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CSENEX-I 100-Z2

Intelligent Measuring and Protection Device

CSENEX
Series



Catalogue



Protection & Measurement Devices

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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 is an 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
- ❖ Three phase time over-current protection
- ❖ Three phase instantaneous protection
- ❖ Earth time over-current and earth instantaneous over current
- ❖ Fault recorder
- ❖ DO programmable matrix
- ❖ Two setting groups for protection settings
- ❖ 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.

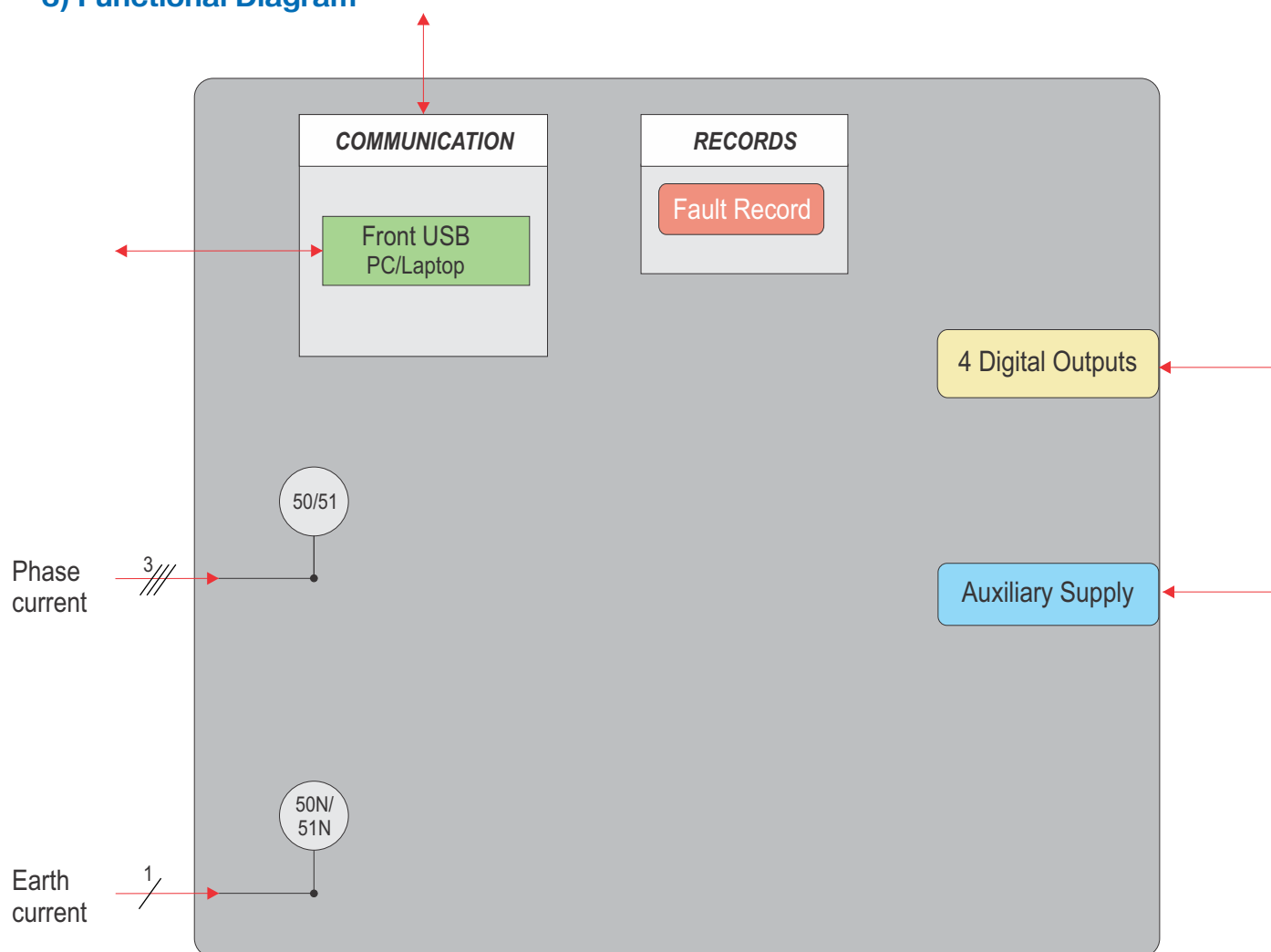
4) Hardware

- ❖ Micro controller based numeric design.
- ❖ Measures true RMS with DFT filter .
- ❖ Four Current analog inputs.
- ❖ Four digital outputs.
- ❖ Alpha numeric (12 x 2) LCD.
- ❖ USB communication.
- ❖ Five Push button on the front for MMI.

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).

6) Functional Diagram



(Figure 1)

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 ($I_e >$) 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.

Group Selection Logic

CSENEX Relay is having two independently protection setting groups G1 & G2. G1 group setting is for feeder protection during three phase supply mode, normally set at feeder protection over current and earth fault settings and G2 group setting for over load protection during single phase supply.

Relay is having inbuilt logic for selection of G1/G2 automatically duly monitoring the supply condition. By default, when all the three currents exist or zero currents during off condition, Relay goes into G1 group. When only one or two phase currents exist, relay switches over to G2.

7) Fault Recording

CSENEX-I records last 10 faults in its non volatile memory with it's 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
 F-TYPE : FAULT TYPE

Where

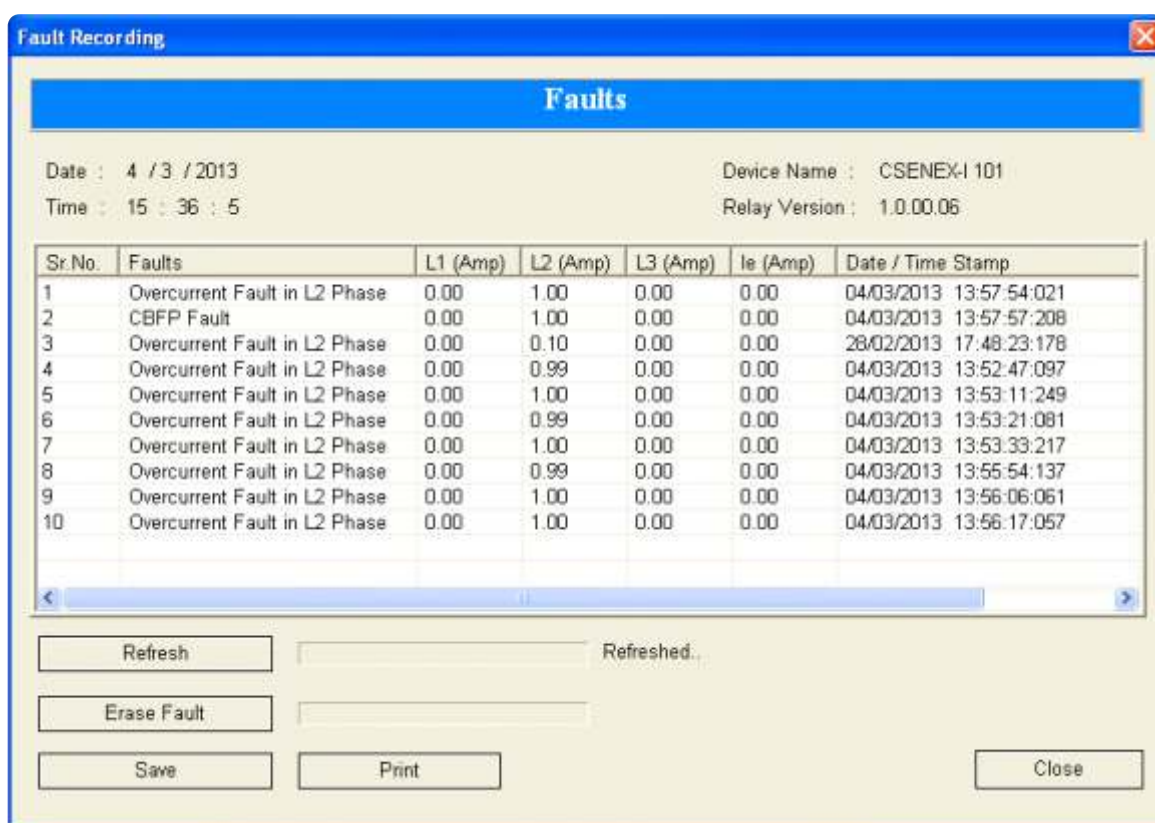
[F][ILx] Magnitude of phase current's.

[F]Ie Magnitude earth fault current's

F-Type Origin of fault (over current, negative phase sequence, 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.



Sr.No.	Faults	L1 (Amp)	L2 (Amp)	L3 (Amp)	Ie (Amp)	Date / Time Stamp
1	Overcurrent Fault in L2 Phase	0.00	1.00	0.00	0.00	04/03/2013 13:57:54:021
2	CBFP Fault	0.00	1.00	0.00	0.00	04/03/2013 13:57:57:208
3	Overcurrent Fault in L2 Phase	0.00	0.10	0.00	0.00	28/02/2013 17:48:23:178
4	Overcurrent Fault in L2 Phase	0.00	0.99	0.00	0.00	04/03/2013 13:52:47:097
5	Overcurrent Fault in L2 Phase	0.00	1.00	0.00	0.00	04/03/2013 13:53:11:249
6	Overcurrent Fault in L2 Phase	0.00	0.99	0.00	0.00	04/03/2013 13:53:21:081
7	Overcurrent Fault in L2 Phase	0.00	1.00	0.00	0.00	04/03/2013 13:53:33:217
8	Overcurrent Fault in L2 Phase	0.00	0.99	0.00	0.00	04/03/2013 13:55:54:137
9	Overcurrent Fault in L2 Phase	0.00	1.00	0.00	0.00	04/03/2013 13:56:06:061
10	Overcurrent Fault in L2 Phase	0.00	1.00	0.00	0.00	04/03/2013 13:56:17:057

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

Output Contacts

No. of digital outputs : 4 (DO1, DO2, DO3, Do4)
 [2 Change Over, 2 Normal Open]
 Type of outputs : Relay
 Programmable (DO Assignment) : Yes
 Relay reset type : Programmable (Auto/Manual)

8) 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.
- ❖ One push switch for the functions assigned in the 'HMI'.
- ❖ Sixteen LEDs for pickup or tripping on fault in any phase.

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 downward direction.
	is used to scroll in upward direction.



(Figure 3) (HMI)

9) Communication (Local)

The unit has:

- ❖ 1 Front USB port for direct connection to a PC

Front Communication

The entire setting, Fault is available on 'A' type USB (female) interface with CSE LIVELINK with saving & printing option. This unit also has Front-end Live Link simulation support for testing of relay even without any three phase injection source.

10) Setting Ranges

CSENEX-I 100-Z2 Setting

Over Current & Earth Protection

S. No	Parameter	Display	Setting Range		Step Size	Default Setting
			Min.	Max.		
1	Phase over-current characteristics	PCh			DEFT/EINV/VINV /LINV/NINV1.3/ NINV3.0/NINV0.6	DEFT
2	Earth over-current Characteristics	ECh			DEFT/EINV/VINV /LINV/NINV1.3/ NINV3.0/NINV0.6	DEFT
3	Phase over-current low set pickup setting Phase over-current definite timing Phase over-current inverse timing	I> t> ti>	0.05xIp 0.1 Sec 0.01	4.0xIp 150 Sec 1.50	0.01xIp 0.01Sec 0.005	EXIT 0.10 Sec 0.05
4	Phase over-current hi-set pickup setting Phase over-current hi-set definite timing	I>> t>>	0.5xIp 0.03 Sec	15xIp 20 Sec	0.1xIp 0.01Sec	EXIT 0.10 Sec
5	Earth over-current low set pickup setting Earth over-current low set definite timing Earth over-current low set inverse timing	Ie> te> tie>	0.05xIn 0.03 Sec 0.01	2.5xIn 150 Sec 1.50	0.01xIn 0.01Sec 0.005	EXIT 0.10 Sec 0.05
6	Earth over-current hi-set pickup setting Earth over-current hi-set definite timing	Ie>> te>>	0.5xIn 0.03 Sec	15xIn 20 Sec	0.05xIn 0.01 Sec	EXIT 0.10 Sec

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

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

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

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

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

For Current Range 0.2 to 20xIn:

Trip timing Accuracy : VINV / NINV 3.0 / 1.3 : +5% OR +30mSec (whichever is higher)
 EINV / NINV 0.6 / LINV : +7.5% OR +30mSec (whichever is higher)

For Current Range 0.05 to 0.2xIn:

Trip timing Accuracy : VINV / NINV 3.0 / 1.3 : +20% OR +40mSec (whichever is higher)
 EINV / NINV 0.6 / LINV : +20% OR +40mSec (whichever is higher)

DO Reset

S.No.	Display	Setting	Default
1	DO-1	Auto/Manual	Auto
2	DO-2	Auto/Manual	Auto
3	DO-3	Auto/Manual	Auto
4	DO-4	Auto/Manual	Auto

Erase Record

S.No.	Parameter	Display	Min	Max	Step	Default
1	Fault Erase	Faults	NO	YES	-----	NO
2	Trip Counter Erase	TRP_CNT	NO	YES	-----	NO

DO Assignment

S.No	Parameter	Display	Min	Max	Default
1	Phase over-current low set	I>	1	1234	1234
2	Phase over-current hi-set	I>>	1	1234	1234
3	Earth over-current low set	E>	1	1234	1234
4	Earth over-current hi-set	E>>	1	1234	1234
5	Self supervision	Slfsup	1	1234	----

Common Setting: (These are the settings common for all protections)

S.No.	Parameter	Display	Setting Range		Step Size	Default Setting
			Min.	Max.		
1.	Rated phase current	Ip	1 A	5 A	-----	1 A
2.	Rated earth current	In	1 A	5 A	-----	1 A
3.	Phase CT ratio	P-CTR	1	9999	1	1
4.	Earth CT ratio	E-CTR	1	9999	1	1
5.	Reset Delay	Rstdl	0 Sec	20 Sec	0.1Sec	0
6.	Fault Message Status	F-Stats	NO	YES	-----	NO
7.	Group Toggle Delay	t_Grp	0.02Sec	10Sec	0.01Sec	1Sec

USB Communication			
Protocol	:	CSE proprietary protocol: available with front software	
Baud rate	:	19200 bps	
Cable required for interface	:	USB cable type (A to A)	

Auxiliary Supply

Auxiliary Voltage Range	:	For 'L' Model	18V-60V DC
		For 'W1' Model	18V-150V DC
		For 'H' Model	85V-280V AC / 110V-300V DC
Power Consumption	:	Quiescent approx. 3W	Operating approx. <7W

Measurement Accuracy

S.No	Quantity	Range	Frequency Range	Accuracy
1	Current	0.2 - 15 xI _p	50 Hz	±2%

11) Technical Data

Measuring Inputs

Rated Data	Rated current I _p : 1A or 5A Rated frequency F _n : 50 Hz/60Hz
Drop out to Pickup Ratio	>96%
Power consumption in current circuit	At I _p = 1A 0.2 VA At I _p = 5A 0.4 VA
Thermal withstand capability in current circuit	Dynamic current withstand (half wave) : 250 x I _p for 1 Sec : 100 x I _p for 10 Sec : 30 x I _p continuously : 4 x I _p

12) Type Test

DESIGN STANDARD		
Specified ambient service temp. range	:	VDE 04355 part 303, IEC 255-4, BS 142
For storage	:	-40°C to + 85°C
For operation	:	-20°C to +70°C
Environmental protection class 'F' as per DIN 40040 and per DIN IEC 68, part 2.3	:	relative humidity 95% at 40°C for 56 days.
Isolation test voltage, inputs and outputs between themselves and to the relay frame as per VDE 0435, part 303	:	2.5 KV (eff.0 / 50 Hz, 1 min.
Impulse test voltage, inputs and outputs between themselves and to the relay frame as per VDE IEC 0435, part 303	:	5 KV, 1.2/50ms, 0.5
High frequency interference test voltage, inputs and outputs between themselves and to the relay frame as per DIN IEC 255, part 22-1	:	2.5 KV/1MHz
Electrical fast transient (burst) test as per DIN VDE 0843 part 4	:	4KV / 2.5 kHz, 15ms
Radio interference suppression test as per DIN VDE 57 871	:	Limit value class 'B'
Electrostatic discharge (ESD) test as per DIN VDE 0843 part 2	:	8 KV
Radiated electromagnetic field test as per VDE 0843 part2	:	10 V/m

13) Technical 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. 1.5 Kg

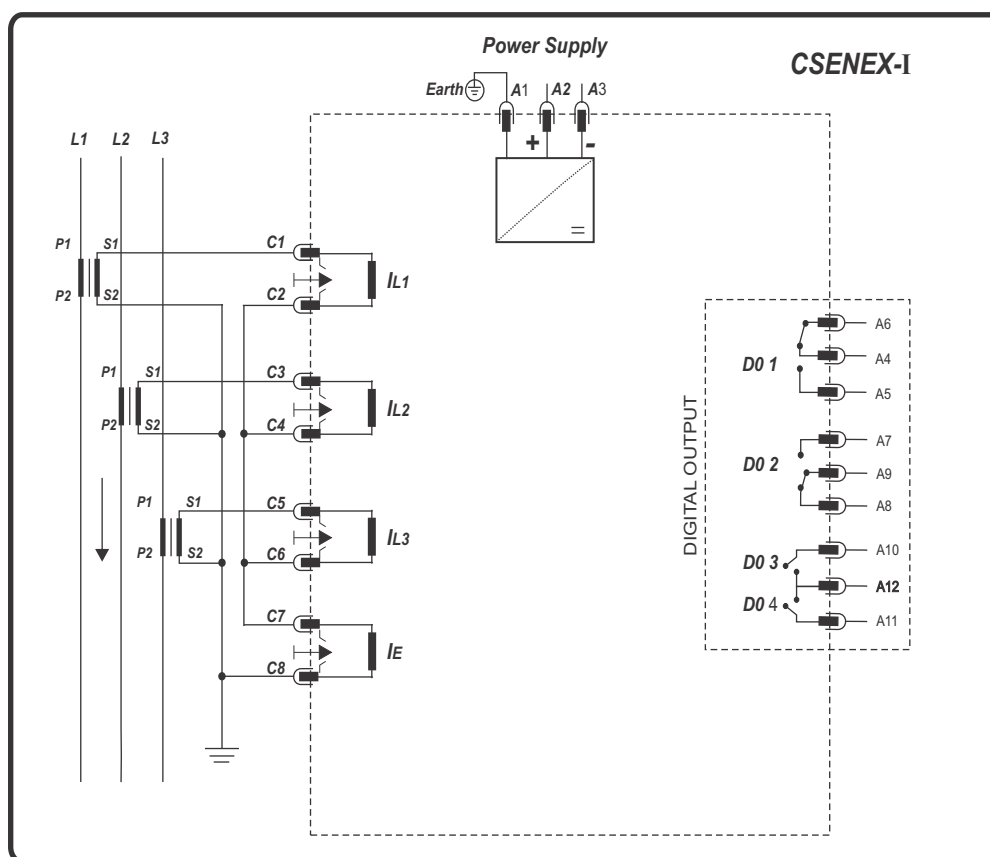
Relay Contact Rating

Contact rating	
Contact relay	Dry contact Ag Ni
Make current	Max. 30A & carry for 1S
Carry capacity	6A continuous for All contacts
	Rated voltage: 300V AC/ 30V DC
Breaking characteristics	
Breaking capacity AC	1500VA resistive
	1500VA inductive (PF=0.5)
	220V AC, 6A (cos Ø ≤0.6)
Breaking capacity DC	135V DC, 0.3A (L/R=30ms)
	250V DC, 50W resistive or
	25W inductive (L/R=40ms)
Operation time	<10ms
Durability	
Loaded contact	30000 operation minimum
Unloaded contact	10000 operation minimum

Over-voltage category : II
Insulation voltage : 300V
Pollution Degree : 2
IP 54 from Front

14) Connection Diagram

Terminal Connection Details



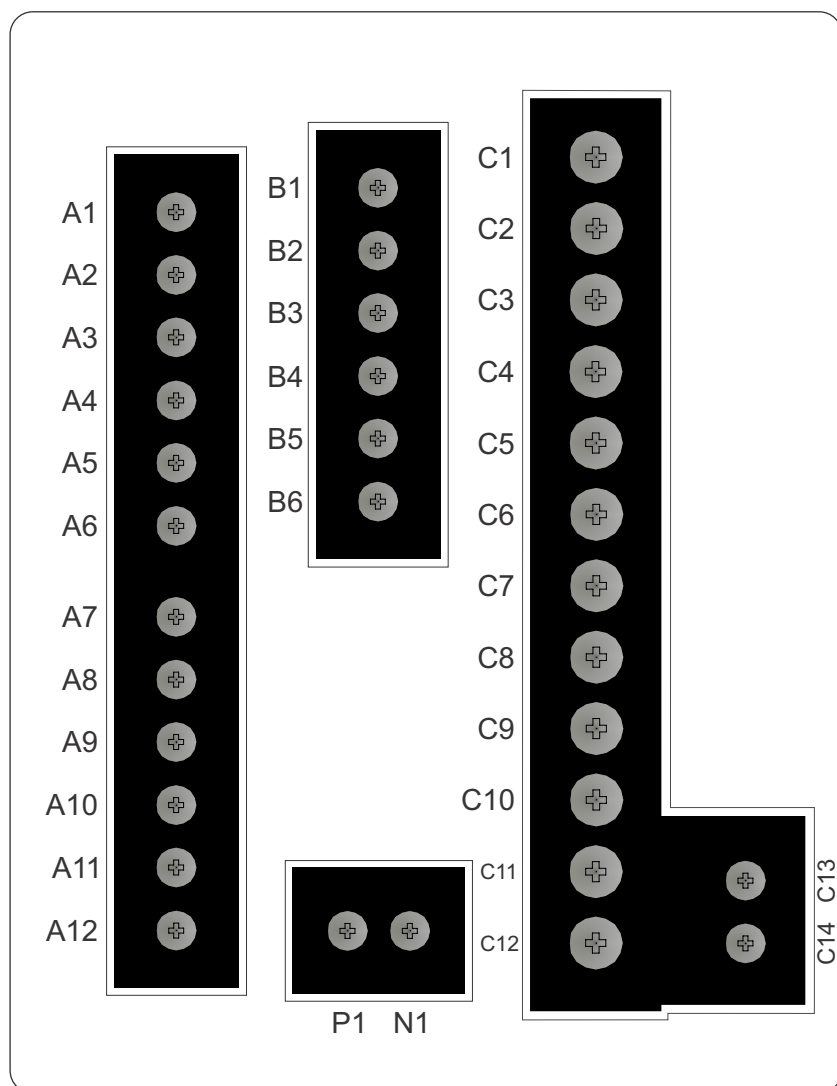
(1A or 5A ordering based model)

(Figure 4)

Terminal Description

Terminal Name	Terminal Description
A1	: Auxiliary Supply Earth
A2-A3	: Auxiliary Supply (A2: + & A3: -)
A12-A11	: Potential free Digital Output 4
A12-A10	: Potential free Digital Output 3
A7-A9-A8	: Potential free Digital Output 2
A6-A4-A5	: Potential free Digital Output 1
C1-C6	: CT Terminal for Phase current inputs L1(C1-C2), L2(C3-C4), L3(C5-C6)
C7-C8	: CT Terminal for Earth current input

15) Back Terminal Diagram



(Figure 5)

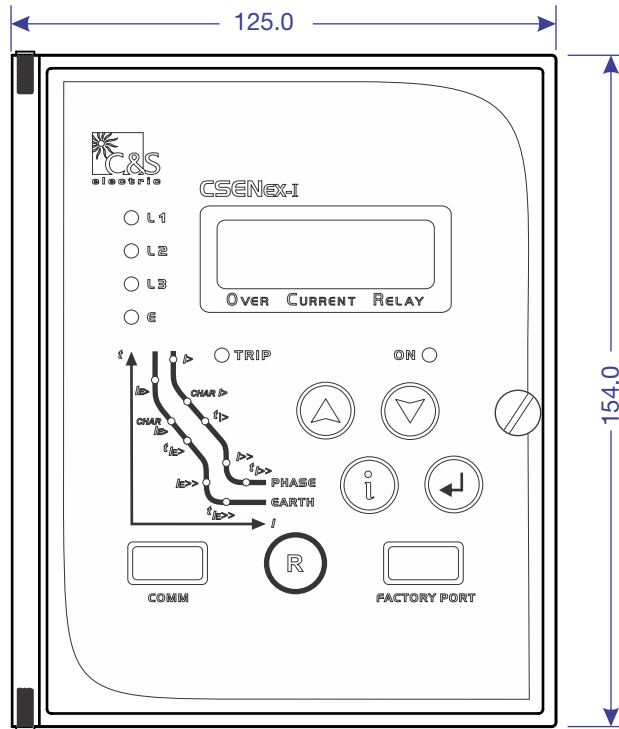
Terminal Description

Terminal Name	Terminal Description
A1	: Auxiliary Supply Earth
A2-A3	: Auxiliary Supply (A2: + & A3: -)
A12-A11	: Potential free Digital Output 4
A12-A10	: Potential free Digital Output 3
A7-A9-A8	: Potential free Digital Output 2 (change over)
A6-A4-A5	: Potential free Digital Output 1 (change over)
C1-C2	: CT Terminal for Phase current input (1A) L1
C3-C4	: CT Terminal for Phase current input (5A) L1
C5-C6	: CT Terminal for Phase current input (1A) L2
C7-C8	: CT Terminal for Phase current input (5A) L2
C9-C10	: CT Terminal for Phase current input (1A) L3
C11-C12	: CT Terminal for Phase current input (5A) L3
C13-C14	: CT Terminal for Earth current input (1A / 5A)

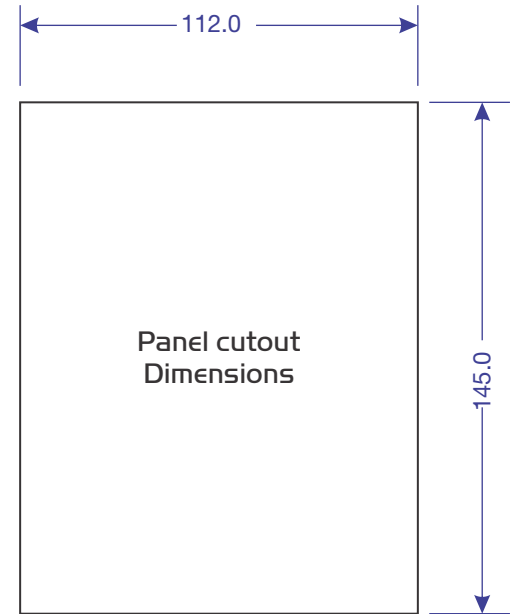
16) Dimensional Details

Panel cutout dimensions: WxH = 112.0x145.0mm

Front View

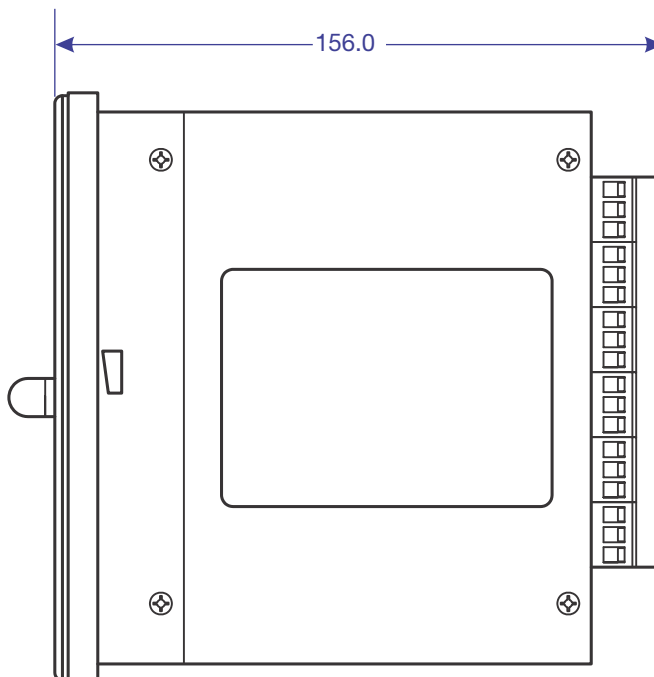


(Figure 6)



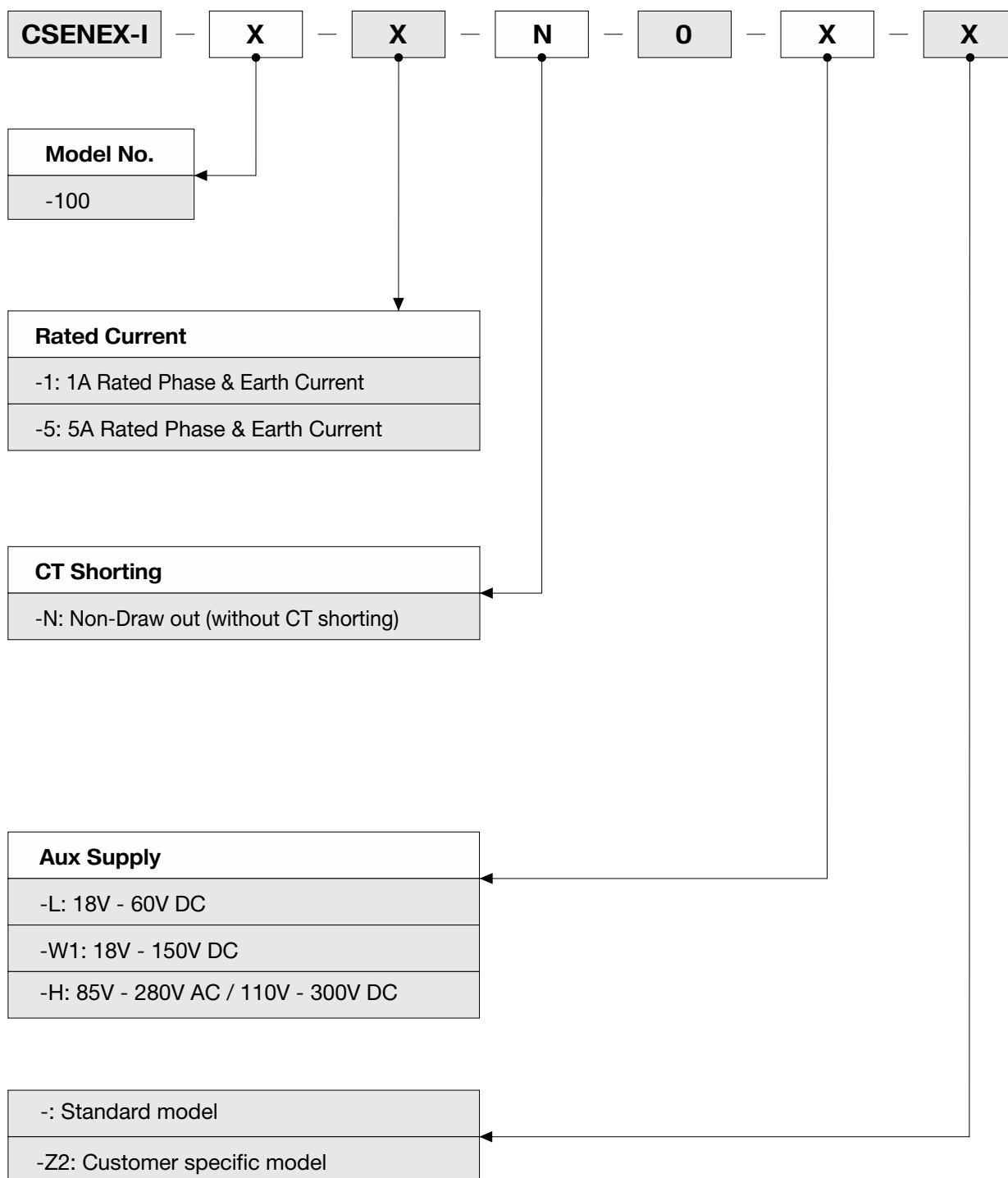
(Figure 7)

Side View



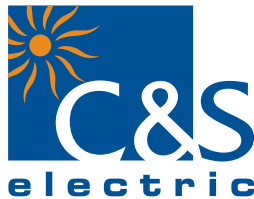
(Figure 8)

17) Ordering Information



EXAMPLE: CSENEX-I-100-1-N-L-Z2

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