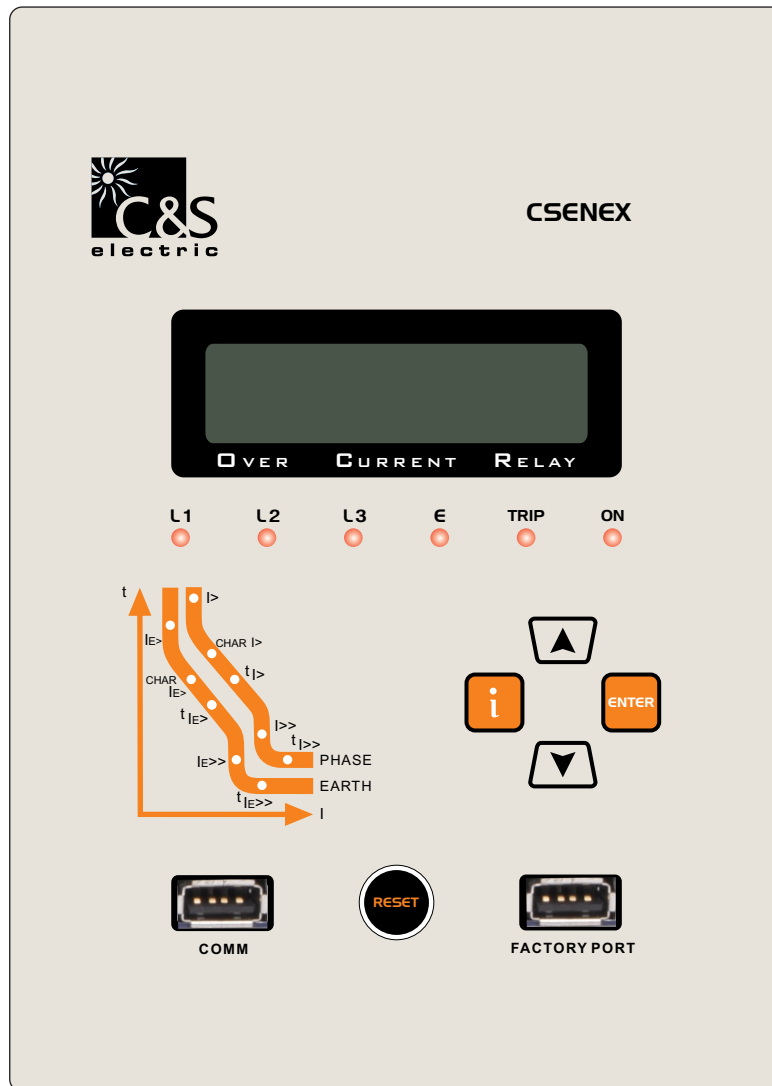
Input Contacts

No of digital inputs : 04 Nos.
 Programmable (DI Assignment) : Yes

9) Human Machine Interface

It comprises of bright LCD display

- ❖ Four push switches for setting values of normal tripping characteristics and other operations for local access
- ❖ One 'RESET' push switch
- ❖ LEDs for pickup or tripping on fault and event in any phase



(Figure 4)

Keys	Manual Key
	is used as intelligent key to see the details of last fault and Relay status.
	is used as a "ENTER" key.
	is used to manual reset (after pressing for 2 sec).
	is used to scroll in upward direction.
	is used to scroll in downward direction.

10) Communication (Local and Remote)

The unit has: ❖ 1 Front USB port for direct connection to a PC
❖ 1 Rear RS-485 communication port

10.1) Rear Communication : The protocol for the rear port is MODBUS-RTU / IEC 103.

10.2) Front Communication : The entire setting, Fault & Event are available on 'A' type USB (female) interface with CSE LIVELINK with saving & printing option.

11) Setting Ranges

Phase Over Current and Earth Protection

S. No	Parameter	Display	Setting Range		Step Size	Default Setting
			Min.	Max.		
1	Phase characteristics	P-Char	-----	-----	DEFT/EINV/VINV /LINV/NINV1.3/ NINV3.0/NINV0.6	DEFT
2	Earth Characteristics	E-Char	-----	-----	DEFT/EINV/VINV /LINV/NINV1.3/ NINV3.0/NINV0.6	DEFT
3	Phase over-current low set pickup setting	I>	0.05xI _p	4xI _p	0.01xI _p	EXIT
	Phase over-current definite timing	t>	0.05 Sec	150 Sec	0.01Sec	0.10 Sec
	Phase over-current inverse timing	ti>	0.01	1.50	0.005	0.05
4	Phase over-current hi-set pickup setting	I>>	0.05xI _p	30xI _p	0.01xI _p	EXIT
	Phase over-current hi-set definite timing	t>>	0.02 Sec	20 Sec	0.01Sec	0.10 Sec
5	Earth over-current low set pickup setting	Ie>	0.05xI _n	2.5xI _n	0.01xI _n	EXIT
	Earth over-current low set definite timing	te>	0.03 Sec	150 Sec	0.01Sec	0.10 Sec
	Earth over-current low set inverse timing	tie>	0.01	1.50	0.005	0.05
6	Earth over-current hi-set pickup setting	Ie>>	0.05xI _n	15xI _n	0.01xI _n	EXIT
	Earth over-current hi-set definite timing	te>>	0.02 Sec	20 Sec	0.01 Sec	0.10 Sec

$$\text{Very Inverse} \quad t = \frac{13.5}{(I/I_s) - 1} \quad t_i [s]$$

$$\text{Extremely Inverse} \quad t = \frac{80}{(I/I_s)^2 - 1} \quad t_i [s]$$

$$\text{Long time Inverse} \quad t = \frac{120}{(I/I_s) - 1} \quad t_i [s]$$

$$\text{Normal Inverse 3.0/1.3/0.6} \quad t = \frac{0.14/0.061/0.028}{(I/I_s)^{0.02} - 1} \quad t_i [s]$$

Where t = Tripping time t_i = Time multiplier
 I = Fault current I_s = Setting value of current

Trip timing Accuracy : DEFT/ NINV 0.6 / NINV 3.0 / 1.3 : ±5% OR ±40mSec (whichever is higher)
EINV / VINV / LINV : ±7.5% OR ±40mSec (whichever is higher)

Cold Load Protection (62 CLD)

S. No	Parameter	Display	Setting Range		Step Size	Default Setting
			Min.	Max.		
1	Phase characteristics	P-Char	-----	-----	DEFT/EINV/VINV /LINV/NINV1.3/ NINV3.0/NINV0.6	DEFT
2	Earth Characteristics	E-Char	-----	-----	DEFT/EINV/VINV /LINV/NINV1.3/ NINV3.0/NINV0.6	DEFT
3	Phase over-current low set pickup setting	l>	0.05xlp	4xlp	0.01xlp	EXIT
	Phase over-current definite timing	t>	0.05 Sec	150 Sec	0.01Sec	0.10 Sec
	Phase over-current inverse timing	ti>	0.01	1.50	0.005	0.05
4	Phase over-current hi-set pickup setting	l>>	0.05xlp	30xlp	0.01xlp	EXIT
	Phase over-current hi-set definite timing	t>>	0.02 Sec	20 Sec	0.01Sec	0.10 Sec
5	Earth over-current low set pickup setting	le>	0.05xln	2.5xln	0.01xln	EXIT
	Earth over-current low set definite timing	te>	0.03 Sec	150 Sec	0.01Sec	0.10 Sec
	Earth over-current low set inverse timing	tie>	0.01	1.50	0.005	0.05
6	Earth over-current hi-set pickup setting	le>>	0.05xln	15xln	0.01xln	EXIT
	Earth over-current hi-set definite timing	te>>	0.02 Sec	20 Sec	0.01 Sec	0.10 Sec
7	Cold Load Pickup	CLP PKUP	Enable	Disable	-----	Disable
8	Cold Load Time	tcold	0.00s	100.00s	-----	0.10s

Trip Circuit Supervision Protection (74TC)

S.No.	Parameter	Display	Setting Range		Step Size	Default Setting
			Min.	Max.		
1	TCS	t_TCS	0.03 Sec	2 Sec	0.01	EXIT

Circuit Breaker Failure Protection (50BF)

S.No.	Parameter	Display	Setting Range		Step Size	Default Setting
			Min.	Max.		
1	CBFP	t_CBFP	0.03 Sec	2 Sec	0.01	EXIT
2	CBFP Level	CBFP%	5%	50%	5%	5%

Harmonic Setting

S.No.	Parameter	Display	Setting Range		Step Size	Default Setting
			Min.	Max.		
1	Enable Phase block	PH Block	NO	YES	-----	NO
2	Phase Blocking time	t_phase	0.10 Sec	20 Sec	0.01	0.10 Sec
3	Enable Earth block	E Block	NO	YES	-----	NO
4	Earth Blocking time	t_earth	0.10 Sec	20 Sec	0.01	0.10 Sec

DI Assignment

S.No	Parameter	Display	Setting Range	
			Min.	Max.
1	CB Open	CB Open	---	1234
2	CB Close	CB Close	---	1234
3	Remote Reset	RemoteRst	—	1234
4	Over current Blocking	OCBLK	—	1234
5	Short Circuit Blocking	SCBLK	—	1234
6	Earth Low set Blocking	ELBLK	—	1234
7	Earth High set Blocking	EHLK	—	1234

DO Assignment

S.No	Parameter	Display	Setting Range		Step Size *
			Min.	Max.	
1	Phase over-current low set	I>	---	—	DO1/DO2.....DO6
2	Phase over-current hi-set	I>>	---	---	DO1/DO2.....DO6
3	Earth over-current low set	Ie>	---	---	DO1/DO2.....DO6
4	Earth over-current hi-set	Ie>>	---	---	DO1/DO2.....DO6
5	Circuit breaker failure protection	CBFP	---	---	DO1/DO2.....DO6
6	Common Fault	ComFlt	---	---	DO1/DO2.....DO6
7	Trip circuit supervision	TCS	---	---	DO1/DO2.....DO6
8	Self supervision	SELF SUP	---	---	DO1/DO2.....DO6

* Note: No. of DOs are Model Dependent

Function Reset

S.No.	Parameter	Display	Setting Range		Default Setting
			Min.	Max.	
1	Phase over-current low set	I>	AUTO	MANUAL	AUTO
2	Phase over-current hi set	I>>	AUTO	MANUAL	AUTO
3	Earth over-current low set	Ie>	AUTO	MANUAL	AUTO
4	Earth over-current hi set	Ie>>	AUTO	MANUAL	AUTO
5	Trip Circuit Supervision	TCS	AUTO	MANUAL	AUTO
6	Common Fault	ComFlt	AUTO	MANUAL	AUTO

Common Setting

S.No.	Parameter	Display	Setting Range		Step Size	Default Setting
			Min.	Max.		
1	Rated Phase Current	Ip	1.00 Amp	5.00 Amp	-----	1.00 Amp
2	Rated Earth Current	In	1.00 Amp	5.00 Amp	-----	1.00 Amp
3	Phase CT Ratio	PCTRATIO	1	9999	1	1
4	Earth CT Ratio	ECTRATIO	1	9999	1	1
5	Reset Delay	ResetDly	0	20 Sec	0.1 Sec	0 Sec
6	Fault Popup	Flt_Pop	YES	NO	-----	YES

Rear Port (RS-485) Communication

Protocol	MODBUS RTU / IEC 103
Baud rate selection (programmable)	4800/9600/19200/38400/57600 bps
Parity selection (programmable)	Even / Odd / None
Stop bit	1 Bit
Data bit	8 Bit data
Remote Address (programmable)	(1 to 247)
Cable required for interface	Two wire twisted shielded cable

USB Communication

Protocol	CSE proprietary protocol: available with front software
Baud rate	9600 bps
Cable required for interface	USB cable type (A to A)

Auxiliary Supply

Auxiliary Voltage Range	For 'L' Model	18V-60V DC
	For 'H' Model	85V-280V AC / 90V-300V DC
	For 'W' Model	18V-160V DC
Power Consumption	Quiescent approx. 3W	Operating approx. <7W
Rated Supply for Digital Input	For 'L' Model	18V-150V DC (Active)
		<10V DC (Inactive)
	For 'H' Model	40V-280V AC (Active)
		40V-300V DC (Active)
		<25V AC/DC (Inactive)

Measurement Accuracy

S.No	Quantity	Range	Frequency	Accuracy
1	Current	0.05- 30 xI _p	50 Hz	±2% / ±10mA

Pickup Accuracy

S.No	Quantity	Range	Frequency	Accuracy
1	Current	1 - 30 xI _p	50 Hz	+5% of Pickup setting

12) Technical Data

Measuring Input

Rated Data	Rated current I _p :1A or 5A Rated frequency F _n : 50 Hz
Drop out to Pickup Ratio	>96%
Reset Time	30mSec
Power consumption in current circuit	At I _p =1A 0.1 VA At I _p =5A 0.2 VA
Thermal withstand capability in current circuit	Dynamic current withstand for 1 Sec : 100 x I _p for 10 Sec : 30 x I _p continuously : 4 x I _p

Trip Contact Rating

Contact Rating	
Contact relay	Dry contact Ag Ni
Make current	Max. 30A & carry for 3S
Carry capacity	8A continuous : Relay 1, Relay 2
	6A continuous : Relay 3, 4, 5, 6
Rated voltage	250V AC/ 30V DC
DC Current Carrying Capacity	8A@30VDC / 0.3A@110VDC/ 0.2A@220VDC
Breaking Characteristics	
Breaking capacity AC	1500VA resistive 1500VA inductive (PF=0.5)
	220V AC, 5A (cosØ ≤0.6) 135V DC, 0.3A (L/R=30ms) 250V DC, 50W resistive or 25W inductive (L/R=40ms)
Breaking capacity DC	
Operation time	<10ms
Durability	
Loaded contact	10,000 operation minimum
Unloaded contact	30,000 operation minimum

13) Mechanical Test

Shock	As per DIN IEC 41 B (CO) 38: class 1
Vibration	As per DIN IEC 41 B (CO) 35: class 1
Protection-Front Panel	IP-54
Protection-Rear Panel	IP-00
Weight	Approx. 1.0 Kg

14) Specification Table of I-150 Model

Function	ANSI	NEX-I 150
CT inputs	–	4
PT inputs	–	x
Over current	50/51	✓
Earth Fault	50N/51N	✓
CBFP	50BF	✓
Trip circuit	74TC	✓
Cold Load Pickup	62 CLD	✓
Harmonic blocking	50H	✓
Fault record	–	10
Event record	–	10
Selection of 1/5A	–	Site selectable
Digital input	–	4
Digital output	–	6
Enclosure type	–	Draw out with CT shorting
Front communication	–	✓
Rear comm. (RS-485)	–	✓

15) Standards

Type Test			
F1	Functional Tests	Internal Design	Performance in line with Specification & Standards
		Specifications & IEC 60255-6 IEC 60255-3	Pickup/Drop down/Power consumption in Current/Voltage/Aux Supply/Trip timing accuracy: OC/ Directional/NPS/Thermal/OV/Zero Seq/Over Power/ freq/Rate of change of Freq

Climatic Test			
C1	Temperature Dry Cold (Relay operational)	IEC 60068-2-1	-20 deg C, 96 hours
C2	Temperature Dry Cold Transportation & Storage	IEC 60068-2-1	-25 deg C, 96 hours
C3	Temperature Dry Heat (Relay operational)	IEC 60068-2-2	55 deg C, 96 hours
C4	Temperature Dry Heat Transportation & Storage	IEC 60068-2-2	70 deg C, 96 hours
C5	Damp Heat Test (Relay operational)	IEC 60068-2-3	95% @ +55 / +25 deg C, 6 cycle (12hr + 12hr each)

Enclosure			
C6	Enclosure	IEC 529	Front IP54 (Dust 5x + Water x4)

Mechanical Test

Relay Operational			
M1	Vibration response / Endurance test	IEC 60255-21-1	Class I Vibration response (Relay operational) 10Hz~150 Hz - peak displacement 0.035 mm below 58/60 Hz, 0.5 g above, 1 sweep cycle in each axis Vibration endurance (Relay de-energised) 10 Hz~150 Hz 1g, 20 sweep cycles in each axis
M2	Shock Response / Withstand Test	IEC 60255-21-1	Class I Shock response (Relay operational) 5g 11mS 3 pulse in each axis Shock withstand (Relay de-energised) 15g 11mS 3 pulses in each axis
M3	Bump	IEC 60255-21-1	Bump (Relay de-energised) 10g 16mS 1000 pulses in each axis
M4	Seismic	IEC 60255-21-3	Class I Method A single axis sine sweep 1 Hz~35 Hz~below 8/9 Hz 3.5 mm peak displacement horizontal axis, 1.5 mm vertical axis above 8/9 Hz 1g horizontal, 0.5 g vertical 1 sweep cycle in each axis

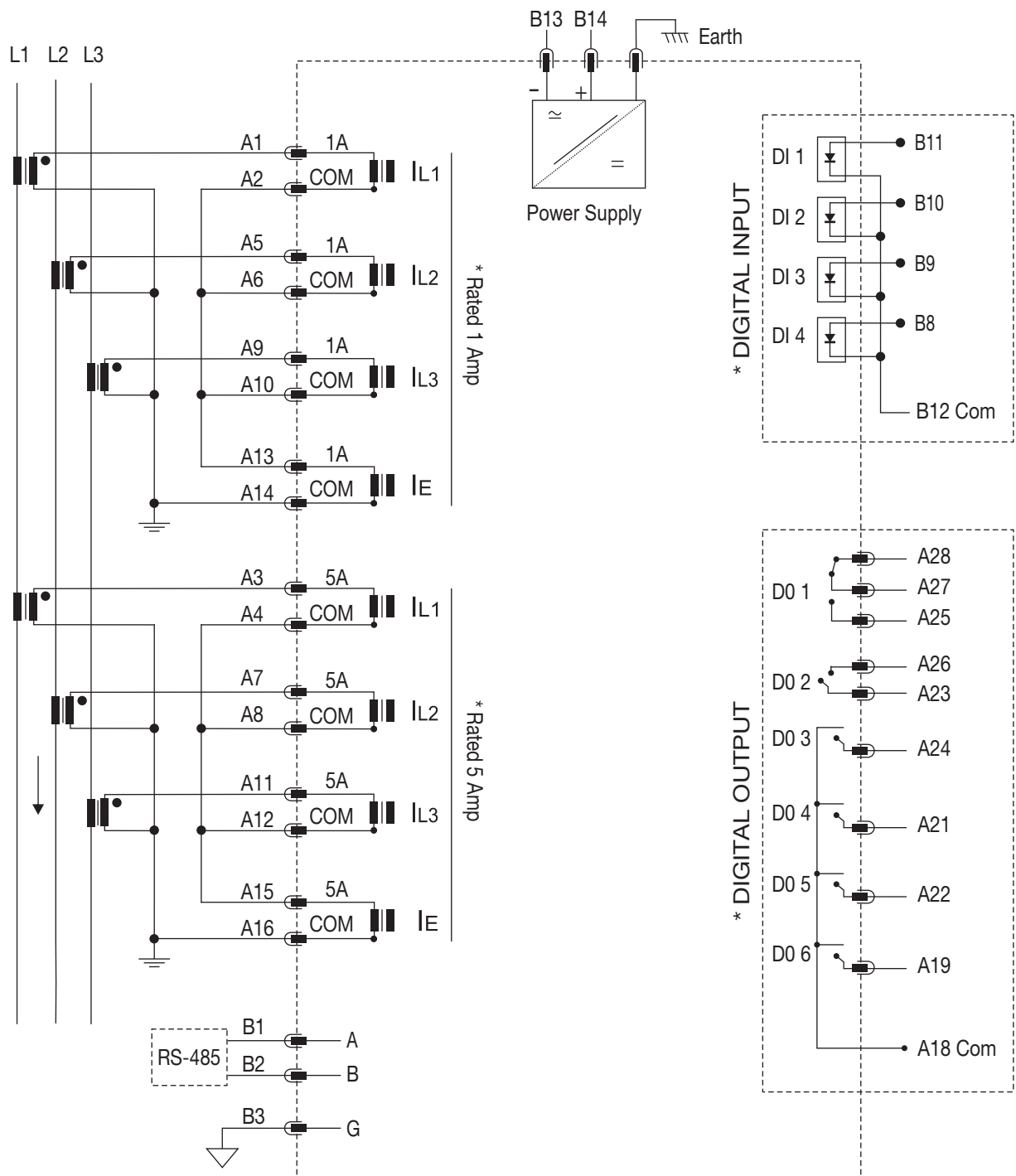
Electrical Test			
E1	Insulation Resistance >100MΩ	IEC 60255-5	500V DC, 5 sec between all terminals & case earth, between terminals of independent circuits including contact circuits and across open contacts
E2	DC & AC Supply Voltage (Relay operational)		IEC60255-6 Voltage range, upper & lower limit continuous withstand, ramp up & down over 1 minute
E3	Voltage Dips, Short Interruptions & Voltage variations immunity (Relay operational)	IEC 1000-4-11	IEC60255-113 Dips & 3 Interruptions at 10 sec intervals of duration between 10mS and 500mS at zero crossings & at other points on wave Variation: 100% to 40% over 2s, hold for 1s, return to 100% over 2s
E4	Ripple in DC supply (Relay operational)	IEC 60255-11	12% AC ripple
E5	Dielectric Test (Relay de-energised) No breakdown or flash over Test voltage 45~65 Hz sinusoidal or with DC voltage at 1.4x the stated AC values	IEC 60255-5	2.0 KV @ 1min All circuit to Earth / Between IP & OP
E6	High Voltage Impulse (Relay de-energised)	IEC 60255-5	5 kV peak 1.2/50uS, 0.5 J-3 positive, 3 negative between all terminals to case earth between independent circuits
E7	VT Input Thermal Withstand		1.5xVn, continuous
E8	CT Input Thermal Withstand		250xIn half wave 100xIn for 1 second 30xIn for 10 second 4xIn continuously
E9	Contact performance & endurance tests	IEC 60255-14,15 IEC 60255-23	

Electro-magnetic Compatibility			
R1	Electrical fast Transient/Burst (Relay operational)	IEC60255-22-4 IEC60100-4-4	Class IV- ± 4.0 kV All Circuits. Pulse 5/50nsec/Duration 15msec/ Period: 300msec/Pulse Freq: 5KHz / 2KV at I/O
R2	HF Disturbance Test (Oscillatory Waves) 1 MHz Burst (Relay operational)	IEC60255-22-1	Class III Longitudinal 2.5 kV peak, 2sec between independent circuits & case earth
R3	Electrostatic Discharge (Relay operational)	IEC60255-22-2 IEC61000-4-2	Class III 8kV air discharge, 6KV contact No of Discharge : 10 both polarities at 1 sec intervals
R4	Conducted Disturbance RF fields (Relay operational)	IEC61000-4-6 IEC60255-22-6	0.15 to 80 MHz (Level-3) Severity Level 10V RMS + sweeps 0.05-0.15 MHz & 80-100 MHz
R5	Radiated RF E-M field immunity test (Relay operational)	IEC60255-22-3 IEC61000-4-3	Class III Test method A + sweep 80-1000 MHZ or IEC 1000-4-3 80-1000 MHZ severity 10 V/m 80% modulated 1 kHz
R6	Surge Immunity capacitively coupled (Relay operational)	IEC61000-4-5 Class 5 Test level 4 IEC60255-22-5: 2008 Latest: IEC60255-26:2013	Short circuit combination wave generator 1.2 uS/50 uS open circuit repetition rate 1 per minute Power supply, CT & VT circuits – 4kV common mode 2 Ohm source 2kV differential mode 12 Ohm source
R7	Power Frequency Magnetic Field (Relay operational)	IEC61000-4-8	100 A/m for 1 minute in each of 3 axes
R8	Conducted & Radiated RF Interference Emission (Relay operational)	EN55011 IEC60255-25	CISPR11/ Class A
R9	Power Frequency, conducted common mode	IEC 1000-4-16 IEC60255-22-7	D.C. to 150 kHz Test Level 4 300V at 16 2/3 Hz and 50 Hz

16) Recommended Terminal Lugs Specifications

Term Blocks	Type/Cable Specifications
Current Inputs	Ring Type lug / 2.5mm ² or 4 mm ² control cable
Auxiliary Supply	Pin Type lug / 1.5 mm ² / 2.5 mm ² control cable
Rear Comm. Port	Pin Type lug / 1.5 mm ² / 2.5 mm ² control cable
Front Comm. Port	USB, Type A
Binary Input	Pin Type lug / 1.5mm ² / 2.5mm ² control cable
Binary Output	Pin Type lug / 4.0mm ² control cable
Earth Connections	Ring Type / 2.5mm ² or 4 mm ² contact cable

17) Connection Diagram



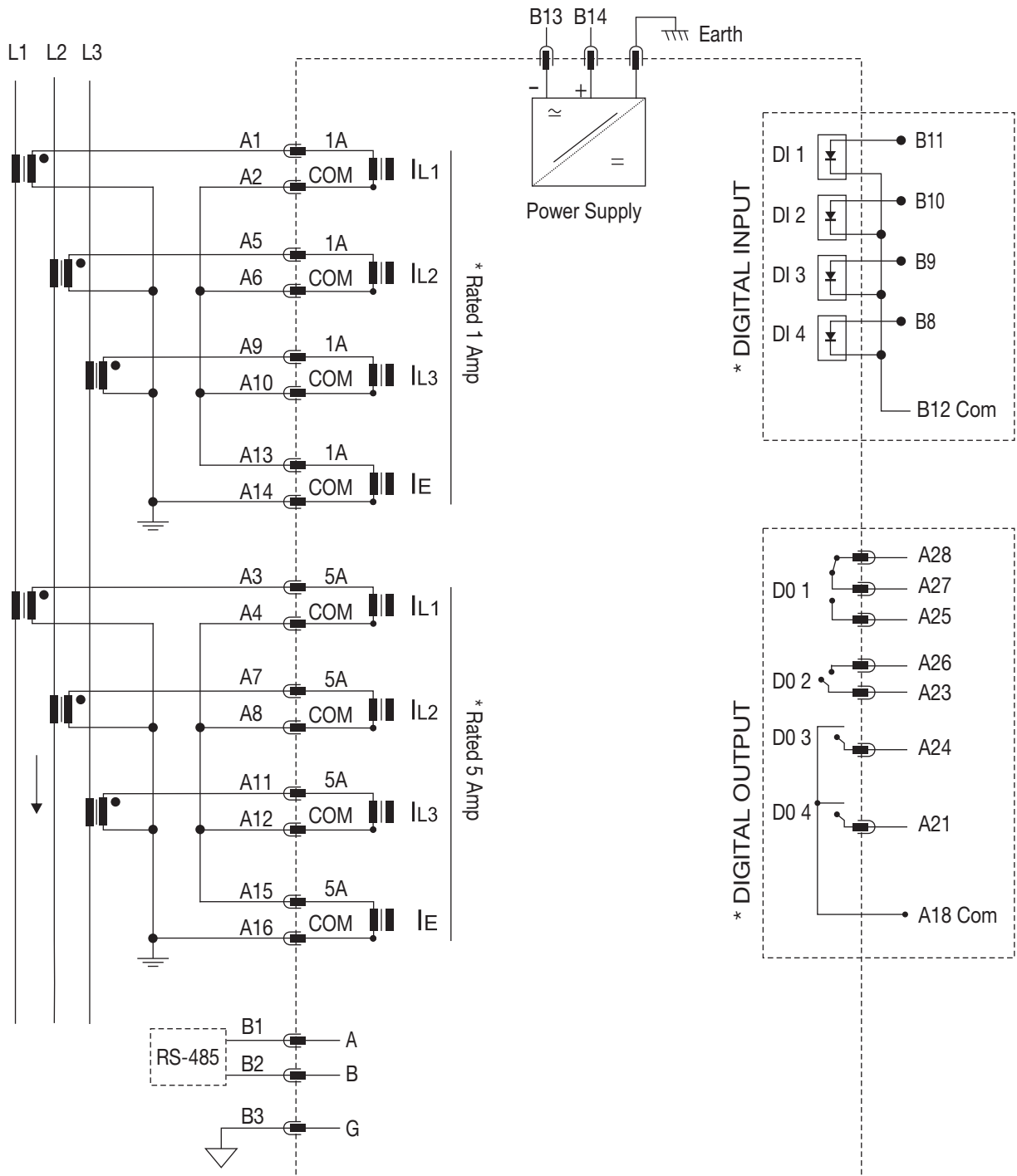
CSENX-I for 4 DIs & 6 DOs

(Figure 5)

18) Terminal Description (for 4 DIs & 6 DOs)

Term Name	Terminal Description
A1-A2	CT Terminal for Phase current input (1A) in L1 Phase
A5-A6	CT Terminal for Phase current input (1A) in L2 Phase
A9-A10	CT Terminal for Phase current input (1A) in L3 Phase
A13-A14	CT Terminal for Phase current input (1A) in Neutral current
A3-A4	CT Terminal for Phase current input (5A) in L1 Phase
A7-A8	CT Terminal for Phase current input (5A) in L2 Phase
A11-A12	CT Terminal for Phase current input (5A) in L3 Phase
A15-A16	CT Terminal for Phase current input (5A) in Neutral current
A19-A18	Digital Output (DO-6) (NO-COM)
A22-A18	Digital Output (DO-5) (NO-COM)
A21-A18	Digital Output (DO-4) (NO-COM)
A24-A18	Digital Output (DO-3) (NO-COM)
A26-A23	Digital Output (DO-2) (NO-COM)
A28-A27-A25	Digital Output (DO-1) (NC-COM-NO)
B1-B2	RS-485 (A), RS-485 (B)
B3	RS-485 Ground
B8-B12	Digital Input (DI-4)
B9-B12	Digital Input (DI-3)
B10-B12	Digital Input (DI-2)
B11-B12	Digital Input (DI-1)
B13-B14	Aux supply (B13: '-' B14: '+')

19) Connection Diagram



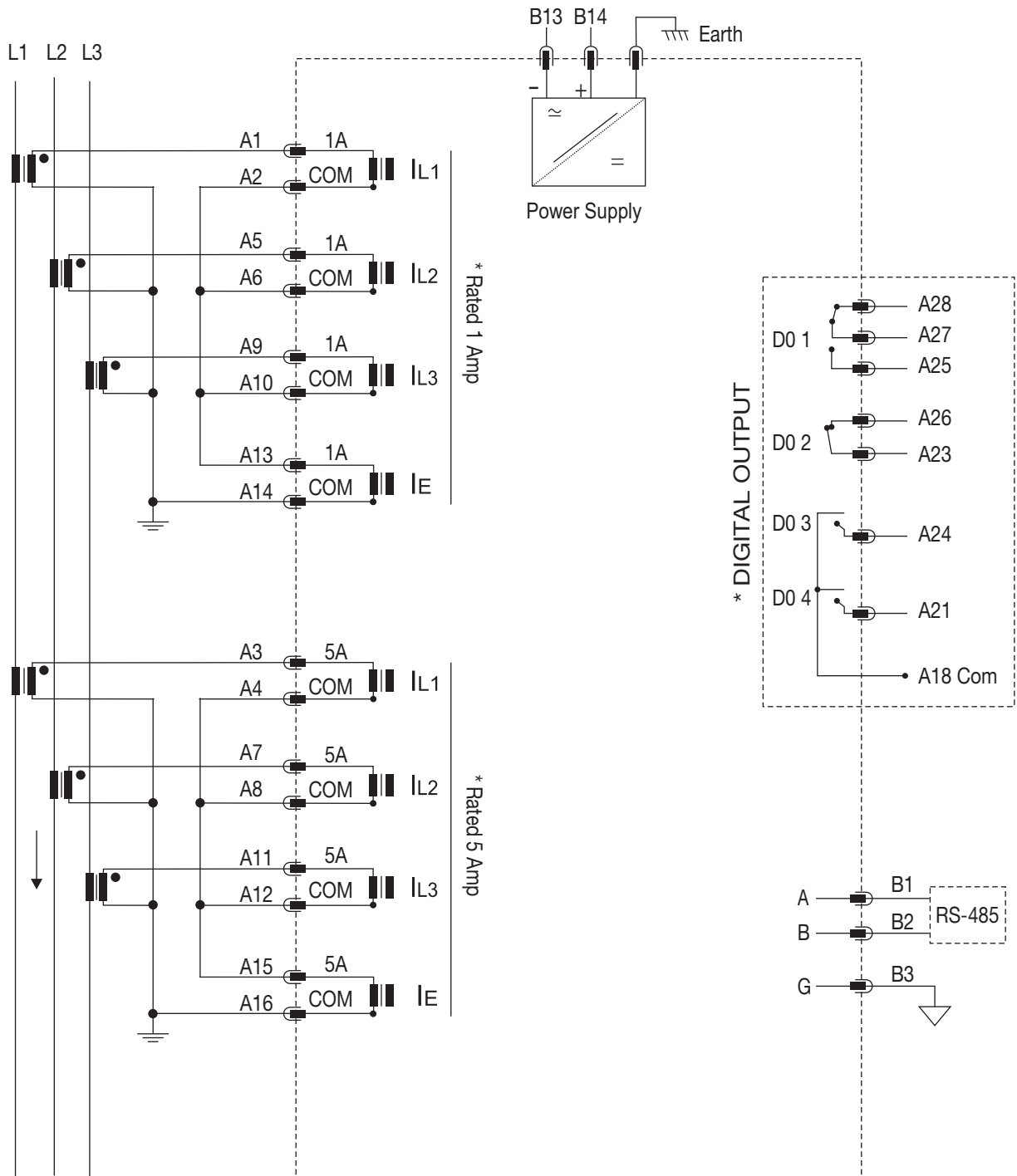
CSENX-I for 4 DIs & 4 DOs

(Figure 6)

20) Terminal Description (for 4 DIs & 4 DOs)

Term Name	Terminal Description
A1-A2	CT Terminal for Phase current input (1A) in L1 Phase
A5-A6	CT Terminal for Phase current input (1A) in L2 Phase
A9-A10	CT Terminal for Phase current input (1A) in L3 Phase
A13-A14	CT Terminal for Phase current input (1A) in Neutral current
A3-A4	CT Terminal for Phase current input (5A) in L1 Phase
A7-A8	CT Terminal for Phase current input (5A) in L2 Phase
A11-A12	CT Terminal for Phase current input (5A) in L3 Phase
A15-A16	CT Terminal for Phase current input (5A) in Neutral current
A21-A18	Digital Output (DO-4) (NO-COM)
A24-A18	Digital Output (DO-3) (NO-COM)
A26-A23	Digital Output (DO-2) (NO-COM)
A28-A27-A25	Digital Output (DO-1) (NC-COM-NO)
B1-B2	RS-485 (A), RS-485 (B)
B3	RS-485 Ground
B8-B12	Digital Input (DI-4)
B9-B12	Digital Input (DI-3)
B10-B12	Digital Input (DI-2)
B11-B12	Digital Input (DI-1)
B13-B14	Aux supply (B13: '-' B14: '+')

21) Connection Diagram



CSENEX-I for 4 DOs

(Figure 7)

22) Terminal Description (for 4 DOs)

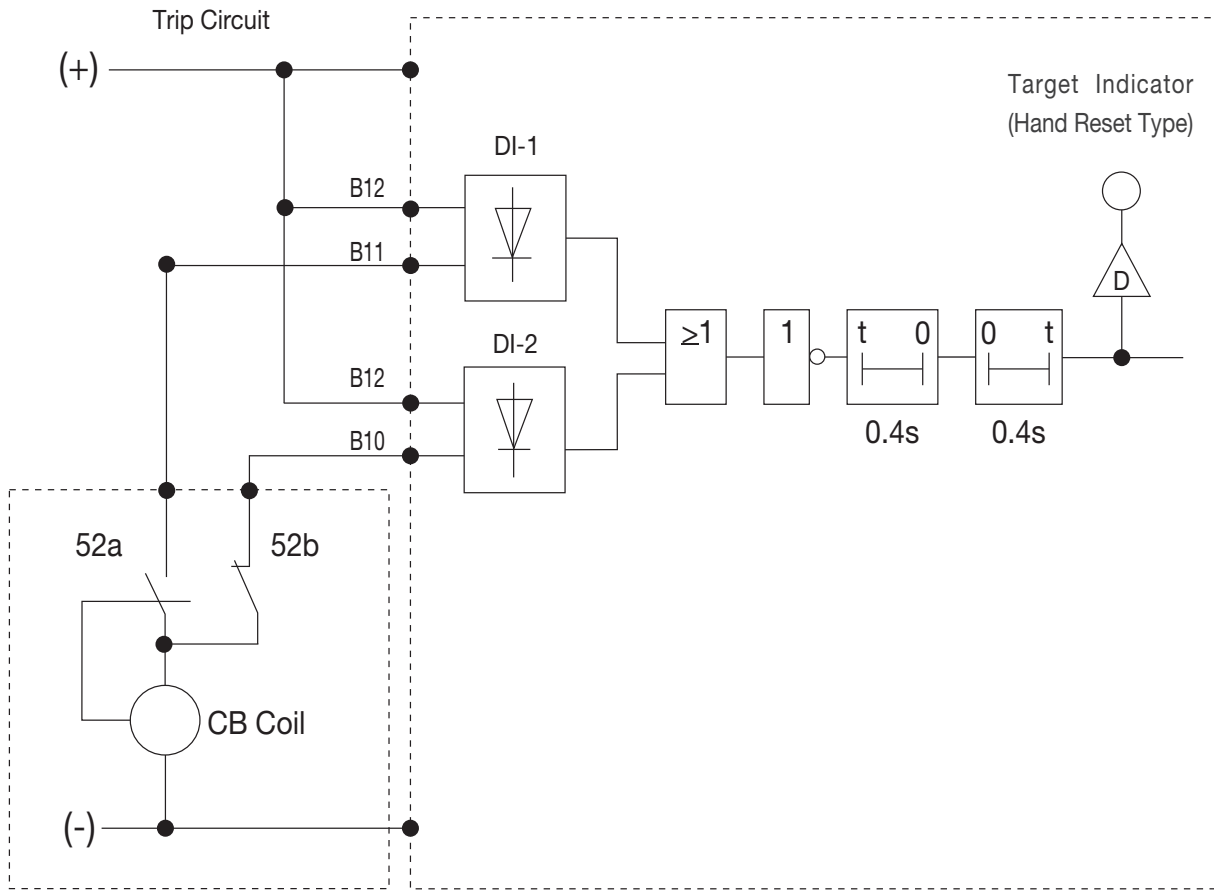
Term Name	Terminal Description
A1-A2	CT Terminal for Phase current input (1A) in L1 Phase
A5-A6	CT Terminal for Phase current input (1A) in L2 Phase
A9-A10	CT Terminal for Phase current input (1A) in L3 Phase
A13-A14	CT Terminal for Phase current input (1A) in Neutral current
A3-A4	CT Terminal for Phase current input (5A) in L1 Phase
A7-A8	CT Terminal for Phase current input (5A) in L2 Phase
A11-A12	CT Terminal for Phase current input (5A) in L3 Phase
A15-A16	CT Terminal for Phase current input (5A) in Neutral current
A21-A18	Digital Output (DO-4) (NO-COM)
A24-A18	Digital Output (DO-3) (NO-COM)
A26-A23	Digital Output (DO-2) (NC-COM)
A28-A27-A25	Digital Output (DO-1) (NC-COM-NO)
B1-B2	RS-485 (A), RS-485 (B)
B3	RS-485 Ground
B13-B14	Aux supply (B13: '-' B14: '+')

Cable required for Front USB Communication (Type A to A)



(Figure 8)

23) Trip Circuit Supervision Diagram



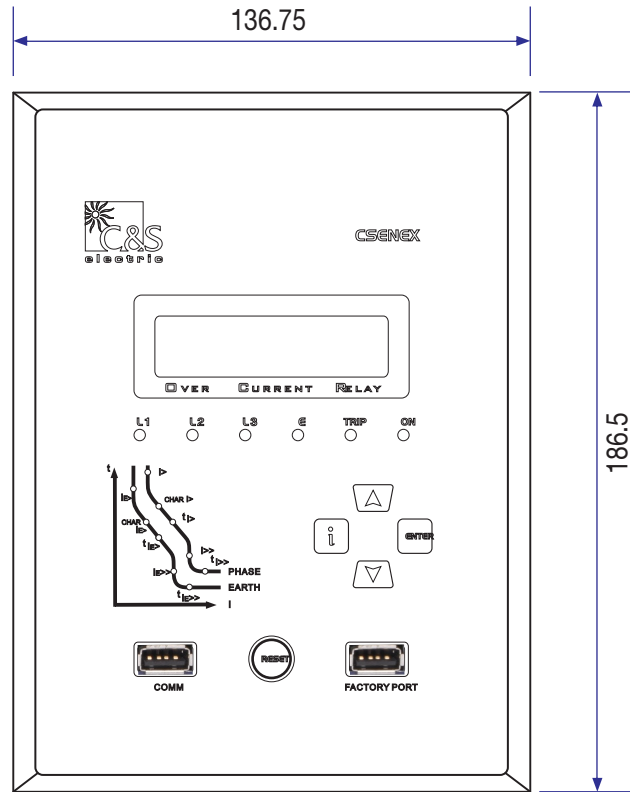
(Trip Circuit Supervision Function)

* Terminal above shown for reference only. Any Digital Input can be configure for TCS (CB Close / CB Open DI)

24) Dimensional Details

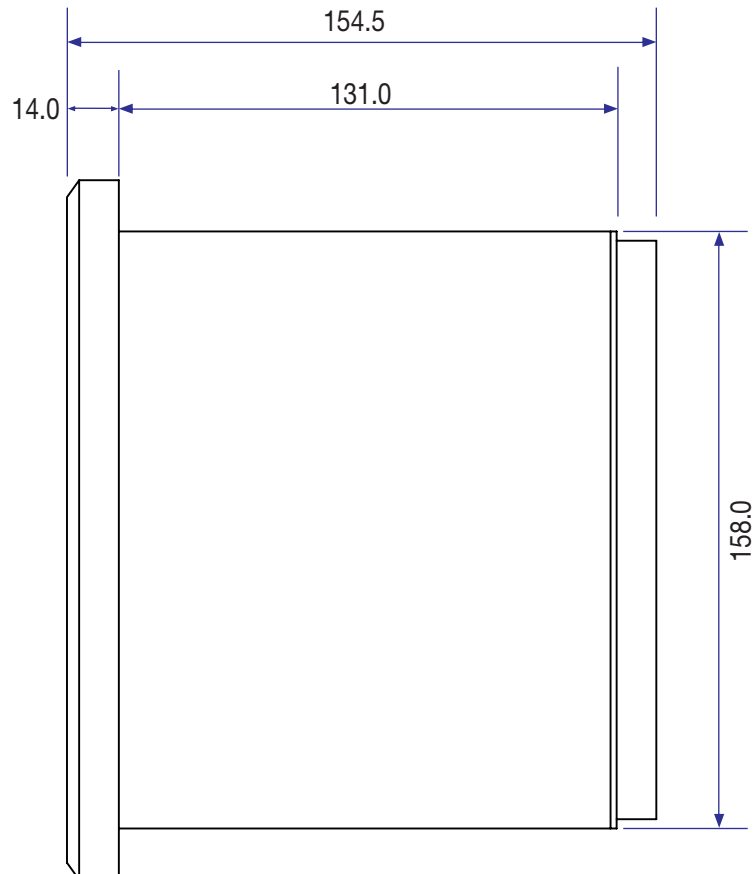
All the Dimension are in mm (Gen Tol.: ± 1.0 mm)

Front View



(Figure 9)

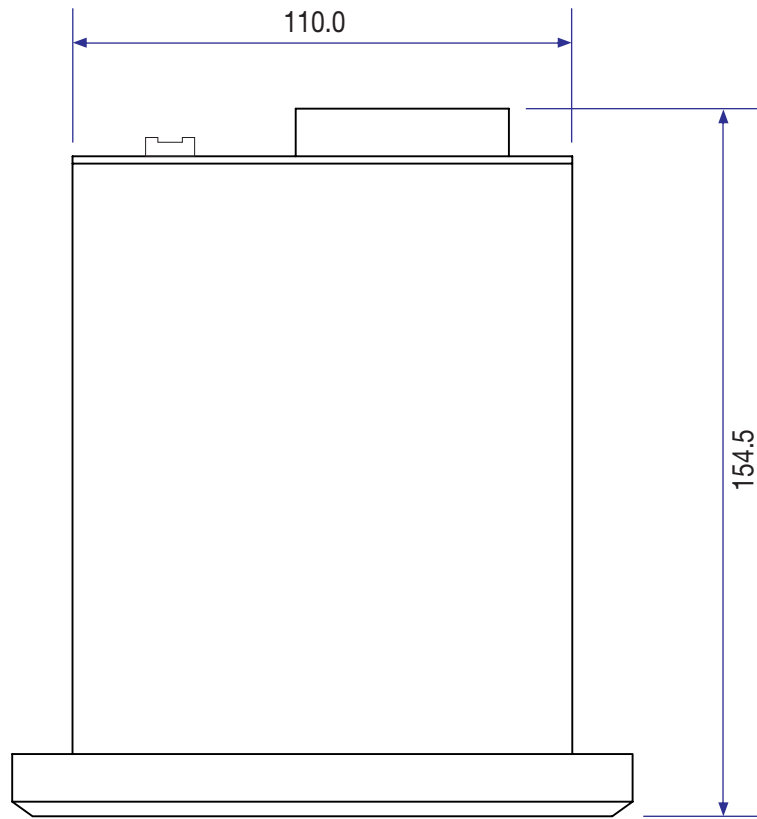
Side View



(Figure 10)

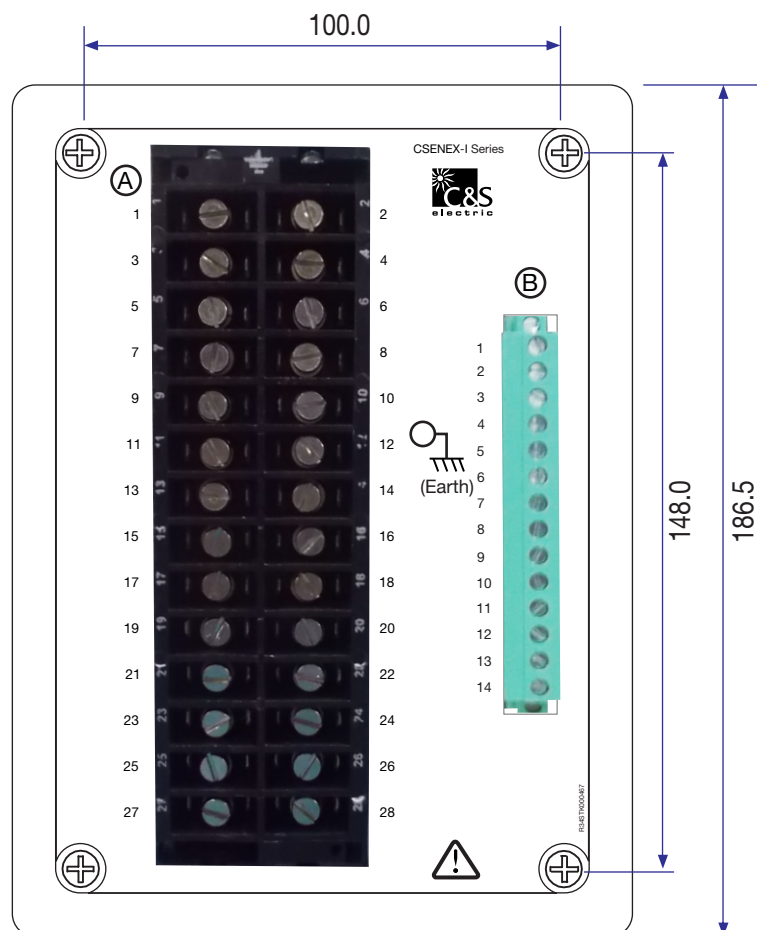
Dimensional Details contd..

Top View



(Figure 11)

Back View



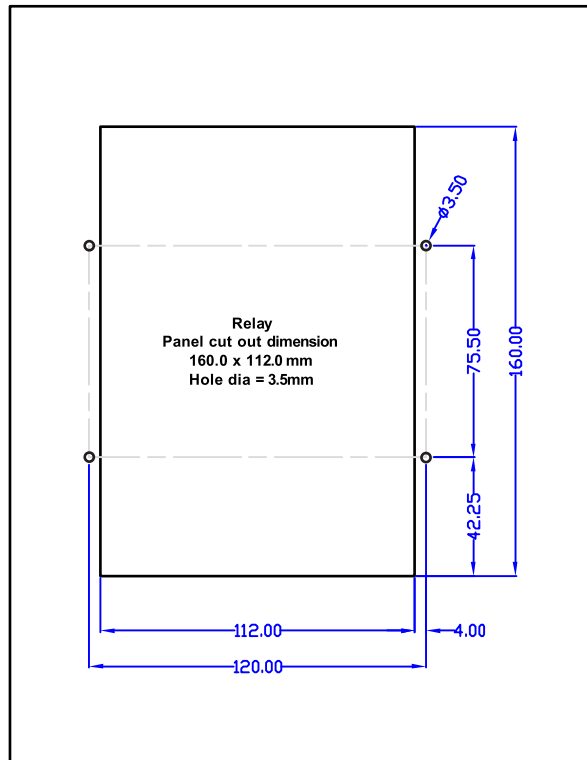
(Figure 12)

25) Panel Mounting Details

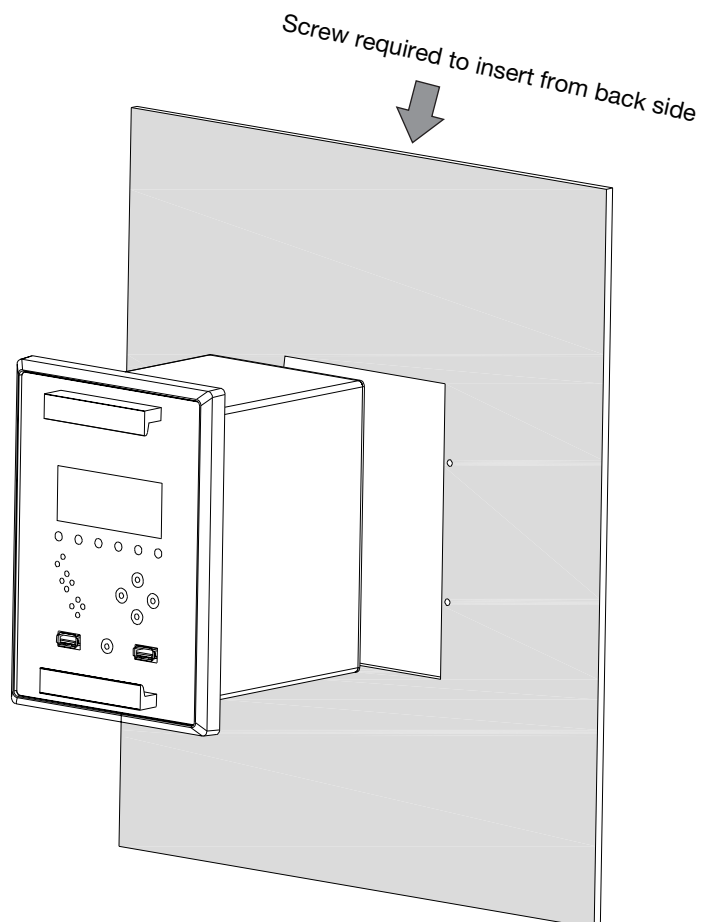
Panel cut out Dimension: HeightxWidth=160x112mm

Screw : M3

Qty : 04 Nos.

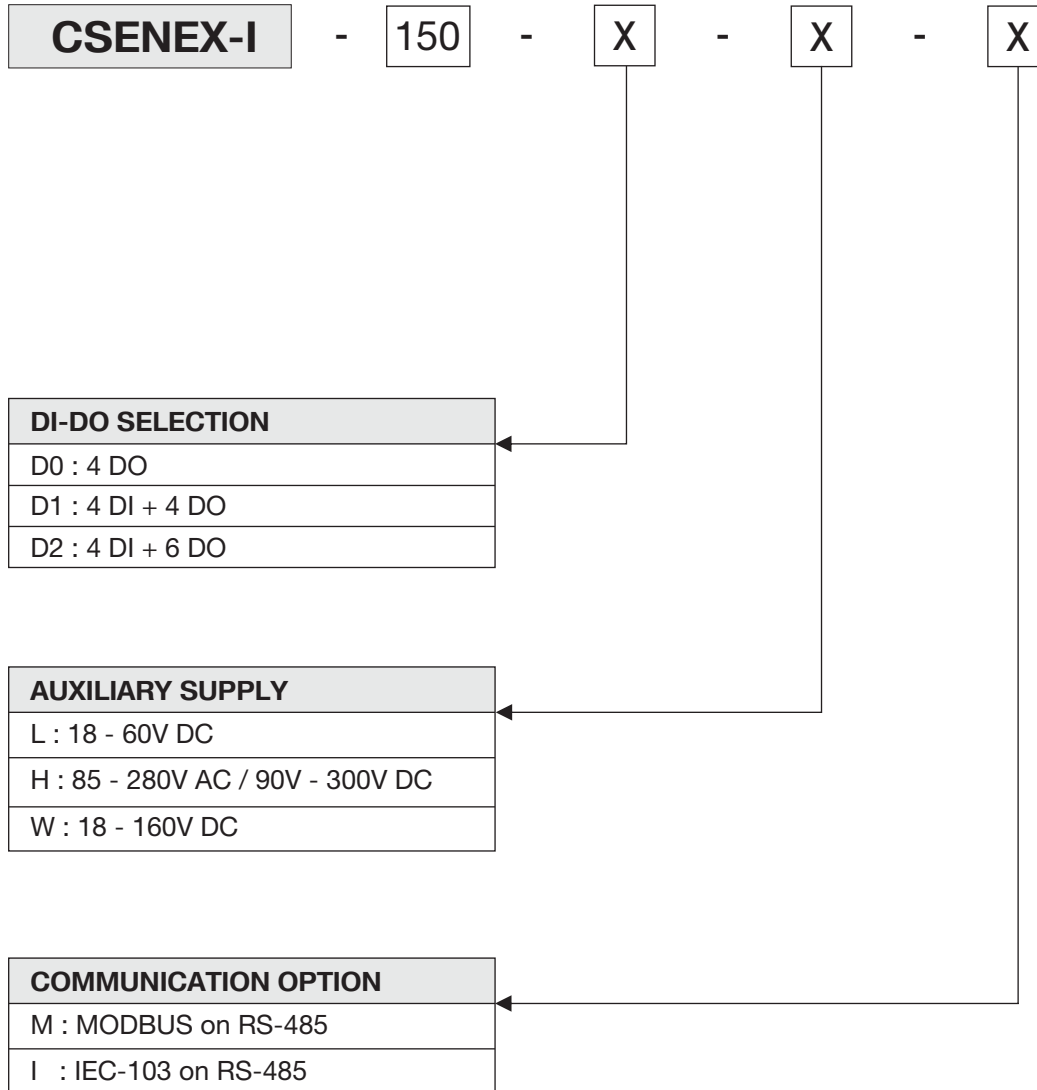


(Figure 13)



(Figure 14)

26) Ordering Information



Revision History

S.No.	Rev.No.	Details	Date
01	01	Inclusion of 'Reset Time' in Measuring Input Technical Data clause 12	20.07.15
02	02	Inclusion of Standards, change in measuring inputs & in ordering information	27.10.15
03	03	Change in connection diagram and its description	03.11.15
04	04	Inclusion of Recommended Terminal lugs specifications	07.12.15
05	05	Change in Event record etc.	09.01.16
06	06	Inclusion of 2 more Baud Rate setting in Communication setting on page 13.	11.02.16
07	07	Inclusion of Connection diagram & Term description for 4 DI & 4 DO	19.02.16
08	08	Inclusion of new Conn. diagram of 4 Do's & change in ordering information regarding this.	14.03.16
09	09	Inclusion of Wide Range Aux Supply Rating in Ordering Information & Aux Supply Table	18.03.16
10	10	Inclusion of TCS Diagram in the catalogue	14.06.16
12	11	Inclusion of Lugs image on page 18	02.11.16
13	12	Change in TCS diagram on page 25 of 'TCS diagram' heading	21.08.17
14	13	Change in Trip contact rating on page 13	30.12.17
15	14	In connection diagram, symbol of Earth (power supply) and Ground (Communication) change	15.03.18
16	15	Shorting in connection diagram removed.	03.09.18

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