



Numerical

Over Current / Earth Fault

Protection Relay

Type : ADR141C / 241C

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1. Description:

- ADR141C / ADR241C are second generation Numerical 3OC + 1EF Over Current Relay. *[The ADR241C is communicable Relay having RS485 Port. All the other features as per ADR141C Relay]* It consist all the necessary protection and monitoring functions required for Normal feeder. It consists of High Speed Digital DSP Controller.
- Analog Measuring Module.
- Power supply Module.
- Digital Input output module.

The High speed Digital Signal Controller continuously monitors phase, E/F current along with different optical isolated status connections. The high-speed micro-controller samples these current signals through a **A/D converter**. The Digital Signal performs powerful **Numerical Algorithms** to find out RMS of fundamental & harmonic contents of the current then this value is used for protection and metering function. All measurement is tuned to fundamental frequency i.e. 50Hz, thus relay remain stable during distorted waveform generated electronics loco-motive. All these measure values are then used for different protection function such as IDMT/DMT Over current protection, Instantaneous Over current protection, Earth Fault protection, etc. These measured values are also displayed on large 16 x 2 LCD display for metering purpose. The **DSC** also monitors different digital input through optical isolator and perform some monitoring function such trip circuit supervision, and control potential free contact for control CB and generate ALARM and Tele-signalling.

The power supply module is basically DC – DC converted designed using modern PWM based Switching mode technique to convert station battery supply to the 12V and 24Vdc low voltage supply for relay electronics and control circuit. It also provides necessary isolation from station battery. The power supply module is design using very advance PWM controller which allow very wide input supply variation i.e 18V to 250VAC/DC covering 24Vdc, 30Vdc, and 110Vdc and 220Vdc station battery requirement.

The relay is having total 4 nos of high intensity dual LED for easy identification of type of fault for easy user interface. All LEDs and control output RL2 to RL4 are fully programmable via keypad interface

2. Protection Features:

- ✓ 4 Element (3 Phase + EF) Non Directional Over current IDMT/DMT.
- ✓ Selection of Curve: Five selectable curve (Normal Inverse1 (C1), Normal Inverse2, (C2) Very inverse (C3), Extremely inverse (C4), Long time inverse (C5)) and Define Time (C6)
- ✓ Instantaneous Over-Current Protection with adjustable timer.
- ✓ Breaker Failure detection.
- ✓ In-built CB Trip Circuit Supervision function during pre closing and post closing of CB.
- ✓ On site CT Secondary selection 1A or 5A.
- ✓ Internal calculation of zero seq. current (3I₀) for Earth fault.
- ✓ Wide range Power supply input 18V to 250V AC/DC.
- ✓ Cold Load Pickup.
- ✓ RS485 communication Port with IEC 60870-5-103 protocol. [Only in ADR241C]

3. Relay Design Features:

- ✓ 16 x 2 LCD Backlit display for Parameter and setting display.
- ✓ Online display of CB status and other digital and logical status.
- ✓ Continuous monitoring of module's internal hardware and alarm generation in case of failure of any critical components.
- ✓ 4 Digital Output contacts for local alarm as Trip.
- ✓ 2 dedicated status input for Trip Circuit Monitoring.
- ✓ 8 nos of Fault data stored with keypad interface and time stamping.
- ✓ 16 Nos. of Event Log provided.

4. Main Functions:

The ADR141C are having following protection functions.

1. Non Directional phase Over current element. (I_p>, and I_p>>)
2. Non Directional 3I₀ (Internally derived EF) (3I₀> and 3I₀>>).
3. Trip Circuit Super vision.
4. Breaker Failure Detection.
5. Monitoring Functions.

Each of these functions are independently programmable and can be enable or disable by user depending upon requirement.

4.1 Over Current & EF Element:

The ADR141C is member of Ashida Numerical Relay family design for protection general feeder. The relay has one stage of IDMT/DMT setting and one stage of instantaneous setting. (I_p>, I_p>>, 3I₀>, 3I₀>>). All major international IDMT curves are available. Range for first stage is 10% to 250% and 50% to 3000% for instantaneous stage for phase and 3I₀. Although the curves tend towards infinite when the current approaches I_s (general threshold),

the minimum guaranteed value of the operating current for all the curves with the inverse time characteristic is 1.1Is (with a tolerance of ± 0.05 Is).

4.2 Inverse Time Curves :-

The each stage thresholds for phase (earth) over current can be selected with an Inverse Definite Minimum Time (IDMT) characteristic. The time delay is calculated with a mathematical formula

$$t = \frac{K * a}{\left[\frac{I}{I_{ref}} \right]^b - 1}$$

where

t = operation time

a = constant

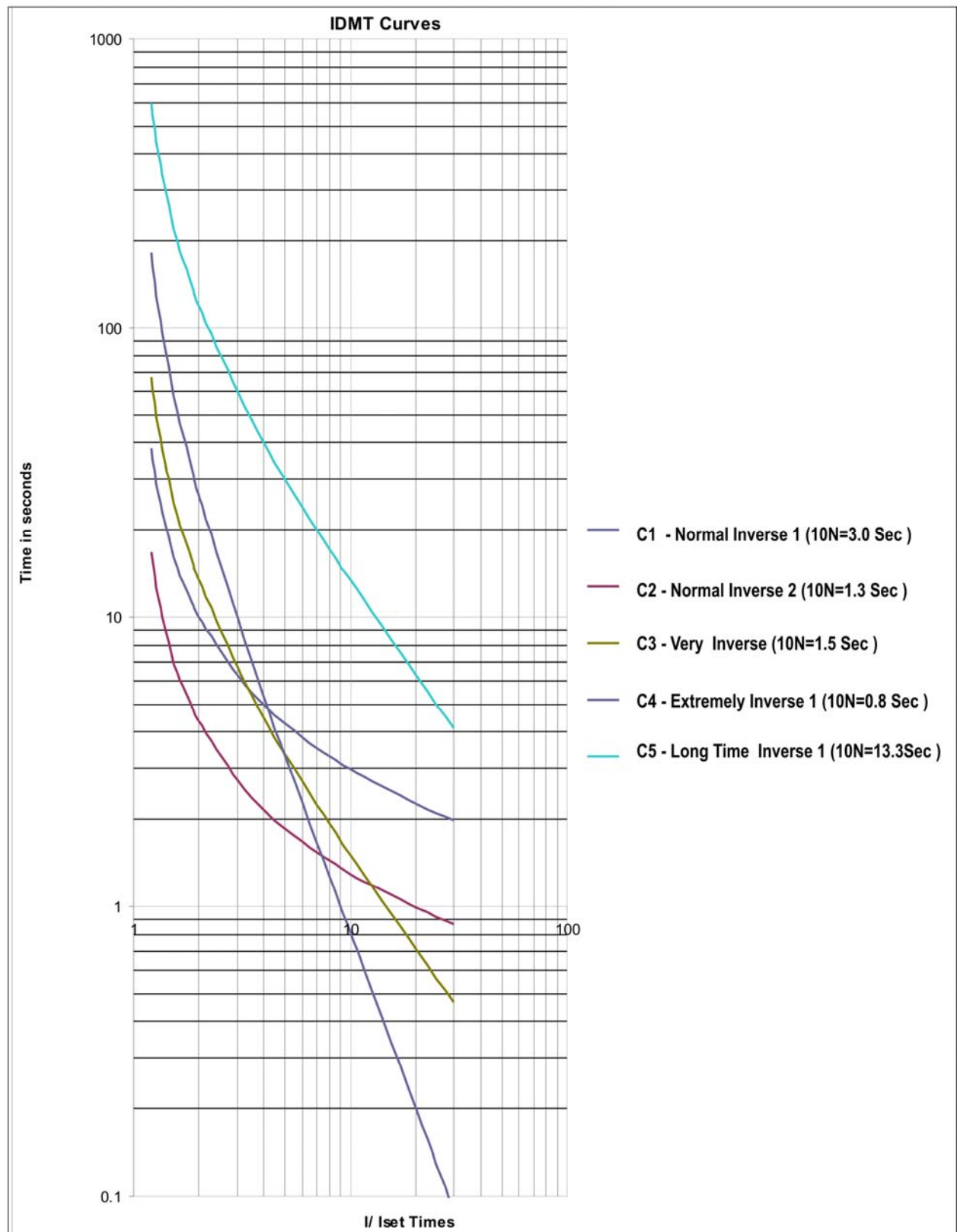
I = Input current

Iref = Current threshold setting

b = Constant

K = Time multiplier setting or Time dial Setting

Curve Type	Description	a	b
C1	Standard Inverse_1	0.14	0.02
C2	Standard Inverse_2	0.06	0.02
C3	Very Inverse	13.5	1
C4	Extremely inverse	80	2
C5	Long Time Inverse	120	1
C6	Define Time	Inst	99.9 Sec



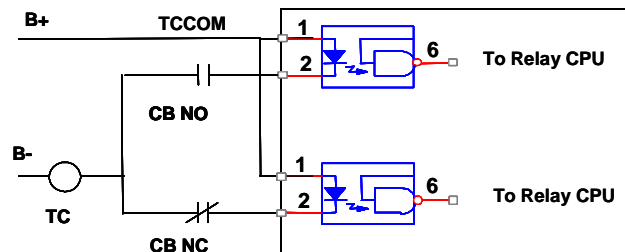
4.3 Trip circuit Supervision:-

The ADR141C is having 2 separate digital opto-coupler status input which can be used to continuously monitor continuity of trip-circuit. The general scheme is as shown in fig. 4.

Relay monitor Trip coil continuity through CB NO during close condition and through CB NC during Trip condition. If any discontinuity observed it generate Alarm signal.

The output can be assigned to any of 4 relay RL1 to RL4, The Trip circuit supervision logic set reset PROTH (Protection healthy) bit, it normally ON and become OFF at following condition

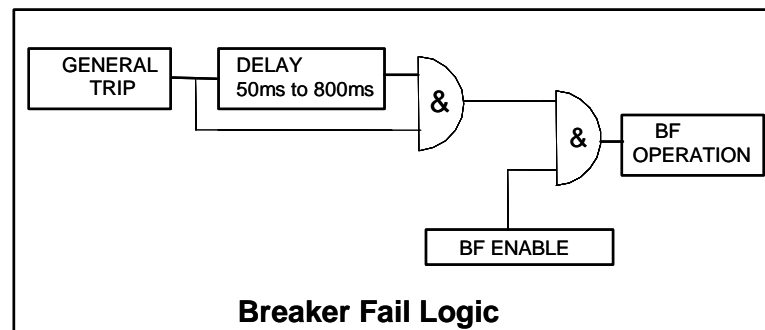
- ✓ When DC supply is not sufficient (DC fail)
- ✓ When CB NO and CB NC both active or both inactive. CB NO as well as CB NC are both close or open.
- ✓ Relay detects any internal hard ware Error.



Trip Circuit Logic

4.4 Breaker Failure Detection:-

Normally after tripping current should become Zero within 100 – 200ms time depend upon type of fault and breaker mechanism. After Fault ADR141C trigger internal timer (settable from 50ms to 800ms) if fault is not cleared during this time then relay declare as Breaker fail (LBB function) and set BF bit. This bit can be assigned to any of the output relay.



Breaker Fail Logic

4.5 Cold Load pickup:-

When the Circuit breaker is closed on load, A load current take sudden inrush current. This inrush current may be more than 4 to 5 times of rated load current. The duration can be as high as 200ms. Due to this inrush current many times relay operates which is undesirable. General practice is to keep normal setting to such high value so that it will not mal operate at initial closing which result increase in fault clearance time. To avoid such problem relay is equipped with special features known as **cold load pickup**. Whenever a circuit breaker is turn on relay sense through CB auxiliary contact and start internal timer known as CL timer. During this time it takes separate set of setting, so that relay will not mal operate on inrush current

5. Construction Details

The relay is designed in flush mounting cabinet. The overall size of cabinet is 138 x 114 x 175mm Ref. diagram MAC01501.

6. Self Check Feature

The DSP used in relay is having major of it component are within the chip. The controller check all the components which are outside of chip such as ADC, Non volatile memory used for disturbance data, and event, non volatile memory used for relay setting, real time clock etc. Relay checks its internal hardware after every hardware-reset press and periodically ones per day. If any fault in hardware is detected the relay change contact marked as PROTH and display error code on LCD display. Depend upon the component relay take necessary action.

Following table summarized the type of fault and action taken by relay

Type of Fault (Error code)	Action
ADC Error 16	Most critical Error. Relay give error message and change PROTH contact Relay use alternate ADC for OCR section and OCR remain in protection
NV RAM used for disturbance record 32 & 64	Generate Error signal and remain in protection change PROTH contact
NV RAM use for setting 2	Generate Error signal and remain in protection by assuming default setting value. change PROTH contact
Setting Error 1	Generate Error signal and remain in protection by assuming default setting value. change PROTH contact
RTC Error 4 & 8	Generate Error signal and remain in protection change PROTH contact
Trip Ckt Supervision Fail Error 128	Generate Error signal and remain in protection by assuming default setting value. change PROTH contact

7. Technical data

7.1 Technical specifications

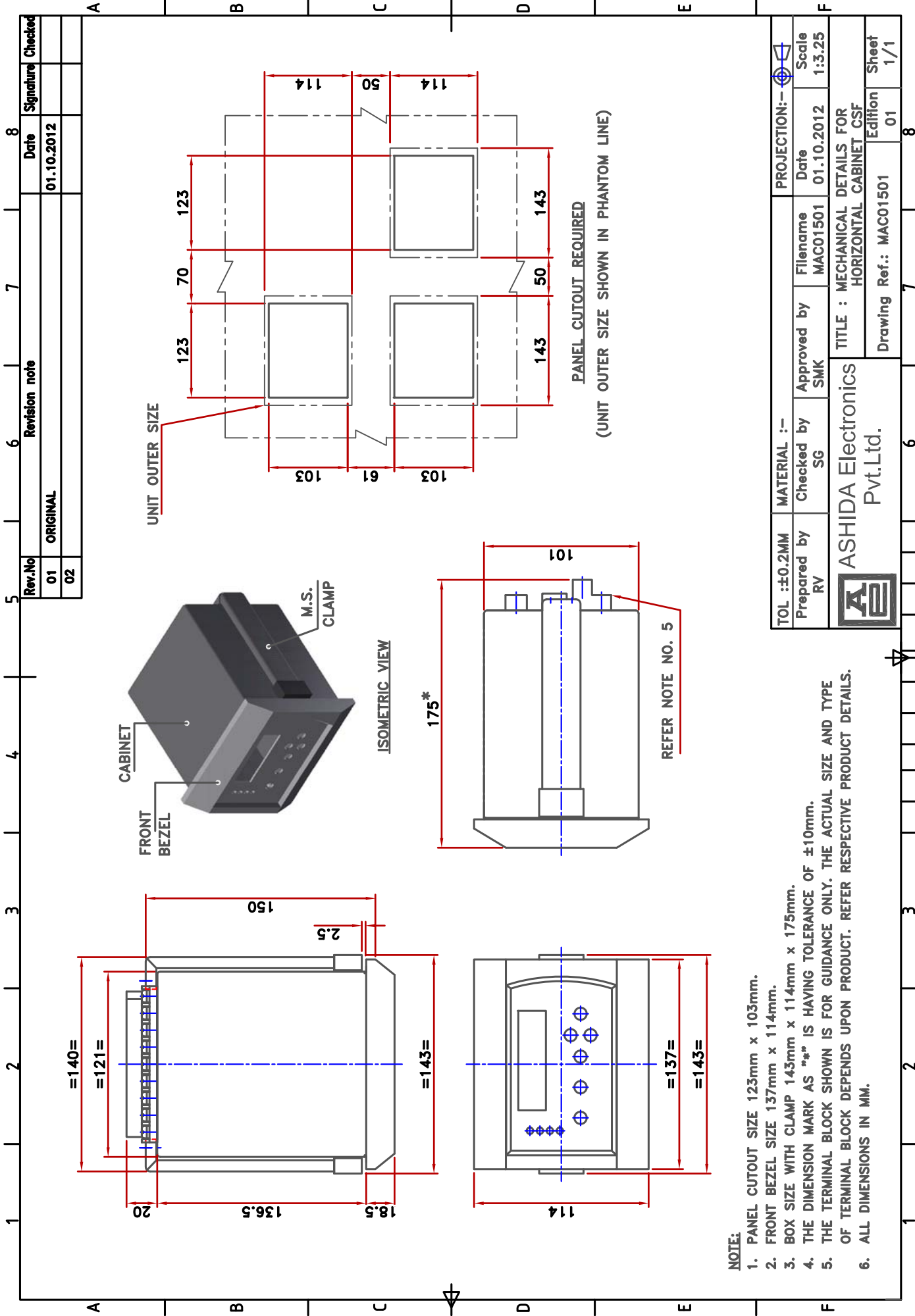
Sr. No.	Specification	Particulars	
I.	Current Input	: Suitable for CT secondary 5Amp. Or 1Amp site selectable	
II.	Aux. Supply	: 18 - 250VAC/DC.	
III.	VA burden on CT	: Less than 0.2VA	
IV.	VA burden on Aux.	: Less than 10 Watts	
V.	Operating Temp. range	: -10 deg. To + 65 deg.	
VI.	Continuous carrying capacity	: 2 x of rated for CT and 1.5 x of rated for PT	
VII.	Pick up	: Within 1.1 times of set value.	
VIII.	Reset Value	: 95% to 90% of pick up.	
IX.	Output Contact	: 4 Trip duty user assignable	
X.	Contact Rating	: Continuous: 5A : Make & carry for 0.5 sec : 30A : Make & carry for 3 sec : 15A	
XI.	Opto Isolated input	: 1 for CB NO & 1 for CB NC	
XII.	Thermal With stand for CT	: 20 x of rated for 3.0 sec.	
General Settings			
XIII.	General setting	: New Password	0 – FFFF
		: Unit Id	0 – 250 in steps of 1
		: CT Sec	1A or 5A
		: CT Primary	10 – 3000 in steps of 1
		: Test Block	01: YES, 02: NO
		: Trip Ckt.	01: YES, 02: NO
		: BF Enable	01: YES, 02: NO
		: BF Delay	50 - 800 ms steps of 50ms
		: Baud Rate	1200 – 57600 (Only for ADR241C)
		: Frequency	50Hz – 60Hz
Relay Settings			
XIV.	Phase Section (Ip)	: IP> Settings	10% – 250% in steps of 1%.
		: IP> Time Multiplier (TMS)	x0.01 – x1.00 in steps of 0.01
		: IP> Curve (Operating Time)	C1 – C6 (IDMT curve C1 – C5 or Definite Time C6)
		: IP> C6 Delay	0.1 – 99.9 Sec in steps of 0.1Sec.
		: IP>> Settings	50% – 3000% in steps of 50%
		: IP>> Delay	0 – 2.00 Sec in steps of 0.01Sec.

XV.	Earth Fault Section (3lo)	: 3lo> Settings	10% – 250% in steps of 1%
		: 3lo> Time Multiplier (TMS)	x0.01 – x1.00 in step of 0.01.
		: IE> Curve (Operating Time)	C1 – C6 (IDMT curve C1 – C5 or Definite Time C6)
		: 3lo> C6 Delay	0.1– 99.9 Sec in steps of 0.1Sec.
		: 3lo>> Settings	50% – 3000% in steps of 50%
		: 3lo>> Delay	0 – 2.00 Sec in steps of 0.01Sec.
Cold Load settings			
XVI.	Phase Section (Ip)	: CL Enable	01: YES, 02: NO
		: CL Timer	0.01 - 2.00S in steps of 0.01 sec
		: IP> Settings	10% – 250% in steps of 1%.
		: IP> Time Multiplier (TMS)	x0.01 – x1.00 in steps of 0.01
		: IP> Curve (Operating Time)	C1 – C6 (IDMT curve C1 – C5 or Definite Time C6)
		: IP> C6 Delay	0.1 – 99.9 Sec in steps of 0.1Sec.
		: IP>> Settings	50% – 3000% in steps of 50%
		: IP>> Delay	0 – 2.00 Sec in steps of 0.01Sec.
XVII.	Earth Fault Section (3lo)	: 3lo> Settings	10% – 250% in steps of 1%
		: 3lo> Time Multiplier (TMS)	x0.01 – x1.00 in step of 0.01.
		: IE> Curve (Operating Time)	C1 – C6 (IDMT curve C1 – C5 or Definite Time C6)
		: 3lo> C6 Delay	0.1 – 99.9 Sec in steps of 0.1Sec.
		: 3lo>> Settings	50% – 3000% in steps of 50%
		: 3lo>> Delay	0 – 2.00 Sec in steps of 0.01Sec.
Operational Indicators (Flags) 4 user assignable bi-colour output LED Default assignment			
XVIII.	LED1 - PROT.H /ON	: Green LED indicates Relay OK (Protection Healthy) : Red LED indicates Fault in following conditions. 1. Problem in relay Hardware. 2. Trip Circuit Fault	
	LED 2 - PICK-UP	: Red LED indicate Start of timer Self Reset (SR) Type	
	LED 3 - FAULT	: Red LED indicate Relay Operated Flag (HR)	
	LED 4 - TRIP	: Green LED indicates Output TRIP relay contact closer (SR) Type	
XIX.	Drawing References	: For Typical External connection	- ADV02702
		: For Cabinet Type	- MAC01501 (CSF)

7.2 Type Test Details

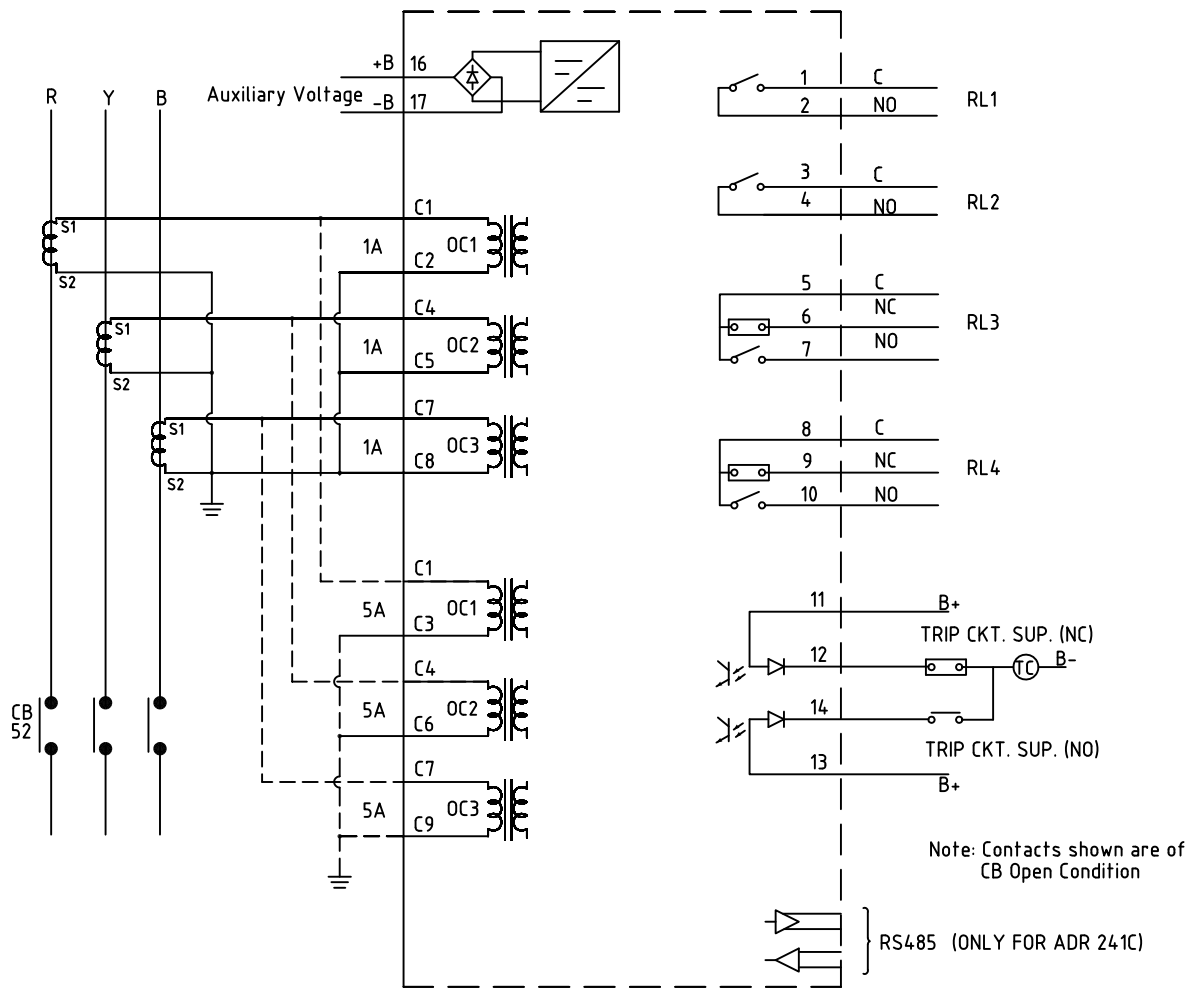
Sr. No.	Title	Standard no.
Electromagnetic Compatibility Type Test:		
1.	High Frequency Test	: IEC 60255-22-1, class – III : Frequency : 1MHz Damped Oscillatory : Longitudinal :5 KV (peak) : Duration: sec duration 2 sec. : Between input current Terminal
2.	Electrostatic Discharge Direct Application	: IEC 60255-22-2 Class III and IEC 61000-4-2 class III. : Contact discharge: 6kV, : Air discharge: 8KV : Polarity: both +ve and –Ve polarities.
3.	Indirect Application	: IEC-61000-4-2, Class-III
4.	Fast Transient Disturbance	: IEC 60255-22-4 and IEC 61000-4-4, class A : 1.2KV; 5/50ns; 5KHz burst duration = 15ms. : Repetition rate 300ms; Both polarities; Ri = 50Ω; duration 1 min.
5.	Surge Immunity Test	: IEC 60255-22-5 / IEC 61000-4-6 class 4 : Differential Mode = 2kV : Common Mode = 4kV : 1.2/50uS , 5 surges of each polarity
6.	Power Frequency Magnetic Field Test	: IEC-61000-4-8, Class-V
7.	Radiated Electromagnetic Field Disturbance	: IEC- 60255-22-3 : EN-61000-4-3 : Frequency 80MHz – 1GHz
8.	Conducted Disturbance Induced By Radio Frequency Field	: IEC 60255-22-6 / IEC 61000-4-6: 1996. : Freq. 150kHz – 80MHz, Amplitude 10 V, Modulation 80% AM @ 1 KHz
9.	AC Ripple In DC Supply Test	: IEC 60255-11
10.	Radiated Emission	: IEC 60255-25
Insulation Tests:		
11.	High Voltage Test	: IEC 60255-5. class – III : At 2.5kV 50Hz between all terminal connected together and earth for 1 minutes
12.	Impulse Voltage Test	: IEC 60255-5. class – III : Test voltage: 5KV (peak) 1.2 / 50us, : Energy :0.5 J, : Polarity : + ve and – Ve : Nos. of impulses : 3 positive and 3 negative impulse : Duration between Impulses : 5 sec.

Environmental tests:		
13.	Cold test Storage test	: IEC 60068-2-1
14.	Dry heat test	: IEC 60068-2-2
15.	Damp heat test, steady state	: IEC 60068-2-3
16.	Damp heat test, cyclic	: IEC 60068-2-30
Mechanical tests		
17.	Vibration	: IEC 60255-21-1 class 1 : Frequency Range = 10Hz – 150Hz, acceleration. = 1gn (9.8 m/s ²) : Sweep rate 1 octave/min; 20 cycle in 3 orthogonal axis.
18.	Bump Test	: IEC 60255-21-2 Class-1 : 1000 bumps of 10gn peak acceleration and 16ms pulse duration in each of the two opposite direction per axis as per IEC 60255-21-2 class 1 No. of axes : 3.
19.	Shock Withstand	: IEC 60255-21-2 Clas-1 : 3 shocks of 15gn peak acceleration and 11ms pulse in each of two opposite direction . No. of axis : 3
20.	Seismic Test	: IEC 60255-21-3 : In single axis sine sweep in X-axis sweep (@a sweep rate of 1 octave/minute) vibration in the frequency range (5-40 Hz) at amplitude of 3.5mm or 1.0gn (whichever is less) : In single axis sine sweep in Y-axis - sweep (@a sweep rate of 1 octave/minute) vibration in the frequency range (5-40 Hz) at amplitude of 1.5mm or 0.5gn (whichever is less)

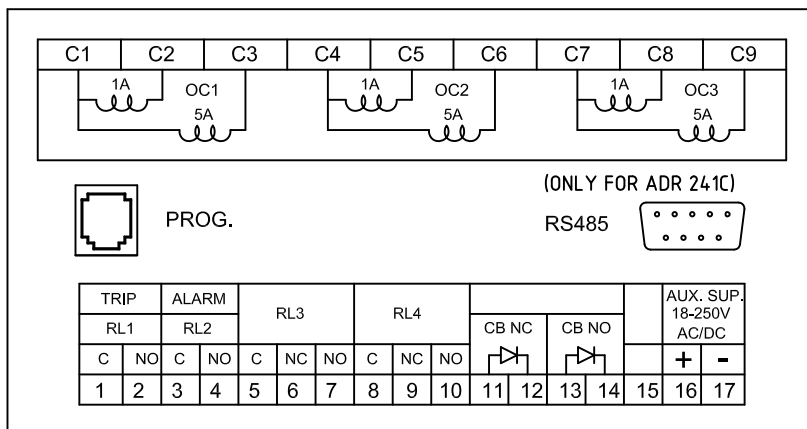


1	2	3	4
RevNo	Revision note	Date	Signature
01	RS422 TO RS485	10.07.2014	VAP
RevNo	Revision note	Date	Signature
01	RS422 TO RS485	10.07.2014	VAP

RELAY USE INTERNAL EF (3Io) FOR EF PROTECTION



BACK TERMINAL DETAILS



Dim : MM	TOL :	FINISH:	MATERIAL:
Perpaed by PD	Checked by VAP	Approved by - date SMK	Filename ADV02702R
Date 10.07.2014	Scale NTS	Title : - ELECTRICAL CONNECTION & BACK TERMINAL DETIALS FOR NUMERICAL OVER CURRENT RELAY ADR 241C	
Drawing_ Ref. ADV02702R	Edition 01	Sheet 1 OF 1	



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8.0 Front Panel and Control

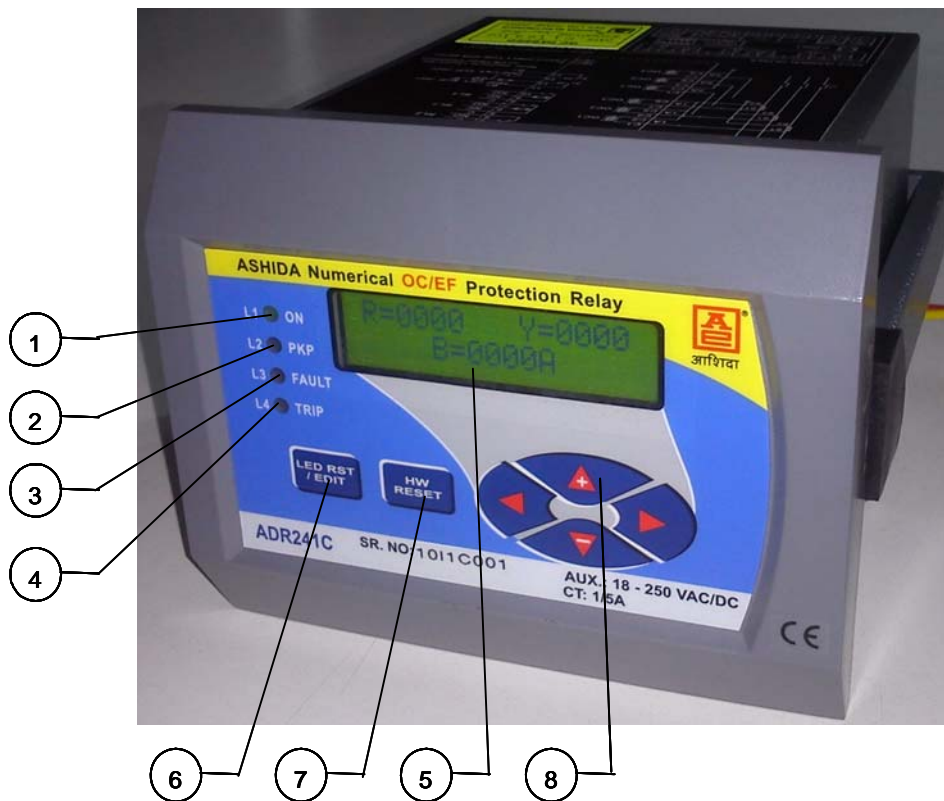


Fig. 4.1

Sr. No.	Legend		Description
	LEDs		Total 4 bi-colors LED (Red and Green) are provided for user interface. Some of LEDs are pre defined others are spare and can be programmed as per the requirement. Following are pre defined LEDs
1	L1	ON	: Green LED indicates Relay OK (Protection Healthy) : Red LED indicates Fault in following conditions. 1. Problem in relay Hardware. 2. Trip Circuit Fault
2	L2	PKP	: Red LED indicate Start of timer Self Reset (SR) Type
3	L3	FAULT	: Red LED indicate Relay Operated Flag (HR)
4	L4	TRIP	: Green LED indicates Output TRIP relay contact closer (SR) Type
5	LCD display		16 character by 2 line back-lit LCD display will be provided for display of settings / status and measured value such as line current etc.
6	LED RESET/EDIT		1 Key provided for LED Reset / EDIT
7	HW Reset		1 key provided for Hardware reset. This key will be interlocked with LED Reset / EDIT.
8	Navigation Key		4 keys provided for navigation through different display menu and to do setting

8.1 USER INTERFACE

8.1.1 LCD Display

Back-lit LCD display 16 character by 2 line is provided for parameter and setting display and for easy viewing of measurement, setting, fault records, date & time, error message. Back-lit will automatically switch off if any push button key will not be pressed for more than 100sec. The display back-lit can be made ON by pressing any push button key. Back-lit is also automatically turned ON when any tripping occurs on particular equipment.

8.1.2 Touch Keys

The function of relay is controlled by the following keys, Left Arrow key (◀), Right Arrow key (▶), Up Arrow key (+ / ▲), Down Arrow key (- / ▼) and LED Reset Key and HW Reset Key which are provided on the Front Plate.

- When the Right Arrow key (▶) is pressed the operator is able to view the setting of the relay. When the Right Arrow key (▶) is pressed again it will go to the next setting page, but in case there are no more setting to be displayed it returns to the main menu.
- When the Left Arrow key (◀) is pressed then you are able to enter the setting which can be now modified in the Main Menu using Up Arrow key (+ / ▲) Down Arrow key (- / ▼). When the Left Arrow key (◀) pressed again it will go to the next setting.
- The Up Arrow key (+ / ▲) is used for two purposes: 1) (▲) To scroll the Main Menu and 2) (+) To increment the value in the setting mode.
- The Down Arrow key (- / ▼) is used for two purposes: 1) (▼) To scroll the Main Menu and 2) (-) To decrement the value in the setting mode.
- The Left Arrow key (◀) Right Arrow key (▶) can be used to go forward or backward, both when doing the settings and while viewing the settings

'LED RESET/EDIT' key

- 'LED RESET/EDIT' key is used to Reset the Trip Flags.
- 'LED RESET/EDIT' key is used to display the Curser while setting the Password and the Relay Led Configuration.
- LED RESET/EDIT' key is used to discard while doing the settings and abort to Main Menu.

Note: At the time of setting if changes are not carried within 100s then the display will reset itself and return to the main menu.

'HW RESET' key

'HW RESET' key is never require in normal operation, It is in series with 'LED RESET/EDIT' key, When both keys are pressed simultaneously it reset total hardware of relay. This normally is required during firmware update of relay.

8.1.3 LED's

The relay is having total 4 nos of dual colour LED of high intensity for easy identification of type of fault for easy user interface.

Sr. No.	Legend		Description
1	L1	ON	: Green LED indicates Relay OK (Protection Healthy) : Red LED indicates Fault in following conditions. 1. Problem in relay Hardware. 2. Trip Circuit Fault
2	L2	PKP	: Red LED indicate Start of timer Self Reset (SR) Type
3	L3	FAULT	: Red LED indicate Relay Operated Flag (HR)
4	L4	TRIP	: Green LED indicates Output TRIP relay contact closer (SR) Type

8.2 Password

8.2.1 Password Entry and changing the password

To enter password in all **ADR141C** refer following steps (User can go to this screen by pressing HW RESET + LED RESET/EDIT Simultaneously)

R= 0000 Y = 0000 B = 0000A
--

This is default window showing the actual Primary Load Current as per “CT Sec” selection

Press the left arrow key (◀) the relay will display as follows.

Pri. Current

This window is showing Main menu.

Press the down arrow key (- / ▼) the relay will display as follows.

General Settings

Password protected window for “**General Setting**” for setting New Password, Unit ID, CT sec. CT primary, Test Block, Trip Ckt, BF Enable BF Delay and Frequency.

Press the left arrow key (◀) the relay will display as follows.

Password = 0001 Use Inr/Dec ^

To Enter the previously set Password

Press the LED Reset Key this will display the curser (^) below the password digits at Extreme Right (0000) this curser (^) can be shifted right to left and left to right using the left arrow key (◀) and Right Arrow key (▶).

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) a given value can be set for each of the digits. The range is from 0 to F. (The range is from 0000 – FFFF)

When the Password is set, press the LED Reset Key it will come out of cursor (^).

Press the left arrow key (◀) the relay will display as follow.

Note:

- **Default password setting is '0000'**
- **The set Password will remain common for all the settings**

Password	= 0000
New Password	^

To Change Password (New Password)

Press the LED Reset Key this will display the cursor (^) below the password digits at Extreme Right (0000) this cursor (^) can be shifted right to left and left to right using the left arrow key (◀) and Right Arrow key (▶).

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) a given value can be set for each of the digits. The range is from 0 to F. (The range is from 0000 – FFFF)

When the desired Password is set press the LED Reset/EDIT Key it will come out of cursor (^).

Press the left arrow key (◀) the relay will display other windows one by one till the following window.

-
-
-

<p>Save Settings?</p> <p>Mode for Save</p>
--

Now again press the left arrow key (◀) the 'OK' window will appear for a moment and the control will automatically return to "General Settings"

<p>OK</p>

This window will flash for moment

The control will return to the main menu

<p>→ General Settings ←</p>

8.2.2 Clear Password

There are unlinking event when user forgets the password, in such case password can be cleared by pressing following sequences.

R= 0000 Y = 0000
B = 0000A

This is default window showing the actual Primary Load Current as per “**CT Sec**” selection

- 1) Press 'HW RESET' + 'LED RESET/EDIT' and LEFT ARROW KEY (◀) this will initialize relay hardware.
- 2) Release 'HW RESET' + 'LED RESET/EDIT' and keeping the left arrow key (◀) pressed till the following message is display. This will Reset password to '0' (Zero).

Ashida Digital
OC/EF Relay

ADR141C – 01.20
Unit ID = 0001

Fault Memories &
Password clear

R= 0000 Y = 0000
B = 0000A

8.3 MENUS

8.3.1 Default Display

After **Power ON** or when the HW RESET and LED RESET/EDIT push button is pressed simultaneously, the relay will display the following message.

Ashida Digital
OC/EF Relay

This window will flash momentarily showing the following
Relay Name: OC/EF Relay
Then the control will go automatically to next window.

ADR141C - Ver. 01.20
Unit ID : 0001

This window will flash momentarily showing the following
Relay Type : ADR141C Software Version : V01.20
Unit ID = 0001
Then the control will go automatically to default window

R = 0000 Y = 0000
B = 0000A

This is default window showing the actual Primary Load
Current as per “**CT Pri**” selection.

8.3.2 Main Menu List

R = 0000 Y = 0000
B = 0000A

This is default window showing the actual Primary Load
Current as per “**CT Primary**” selection

Press the left arrow key (◀) the relay will display Main menu
directly as follows.

Primary current
General Settings
Relay setting
Cold Load
Relay/LED Config
Trip Test
Fault 1
Fault 2
Fault 3
Fault 4
Fault 5
Fault 6
Fault 7

Primary Current, General Settings, Relay setting, Cold Load,
Relay/LED Config, Trip Test, Fault 1, Fault 2, Fault 3, Fault
4, Fault 5, Fault 6, Fault 7, Fault 8, Events Log, Error Log,
Status, Date/Time, and Secondary Current these are the
Main Menus available in this relay.

Since the LCD Display consist only of 2 Lines, the main
menu list can be scrolled up or down by using the up arrow
key (+ / ▲) or the down arrow key (- / ▼).

Fault 8
Events Log
Error Log
Status
Date/Time
Secondary Current

8.3.2.1 Main Menu List Details

Pri. Current

This menu is to view the actual load current in **Primary** as per the CT Primary selection.

Press the down arrow key (- / ▼) the relay will display as follows.

General Settings

Password protected window for “**General Setting**” for setting New Password, Unit ID, CT sec. CT primary, Test Block, Trip Ckt, BF Enable BF Delay and Frequency.

Press the down arrow key (- / ▼) the relay will display as follows.

Relay Settings

Password protected window for “**Relay Settings**” for setting IP> Enable, IP> Range, IP TMS, IP>> Enable, IP>> Multiply by 50, 3lo> Enable, 3lo> Range, 3lo TMS, 3lo>> Enable, 3lo>> Multiply by 50, IP Curve, 3lo Curve, IP>> Delay, 3lo>> Delay, IP>C6 Delay & 3lo>C6 Delay.

Press the down arrow key (- / ▼) the relay will display as follows.

Cold Load

Password protected window for “**Cold Load**” for setting CL Enable, CL Timer, IP> Enable, IP> Range, IP TMS, IP>> Enable, IP>> Multiply, 3lo> Enable, 3lo> Range, 3lo TMS, 3lo>> Enable, 3lo>> Multiply, IP Curve, 3lo Curve, IP>> Delay, 3lo>> Delay, IP> C6 Delay, 3lo> C6 Delay.

Press the down arrow key (- / ▼) the relay will display as follows.

Relay/LED Config

Password protected window for “**Relay/LED Config.**” for Setting Password, Load fact Set, RL1 A, RL1 B, RL2 A, RL2 B, RL3 A, RL3 B, RL4 A, RL4 B, L1 Green A, L1 Green B, L1 Red A, L1 Red B, L2 Green A, L2 Green B, L2 Red A, L2 Red B, L3 Green A, L3 Green B, L3 Red A, L3 Red B, L4 Green A, L4 Green B, L4 Red A and L4 Red B.

Press the down arrow key (- /▼) the relay will display as follows.

Trip Test

This function is used for **Tripping** purpose that is by pressing on Right Arrow key (►).

Press the down arrow key (- /▼) the relay will display as follows.

Fault 1

This menu is to view the latest **Fault** data stored by the relay. That is Trip Flags, Instantaneous and Phase primary Current, Trip Counter (TC), Fault Date & Time.

Press the down arrow key (- /▼) the relay will display as follows.

Fault 2

This menu is to view the First latest **Fault** data stored by the relay. That is Trip Flags, Instantaneous and Phase primary Current, Trip Counter (TC), Fault Date & Time.

Press the down arrow key (- /▼) the relay will display as follows.

Fault 3

This menu is to view the second latest **Fault** data stored by the relay. That is Trip Flags, Instantaneous and Phase primary Current, Trip Counter (TC), Fault Date & Time.

Press the down arrow key (- /▼) the relay will display as follows.

Fault 4

This menu is to view the third latest **Fault** data stored by the relay. That is Trip Flags, Instantaneous and Phase primary Current, Trip Counter (TC), Fault Date & Time.

Press the down arrow key (- /▼) the relay will display as follows.

Fault 5

This menu is to view the fourth latest **Fault** data stored by the relay. That is Trip Flags, Instantaneous and Phase primary Current, Trip Counter (TC), Fault Date & Time.

Press the down arrow key (- /▼) the relay will display as follows.

Fault 6

This menu is to view the fifth latest **Fault** data stored by the relay. That is Trip Flags, Instantaneous and Phase primary Current, Trip Counter (TC), Fault Date & Time.

Press the down arrow key (- /▼) the relay will display as follows.

Fault 7

This menu is to view the sixth latest **Fault** data stored by the relay. That is Trip Flags, Instantaneous and Phase primary Current, Trip Counter (TC), Fault Date & Time.

Press the down arrow key (- /▼) the relay will display as follows.

Fault 8

This menu is to view the seventh latest **Fault** data stored by the relay. That is Trip Flags, Instantaneous and Phase primary Current, Trip Counter (TC), Fault Date & Time.

Press the down arrow key (- /▼) the relay will display as follows.

Events Log

This menu is to view the **Events Log** showing the history of events.

Press the down arrow key (- /▼) the relay will display as follows.

Error Log

This menu is to view the **Error Code** detected by the self supervision function of the relay.

Press the down arrow key (- /▼) the relay will display as follows.

Status

This menu is to view the **Status** that is Digital Input, Trip Ckt., Ckt Breaker and S/W & H/W versions.

Press the down arrow key (- /▼) the relay will display as follows.

Date/Time

Password protected window for setting “**Date/Time**”

Press the down arrow key (- / ▼) the relay will display as follows.

Sec. Current

This menu is to view the actual load current in **Secondary** as per the CT Secondary selection.

Press the down arrow key (- / ▼) the relay will display as follows.

Pri. Current

8.3.3 Primary Current

8.3.3.1 To View – Primary Current

Pri. Current

This menu is to view the actual load current in **Primary** as per the CT Primary selection.

Press the right arrow key (►) the relay will display as follows.

R = 0000 Y = 0000
B = 0000A

This window will show Primary load current of R, Y & B.

Press the right arrow key (►) the relay will display as follows.

3Io = 0000A

This window will show Primary load current of 3Io.

Press the right arrow key (►) the relay will display main menu

Pri. Current

8.3.4 General setting

8.3.4.1 To Set – General setting

General Settings

Password protected window for “**General Setting**” for setting New Password, Unit ID, CT Secondary, CT Primary Test Block, Trip Ckt. BF Enable, BF Delay & Frequency.

Press the left arrow key (◀) the relay will display as follows.

Password = 0000

Use Inr/Dec

Enter the previously set password, by pressing LED Reset and then using the up arrow key (+ / ▲) or the down arrow key (- / ▼). As per the Enter the Password selection.

Note : Default password setting is ‘0000’

Press the left arrow key (◀) the relay will display as follows.

Password = 0000

New Password

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) **New Password** can be set. As per the New Password selection.

Press the left arrow key (◀) the relay will display as follows.

Unit ID = 001

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **Unit ID** address can be set. The unit address can be set from 001 to 250 in steps of 001, which means total 250 devices can be connected to single computer. The 250TH address is reserved for special command. These settings are required to communicate with the SCADA computer.

Press the left arrow key (◀) the relay will display as follows.

CT Sec. = 5A

1=1A , 2= 5A

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the **CT Sec.** setting can be selected, i.e. 1 Amp. or 5 Amp.

Note: Care should be taken to see proper connection are established at the back terminal, i.e. between Com. and 1 while selecting 1 Amp and between Com. and 5 while selecting 5Amp.

Press the left arrow key (◀) the relay will display as follows

CT Primary = 0010
Range 10 – 3000

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **CT Primary** can be set. The setting range is from 10 to 3000 in steps of 1.

Press the left arrow key (◀) the relay will display as follows.

Test Block = YES
01 = YES , 02 = NO

This setting is used to block Trip Test button function. Normally Trip Test is required during pre commission testing to check operation of relay and panel wiring.

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **Test block** can be enabled or disabled, i.e. YES or NO. When the given set value is YES then it will enable Trip Test Key but when the given set value is NO then Trip Test key will be blocked.

Press the left arrow key (◀) the relay will display as follows.

Trip Ckt. = YES
01 = YES , 02 = NO

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the **Trip Ckt** can be selected, i.e. YES or NO. If set YES then Trip Ckt Supervision is enabled and if set NO then it will be disabled.

Press the left arrow key (◀) the relay will display as follows.

BF Enable = YES
01 = YES , 02 = NO

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **BF Enable** can be selected, i.e. YES or NO. If set YES then BF setting is enabled and if set NO then it will be disabled.

Press the left arrow key (◀) the relay will display as follows.

BF Delay = 200
Range 50 – 800 ms

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **BF Delay** can be set. The setting range is from 50 to 800ms in step of 50ms.

Press the left arrow key (◀) the relay will display as follows.

Baud Rate = 57600
Range 1200 – 57600

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **Baud Rate** can be selected. The settings are from 1200 to 57600. (i.e. 1200, 2400, 9600, 19200, 38400 and 57600) (**Only for ADR241C**)

Press the left arrow key (◀) the relay will display as follows.

Frequency = 50Hz
Range 50 – 60Hz

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **Frequency** can be selected.. i.e. 50Hz or 60Hz.

Press the left arrow key (◀) the relay will display as follows.

Save Setting?
Mode For Save

To **Save** any changes.

Press the left arrow key (◀) the relay will save the changes and the following message is display.

Note: *If changes made are **not to be saved** press LED Reset or leave key pad untouched for 100 sec.*

OK

This window will flash for moment

The control will return to the main menu

General Setting

8.3.4.2 To View – General Setting**General Setting**

Press the right arrow key (▶) the relay will display as follows.

Unit ID = 001

This window will show **General Setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

CT Sec. = 1Amp
CT Primary = 0100A

This window will show **General Setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

Test Block = NO
Trip Ckt. = NO

This window will show **General Setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

BF Enable = No
BF Delay = 200

This window will show **General Setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

Baud Rate = 57600

This window will show **General Setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

(Only for ADR241C)

Frequency = 50Hz

This window will show **General Setting** done previously.

Press the right arrow key (▶) the relay will display Main Menu.

General Setting

8.3.5 RELAY SETTINGS

8.3.5.1 To Set Relay Setting

Relay Setting

Password protected window for “**Relay Settings**” for setting IP> Enable, IP> Range, IP TMS, IP>> Enable, IP>> Range, 3lo> Enable, 3lo> Range, 3lo TMS, 3lo>> Enable, 3lo>> Range, IP Curve, 3lo Curve, IP>> Delay, 3lo>> Delay, IP> C6 Delay and 3lo> C6 Delay.

Press the left arrow key (◀) the relay will display as follows.

Password = 0000

Use Inr/Dec

Enter the previously set password, by using the up arrow key (+ / ▲) or the down arrow key (- / ▼). As per the Enter the Password selection.

Note : Default password setting is ‘0000’

Press the left arrow key (◀) the relay will display as follows.

IP> Enable = YES

01 = YES , 02 = NO

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **IP> Enable** can be selected. i.e. YES or NO. If set YES then IP> setting is enabled and if set NO then it will be disabled.

Press the left arrow key (◀) the relay will display as follows.

IP> = 200

Range 10% – 250%

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **IP>** can be set. The setting range is from 10% to 250% in steps of 1%.

Press the left arrow key (◀) the relay will display as follows.

IP> TMS = X1.00

Range X 0.01 – 1.00

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **IP> TMS** can be set. The setting range is from 0.01 to 1.00 in steps of 0.01

Press the left arrow key (◀) the relay will display as follows.

IP>> = Enable

01 = YES , 02 = NO

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **IP>> Enable** can be selected . i.e. YES or NO. If set YES then IP>> setting is enabled and if set NO then it will be disabled

Press the left arrow key (◀) the relay will display as follows.

IP>> 001

Multiply by 50

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the **IP>>** can be set in range of multiply by 50.

Press the left arrow key (◀) the relay will display as follows.

3lo> Enable = YES**01 = YES , 02 = NO**

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo> Enable** can be selected . i.e. YES or NO. If set YES then 3lo> setting is enabled and if set NO then it will be disabled

Press the left arrow key (◀) the relay will display as follows.

3lo> = 200

Range 10 – 250%

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo>** can be set. The setting range is from 10% to 250% in steps of 1%.

Press the left arrow key (◀) the relay will display as follows.

3lo> TMS = X1.00

Range X0.01 – 1.00

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo> TMS** can be set. The setting range is from X0.01 – 1.00 in steps of 0.01.

Press the left arrow key (◀) the relay will display as follows.

3lo>> Enable = YES**01 = YES , 02 = NO**

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo>> Enable** can be selected . i.e. YES or NO. If set YES then 3lo>> setting is enabled and if set NO then it will be disabled

Press the left arrow key (◀) the relay will display as follows.

3lo>> = 001

Multiply by 50

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo>>** can be set. The setting range is Multiply of 50 in steps of 1.

Press the left arrow key (◀) the relay will display as follows.

Ip Curve = 006

Range C1 – C6

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **Ip Curve** can be selected. Six different types of curves are provided from C1 to C6. When the given value is 001, curve 1 is selected and when the given value 002, curve 2 is selected.

In similar manner any desired curve can be selected as 001 to 006 correspond respectively with C1 to C6.

Press the left arrow key (◀) the relay will display as follows.

3lo Curve = 006

Range C1 – C6

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo Curve** can be selected. Six different types of curves are provided from C1 to C6. When the given value is 001, curve 1 is selected and when the given value 002, curve 2 is selected.

Press the left arrow key (◀) the relay will display as follows.

Ip>> Delay = 2.00

Range 0 – 2.00s

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **Ip>> Delay** can be selected. The setting range is from 0 to 2.00s in steps of 0.01s.

Press the left arrow key (◀) the relay will display as follows.

3lo>> Delay = 2.00

Range 0 – 2.00s

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo>> Delay** can be selected. The setting range is from 0 to 2.00s in steps of 0.01s.

Press the left arrow key (◀) the relay will display as follows.

Ip> C6 Delay = 99.5

Range 0.1 – 99.9s

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **Ip>C6 Delay** can be selected. Range is in between 0.1 – 99.9s in steps of 0.01s

Press the left arrow key (◀) the relay will display as follows.

3lo> C6 Delay = 99.5

Range 0.1 – 99.9s

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo>C6 Delay** can be selected. Range is in between 0.1 – 99.9s in steps of 0.01s

Press the left arrow key (◀) the relay will display as follows.

Save Settings?

Mode for Save

To **Save** any changes,

Press the left arrow key (◀) the relay will save the change and the following message is display.

Note: If changes made are **not to be saved** press **LED Reset** or leave key pad untouched for 100Sec.

OK

This window will flash for moment

The control will return to the main menu

Relay Setting

8.3.5.2 To View – Relay Setting

Relay Setting

Press the right arrow key (▶) the relay will display as follow.

IP> Enable = Yes

IP>> Enable = Yes

This window will show **Relay setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

IP>200% t= X1.00

IP>>800%

This window will show **Relay setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

3Io> Enable = No

3Io>> Enable = No

This window will show **Relay setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

3Io>020% t= X1.00

3Io>>200

This window will show **Relay setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

IP> Normal Inv. 2

3Io> Normal Inv. 1

This window will show **Relay setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

IP>> Delay = 0.00

3Io>> Delay = 0.00

This window will show **Relay setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

IP> C6 Delay = 04.0

3Io> C6 Delay = 00.0

This window will show **Relay setting** done previously.

Press the right arrow key (▶) the relay will display the main menu.

Relay Setting

8.3.6 COLD LOAD SETTINGS

8.3.6.1 To Set Cold Load Setting

Cold Load Setting

Password protected window for “Cold Load” for setting CL Enable, CL Timer, IP> Enable, IP> Range, IP TMS, IP>> Enable, IP>> Multiply, 3lo> Enable, 3lo> Range, 3lo TMS, 3lo>> Enable, 3lo>> Multiply, IP Curve, 3lo Curve, IP>> Delay, 3lo>> Delay, IP> C6 Delay, 3lo> C6 Delay.

Press the left arrow key (◀) the relay will display as follows.

Password = 0000

Use Inr/Dec

Enter the previously set password, by pressing LED RESET key and using the up arrow key (+ / ▲) or the down arrow key (- / ▼). As per the Enter the Password selection.

Note: Default password setting is '0000'

Press the left arrow key (◀) the relay will display as follows.

CL Enable = YES

01 = YES , 02 = NO

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **CL Enable** can be selected i. i.e. YES or NO. If set YES then CL setting is enabled and if set NO then it will be disabled

Press the left arrow key (◀) the relay will display as follows.

CL Timer = 0.50

Range 0.1 – 10.0S

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **CL Timer** can be set. The setting range is from 0.1 – 10.0S in steps of 0.1.

Press the left arrow key (◀) the relay will display as follows.

IP> Enable = YES

01 = YES , 02 = NO

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **IP> Enable** can be selected . i.e. YES or NO. If set YES then IP> setting is enabled and if set NO then it will be disabled

Press the left arrow key (◀) the relay will display as follows.

IP> = 250

Range 10 – 250%

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the **IP>** can be set in Range 10 – 250% in steps of 001%

Press the left arrow key (◀) the relay will display as follows.

IP> TMS = X1.00
Range X0.01 – 1.0

By using the up arrow key (**+ / ▲**) or the down arrow key (**- / ▼**) the **IP> TMS** can be set in range of X0.01 – 1.0 in step of 0.01

Press the left arrow key (**◀**) the relay will display as follows.

Ip>> Enable = YES
01 = YES , 02 = NO

By using the up arrow key (**+ / ▲**) or the down arrow key (**- / ▼**) the desired **IP>> Enable** can be selected i. i.e. YES or NO. If set YES then BF setting is enabled and if set NO then it will be disabled

Press the left arrow key (**◀**) the relay will display as follows.

Ip>> = 001
Multiply by 50

By using the up arrow key (**+ / ▲**) or the down arrow key (**- / ▼**) the desired **Ip>>** can be set. The setting range is multiply of 50 in steps of 1.

Press the left arrow key (**◀**) the relay will display as follows.

3Io> Enable = YES
01 = YES , 02 = NO

By using the up arrow key (**+ / ▲**) or the down arrow key (**- / ▼**) the desired **3Io> Enable** can be selected . i.e. YES or NO. If set YES then **3Io>** setting is enabled and if set NO then it will be disabled

Press the left arrow key (**◀**) the relay will display as follows.

3Io> = 250
Range 10 – 250%

By using the up arrow key (**+ / ▲**) or the down arrow key (**- / ▼**) the **3Io>** can be set in Range 10 – 250% in steps of 001%

Press the left arrow key (**◀**) the relay will display as follows.

3Io> TMS = X1.00
Range X0.01 – 1.00

By using the up arrow key (**+ / ▲**) or the down arrow key (**- / ▼**) the desired **3Io> TMS** can be set. The setting range is from X0.01 – 1.00 in steps of 0.01.

Press the left arrow key (**◀**) the relay will display as follows.

3Io>> Enable = YES
01 = YES , 02 = NO

By using the up arrow key (**+ / ▲**) or the down arrow key (**- / ▼**) the desired **3Io>> Enable** can be selected .e. YES or NO. If set YES then **3Io>>** setting is enabled and if set NO then it will be disabled

Press the left arrow key (**◀**) the relay will display as follows.

3lo>> = 001

Multiply by 50

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo>>** can be set. The setting range is multiply of 50 in steps of 1.

Press the left arrow key (◀) the relay will display as follows.

Ip Curve = 006

Range C1 – C6

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **Ip Curve** can be selected. Six different types of curves are provided C1 to C6. When the given value is 0001 curve 1 is selected and when the given value 0002 curve 2 is selected.

In similar manner any desired curve can be selected as 0001 to 0006 correspond respectively with C1 to C6.

Press the left arrow key (◀) the relay will display as follows.

3lo Curve = 006

Range C1 – C6

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo Curve** can be selected. Six different types of curves are provided C1 to C6. When the given value is 0001 curve 1 is selected and when the given value 0002 curve 2 is selected.

Press the left arrow key (◀) the relay will display as follows

Ip>> Delay = 2.00

Range 0 – 2.00s

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **Ip>> Delay** can be selected. The setting range is from 0 to 2.00s in steps of 0.01s.

Press the left arrow key (◀) the relay will display as follows.

3lo>> Delay = 2.00

Range 0 – 2.00s

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo>> Delay** can be selected. The setting range is from 0 to 2.00s in steps of 0.01s.

Press the left arrow key (◀) the relay will display as follows.

Ip> C6 Delay = 99.5

Range 0.1 – 99.9s

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **Ip>C6 Delay** can be selected. Range is in between 0.1 – 99.9s in steps of 00.1s

Press the left arrow key (◀) the relay will display as follows.

3lo> C6 Delay = 99.5

Range 0.1 – 99.9s

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) the desired **3lo>C6 Delay** can be selected. Range is in between 0.1 – 99.9s in steps of 00.1s

Press the left arrow key (◀) the relay will display as follows,

Save Settings?

Mode for save

To **Save** any changes.

Press the left arrow key (◀) the relay will save the changes and the following message is display.

Note: If changes made are **not to be saved** press **LED Reset** or leave key pad untouched for 100Sec.

OK

This window will flash for moment

The control will return to the main menu

Relay Setting

8.3.6.2 To View – COLD LOAD Setting

Cold Load Setting

Press the right arrow key (▶) the relay will display as follows.

CL Enable = Yes
CL Timer = 0.50

This window will show **Cold Load setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

IP> Enable = YES
IP>> Enable = YES

This window will show **Cold Load setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

IP> 250% t = X1.00
IP>> 1000%

This window will show **Cold Load setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

3lo> Enable = NO
3lo>> Enable = NO

This window will show **Cold Load setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

3lo> 250% t = X1.00
3lo>> 3000%

This window will show **Cold Load setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

IP> Normal Inv. 1
3lo> Normal Inv. 1

This window will show **Cold Load setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

IP>> Delay = 0.00
3lo>> Delay = 0.00

This window will show **Cold Load setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

IP> C6 Delay = 00.5
3lo> C6Delay = 01.0

This window will show **Cold Load setting** done previously.

Press the right arrow key (▶) the relay will display the main menu.

Cold Load

8.3.7 Relay/ LED config. SETTINGS**8.3.7.1 BIT Configuration**

For Relays RL1, RL2, RL3 and RL4.

For LED L1R /L1G, L2R/L2G, L3R/L3G and L4R/L4G

Bit Posit.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
A	Err	Proth	TC_ OK	TC_ Fail	CB NC	CB NO	BF	Test_ Trip	3lo>> Trip	B>> Trip	Y>> Trip	R>> Trip	3lo> Trip	B> Trip	Y> Trip	R> Trip
B	x	x	x	x	x	x	SR/ HR	Test_ Pkp	3lo>> Pkp	B>> Pkp	Y>> Pkp	R>> Pkp	3lo> Pkp	B> Pkp	Y> Pkp	R> Pkp

Protection Function	Bit information to assign
Set Bit	Assign required protection function and digital input Binary '1' to Set Bit
Reset Bit	Assign required protection function and digital input Binary '0' to Reset Bit
Self Reset (SR)	Assign Bit no. 9 in Relay/LED B as Binary input '0' to set selected function Self Reset.
Hand Reset (HR)	Assign Bit no. 9 in Relay/LED B as Binary input '1' to set selected function Hand Reset.
x	Not Applicable

List of Protection function & Digital input :-

Text	Description
R> Trip	R Phase IDMT/DMT Over Current Trip.
Y> Trip	Y Phase IDMT/DMT Over Current Trip.
B> Trip	B Phase IDMT/DMT Over Current Trip.
3lo> Trip	Internal Derived EF (3lo) IDMT/DMT Trip.
R>> Trip	R Phase Inst. Over Current Trip.
Y>> Trip	Y Phase Inst. Over Current Trip.
B>> Trip	B Phase Inst. Over Current Trip.
3lo>> Trip	Internal Derived EF (3lo) Inst. Trip.
R> Pkp	R Phase IDMT/DMT Over Current Pkp.
Y> Pkp	Y Phase IDMT/DMT Over Current Pkp.
B> Pkp	B Phase IDMT/DMT Over Current Pkp.
3lo> Pkp	Internal Derived EF (3lo) IDMT/DMT Over Current Pkp.
R>> Pkp	R Phase Inst. Over Current Pkp.
Y>> Pkp	Y Phase Inst. Over Current Pkp.

B>> Pkp	B Phase Inst. Over Current Pkp.
3lo>> Pkp	Internal Derived EF (3lo) Inst. Over Current Pkp.
TestTrip	Relay Trip from Test function
Test Pkp	Relay Pkp from Test function
BF	BF Relay Enable.
CB NC	Trip Circuit Supervision Digital input
CB NO	Trip Circuit Supervision Digital input
TC Fail	Trip Circuit Supervision Faulty
TC OK	Trip Circuit Supervision OK
Proth.	Trip Circuit Supervision and Internal Hardware OK
Error	Trip Circuit Supervision OR Internal Hardware Faulty
SR/HR	Relays / LED can be set Self Reset (SR) / Hand Reset.

Refer following table for some equivalent Binary, Hex and Decimal values.

Binary Value	Hex decimal Values	Decimal Values
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
0101	5	5
0110	6	6
0111	7	7
1000	8	8
1001	9	9
1010	A	10
1011	B	11
1100	C	12
1101	D	13
1110	E	14
1111	F	15

For Example:

1. If you want to set Led L2 Green for Inst. Fault flag (HR), then you set bit as follow.

Bit Posit.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
A									3lo >> Trip	B >> Trip	Y >> Trip	R >> Trip				
B							SR / HR									
Bit for A	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0
Bit for B	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
L2 Green A	0				0				F				0			
L2 Green B	0				2				0				0			

i.e. L2 Green A = 00F0

L2 Green B = 0200

2. If you want to set Relay 4 for BF (SR), then you set bit as follow.

Bit Posit.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
A							BF									
B							SR / HR									
Bit for A	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bit for B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L2 Green A	0				2				0				0			
L2 Green B	0				0				0				0			

i.e. RL2 A = 0200

RL2 B = 0000

8.3.7.2 To Set –Relay/ LED config. Setting

Relay/LED's config.

Password protected window for **Relay/LED confi Setting**
 Password, Load fact setting, RL1 A, RL1 B, RL2 A, RL2 B,
 RL3 A, RL3 B, RL4 A, RL4 B, L1 green A, L1 green B, L1
 red A, L1 Red B, L2 green A, L2 green B, L2 Red A, L2 Red
 B, L3 green A, L3 green B, L3 red A, L3 red B, L4 green A,
 L4 green B, L4 Red A, L4 Red B.

Press the left arrow key (◀) the relay will display as follows.

Password = 0001

Use Inr/Dec

Enter the previously set password, by using the up arrow
 key (+ / ▲) or the down arrow key (- / ▼). As per the
Enter the Password selection.

Note: Default password setting is '0000'

Press the left arrow key (◀) the relay will display as follows.

Load Fact set =02

01: Yes 02: No

Load Fact Set if 01 i.e YES

Then the factory defined setting will be loaded as follows:

RL1 A = 01FF

RL1 B = 0000

RL2 A = 01FF

RL2 B = 0000

RL3 A = 0077

RL3 B = 0000

RL4 A = 0088

RL4 B = 0000

L1 Green A = 4000

L1 Green B = 0000

L1 Red A = 8000

L1 Red B = 0000

L2 Green A = 0000

L2 Green B = 0000

L2 Red A = 0000

L2 Red B = 01FF

L3 Green A = 0000

L3 Green B = 0000

L3 Red A = 01FF

L3 Red B = 0200

L4 Green A = 01FF

L4 Green B = 0000

L4 Red A = 0000

L4 Red B = 0000

IF Load Factory setting is 02 i.e. NO then the Users can define the Setting as per his requirements.

Press the LED Reset Key this will display the cursor (^) below the password digits at Extreme Right (0000) this cursor (^) can be shifted right to left and left to right using the left arrow key (◀) and Right Arrow key (▶).

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) a given value can be set for each of the digits. The range is from 0 to F. (The range is from 0000 – FFFF)

When the desired Password or bit is set press the LED Reset Key it will come out of cursor (^).

Note :The entire detailed information regarding the Bit specification is given below in Bit Definitions.

Press the left arrow key (◀) the relay will display as follows.

RL1 A = 01FF

This window shows the Relay/LED configuration. That is RL1 A.

Press the left arrow key (◀) the relay will display as follows.

RL1 B = 0000

This window shows the Relay/LED configuration. That is RL1 B

Press the left arrow key (◀) the relay will display as follows.

RL2 A = 01FF

This window shows the Relay/LED configuration. That is RL2 A

Press the left arrow key (◀) the relay will display as follows.

RL2 B = 0000

This window shows the Relay/LED configuration. That is RL2 B

Press the left arrow key (◀) the relay will display as follows.

RL3 A = 01FF

This window shows the Relay/LED configuration. That is RL3 A

Press the left arrow key (◀) the relay will display as follows.

RL3 B = 0000

This window shows the Relay/LED configuration. That is RL3 B

Press the left arrow key (◀) the relay will display as follows.

RL4 A = 01FF

This window shows the Relay/LED configuration. That is RL4 A

Press the left arrow key (◀) the relay will display as follows.

RL4 B = 0000

This window shows the Relay/LED configuration. That is RL4 B.

Press the left arrow key (◀) the relay will display as follows.

L1 Green A = 4000

This window shows the Relay/LED configuration. That is L1 Green A.

Press the left arrow key (◀) the relay will display as follows.

L1 Green B = 0000

This window shows the Relay/LED configuration. That is L1 Green B.

Press the left arrow key (◀) the relay will display as follows.

L1 Red A = 8000

This window shows the Relay/LED configuration. That is L1 Red A

Press the left arrow key (◀) the relay will display as follows.

L1 Red B = 0000

This window shows the Relay/LED configuration. That is L1 Red B

Press the left arrow key (◀) the relay will display as follows.

L2 Green A = 0000

This window shows the Relay/LED configuration. That is L2 Green A

Press the left arrow key (◀) the relay will display as follows.

L2 Green B = 0000

This window shows the Relay/LED configuration. That is L2 Green B.

Press the left arrow key (◀) the relay will display as follows.

L2 Red A = 0000

This window shows the Relay/LED configuration. That is L2 Red A.

Press the left arrow key (◀) the relay will display as follows.

L2 Red B = 01FF

This window shows the Relay/LED configuration. That is L2 Red B.

Press the left arrow key (◀) the relay will display as follows.

L3 Green A = 0000

This window shows the Relay/LED configuration. That is L3 Green A.

Press the left arrow key (◀) the relay will display as follows.

L3 Green B = 0000

This window shows the Relay/LED configuration. That is L3 Green B.

Press the left arrow key (◀) the relay will display as follows.

L3 Red A = 0000

This window shows the Relay/LED configuration. That is L3 Red A.

Press the left arrow key (◀) the relay will display as follows.

L3 Red B = 0400

This window shows the Relay/LED configuration. That is L3 Red B.

Press the left arrow key (◀) the relay will display as follows.

L4 Green A = 01FF

This window shows the Relay/LED configuration. That is L4 Green A.

Press the left arrow key (◀) the relay will display as follows.

L4 Green B = 0000

This window shows the Relay/LED configuration. That is L4 Green B.

Press the left arrow key (◀) the relay will display as follows.

L4 Red A = 0000

This window shows the Relay/LED configuration. That is L3 Red A.

Press the left arrow key (◀) the relay will display as follows.

L4 Red B = 0400

This window shows the Relay/LED configuration. That is L3 Red B.

Press the left arrow key (◀) the relay will display as follows.

Save Settings?

Mode for Save

To **Save** any changes.

Press the left arrow key (◀) the relay will save the change and the following message is display.

Note: If changes made are **not to be saved** press LED Reset or leave key pad untouched for 100Sec.

OK

This window will flash for moment

The control will return to the main menu

Relay/ LED Config.

8.3.7.3 To View Relay/ LED Config. Setting

Relay/ LED Config.

Press the right arrow key (▶) the relay will display as follows.

**Loading Factory
Settings : NO**

This window will show **Loading Factory** Setting done previously.

**RL1 A = 01FF
RL1 B = 0000**

Press the right arrow key (▶) the relay will display as follows.

This window will show **Relay config. setting** done previously.

**RL2 A = 01FF
RL2 B = 0000**

Press the right arrow key (▶) the relay will display as follows.

This window will show **Relay config. setting** done previously.

**RL3 A = 01FF
RL3 B = 0000**

Press the right arrow key (▶) the relay will display as follows.

This window will show **Relay config. setting** done previously.

**RL4 A = 0088
RL4 B = 0000**

Press the right arrow key (▶) the relay will display as follows.

This window will show **Relay config. setting** done previously.

**L1 Green A = 0000
L1 Green B = 0000**

Press the right arrow key (▶) the relay will display as follows.

This window will show **Relay config. setting** done previously.

**L1 Red A = 8000
L1 Red B = 01FF**

Press the right arrow key (▶) the relay will display as follows.

This window will show **Relay config. setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

L2 Green A = 0000

L2 Green B = 0000

This window will show **Relay config. setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

L2 Red A = 8000

L2 Red B = 01FF

This window will show **Relay config. setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

L3 Green A = 0000

L3 Green B = 0000

This window will show **Relay config. setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

L3 Red A = 8000

L3 Red B = 01FF

This window will show **Relay config. setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

L4 Green A = 0000

L4 Green B = 0000

This window will show **Relay config. setting** done previously.

Press the right arrow key (▶) the relay will display as follows.

L4 Red A = 8000

L4 Red B = 01FF

This window will show **Relay config. setting** done previously.

Press the right arrow key (▶) the relay will display the main menu.

Relay/ LED Config.

8.3.8 TRIP TEST

8.3.8.1 To View Trip Test

Trip Test

This function is used for Tripping purpose.

Press the right arrow key (▶) the relay will display as follows.

I>>:

I>: T

This window will show Trip flag.

Press the right arrow key (▶) the relay will display as follows.

R=0000 Y=0000

B=0000A

This window will show primary fault current in R Y B.

Press the right arrow key (▶) the relay will display as follows.

3Io=0000A

Trip Count: 0000

This window will show primary fault current of 3Io and Trip count.

Press the right arrow key (▶) the relay will display as follows.

20/06/13

16:45:50:603

This window will show date and time of fault.

Press the right arrow key (▶) the relay will display main menu i.e. Fault 1.

Fault 1

8.3.9 FAULT 1

8.3.9.1 To View – Fault 1 Data.

Fault 1

This menu is to view the latest fault data stored by the relay. That is Trip Flag, Instantaneous and Phase primary Current, Trip Counter (TC), Fault Date & Time.

Press the right arrow key (▶) the relay will display as follows.

I>>:
I>: T

This window will show Trip flag.

Press the right arrow key (▶) the relay will display as follows.

R = 0000 Y = 0000
B = 0000A

This window will show primary fault current in R Y B.

Press the right arrow key (▶) the relay will display as follows.

3Io = 0000
Trip Count : 0000

This window will show primary fault current of 3Io and Trip Count

Press the right arrow key (▶) the relay will display as follows.

18/12/09
16:03:59.861

This window will show date and time of fault.

Press the right arrow key (▶) the relay will display main menu.

Fault 1

Note : Fault 2 to Fault 8 can be viewed as above

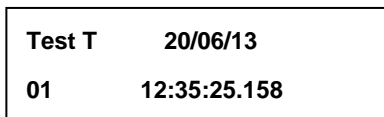
8.3.10 Events Log

8.3.10.1 To View – Events Log



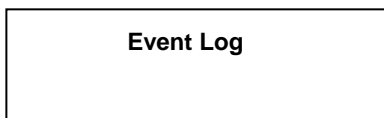
This menu is to view the Events Log data stored by the relay.

Press the right arrow key (▶) the relay will display as follows.



This window will show, Type of Fault, Date, Event Number and Time. This is the latest event.

When the right arrow key (▶) is pressed again the relay will show previous Event No. 16. Similarly if you press the left arrow key it will show Event No. 02. In all 16 Event can be viewed. Then it will return to the main menu.



Note : Event 2 to Event 16 can be viewed as above.

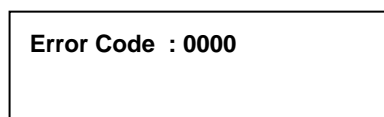
8.3.11 ERROR LOG

8.3.11.1 To View – Error Log



This menu is to view the **Error Log** detected by the self supervision function of relay.

Press the right arrow key (▶) the relay will display as follows.



This window will show Error Code detected by self supervision function of Relay

Press the right arrow key (▶) the relay will display main menu.



8.3.12 STATUS

8.3.12.1 To View – Status

Status

This menu is to view the **Status** of Digital Input, Trip Circuit Supervision, circuit breaker and H/W / S/W version.

Press the right arrow key (▶) the relay will display as follows.

CB NO: OFF
CB NC: OFF

This window will show status of Digital Input i.e. CB NO and CB NC

Press the right arrow key (▶) the relay will display as follows.

Trip Ckt: Healthy
Ckt Brker:?

This window will show status of Trip ckt. and ckt. Breaker.

Press the right arrow key (▶) the relay will display as follows.

S/W V: 01.20
H/W V: 01.01

This window will shows the software and hardware version of relay

Press the right arrow key (▶) the relay will display the main menu.

Status

8.3.13 DATE TIME SETTINGS

8.3.13.1 To Set – Date Time Setting

Date/Time

Password protected menu to set the Date and Time.

Press the left arrow key (◀) the relay will display as follows.

Password = 001

Use INR/DEC

Enter the previously set password, by using the up arrow key (+ / ▲) or the down arrow key (- / ▼). As per the Enter the Password selection.

Press the left arrow key (◀) the relay will display as follows.

SET Hrs = 017

Range 0 – 23

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) **Hours** can be set. The setting range is from 0-23 in steps of 1.

Press the left arrow key (◀) the relay will display as follows.

SET Mins = 017

Range 0 – 59

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) **Minutes** can be set. The setting range is from 0-59 in steps of 1.

Press the left arrow key (◀) the relay will display as follows.

SET Sec = 017

Range 0 – 59

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) **Seconds** can be set. The setting range is from 0-59 in steps of 1.

Press the left arrow key (◀) the relay will display as follows.

SET Date = 017

Range 1 – 31

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) **Date** can be set. The setting range is from 1-31 in steps of 1.

Press the left arrow key (◀) the relay will display as follows.

SET Month = 004

Range 1 – 12

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) **Month** can be set. The setting range is from 1-12 in steps of 1.

Press the left arrow key (◀) the relay will display as follows.

SET Year = 008

Range 00 – 99

By using the up arrow key (+ / ▲) or the down arrow key (- / ▼) **Year** can be set. The setting range is from 000-099 in steps of 001.

Press the left arrow key (◀) the relay will display as follows.

Save Setting?

Mode For Save

To **save** any changes.

Press the left arrow key (◀) the relay will save the change and the following message is display.

Note: If changes made are **not to be saved** press **LED Reset** or leave key pad untouched for 100Sec.

OK

This window will flash for moment

The control will return to the main menu.

Date/Time

8.3.13.2 To View – Date Time Setting

Date / Time

Press the right arrow key (▶) the relay will display as follow.

Time: 16: 40: 57

Date: 19/06/13

This window shows the Date and Time

Press the right arrow key (▶) the relay will display the main menu.

Date / Time

8.3.14 Secondary Current**8.3.14.1 To View – Secondary Current**

Sec. Current

This menu is to view the actual secondary load current as per the CT Secondary selection.

Press the right arrow key (▶) the relay will display as follow

**R = 00.00 Y = 00.00
B = 00.00**

This window will show secondary load current of R,Y & B.

Press the right arrow key (▶) the relay will display as follows.

3Io = 00.00

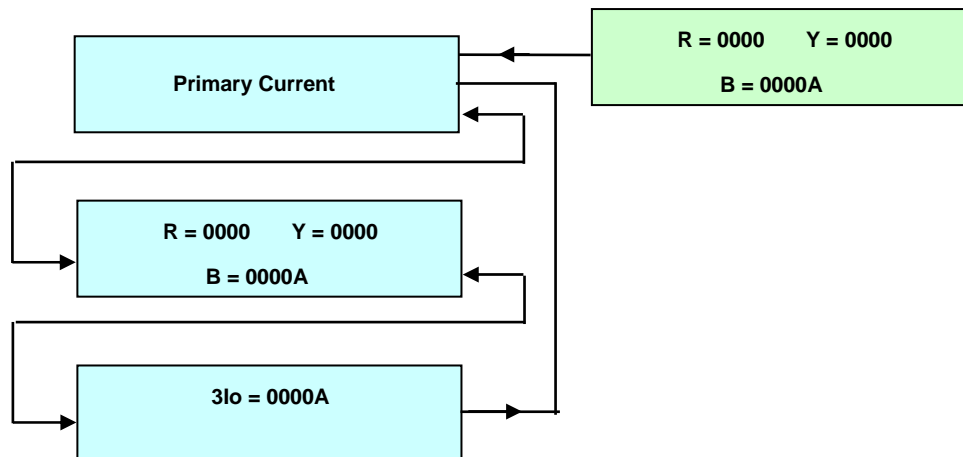
This window will show secondary load current of 3Io.

Press the right arrow key (▶) the relay will display as follows.

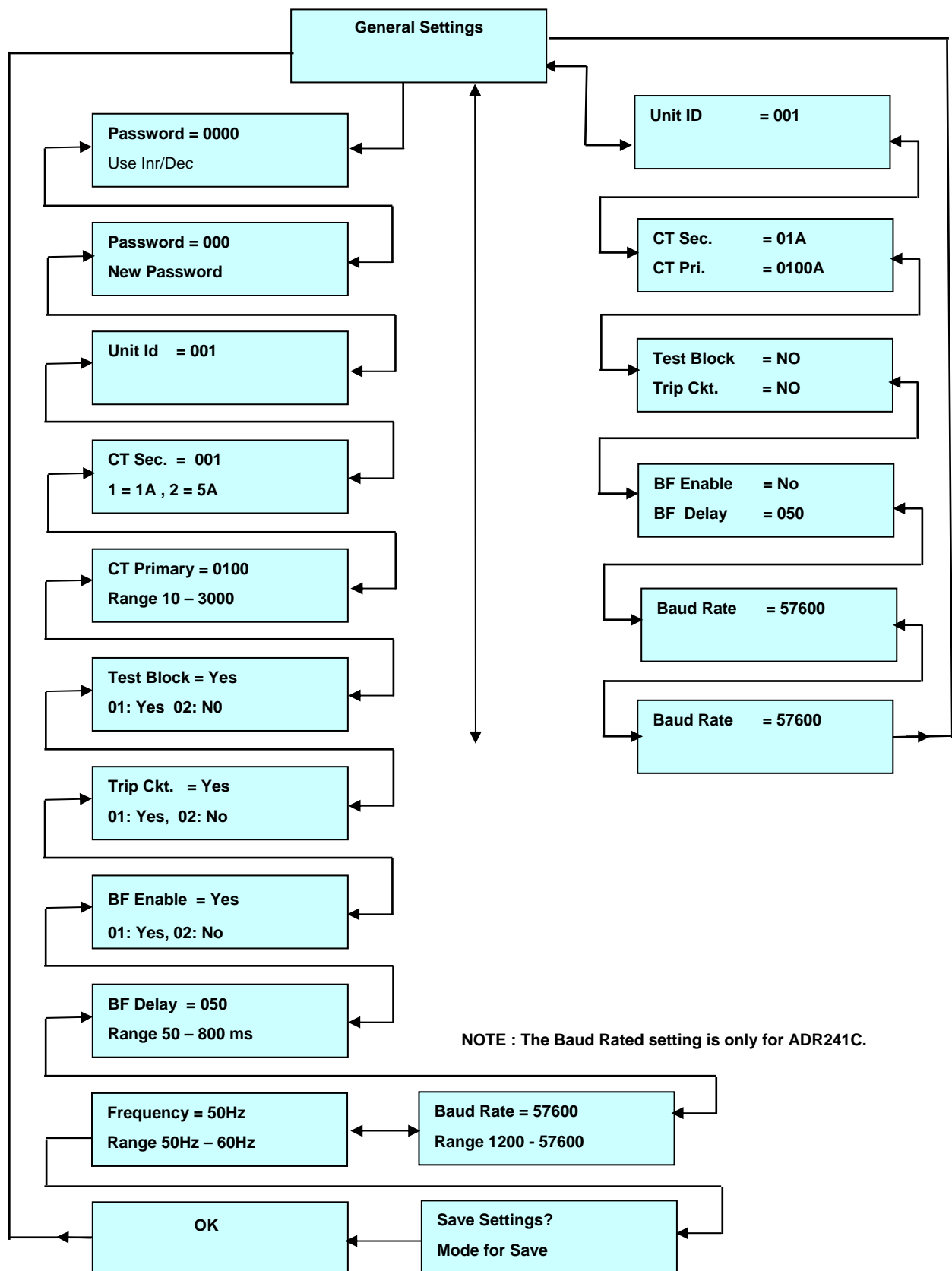
Sec. Current

9.0 FLOW CHART

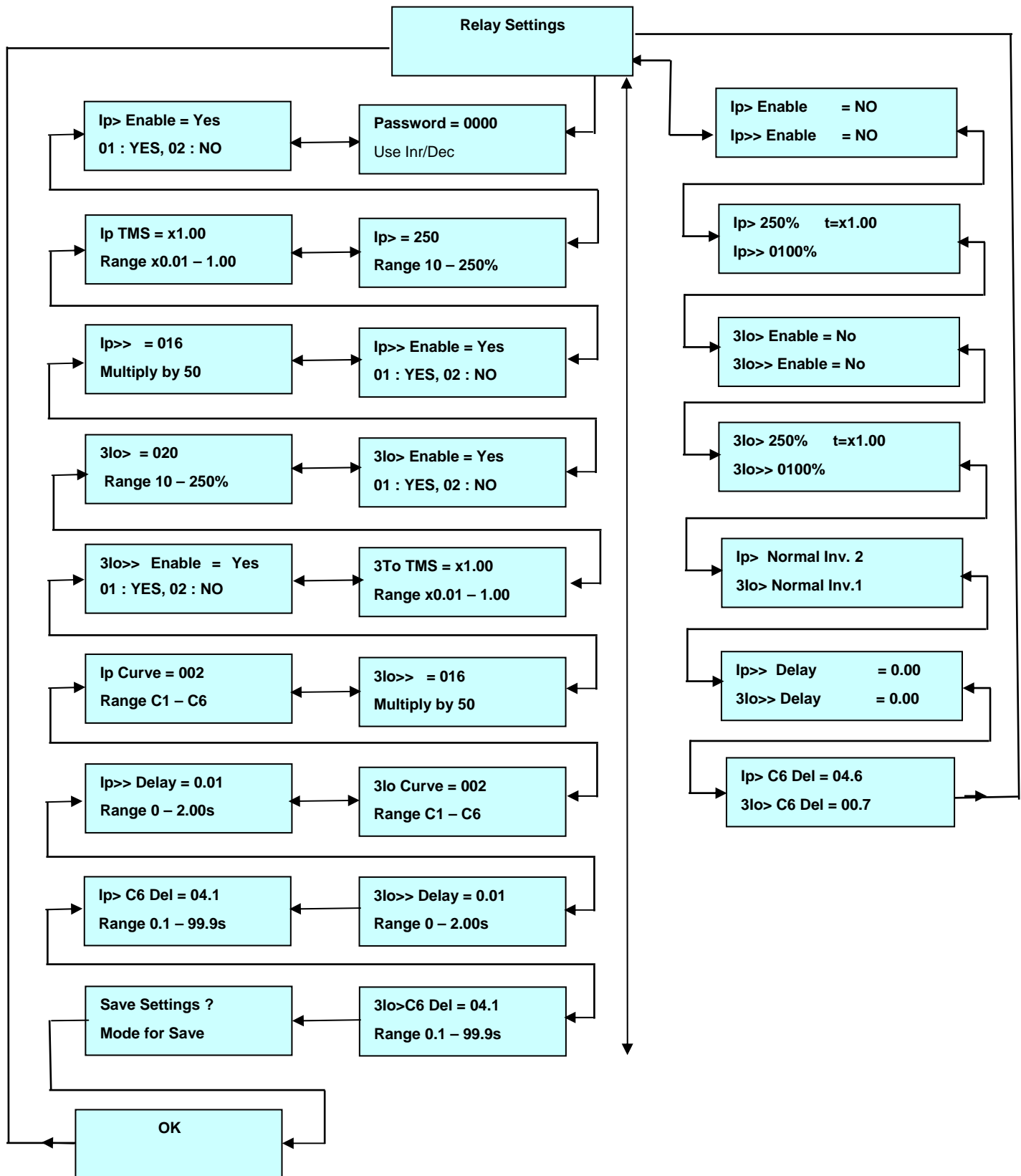
9.1 Flow Chart – To View Primary Current



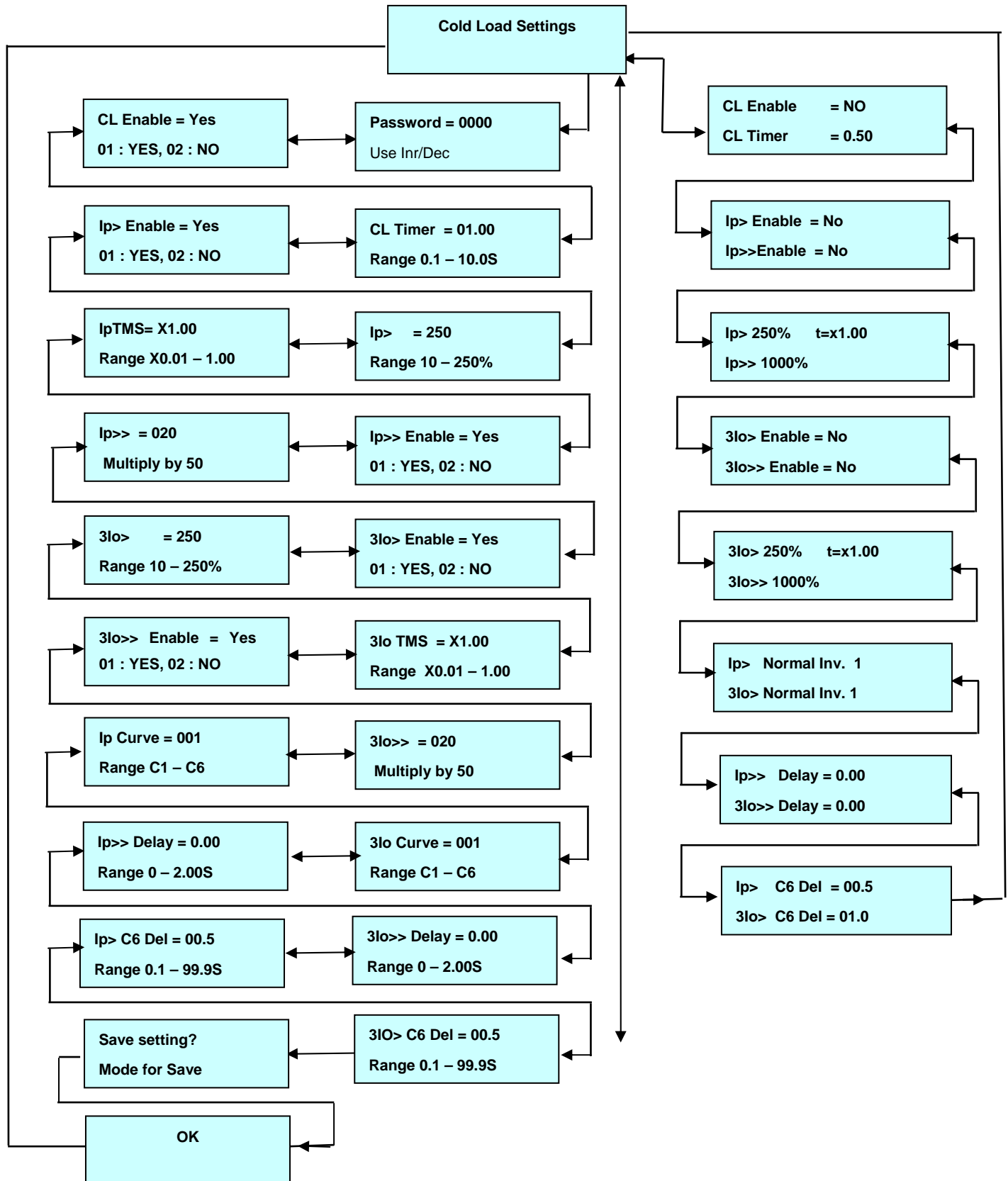
9.2 Flow Chart – To Set & To View General Settings



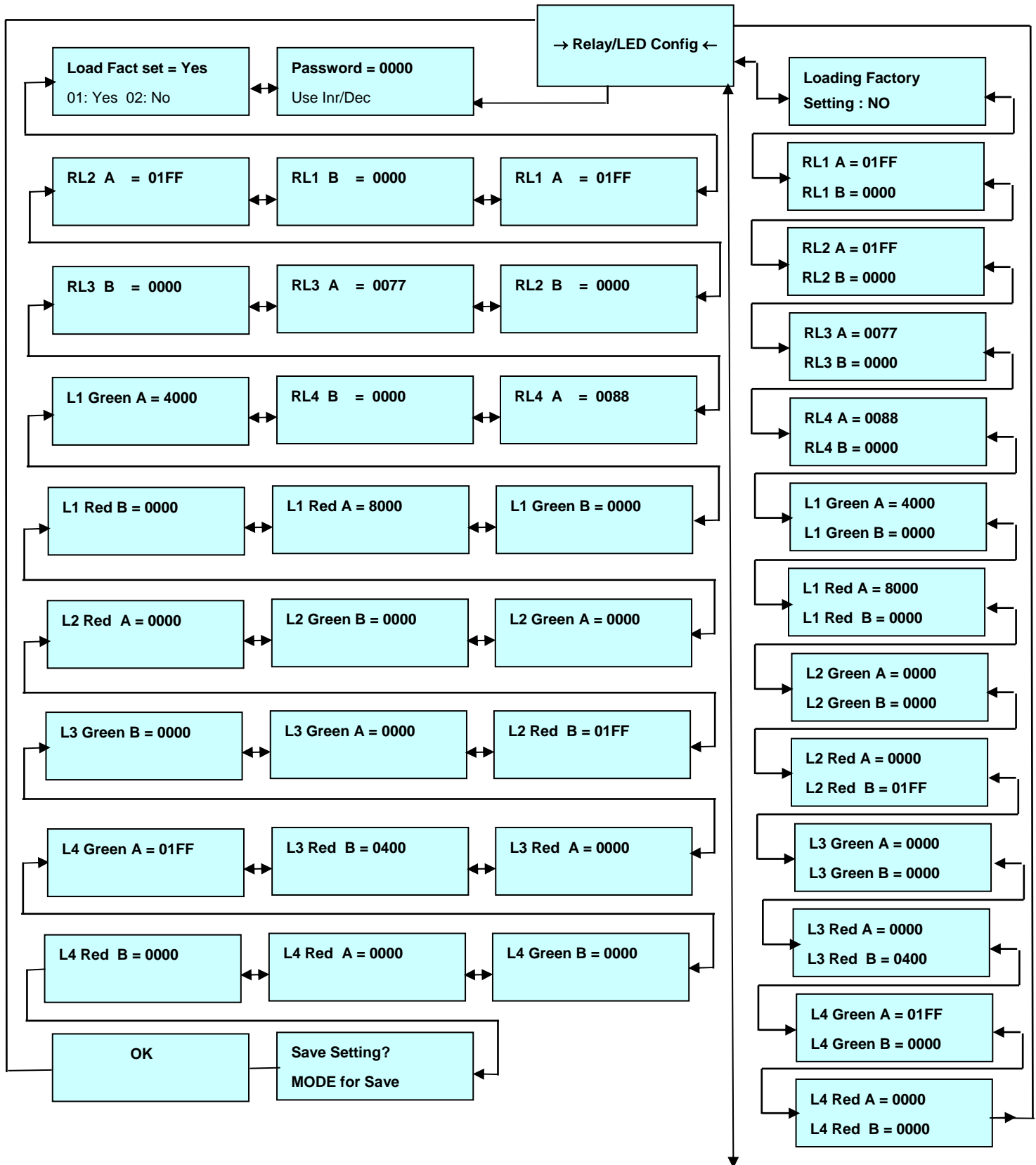
9.3 Flow Chart – To Set & To View Relay Settings



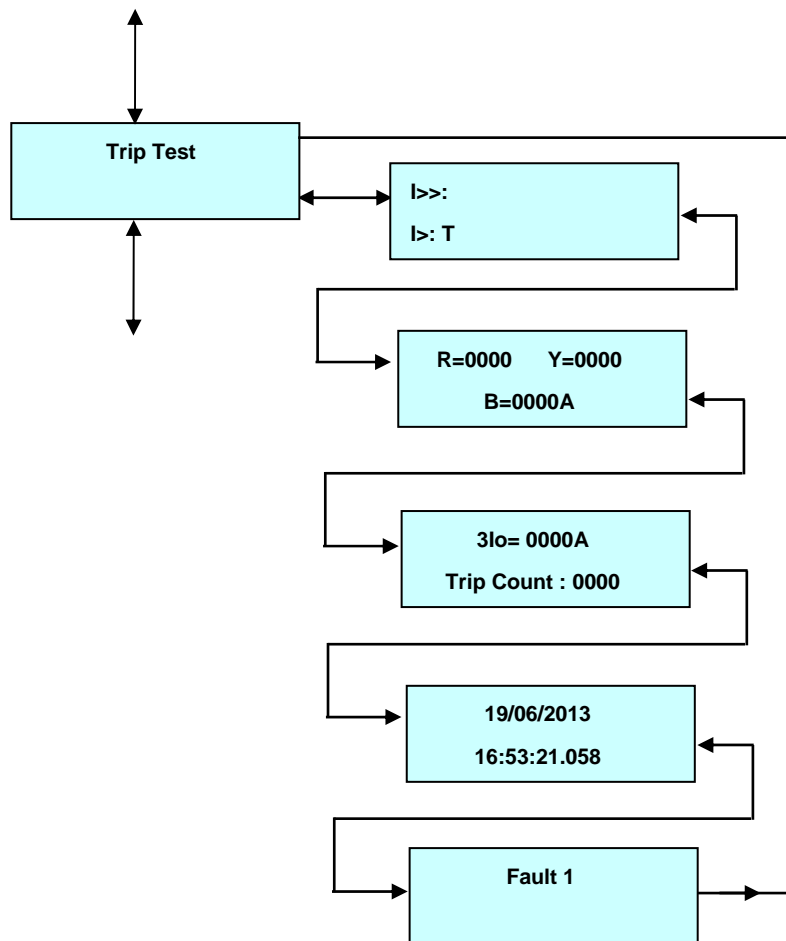
9.4 Flow Chart – To Set & To View COLD LOAD Settings



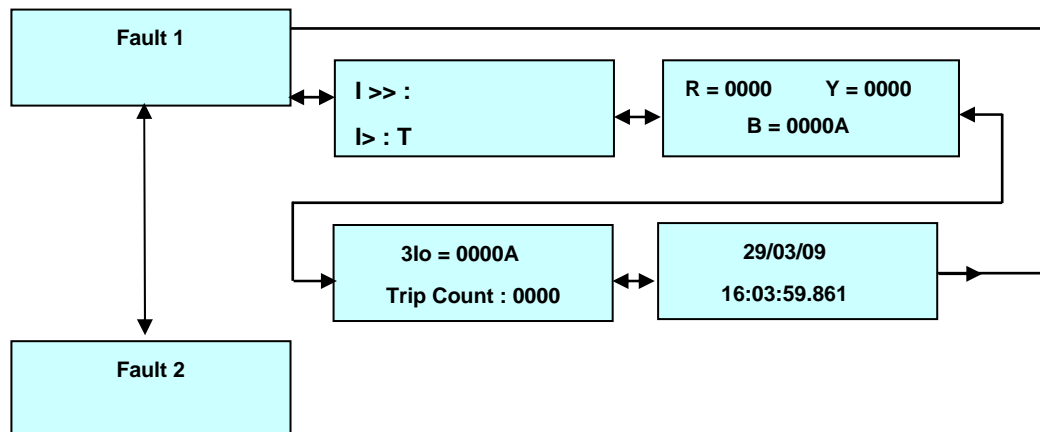
9.5 Flow Chart – To Set & To View Relay/LED Settings



9.6 Flow Chart – To View – TRIP TEST

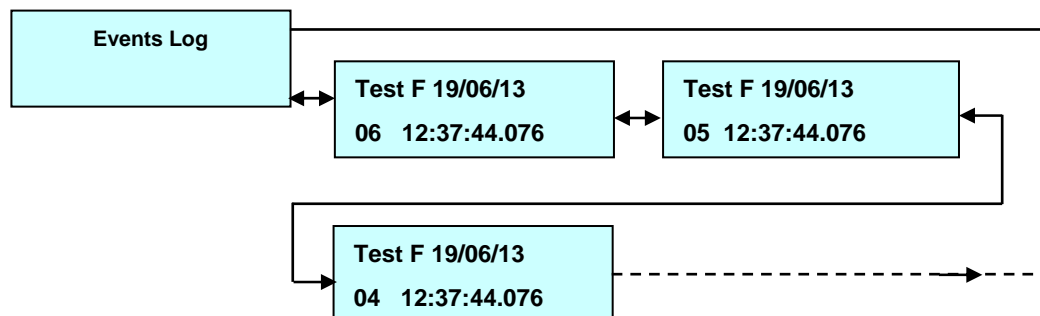


9.7 Flow Chart – To View Faults



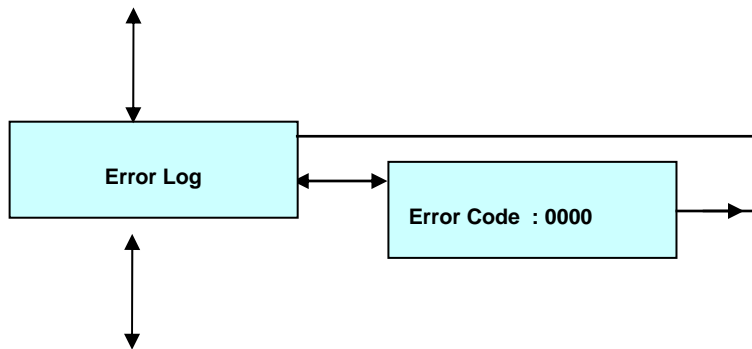
Note : Faults 2 to Fault 8 can be viewed respectively

9.8 Flow Chart – To View Events Log

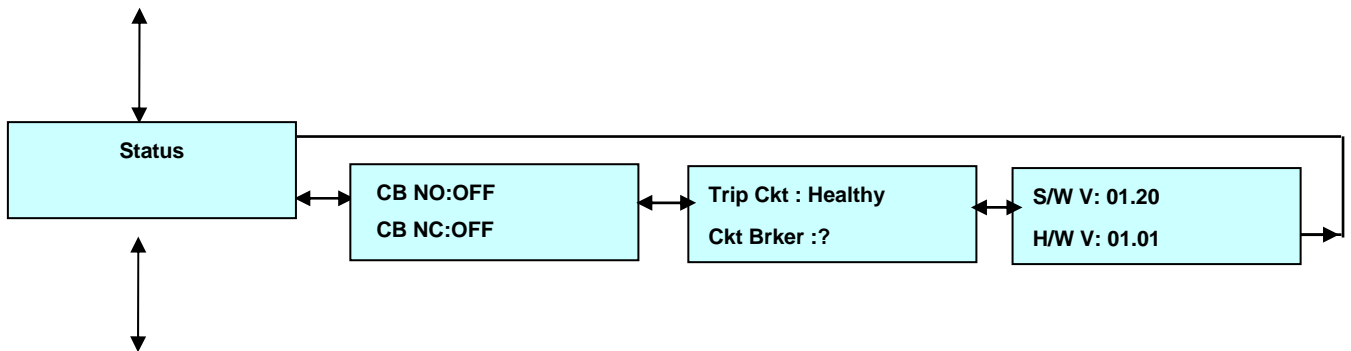


Note : Events 2 to Events 16 can be viewed respectively.

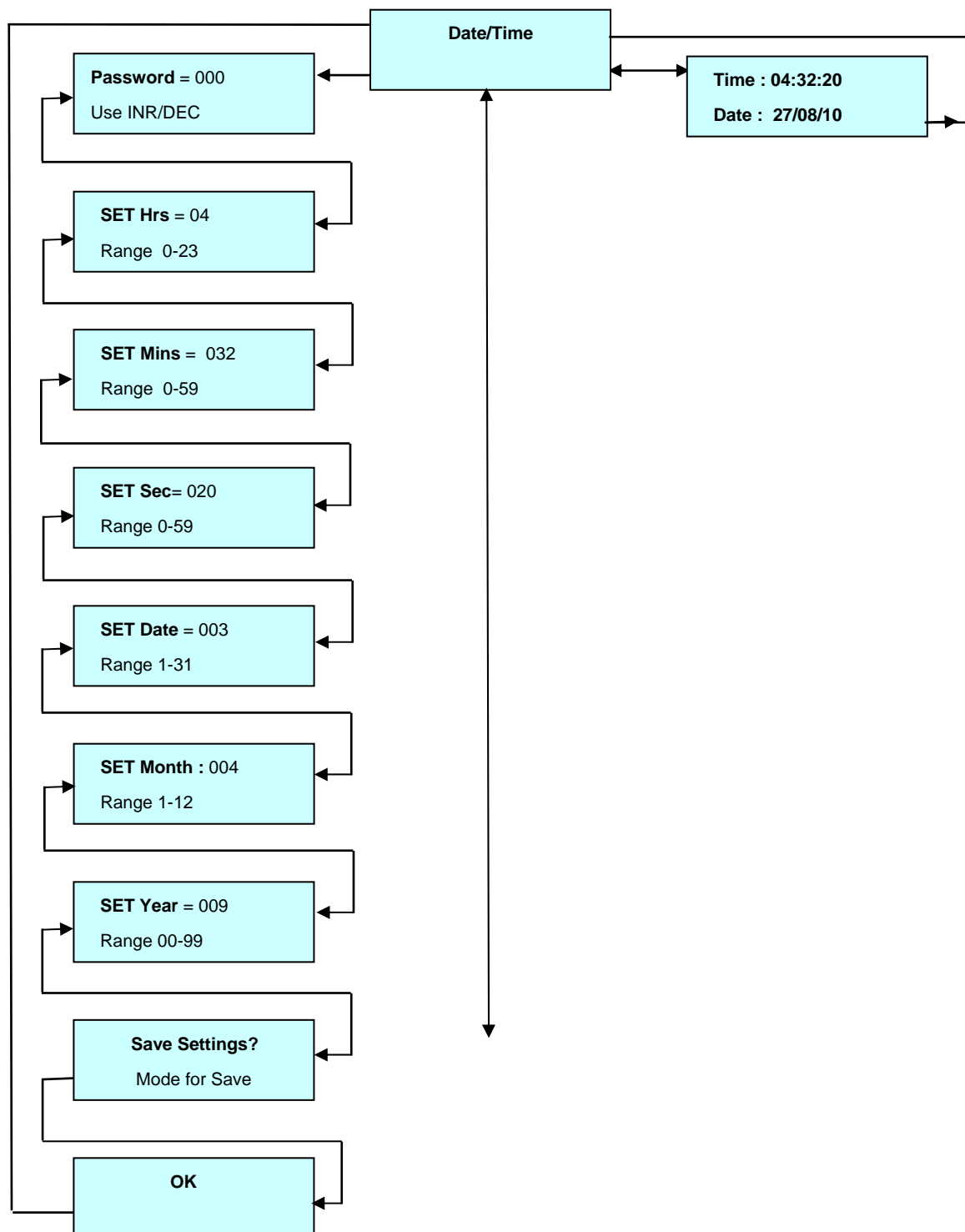
9.9 Flow Chart – To View Error Log Settings



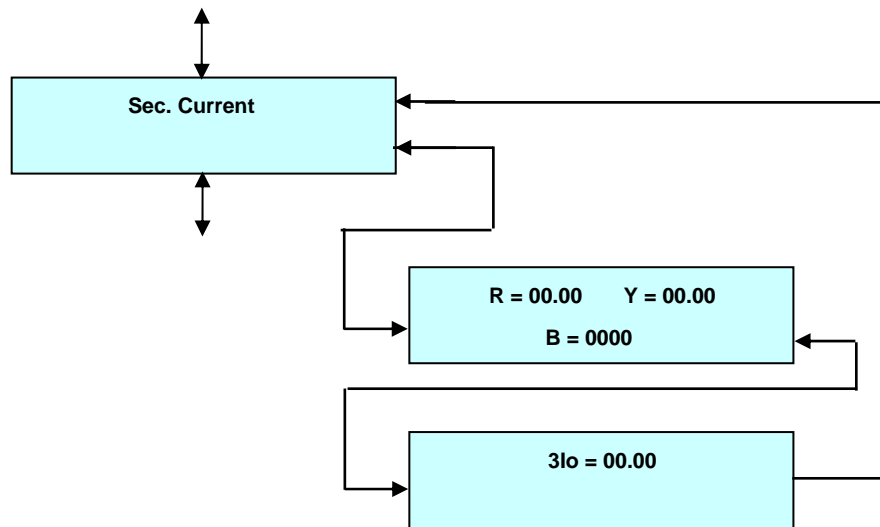
9.10 Flow Chart – To View Status Settings



9.11 Flow Chart – To Adjust & To View Date/Time Settings



9.12 Flow Chart – To View – Secondary Current



10.0 COMMUNICATION (Only for ADR241C Relay)

10.1 General

After every fault relay capture numbers of data which can be very useful to analysis fault. Following is the summary of data which can be given by relay

- 1) **Measurement value:** *The relay is connected to CT which samples the current signal and calculates the number of different values from these signals. These values are available whenever master demands. (Here master means connected PC or SCADA RTU) The ADR241C gives RMS current information.*
- 2) **Event Value:** Apart from basic protection functions. Relay is continuously monitors its internal and external hardware through different status flags. There are two types of status flags 1) Logical status such relay Pick-up, Relay, operation; setting change etc. these are generated within relay. 2) Similarly there is opto-coupler inputs which are connected to external contacts marked as S1 – S2. Any change in logical or physical status is recorded as event. Such events are kept in internal non volatile memory along with time stamp. Up to 100 such event can be store in relay memory. These events can download for detailed analysis of any operation.
- 3) **Fault History:** After the fault, the relay latches all fault alongwith real time values these are known as fault history. Last 5 fault history is available on relay display and on communication port. Details of values are given in user interface

To read this fault information communication port are provided i.e. RS485 at rear. The relay use 3 wire communication port. (RX, TX and GND) hand shaking signal are not used such RTS, CTS, DSR DTR.

10.2 General questions

10.2.1 What is meant by an event?

Event is nothing but every action performed by the relay. For e.g. status ON is one event and status OFF is other event.

10.2.2 How can we read the events that are generated in the relay?

When the communication link is established between the PC and RS485 port of relay, then events can be read on the PC through the SCADA software.

10.2.3 What is RS485?

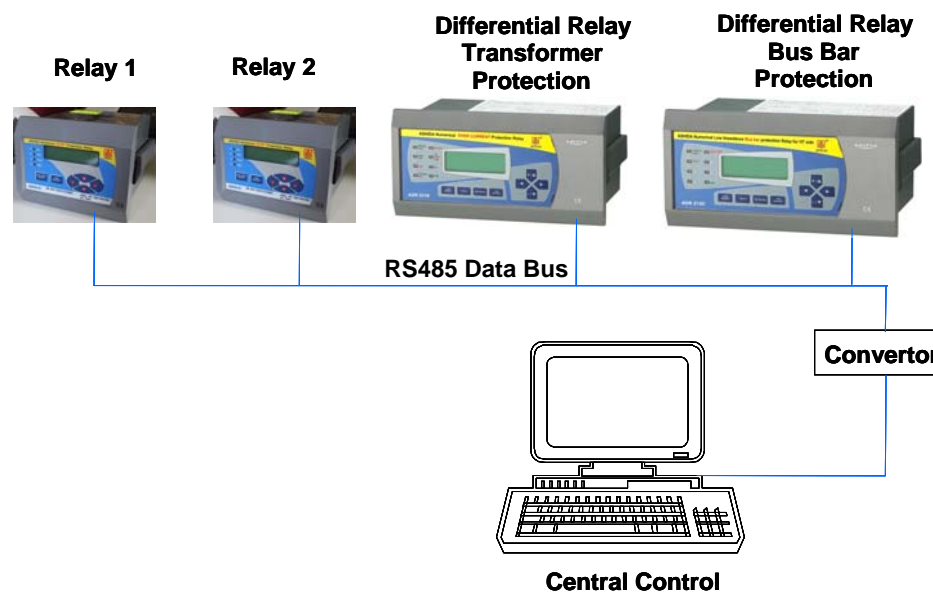
RS485 is the communication port through which relay is communicates with PC through SCADA software.

10.2.4 Where this port is located?

RS485 port is located at the rear side of the relay for permanent wiring of SCADA system.

10.2.5 Why RS485 port is used?

RS485 port is useful for long distance communication with unlikely any distortion in the transmission and reception of data. The major advantage of RS485 Port is it is multidrop i.e. upto 32 different devices can be connected to single port.



10.2.6 What is Relay Talk?

Relay Talk is software (Provided with this relay) which is installed in the PC. This software provides you Communication Bridge between PC and Relay.

10.2.7 Why RS232 to RS485 ISOLATED CONVERTOR is used?

Generally PC is provided with RS232 port, to connect Relay with standard PC we need RS232 to RS485 Isolated Converter.

RS485 is the most versatile communication standard in the standard series defined by the EIA, and widely used for communication interface in data acquisition and control applications where multiple nodes communicate with each other.

RS485 functionality

1. Connect DTE's (Data Terminal Equipment) directly without the need of modems.
2. Connect several DTE's in a network structure.
3. Ability to communicate over longer distances.
4. Ability to communicate at faster communication rates.
5. There is error detection implemented in the higher level protocol to detect the data corruption and resend the information at a later time.

10.3. Physical connection and link layer

Connection is available for IEC60870-5-103 through the rear RS485 port. For this communication Isolated RS232 to RS485 Converter is used.

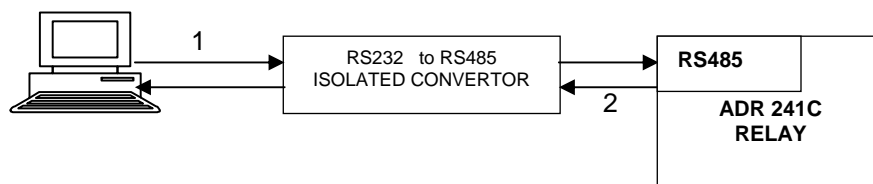


Fig. 10.1 Block Diagram of communication link

1. PC to RS232 Port of convertor and convertor to RS485 of Relay.
2. RS485 to convertor and back to PC.

The parameters of the communication are the following:

- None (NO) Parity, Odd Parity & Even Parity
- 8 Data bits
- 1 stop bit
- Data rate 1200, 2400, 9600, 19200 38400 or 57600 bauds

RS485 communication port Electrical Connection provided at back of Relay

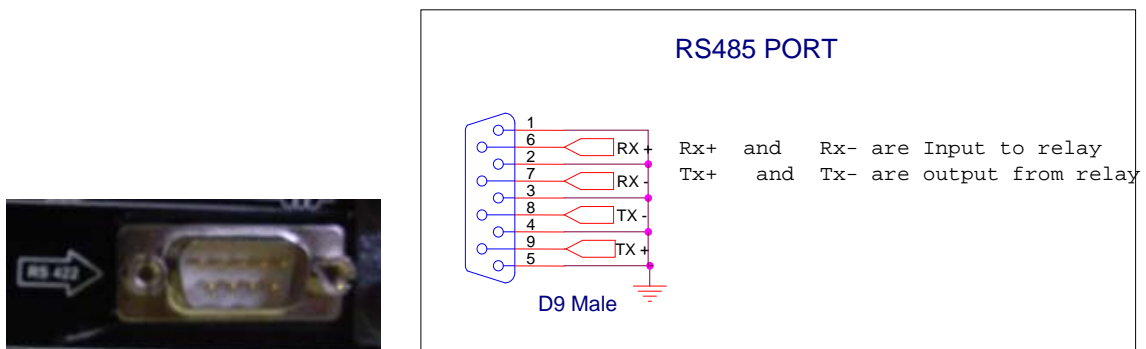


Fig. 10.2

10.4. Relay Talk software for down loading the various data latch by relay,

Following is a brief step by step instruction to down load relay data.

- ***Start Relay Talk program from program menu***

Following is the main screen of Relay talk system.

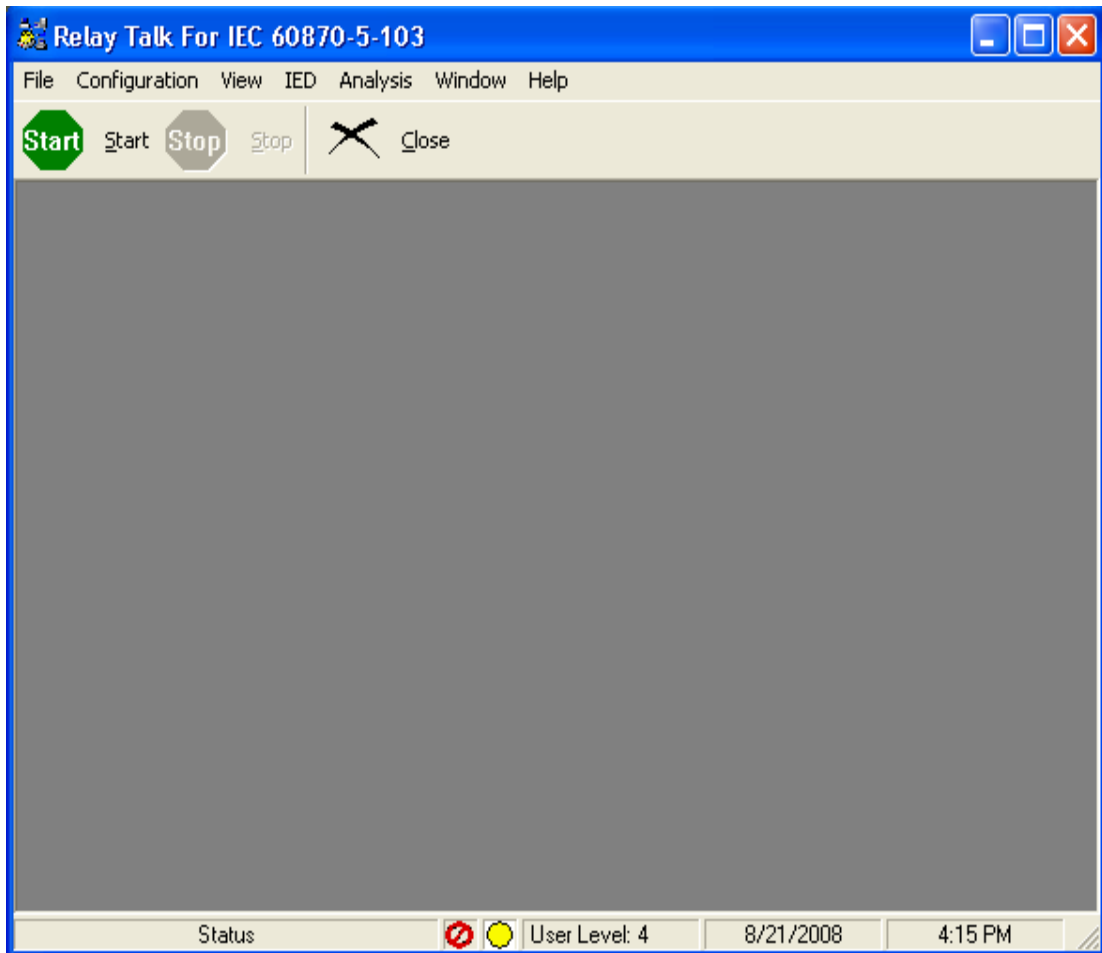


Fig. 10.3

For success communication setting of relay should match with software settings. In relay Talk software there are numbers of settings. Here we have shown only essential screens for ADR241C relay.

To check communication setting click configuration button.

After pressing Configuration button display will show following screen.

And follow steps

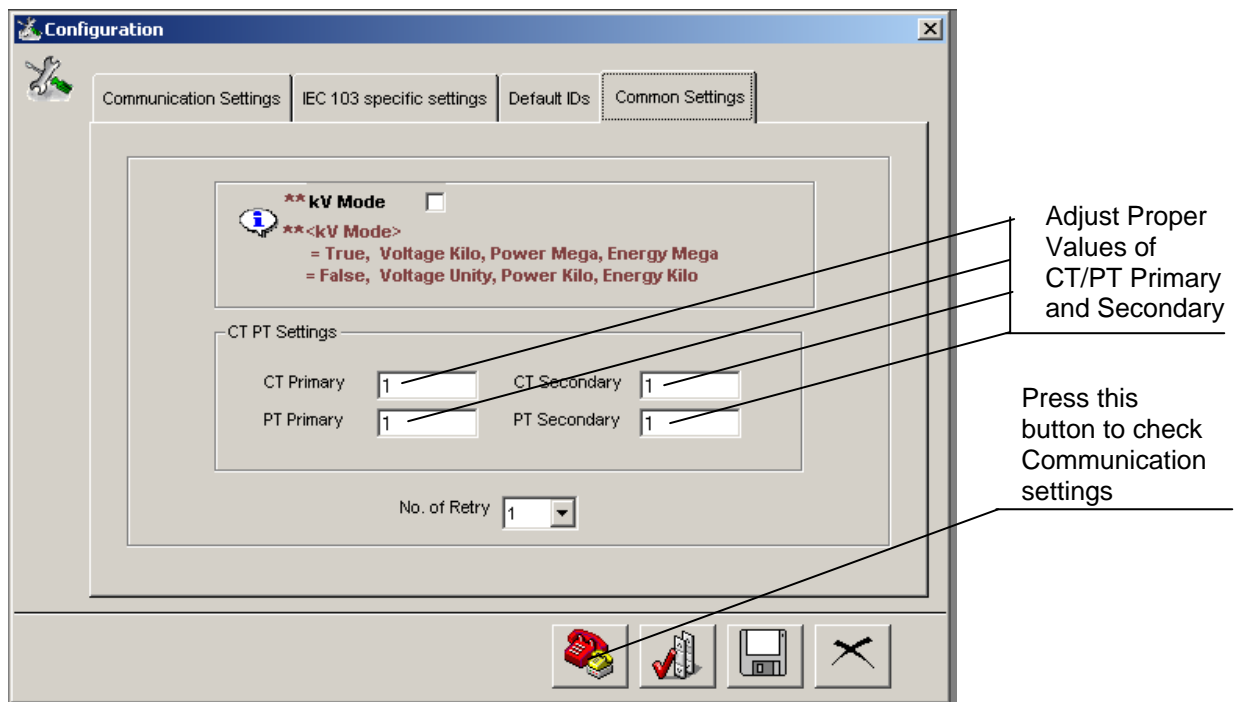


Fig. 10.4

Now check communication setting.

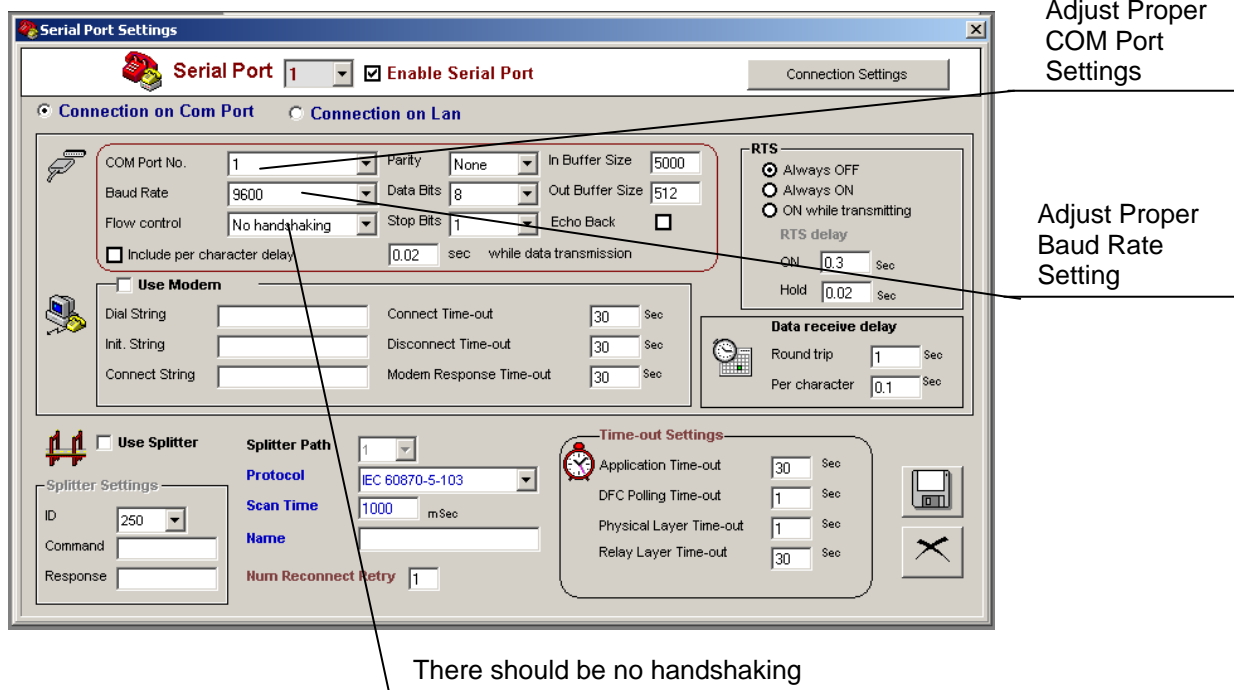


Fig. 10.5

To finalise setting

Press  then Press  & finally Press 

This will return to main screen.

Default IDs settings

Here we set the Default ID of the Relay.

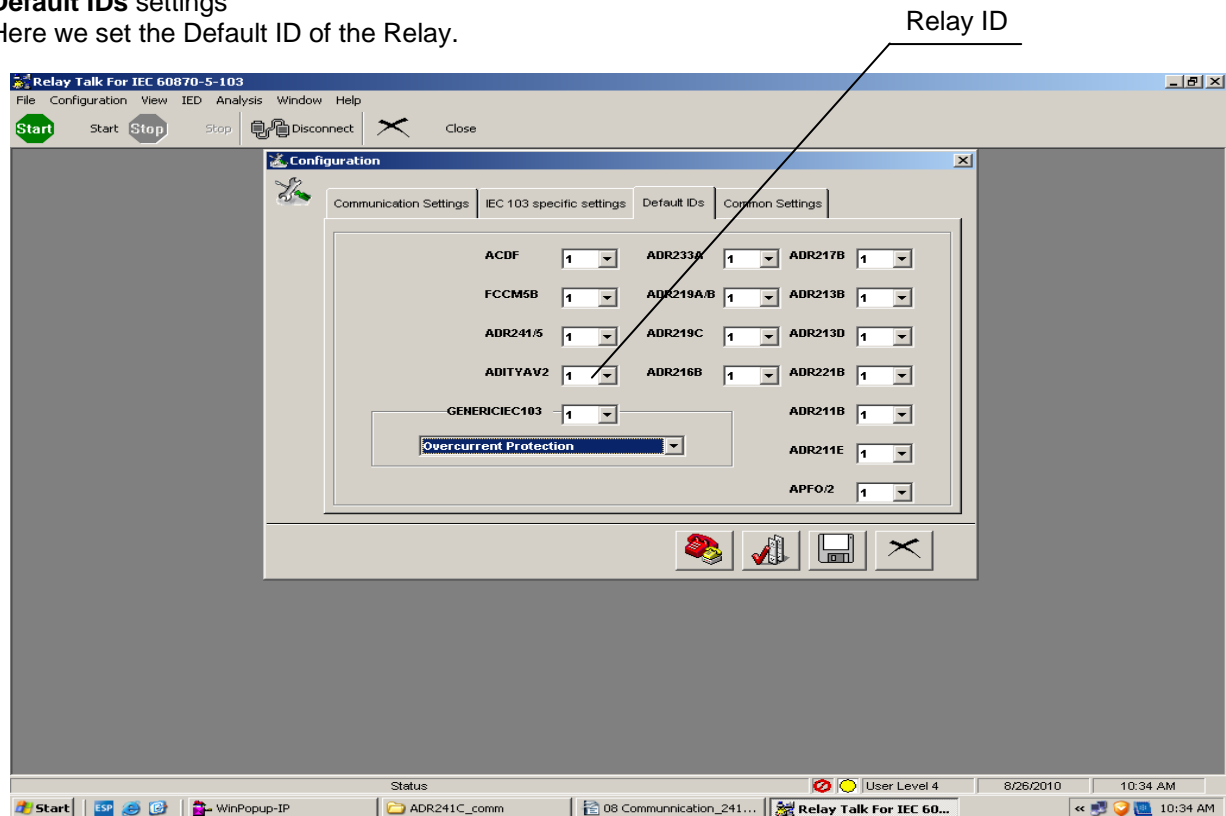


Fig. 10.6

Now select the path as shown in the window. i.e. IED→ ADR Series → ADITYA V2 Series → ADITYA2_2

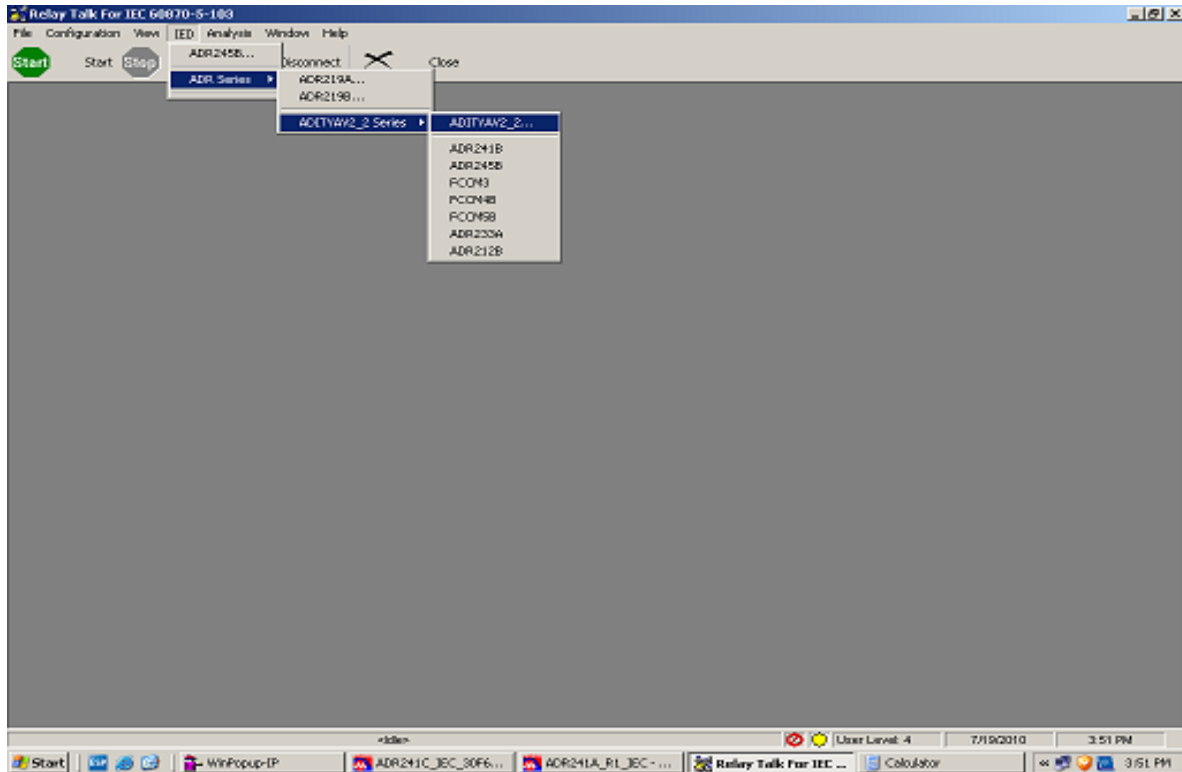


Fig. 10.7

Summary to ADR241C interface with relay talk system

1. Connect RS485 port on the back of ADR241C to PC through cable.
2. Check that relay setting will match to software configuration in serial port setting as well as default ID setting as shown in figure.
3. Check unit ID, Parity, Com Port and Baud rate of ADR241C relay it should match to the configuration of the software.

10.5. ADR241C IED Main Screen

After checking all settings and when the ADR241C is selected the following window will be displayed on the PC screen.

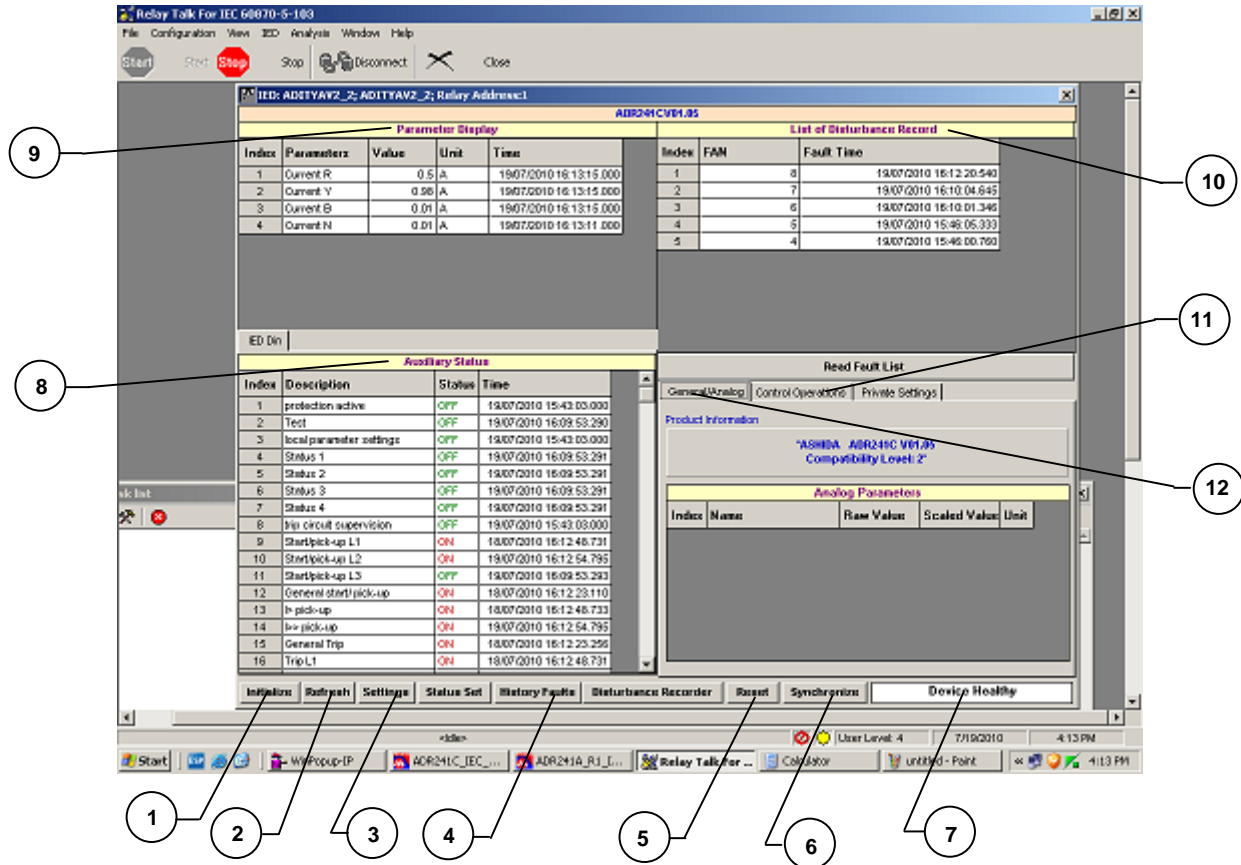


Fig. 10.8

The windows/Buttons functions are as follows

Sr. No	Name	Description
1	Initialized	This will initialize relay communication.
2	Refresh	It will refresh all windows and parameters
3	Setting	This is used to view the settings of the relay and also edit the settings of the relay.
4	History Faults	It will read all fault data (i.e. last 5 fault which is also available on LCD display)
5	Reset	This is used to reset the relay.
6	Synchronize	This is used to synchronize the relay date and time with PC
7	Device Healthy	This window indicates the healthy condition of the relay with software i.e. Successful communication indicator.
8	Auxiliary Status	This is used to view the input status received by the relay
9	Parameter Display	This is used to view the parameters of current and voltage
10	List of Disturbance Recorder	This is used to view the last 5 faults saved in the relay with fault number.

11	Control Operation	This is used to operate relay control through operation from PC
12	General	This is used to view Relay name, Version, and compatibility.

10.5.1 Parameter Display

Online Parameters along with their values in units are displayed along with the Date and Time stamping and these are refreshed on successful communication.

Parameter Display				
Index	Parameters	Value	Unit	Time
1	Current R	0.69	A	20/08/2010 16:40:13.000
2	Current Y	0	A	20/08/2010 16:40:15.000
3	Current B	0.01	A	20/08/2010 16:40:15.000
4	Current N	0.68	A	20/08/2010 16:40:14.000

Fig. 10.9

10.5.2 Physical/Logical Status Display (IEDs Din)

These are physical/logical status (IED Dins), displayed along with there online status.

IED Din				
Auxiliary Status				
Index	Description	Status	Time	
1	protection active	OFF	20/08/2010 16:10:12.000	
2	local parameter settings	OFF	20/08/2010 16:10:12.000	
3	Test	OFF	20/08/2010 16:13:38.000	
4	Status 1	OFF	20/08/2010 16:13:38.000	
5	Status 2	OFF	20/08/2010 16:13:38.000	
6	trip circuit supervision	OFF	20/08/2010 16:10:12.000	
7	Start/pick-up L1	OFF	20/08/2010 16:14:33.000	
8	Start/pick-up L2	OFF	20/08/2010 16:13:38.000	
9	Start/pick-up L3	OFF	20/08/2010 16:13:38.000	
10	General start/ pick-up	OFF	20/08/2010 16:14:33.000	
11	I> pick-up	OFF	20/08/2010 16:14:33.000	
12	I>> pick-up	OFF	20/08/2010 16:10:12.000	
13	General Trip	OFF	20/08/2010 16:14:33.000	
14	Trip L1	OFF	20/08/2010 16:14:33.000	
15	Trip L2	OFF	20/08/2010 16:10:12.000	
16	Trip L3	OFF	20/08/2010 16:10:12.000	

Fig. 10.10

10.5.3 Control Operation

The control operation is used to control the relays parameters i.e. either to Reset the LEDs or to open the CB by TRIP command.

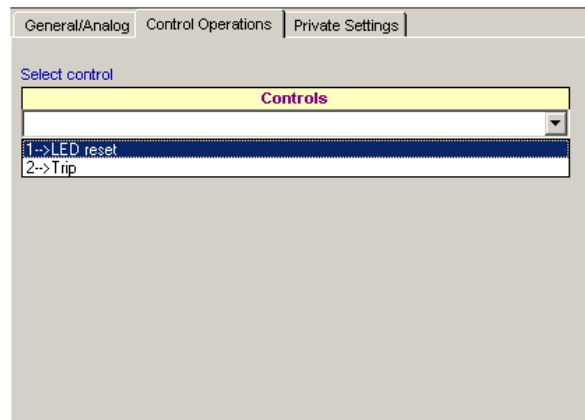


Fig. 10.11

This window is not used in ADR241C

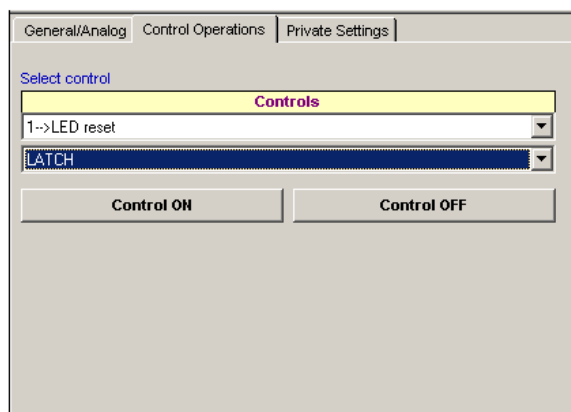


Fig. 10.12

This window is used to operate the controls

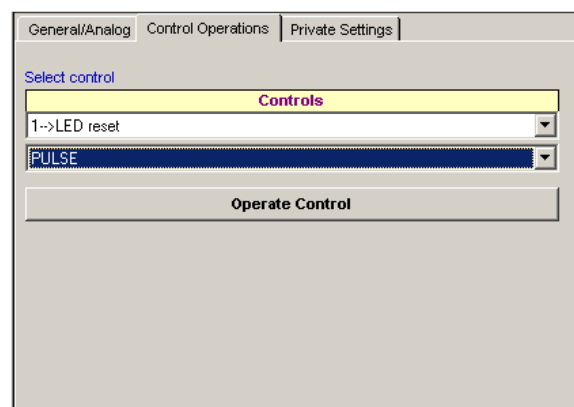


Fig. 10.13

10.5.4 Private Setting

These settings for IEDs are displayed along with their current values and expected values.

Private Settings			
Index	Description	Value	Expected Value
1	Auto DR	False	True; False
2	Line Frequency	50	50; 60

Fig. 10.14

10.6. History Fault

Now when the History fault is selected the following window is displayed.

This window shows last 5 Fault events i.e. Trip Counter, Date & Time of the Faults, Type of faults and present current values.

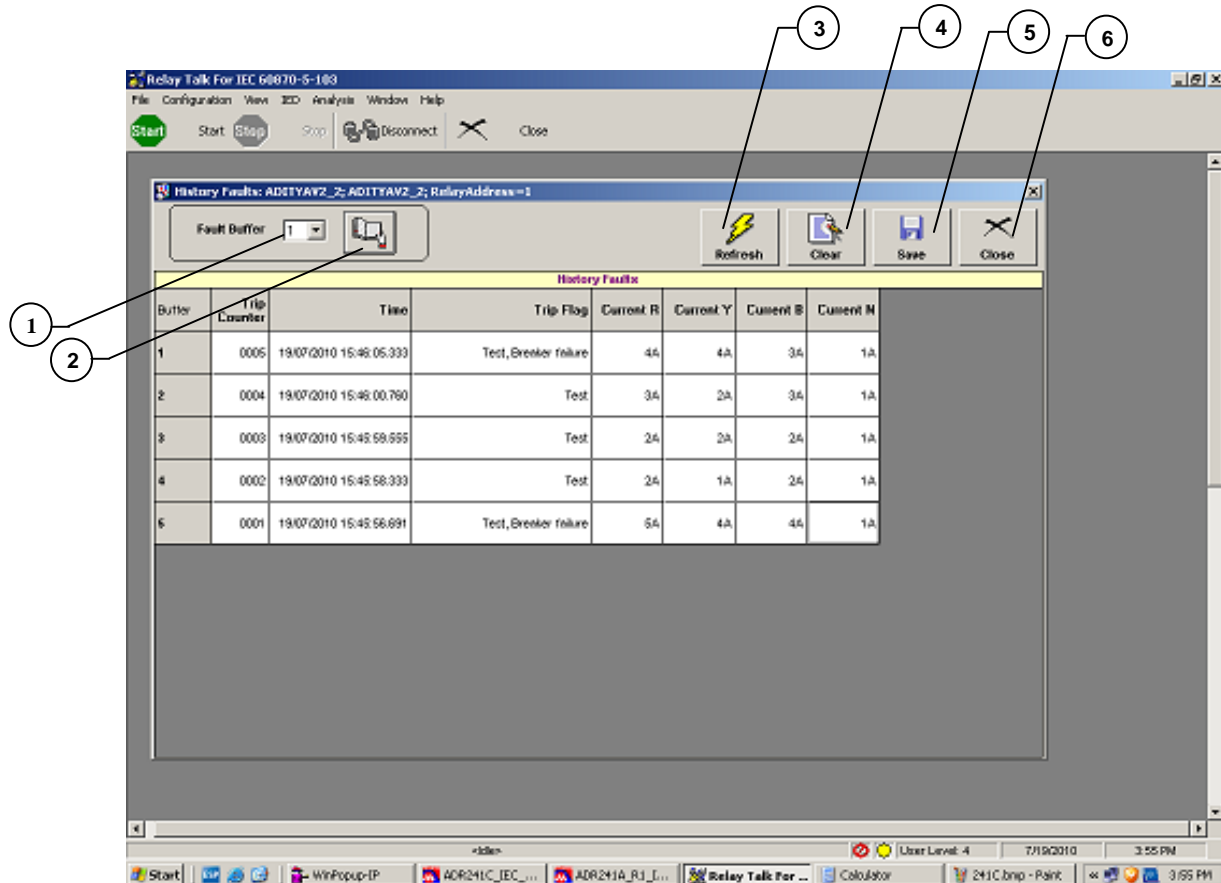


Fig. 10.15

The windows/Buttons functions are as follows

Sr. No.	Name	Description
1	Fault Buffer	To view the fault buffer number
2	Read Fault	To read the fault selected in the fault buffer
3	Refresh Fault	To refresh all windows and parameters
4	Clear Fault display	To clear the screen
5	Save Fault data	To Save the Fault data
6	Close	To close the History fault window

10.7. Settings

This window is to view and edit the parameter of the relay. The setting are of two types General Settings and Bank Settings.

10.7.1 General Settings

This window is to view and edit the parameters in general settings of the relay.

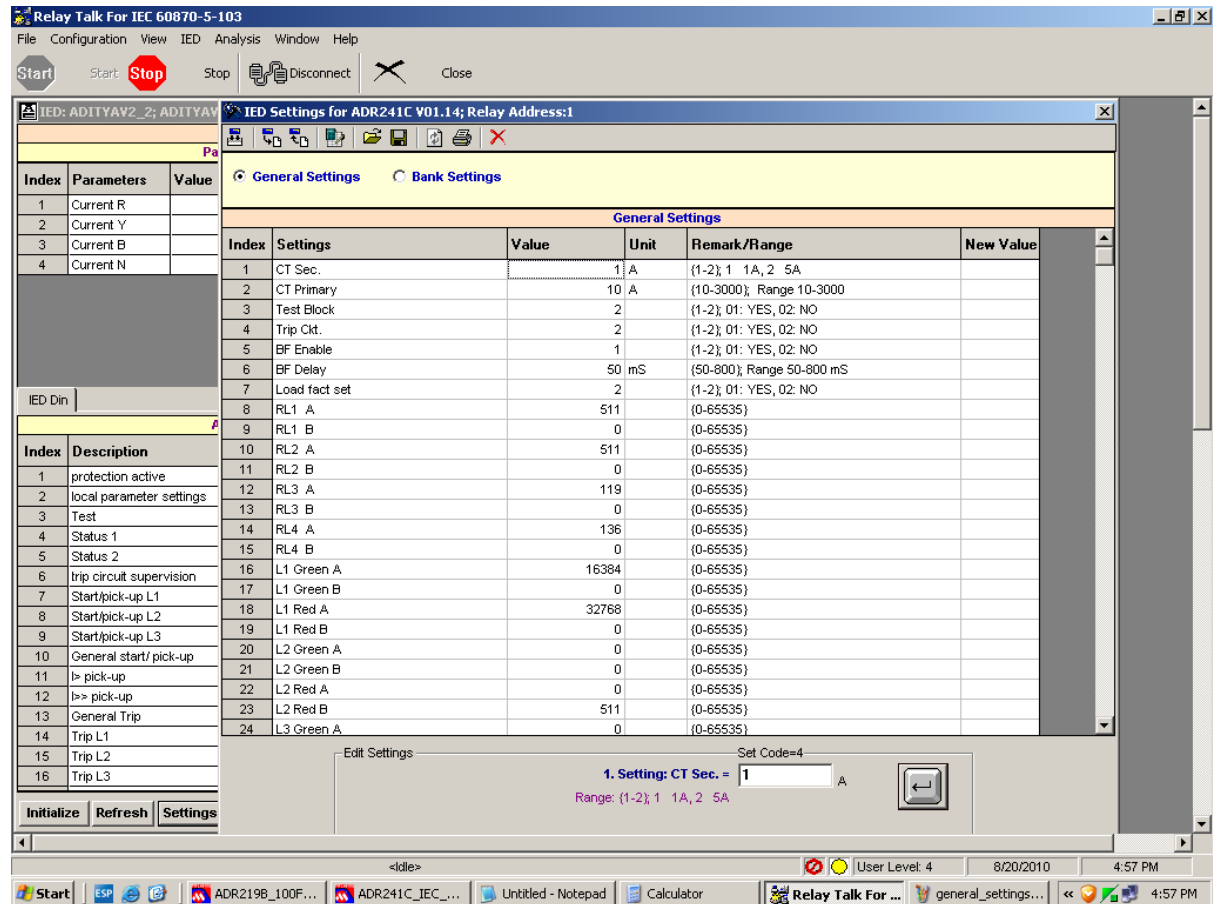


Fig. 10.16

10.7.2 Bank Settings

This window is to view and edit the parameters in Bank settings of the relay.

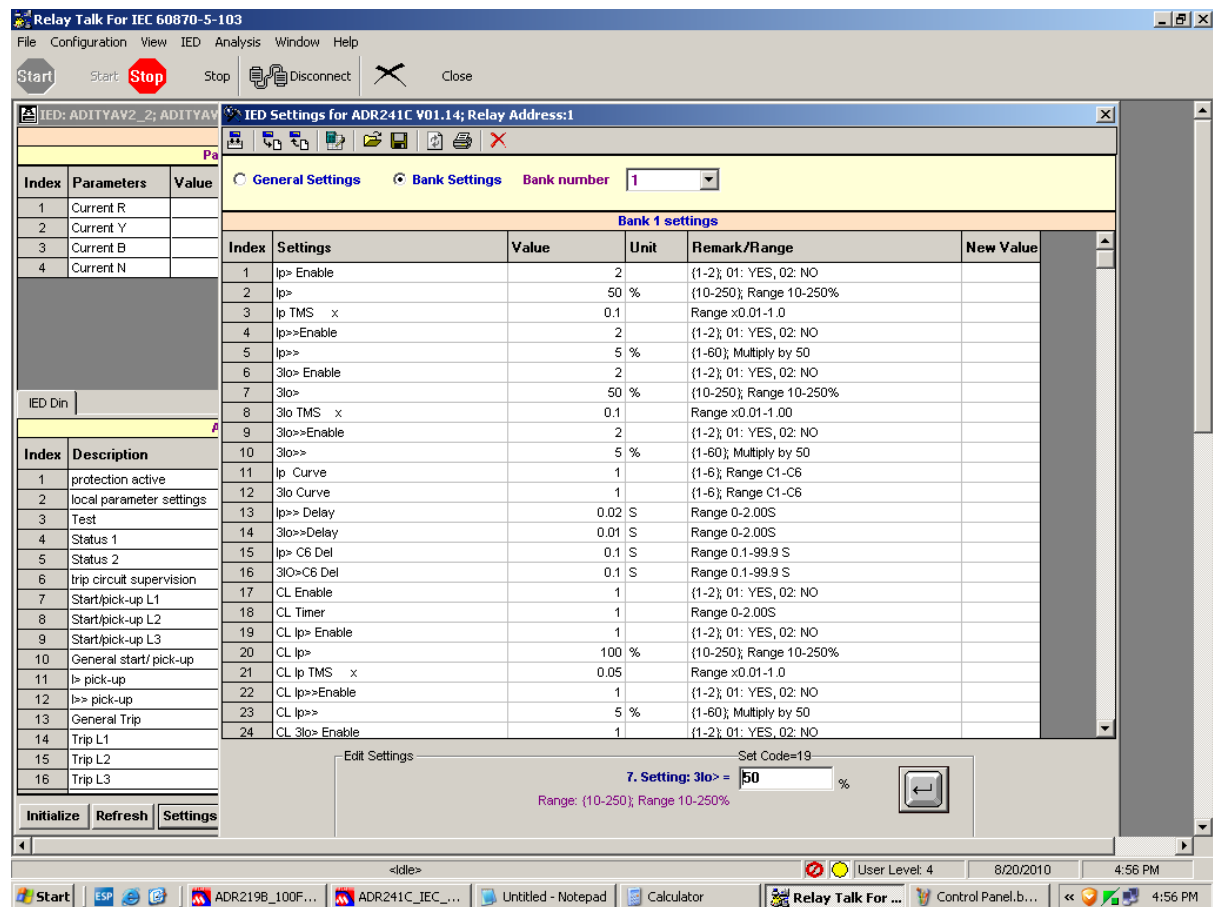


Fig. 10.17

10.8. Event list

This window shows the all events generated in the relay.

The following picture shows the auxiliary status and their event list.

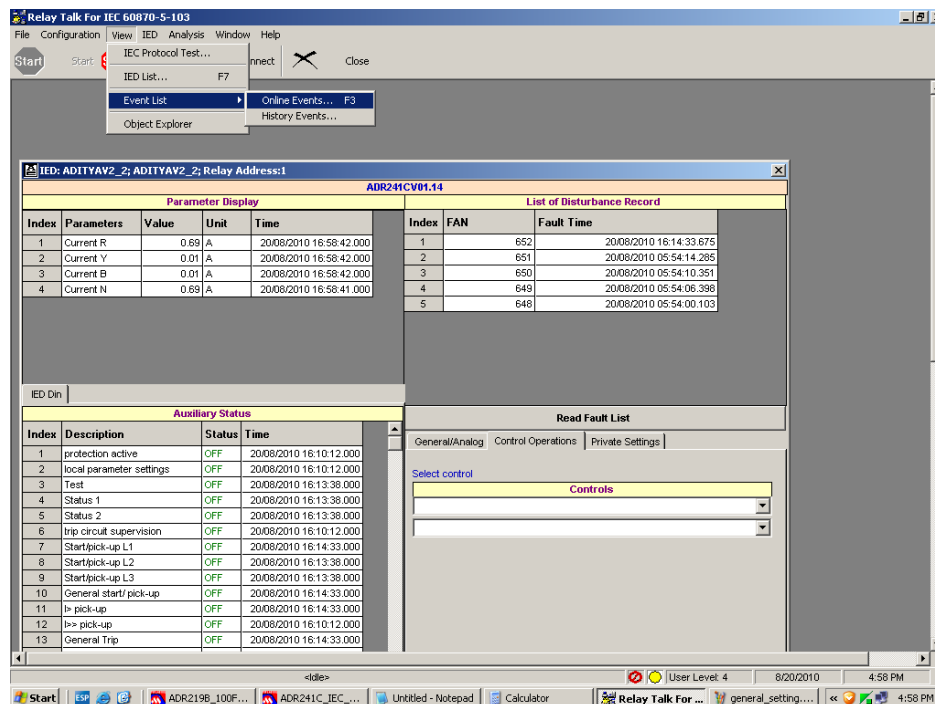


Fig. 10.18

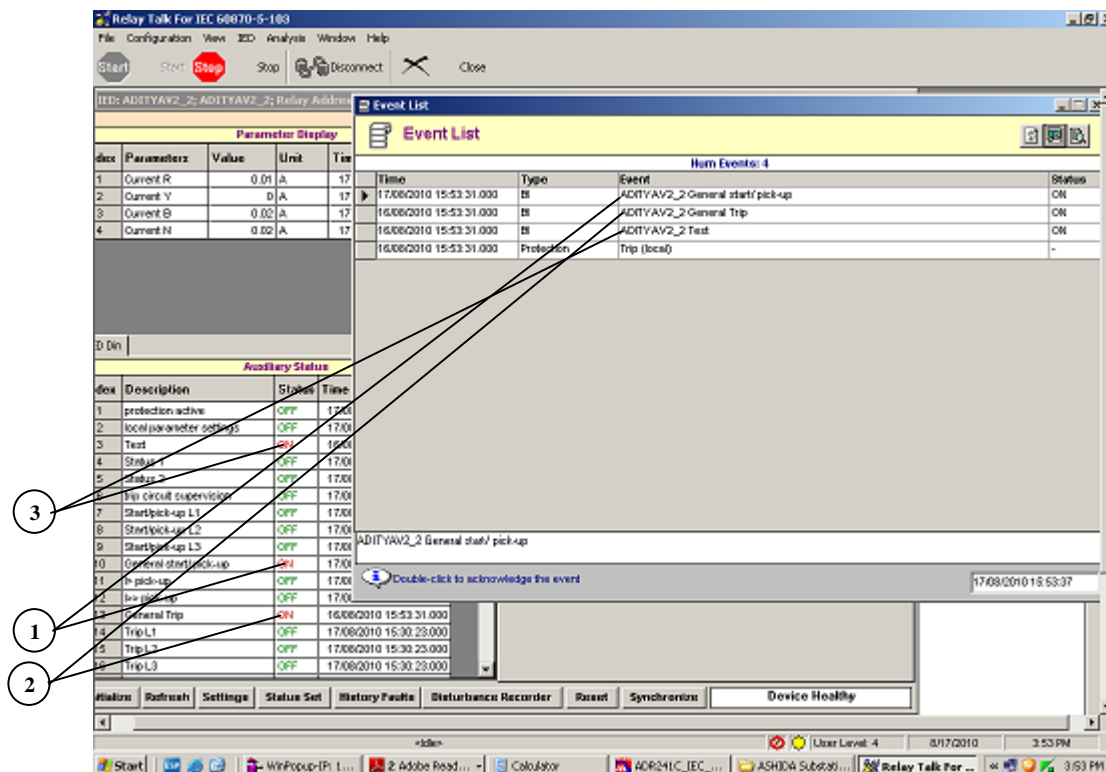


Fig. 10.19

Following events occurred while relay is in Trip mode when local test Trip is occurred.

1. General start/pick up ON
2. General Trip ON
3. Test event ON

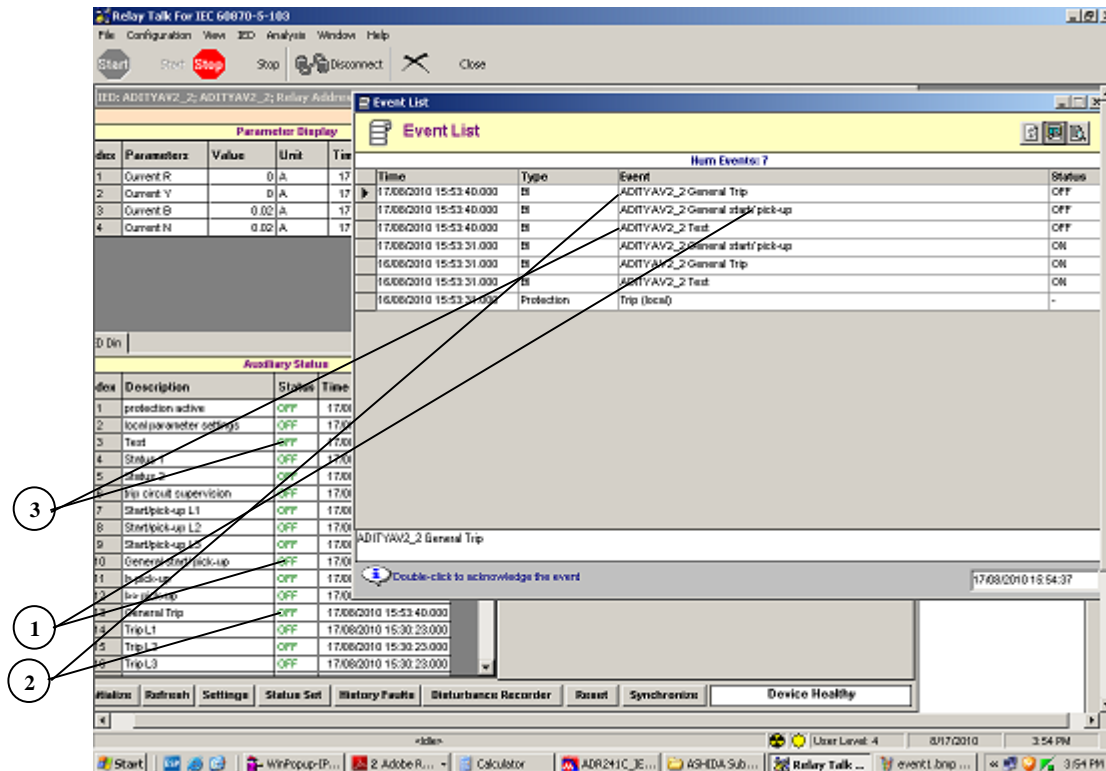


Fig. 10.20

When the relay is not in Trip mode following events are shown.

1. General start/pick up OFF
2. General Trip OFF
3. Test event OFF

11.0 TEST REPORT - Annexure I**1. Pick-Up Test for PHASE and 3IO: (Tolerance 1N – 1.1N)**

Keep Phase & 3IO TMS at X0.01

IP > %	R (Amp.)		Y (Amp.)		B (Amp.)		Tolerance (Amp.)	
	1 A	5 A	1 A	5 A	1 A	5 A	1 A	5 A
10							0.10 to 0.11	0.50 t 0.55
250							2.5 to 2.75	12.5 to 13.75

3IO > %	3IO (Amp.)		Tolerance (Amp.)	
	1 A	5 A	1 A	5 A
10			0.10 to 0.11	0.50 t 0.55
250			2.5 to 2.75	12.5 to 13.75

2. Operating Time Test For PHASE & 3IO (Ref. Table):**Phase Trip at 100% and Phase TMS set at Maximum Position (To be checked for 5 Amp)**

	Set Current at	Delay in Sec.				
		C1	C2	C3	C4	C5
Phase	2N - 10A					
	10N - 50A					
	20N - 100A					

Phase Trip at 200% and Phase TMS set at Maximum Position (To be checked for 1 Amp)

Set Current at	R (Delay in Sec.)	Y (Delay in Sec.)	B (Delay in Sec.)
	C1	C1	C1
2N - 4A			
20N - 40A			

Set 3IO TMS at Maximum position.**(To be checked for 1 Amp)**

Set Current at	3IO > at 10%
	C1
2N - 0.20A	
10N - 1A	

(To be checked for 5 Amp)

Set Current at	3IO > at 100%
	C2
2N - 10A	
10N - 50A	
20N - 100A	

HF Testing for Phase & 3IO (Tolerance 1N – 1.1N)

Keep Trip at 250% & TMS at X1.0

Phase - HF %	1000% (Tolerance 10A – 11A)
R (Amps)	
Y (Amps)	
B (Amps)	
3IO (Amps)	

HF Time Delay Testing For PHASE & 3IO (Adjust Current 2N to Trip Relay with HF):
(Actual Delay = Inst. + Set Delay)

HF Time Delay settings	00(Inst.)	0.06	2.0
Observed Delay(Phase)			
Observed Delay(3IO)			
Tolerance = Inst. + ($\pm 5\%$ of Set)	≤ 40 ms		

Definite Time Delay Testing For PHASE & 3IO (Curve 6) (Adjust Current 1.5N of pickup setting):

Definite Time delay settings	0.5	10.0
Observed Delay(Phase)		
Observed Delay(3IO)		
Tolerance $\pm 5\%$	0.475 to 0.525	9.5 to 10.5

3. Breaker Fail (LBB) Time Test:

Set BF Delay (mSecs)	100	400	800
Observed delay (mSecs)			

4. Key functions: _____.
5. Relay contacts: _____.
6. Back Terminal Connection: _____.
7. Insulation test: _____ M Ω @ 1000VDC.
8. H.V. Test: @ 2000VAC between all Terminals and body for 60 Sec. _____.
9. RS 485 Communication: _____.
10. Conclusion: _____.

Tested By

Checked By (QC)

TESTING OF OVER CURRENT/EARTH-FAULT RELAY.

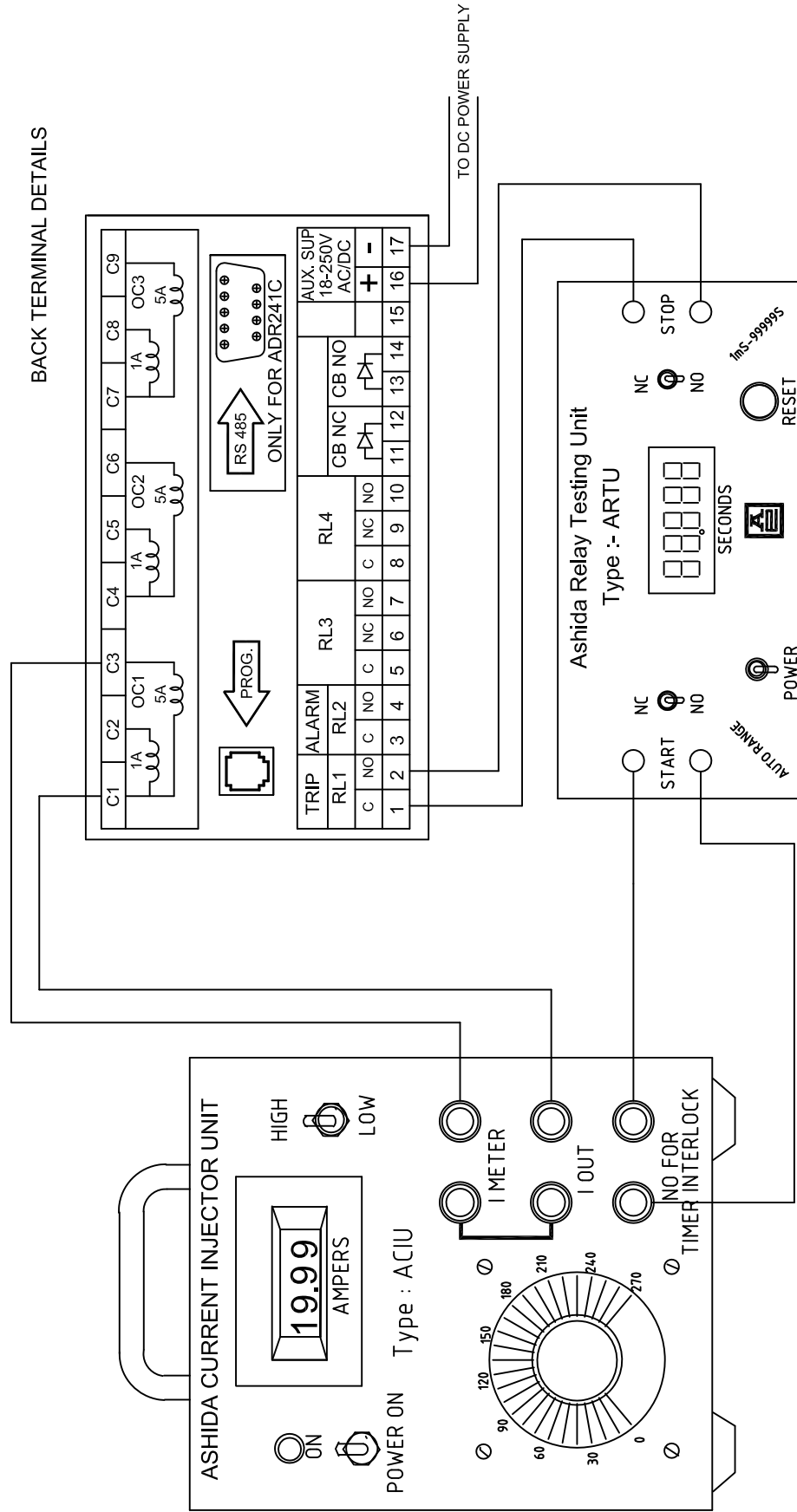


Figure 1.

DIM:MM	TOL:	FINISH :	MATERIAL
Prepared by JD	Checked by VAP	Approved by - date SMK	Date 10.07.2014
ASHIDA Electronics Pvt. Ltd.		Filename ADV02702R_TS	Scale NTS
TITLE :- Test Setup of ADR 141C /241C Relay		Drawing _ Ref.ADV02702R_TS	Sheet 1 OF 1
		Revision 01	

12.0 Revision Note

Issue	Date	Description
01	06.03.2010	Original Version
02	26.08.2010	Communication Details added
03	03.09.2010	Test Report added.
04	15.11.2010	Software Version Changed
04A	22.03.2011	IDMT Graph modified.
04B	03.10.2012	Software Version Changed
04C	19.06.2013	Software Version Changed
04D	10.07.2014	<ul style="list-style-type: none">• Software Version Changed 01.20• Communication modified from 4wires to 2wires.