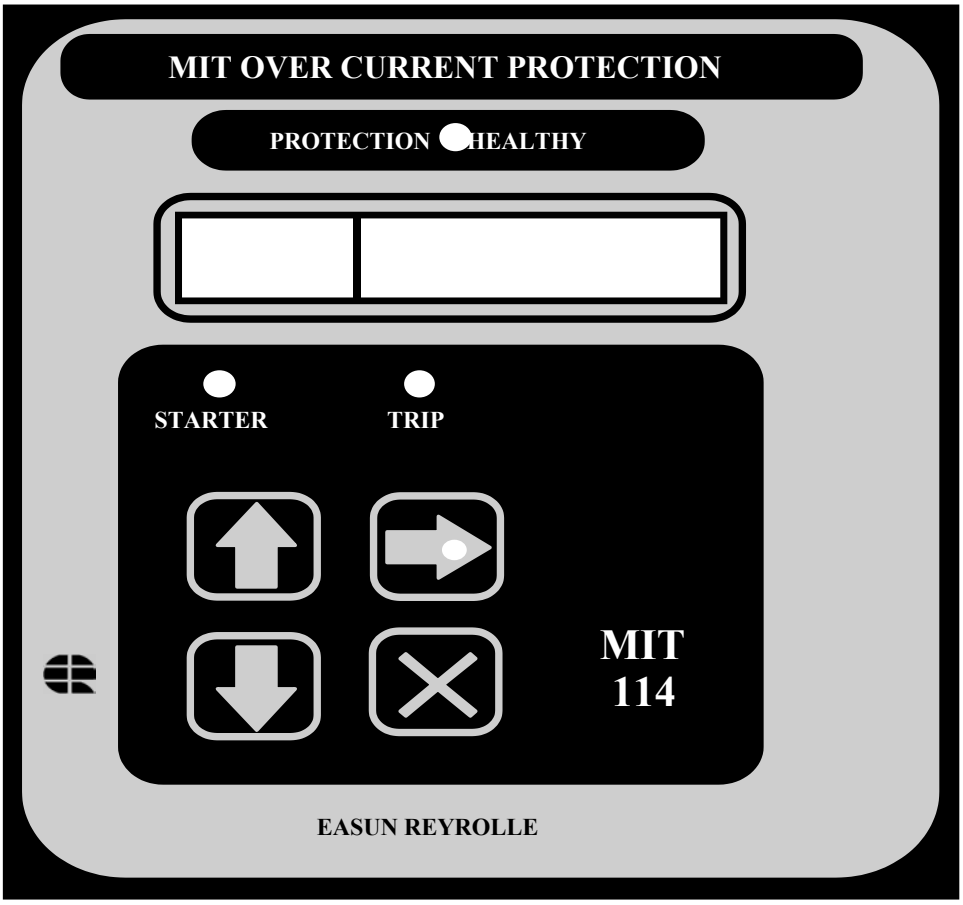
NOVEMBER 2000

APPLICATION AND COMMISSIONING MANUAL

MIT RELAY

EASUN REYROLLE LIMITED


MIT OVER CURRENT PROTECTION
PROTECTION HEALTHY
STARTER
TRIP
MIT
114
EASUN REYROLLE

MIT RELAY

CONTENTS

APPLICATION

1. INTRODUCTION

The type MIT numeric over current protection relay combines the power and flexibility of microprocessor technology. A wide range of protection elements, characteristics and TRUE RMS measurements are available.
Moreover, supervisory components and self-monitoring features give high confidence of

serviceability.

M I T 103	Three Pole Over Current and Earth Fault Relay without Highset
M I T 104	Four Pole Over Current Earth Fault Relay without Highset
M I T 113	Three Pole Over Current Earth Fault Relay with Highset
M I T 114	Four Pole Over Current Earth Fault Relay with Highset

1.1. Multiple Characteristics

MIT relay is suitable for various inverse characteristics and also for definite time lag characteristic, any one of them selectable at site independently for phase and earth fault.

Standard Inverse characteristic - SI 3 theoretical operating time is **3 seconds** at 10 times current setting at time multiplier setting (TMS) 1.000. Theoretical operating time of the **Standard Inverse** characteristics –SI 1 is **1.3 seconds** at 10 times current setting at TMS 1.000.

Very Inverse characteristic - VI curve is suited to networks where there is a significant reduction in fault current as the distance from the source increases. The operating time is shorter for large fault currents and increases at a greater rate as the fault current decreases. This permits the use of the same time multiplier setting for several relays in series.

Extremely Inverse characteristic - EI is very much useful to grade the relay with the fuse and applications where short duration transient over currents occurs. E.g. motor starting or reacceleration.

Long time Inverse characteristic - LTI is generally used for Standby Fault protection for Neutral / Ground Earthing Resistor. The same characteristics can be used to guard against overheating / over loading protection, when it matches with thermal characteristics of the motor, generator, transformer or capacitor banks.

Definite Time Lag characteristic - DTL is used for grading the system where source impedance determines fault current level and the fault current does not vary to a considerable amount down the length of the line.

1.2. DC Transient Free Highset

On transmission lines or transformer feeders where the source impedance is small compared with the protection circuit, to reduce the tripping time at high fault level the highset instantaneous over current element is used in addition to the inverse time over current element. The MIT 113 and MIT 114 relays are provided with highset over current elements in both phase fault and earth fault. Depending upon the point on wave switching of the fault and the X/R ratio of the system, the initial current may have DC offset. The highset over current unit being instantaneous one, it should not over reach due to initial DC offset current though it may exceed the highset pick-up value. The MIT 113 / 114 relays are provided with the DC transient free highset instantaneous elements, which will not over reach for DC transient condition.

1.3. Reset Time Delay

The increasing use of plastic cables, both , conventionally buried types and aerial bundled conductor types have given rise to the number of "pecking" or "flashing intermittent faults on distribution systems. At the fault position, the plastic melts and temporarily reseals the faulty cable for a short time, after which the insulation falls again. The same phenomenon has occurred in joint boxes where an internal flashover temporarily reseals.

The behavior of different types of over current relays under flashing fault condition is compared in Fig.1. The repeating process often caused electromechanical disc relays to "ratchet" up and eventually trip the faulty circuit provided that the reset time of the relay was longer than the time between successive flashes. Early electronic IDMTL relays with instantaneous reset features were not at all effective in dealing with this condition and only tripped after the flashing fault had developed into a solid permanent fault.

To overcome this the MIT relay has a reset time setting which can be user programmed to be either instantaneous or delayed from 1 to 60 seconds.

On the other hand, on overhead line networks, particularly where reclosers are incorporated in the protected system, instantaneous resetting is desirable to ensure that, on multiple shot reclosing schemes, correct grading between the source relays and the relays associated with the reclosers is maintained.

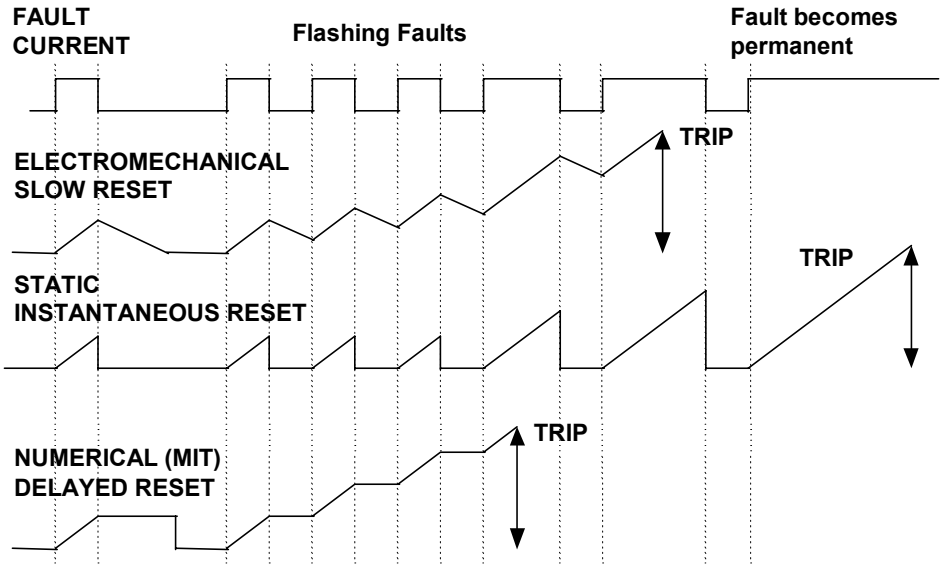


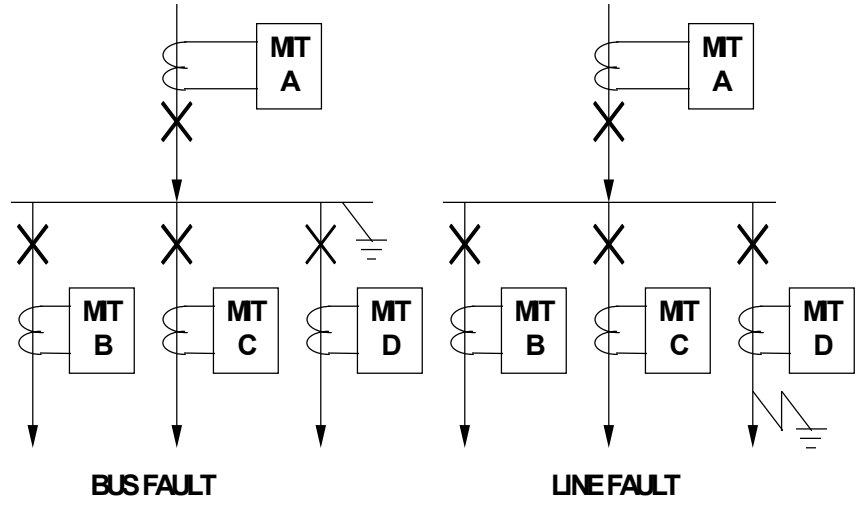
Figure 1 Flashing Fault Protection

1.4. Simple Busbar Protection

For a simple radial system , where there is one incoming and several outgoing feeders, with MIT Relays simple busbar protection can be applied as shown in fig 2. The optional starter output relay with one changeover contact can be used for this application.

The break contacts of the starter output of the outgoing feeders can be connected in series (so that any fault on the outgoing feeder, the trip circuit is not energized) and this combination is connected in series with the normally open repeat contacts of the starter output of the incoming feeder.

The above combination trips the incoming feeder with minimum delay for a bus fault. The repeat contact if necessary has to give a small time delay to avoid racing of contacts. When there is a line fault say at line D, Starter contact of 'D' opens and hence there is no Bus trip. When there is a bus fault, N/O contact of 'A' closes and there is a trip.



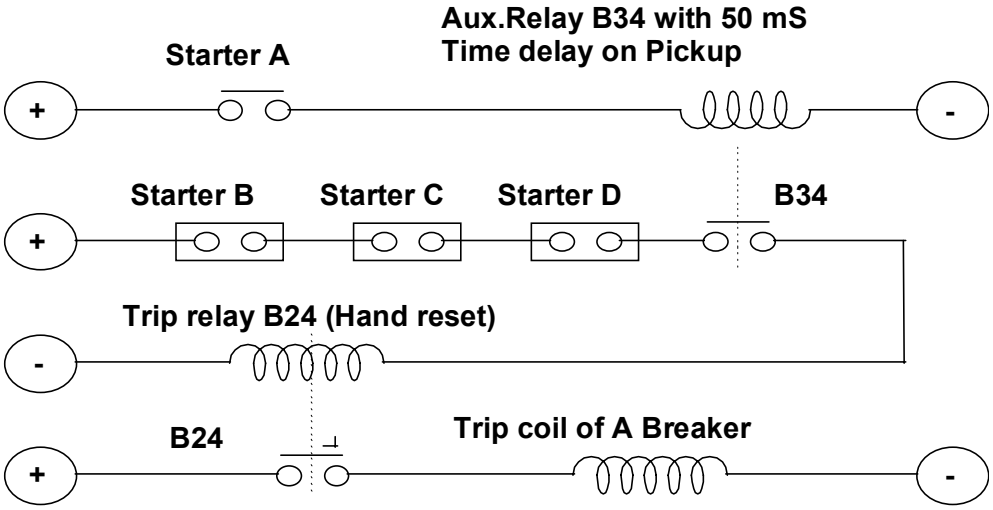


Figure 2 Simple Busbar Protection

Thus same MIT Relay can be used for simple Bus bar protection in addition to the normal duty of protecting the distribution feeders. This is an economic form of Bus bar protection, which can be used, where dedicated form of Bus bar protection cannot be justified.

1.5 Capacitor Bank Protection

The TRUE RMS measurement of the M I T Relay makes it very much suitable for protection of capacitor banks to guard against the faults in the capacitor and the leads between the circuit breaker and units.

1.6. Rough Balance Scheme

Where a dedicated transformer differential protection is not economically justified the MIT relay can be used in the differential circuit of the transformer current balance protection. See fig 3. Since the relay is having lower settings down to 5% even on the phase fault elements, suitable setting can be adopted for this scheme. It may be necessary to change the setting during tap changing of the transformer. The magnetic inrush current while charging the transformer will not affect the relay function as the relay is set for time delayed operation.

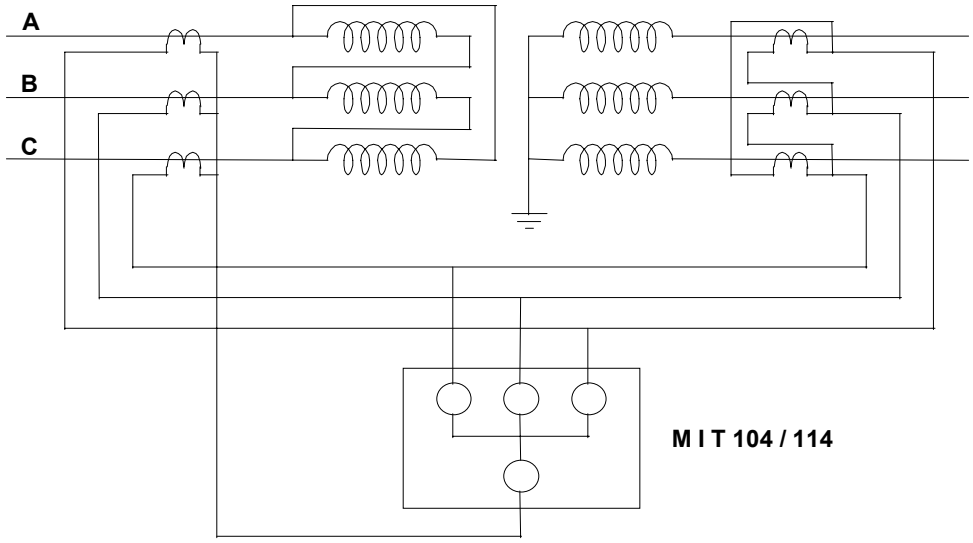


Figure 3 ROUGH BALANCE SCHEME

1.7. Lightly Loaded Systems

The lower range of the current setting available in the phase fault setting makes the relay suitable for lightly loaded system. The setting can be changed to higher value when the system load is upgraded.

INSTALLATION

1.1 . Unpacking

On receipt, remove the relay from the carton box in which it was received and inspect it for obvious damage. It is recommended that the relay is not removed from the relay case. To prevent the possible ingress of dirt, the sealed polythene bag should not be opened until the relay is to be used.

If damage has been sustained, please inform Easun Reyrolle Ltd., for necessary action.

1.2 . Storage

When the relay is not required for immediate use, it should be returned to its original carton and stored in a clean dry place.

1.3 . Handling

The relay's electronic circuits are protected from damage by static discharge when the relay is housed in its case. When relay is withdrawn from the case, static handling procedures should be observed:

- Before removing the relay from its case the operator must first ensure that he is at the same potential as the relay, by touching the case.
- The relay must not be handled by any of the relay terminals at the rear of the chassis.
- Ensure that anyone else handling the relay is at the same potential.

As there are no user serviceable parts and adjustable user settings inside the relay, there should be no requirement to remove any modules from the chassis.

If any modules are removed or tampered with, then the guarantee will be invalidated.

1.4 Mounting

Mount the relay using 2 nos mounting straps and 1no earth strap. Ensure that an earth wire is connected to the earth strap from the earth terminal 23. Terminal 23 should be directly connected to the system ground.

Only settings or trip details can be accessed via the pushbuttons when the cover is fitted. To change the settings the front cover has to be removed. Sealing arrangement is provided in one of the four knurling screws fitted on the cover. Sealing can be done using a sealing wire. Thus mechanical interlock is provided to avoid unauthorized setting change.

2. EQUIPMENT

2.1 Current tap Selection

MIT relays are suitable for 1A or 5A application. However the relays are internally wired for either 1A or 5A as per the customer requirement. Internal wirings are to be changed (Faston crimp connections) for changing the relay rating from one to other.

To ensure the current rating (I_R) of the relay, check the connection of CT wires connected to the bottom TB (Terminal Block) at the rear of the chassis as per the following table:

For 1A

Phase	Terminal No. of TB	Ferrule No. of CT wire(Black)
R	5	5A
Y	7	7A
B	9	9A
E/F	11	11A

For 5A

Phase	Terminal No. of TB	Ferrule No. of CT wire(Black)
R	5	5B
Y	7	7B
B	9	9B
E/F	11	11B

Following are the steps to change the current rating of the relay from 1A to 5A. (Y phase is taken as an example)

1) Identify 7th terminal from number strip on bottom terminal block at the rear of the chassis.

2) The black colour wire "7A" is inserted to 7th terminal of TB.

3) First, carefully lift the PVC boot of the wire by means of a tool (like nose Plier) to expose terminal 7A.

4) Hold the crimp by means of the same tool at the crimp point and lift to remove from the fixed terminal. Remove the "7B" wire from the terminal parking rack (fixed on terminal block) and insert the crimp of "7B" wire on to the terminal No.7 by means of the tool. Insert "7A" wire back to the terminal parking rack.

5) Ensure proper insertion of "7B" wire by pulling the wire by hand and the wire Should not come off the terminal.

6) Push the boot of "7B" wire to completely cover the crimp.

7) Follow the same routing for other phases also.

Same procedure in reverse is to be followed to change from 5A to 1A using appropriate wire numbers

2.2 . MMI (Man Machine Interface)

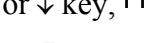
The user friendly MMI provided on the front panel has following hardwares.

1) Six digits, 7 segment LED display (First two digits are Red colour and other four digits are Green colour). First two digits (Red) displays Main menu or Type of fault When selected for Setting mode or Trip indication respectively. Remaining four digits (Green) displays Sub menu or "trip" indication respectively.

2) Green LED - Protection healthy indication.
3) Yellow LED - Starter indication.
4) Red LED - Trip indication.
5) ↑ Key - Up scrolling
6) ↓ Key - Down scrolling
7) → Key - Sub menu
8) × Key - Enter/Reset/Cancel/To check Version.

3. SETTING INSTRUCTIONS:

3.1. How to operate MMI

- Remove the front cover by unscrewing the four knurling screws.
- Apply DC supply. Terminals 22, 24 and 23 are for +Ve, -Ve and Ground supply respectively as per relay rating. When the relay powers up it takes few seconds to complete the self-test routine.
- Ensure Protection Healthy LED (Green) is ON and  indication appears on the LED display unit. Wait till the indication goes off.
- Press ↑ or ↓ key,  or is displayed.
- Represents M I T 103 or M I T 104 versions.
- Represents M I T 113 or M I T 114 versions.

- Press ↓ key , it displays CP on first two digits and SI 3 on second four digits.

  CP - Represents **Main menu**

  SI 3 - Represents **Sub menu**

- Pressing ↓ key repeatedly scrolls down the Main menu in the following order on the display.

  CP SI3 - Standard Inverse 3 seconds Phase fault characteristics

  CE SI3 - Standard Inverse 3 Seconds Earth fault characteristics

  IP 100 - Current setting for Phase Fault is 100%

  IE 100 - Current setting for Earth Fault is 100%

  tP 1.000 -Time multiplier setting for Phase fault is 1.000

  tE 1.000 -Time multiplier setting for Earth fault is 1.000

  rt 0 - Reset time Delay is 0 Sec

  HP oFF -Highset for Phase fault (now in OFF state)

  (This indication will not appear in M I T 10 versions)

  HE oFF -Highset for Earth fault (now in OFF state)

  (This indication will not appear in M I T 10 versions)

3.2. Select characteristics

3.2.1. Phase fault

From CP SI3 **Main** menu, press Submenu → Key, 3mm LED in the Key lit. It indicates that the Sub menu is activated.

SI 3 - Standard Inverse 3 Seconds characteristics.

Pressing ↓ key repeatedly the Sub menu will scroll down in the following order on the display unit.

SI 1 - Standard Inverse 1.3 Seconds.

VI - Very Inverse

EI - Extremely Inverse

LEI - Long Time Inverse

dEL - Definite Time Lag

By pressing ↑ or ↓ key choose the desired characteristic and press →key. Now Submenu LED goes OFF and the Main menu appears on the LED display.

3.2.2. Earth fault

To select Earth fault characteristics, get from CE SEt Main menu, follow the same procedure mentioned above for Phase Fault Characteristics.

3.3. Current settings

Setting range: **5%** to **250%** in steps of **5%** (Phase and Earth fault)

3.3.1. Phase fault

From CP SEt Main menu, press ↓ key repeatedly to get IP 100 main menu (for Phase fault current setting). Press → key (Submenu LED On) to get the Sub menu. Pressing the ↑ or ↓ key, changes the current setting in 1% increments. Upon selecting the desired setting, once again press the → key (Sub menu LED goes OFF) to return to the main menu.

3.3.2. Earth fault

Select Earth fault Current setting, from CE SEt Main menu**,** follow the same procedure mentioned for Phase fault.

3.4. Time Multiplier Setting (For IDMTL char.)

Setting range: 0.025 Seconds to 1.00 Seconds in steps of 0.001 Seconds (Phase and Earth fault)

3.4.1. Phase fault

From CP SEt Main menu, press ↓ key repeatedly to get tP 1.000 main menu (for Phase fault). Press → key (Submenu LED On) to get Submenu. Pressing ↑ or ↓ key, changes time multiplier setting by 0.001 increments. Upon selecting the desired setting, once again press the → key (Sub menu LED goes OFF) to return to the main menu.

3.4.2. Earth fault

Select Earth fault Time Multiplier, from tE 1.000 Main menu, and follow the same procedure mentioned for Phase fault.

3.5. Definite Time Lag (For DTL char.)

Setting range: 0 Sec to 20 Seconds in steps of 0.01 Sec. (Phase and Earth fault)

3.5.1. Phase fault

From CP SI3 Main menu, press → key to get Sub menu and select dtL. Once again press the → key (Sub menu LED goes OFF) to get back the main menu.

Press ↓ key repeatedly to get tP 00.00 main menu (for Phase fault).

Press → key (Submenu LED On) to get Submenu.

Pressing ↑ or ↓ key, changes TIME setting by 0.01 sec increments.

After selecting the desired setting, once again press the → key (Sub menu LED goes OFF) to get back the main menu.

3.5.2. Earth fault

Select Earth fault Time Multiplier, from tP 00.00 Main menu,, follow the same procedure mentioned for Phase fault.

3.6. Reset time

Setting range: 0 Second to 60 seconds in steps of 1 Second.

(Reset time is common for both Phase and Earth fault)

From CP SI3 Main menu, press ↓ key repeatedly to get rt 0 Main menu. Press → key (Submenu LED On) to get Submenu. Pressing the ↑ or ↓ key, changes reset time delay by 1sec increments. After selecting the desired setting, once again press the → key (Sub menu LED goes OFF) to get back the main menu.

3.7. Highset (For MIT 113 or MIT 114 versions only)

Setting range: 50% to 3000% in steps of 50% (Phase and Earth fault).

3.7.1. Phase fault

From HP oFF Main menu, Press → key (Submenu LED On) to get Submenu. Pressing the ↑ or ↓ key, changes highset value by 50% increments. After selecting the desired setting, once again press the → key (Sub menu LED goes OFF) to return to the main menu.

3.7.2. Earth fault

To get Earth fault highset, from HE oFF Main menu, follow the same procedure mentioned for Phase fault.

3.8 Acceptance of Settings

For the relay to accept the above setting changes press ×push switch once, now the display goes off and the settings are updated. By pressing any switch again

MN SE 10 or MN SE 11 indication will appear.

Ensure all the chosen settings are as per requirements.

To change existing settings, choose corresponding Main menu and select the Sub menu (ensure LED ON), using ↑ or ↓ key change the previous setting and once again press the Sub menu switch → (LED OFF). Finally press Enter × switch once.

ENSURE ' X ' KEY IS PRESSED TO ACCEPT THE SETTING CHANGES

4. TO CHECK THE RELAY VERSION

Press **X** push switch four times quickly. Example of relay Version display is as follows:

I 114.001 - Represents M I T 114 relay, version 1.

To get back the main menu presses ↑ or ↓ key.

5. TRIP INDICATION AND RESETTING OF TRIP INDICATION

When the relay operates, RED LED indicates tripping. To find the 'Type of fault', press any arrow key.

E_E rIP Indicates Earth fault (Earth pole tripped)

Further press any arrow key , the following trip information's will come depending upon type of fault.

r_Errl P Indicates R - pole is tripped

Y_Errl P Indicates Y - pole is tripped

b_Errl P Indicates B - pole is tripped

Indicates R - pole Highest tripped

Indicates Y - pole Highest tripped

Indicates B - pole Highest tripped

Indicates Earth fault Highest tripped

During tripping of one pole, if any other poles or poles (time delayed elements) started,

Then in addition to trip information the relay will indicate start information of particular pole as follows, which has started but not tripped.

Indicates R - pole is started

Indicates B - pole is started

Indicates E - pole is started

Once the fault is cleared, press × key twice to reset the trip indication.

Ensure to reset the relay before the breaker is closed. Other wise the tripped pole indication will be added for subsequent faults.

The trip indication will be retained during DC Indicates B - pole is started power supply failure.

COMMISSIONING

1.1. Required Test Equipments

- 500V insulation test sets.
- Variable secondary injection current source rated 10A or greater.
- Time interval meter
- Primary injection equipment
- A DC supply with a nominal voltage within the working range of the relays DC auxiliary supply ratings

2. Inspection

Ensure that all connections are tight and in accordance with the relay wiring diagram and the scheme diagram. Check if the relay is correctly programmed and the relay is fully inserted into the case.

3. Applying settings

The relay settings for the particular application should be applied before any secondary testing is started.

4 . Precautions

Before testing commences, the equipment should be isolated from the current transformers and the CTs to be short-circuited, in line with the local site procedures. The tripping and alarm circuits should also be isolated, where practical. Also, ensure that trip links are removed.
Ensure that correct DC auxiliary voltage and polarity is applied. See the relevant scheme diagrams for the relay connections.

5. TESTS

5.1. Insulation

Connect together all relay CT terminals and measure the insulation resistance between these terminals and all the other relay terminals connected together to earth.

Connect together the terminals of the DC auxiliary supply (only +ve and -ve) and measure the insulation resistance between these terminals and all other terminals connected together to earth.
Connect together all the output relay terminals and measure the insulation resistance between these terminals and all other terminals connected together to earth. A minimum value of 2. 5 to 3 meg ohms can be considered as satisfactory value.

5.2. Secondary injection

Select the relay configuration and settings for the application. Note that the MIT relay can be connected either as 1A or 5A-rated device. The user should check this before commencing secondary test. Please refer Sec. 2.1. in installation

a . Pick up and Reset

The test checks accuracy of the current settings for the relay's main over current characteristics. Apply single-phase current into one of the current inputs. Slowly increase the current until the starter LED (yellow) operates and record the pick up current in Table 1. Reduce the current until the LED goes off and record this as the reset level. Repeat this test for each pole.

Check that all the pick up current levels are measured within 104% ± 4% or ± 10m A of the applied setting. Check that the reset levels are ≥ 94% of the setting.

POLE	PICK-UP SETTING	MEASURED PICK-UP	PICK-UP ERROR	MEASURED RESET	RESET ERROR
PHASE A					
PHASE B					
PHASE C					
E/F					

TABLE 1

b. IDMTL / DTL Characteristics

This test checks the accuracy of the main time delay characteristics (IDMTL / DTL). Select the relay current setting characteristics and time multiplier settings as required and then inject a level of current which is a multiple of the relay setting.

A time interval meter should be connected to the correct output contact terminals. The timer should be started by the source and stopped by the relay trip contacts. Each pole should be tested. A secondary injection timing test circuit is illustrated in Fig. 4. The secondary injection test equipment should be made 'OFF', once the relay contact is closed

Table 2 shows theoretical value of each characteristic with time multiplier set to 1.000. Record the actual results in Table 3 and check that the measured times are within ± 5% or ± 30-m.secs.of theoretical value.

CURVE	2xIs	5 xIs	10 xIs	20 xIs
SI 3	10.03	4.28	2.97	2.27
SI 1	4.39	1.87	1.3	1.0
EI	26.67	3.33	0.81	0.20
VI	13.50	3.38	1.50	0.71
LTI	120.00	30.0	13.33	6.32
DTL	*	*	*	*

TABLE 2 * USER SETTING

Pole	Characteristic (SI3,SI1,EI,VI LTI,DTL)	**2xIs**		**5xIs**		**10xIs**		**20xIs**	
		Delay	Error (±5%)	Delay	Error (±5%)	Delay	Error (±5%)	Delay	Error (±5%)
Phase A									
Phase B									
Phase C									
E/F									

TABLE 3

c . <u>Highset</u>

Program the current settings for the highset characteristics to the required level. Inject a level of current below the setting of the relay, then increase the current until the output operates. Record the pick up level for each pole in Table 4. and confirm that in each case it occurs within 100% ± 4% or ± 10 ma of applied setting. When the highset setting is above the continuous thermal rating of the relay, care should be taken, such that the duration of the applied current should not damage the relay. Refer catalogue for thermal rating.

POLE	HIGHSET SETTING	MEASURED PICK-UP	ERROR
PHASE A			
PHASE B			
PHASE C			
E/F			

TABLE 4

d . Output relays

The basic relay has 2 O/P relays. One relay has 2 N/O contacts for trip application & the other relay has 1N/C for protection healthy. These are to be tested during secondary injection testing. In addition, 5 O/P relays can be given as optional and are given below.

1.Starter - C/O

This contact to be used while testing the pick up and reset value of the relay.

2.IDMTL P/F & IDMTL E/F – 2 N/O contacts

These contacts to be used while testing the IDMTL characteristics.

3.Highset P/F & Highset E/F – 2 N/O contacts

These contacts to be used while testing the highset characteristics

5.3. Primary injection

Primary injection tests are essential to check the ratio and polarity of the transformers as well as the secondary wiring.

Using the circuit shown in Fig.5 / Fig.7, check the current transformer ratio and CT phase to earth connection. Inject a current of sufficient magnitude .The secondary current is

Is = Primary current / CT ratio

Use the circuit shown in Fig.6 / Fig.8 to check the current transformer ratio and the CT phase to phase connections. CT should also be tested for knee point voltage.

5.4 . Putting into service

After completing all tests satisfactorily, the relay should be put into service as follows:

1. Make a final check of the secondary wiring and tightness of all terminal connections.
2. Insert the DC supply fuse.
3. Check the relay healthy indication/display.
4. Replace the relay cover.
5. Insert the trip links.
6. Perform trip test by secondary injection.
7. Remove all test connections

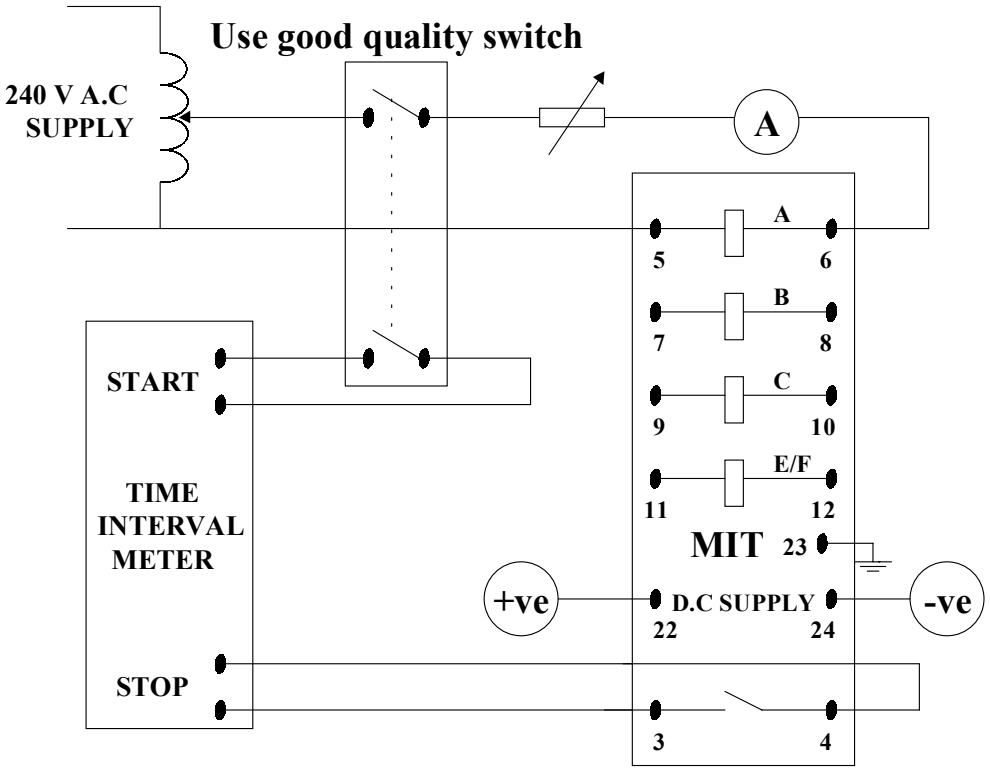


Fig 4 - Secondary injection timing test circuit
(Terminals shown are for 1A rating)

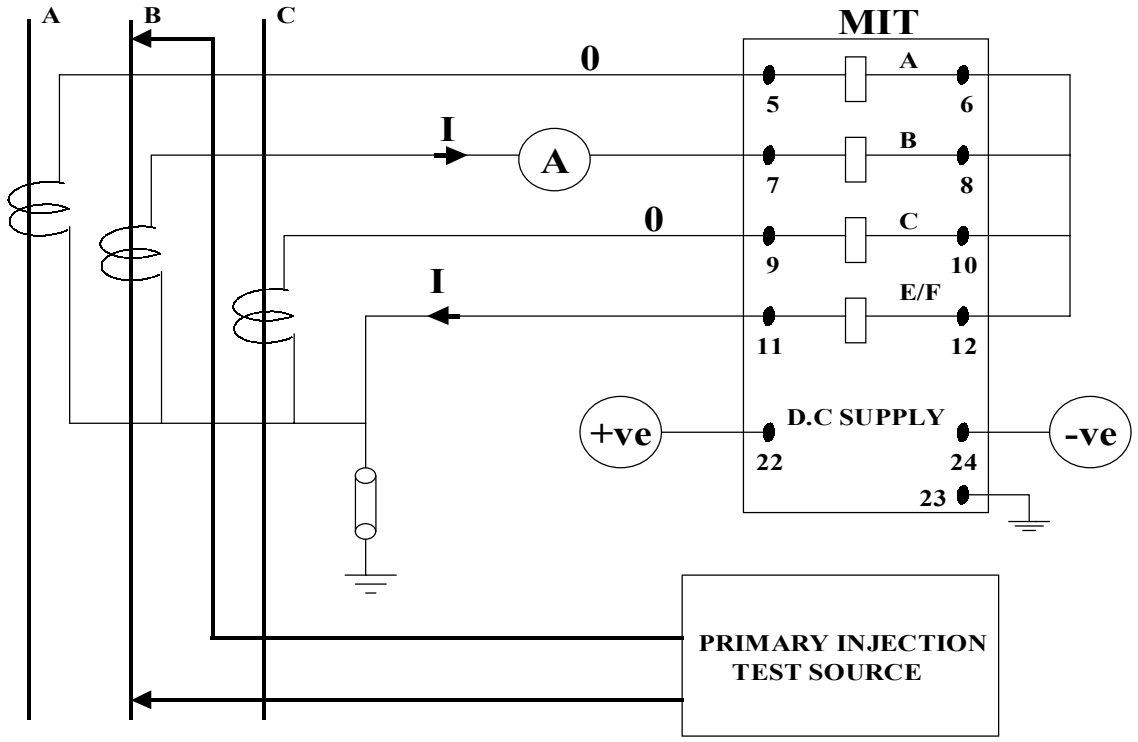


Fig 5 - Primary Injection Test Circuit (Phase to Earth) for 3 O/C & 1 E/F Relay
(Terminals shown are for 1A rating) Similar test shall be conducted on A & C phase CTs

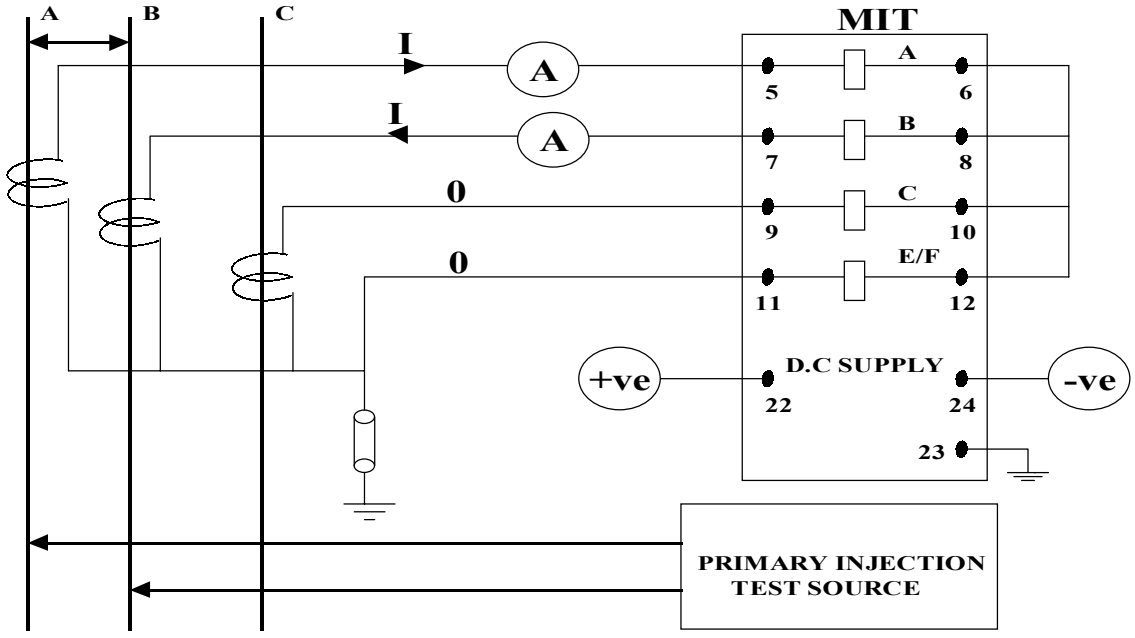


Fig 6 - Primary Injection Test Circuit(Phase to Phase) for 3 O/C & 1 E/F Relay
(Terminals shown are for 1A rating) Similar test shall be conducted on BC & CA phases

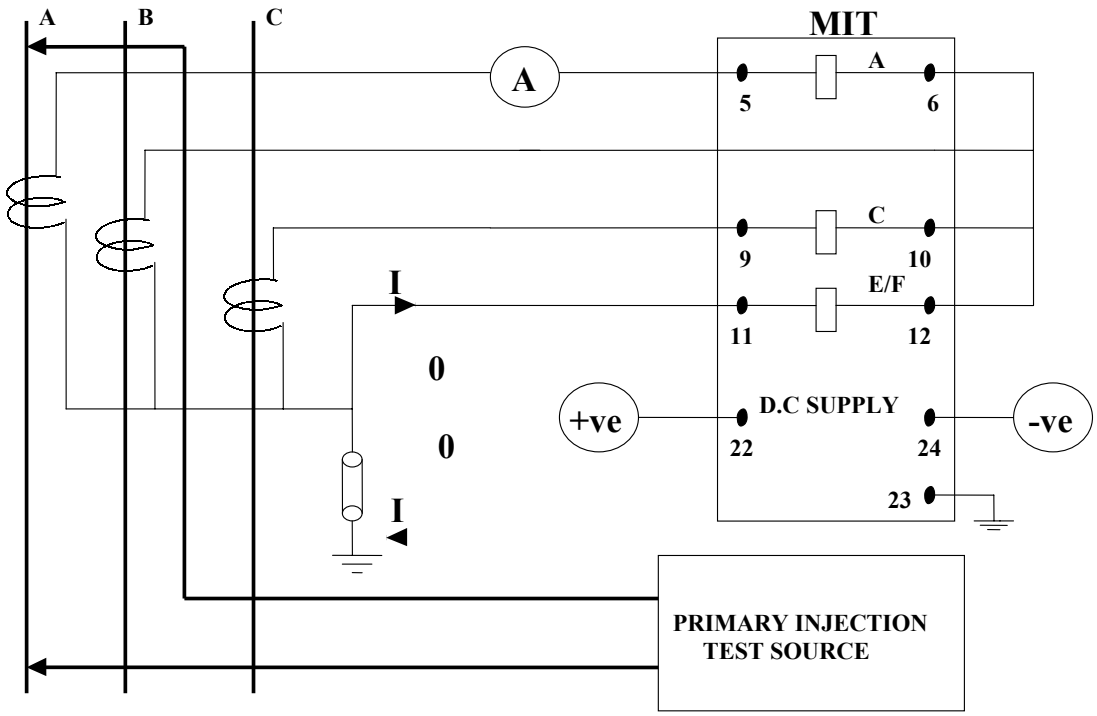


Fig 7 - Primary Injection Test Circuit (Phase to Earth) for 2 O/C & 1 E/F Relay
(Terminals shown are for 1A rating) Similar test shall be conducted on B & C phase CTs

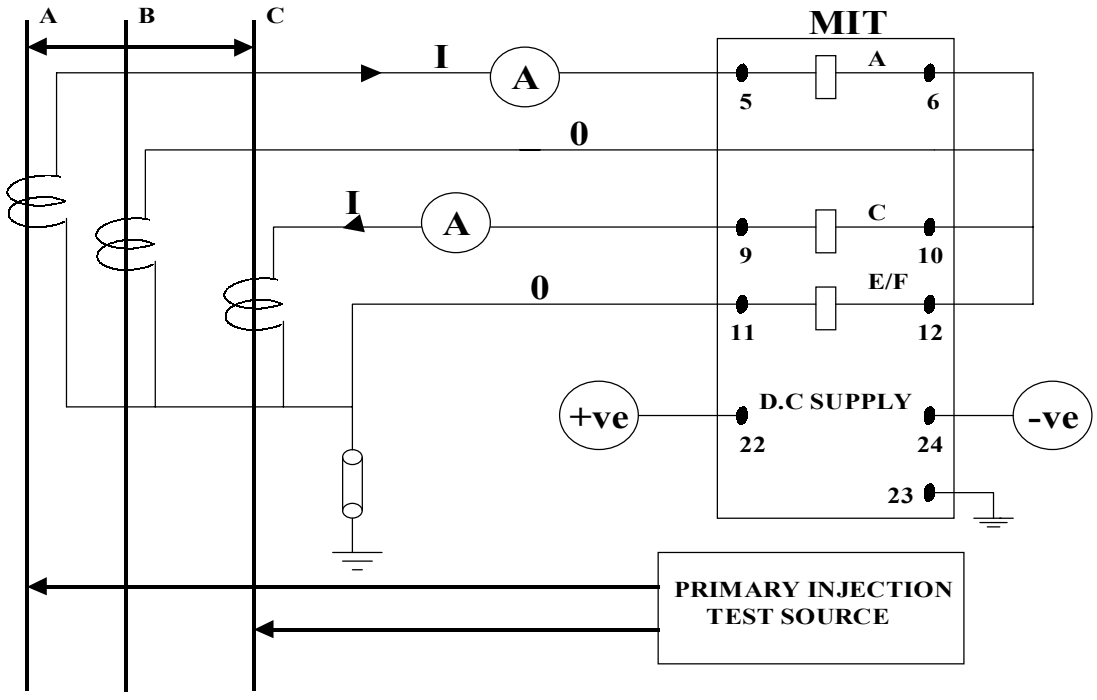
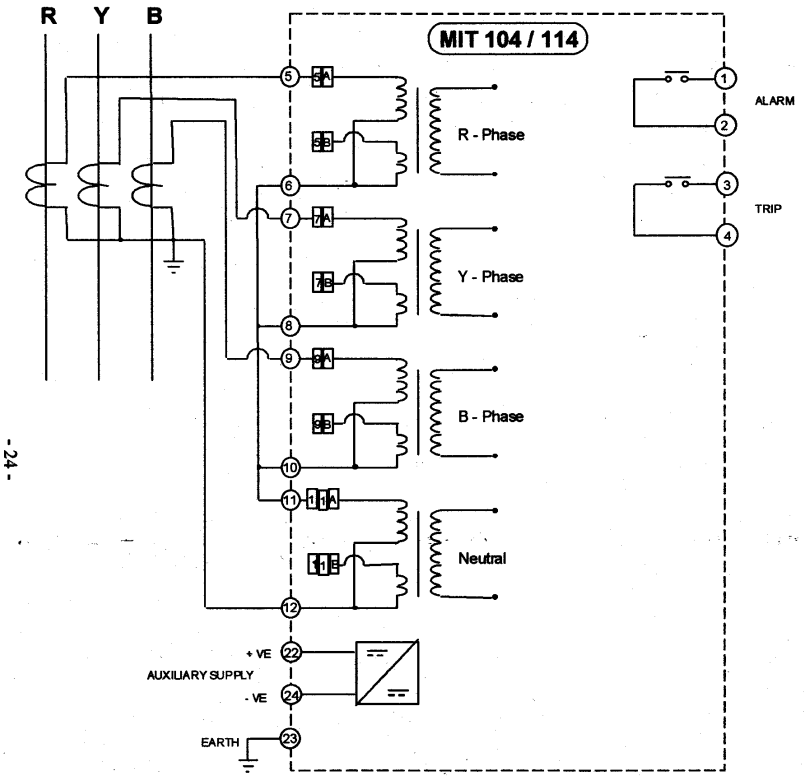
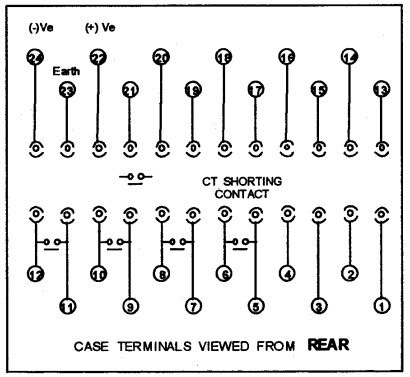


Fig 8 - Primary Injection Test Circuit (Phase to Phase) for 2 O/C & 1 E/F Relay
(Terminals shown are for 1A rating) Similar test shall be conducted on AB & BC phases

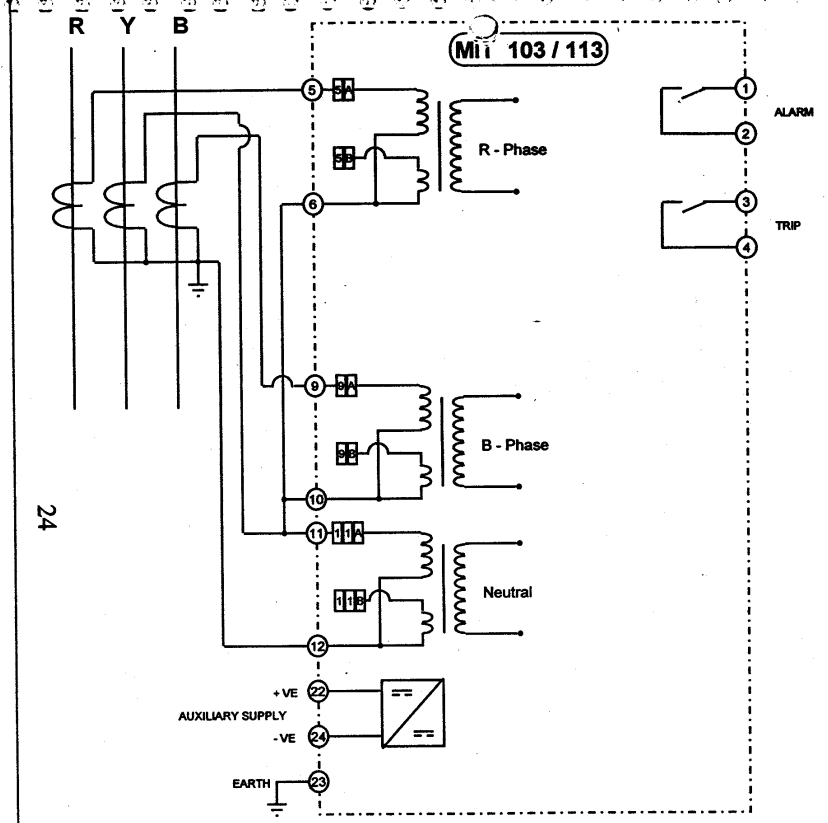


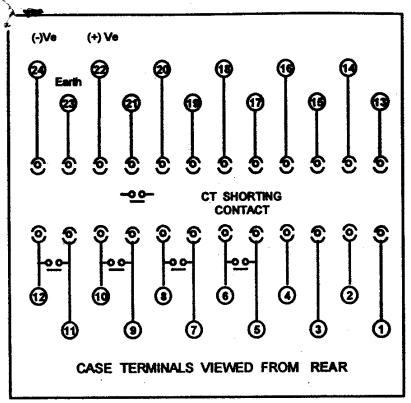


Note :

1. CT Circuits are shown connected to Relay 1A tap. For 5A tap remove 5A 7A 9A 11A wires and connect 5B 7B 9B 11B wires to terminal numbers 5,7,9 & 11 respectively. unused current terminals are fitted with additional boot (dummy) and tightly fixed to dummy terminals in the terminal block in the backside of the chassis.
2. Terminal No.23 (Earth) is to be connected directly to Earthbar.

MIT-104/114 - TYPICAL WIRING DIAGRAM

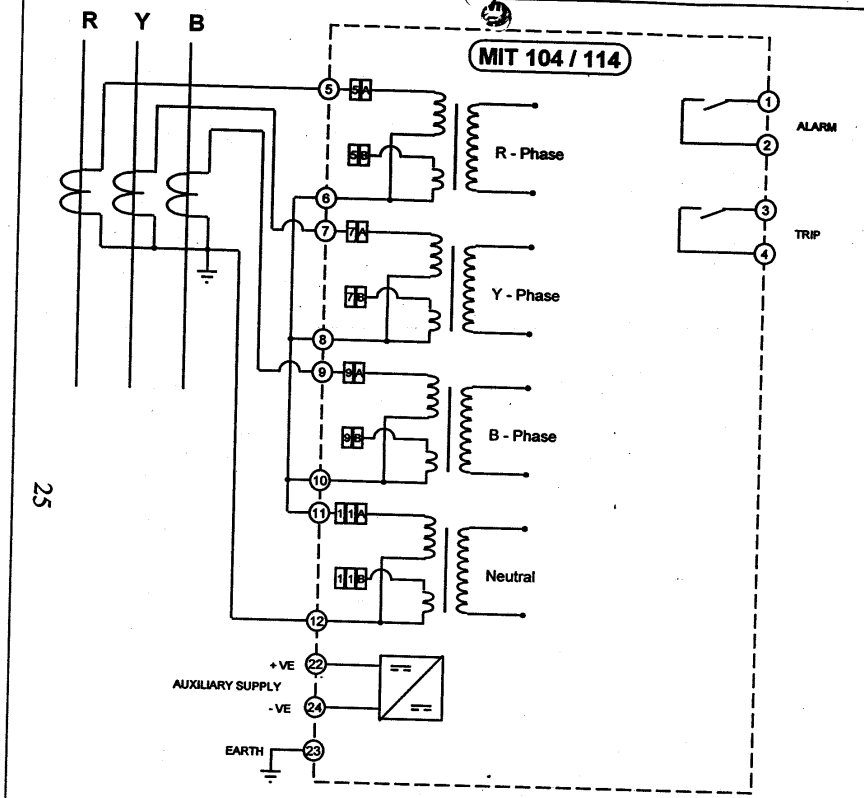


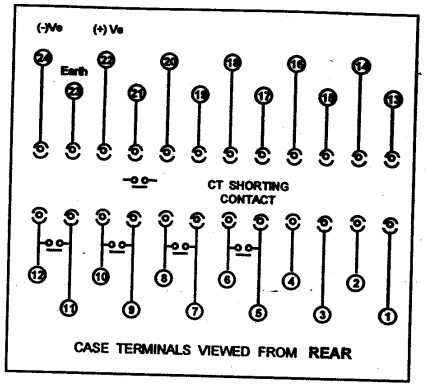


Note :

1. CT Circuits are shown connected to Relay 1A tap. For 5A tap remove 5A 9A 11A wires and connect 5B 9B 11B wires to terminal numbers 5,9 & 11 respectively. unused current terminals are fitted with additional boot (dummy) and tightly fixed to dummy terminals in the terminal block in the backside of the chassis.
2. Terminal No.23 (Earth) is to be connected directly to Earthbar.

	WIRING DIAGRAM FOR MIT 103 / 113 RELAY										Drawing No. :- 8431W20003	
EASUN REYROLLE LIMITED, HOSUR, INDIA.	REV.	No.	Sig. DATE	No.	Sig. DATE	No.	Sig. DATE	DATE DRAWN	15.04.1999 Ravi Sankar	CHECKED Ravi Sankar APPROVED		SUPERSEDES

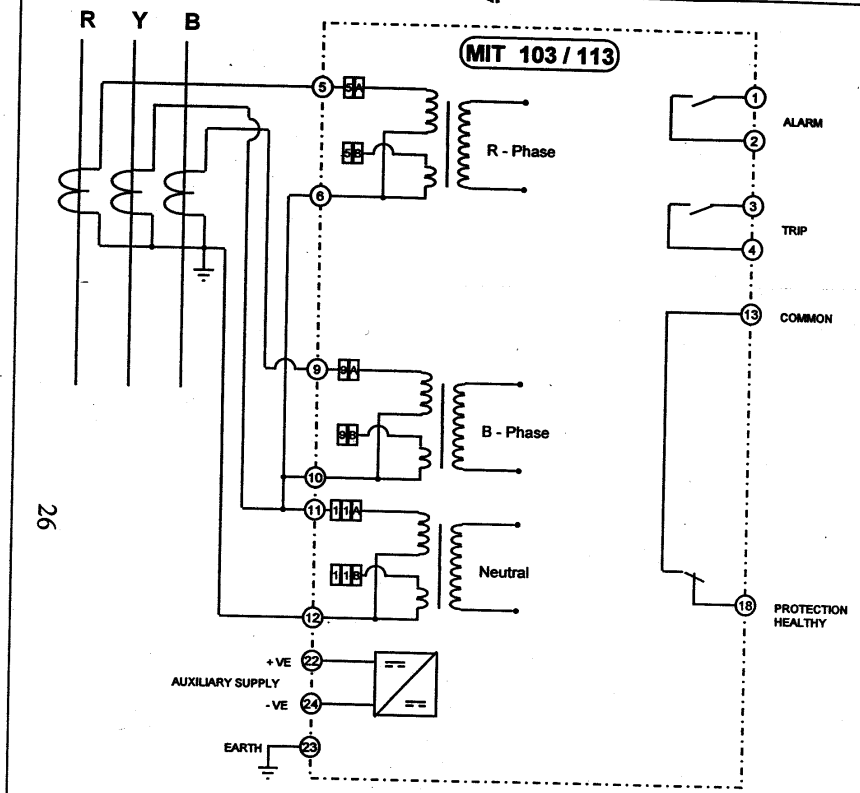


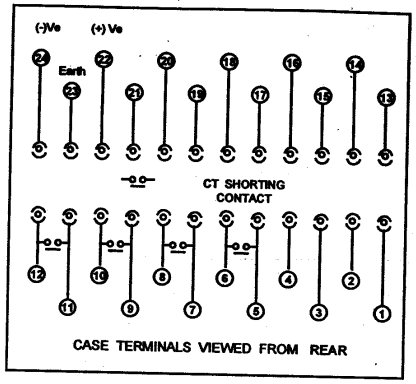


Note :

1. CT Circuits are shown connected to Relay 1A tap. For 5A tap remove 5A 9A 11A wires and connect 5B 9B 11B wires to terminal numbers 5,9 & 11 respectively. unused current terminals are fitted with additional boot (dummy) and tightly fixed to dummy terminals in the terminal block in the backside of the chassis.
2. Terminal No.23 (Earth) is to be connected directly to Earthbar.

	WIRING DIAGRAM FOR MIT 104 / 114 RELAY										Drawing No. :- 8431W20004			
EASUN REYROLLE LIMITED, HOSUR, INDIA.	REV.	No.	Sig. DATE	No.	Sig. DATE	No.	Sig. DATE	DATE	15.04.1999	CHECKED	Ravi Sankar	SUPERSEDES		
								DRAWN	Ravi Sankar	APPROVED				

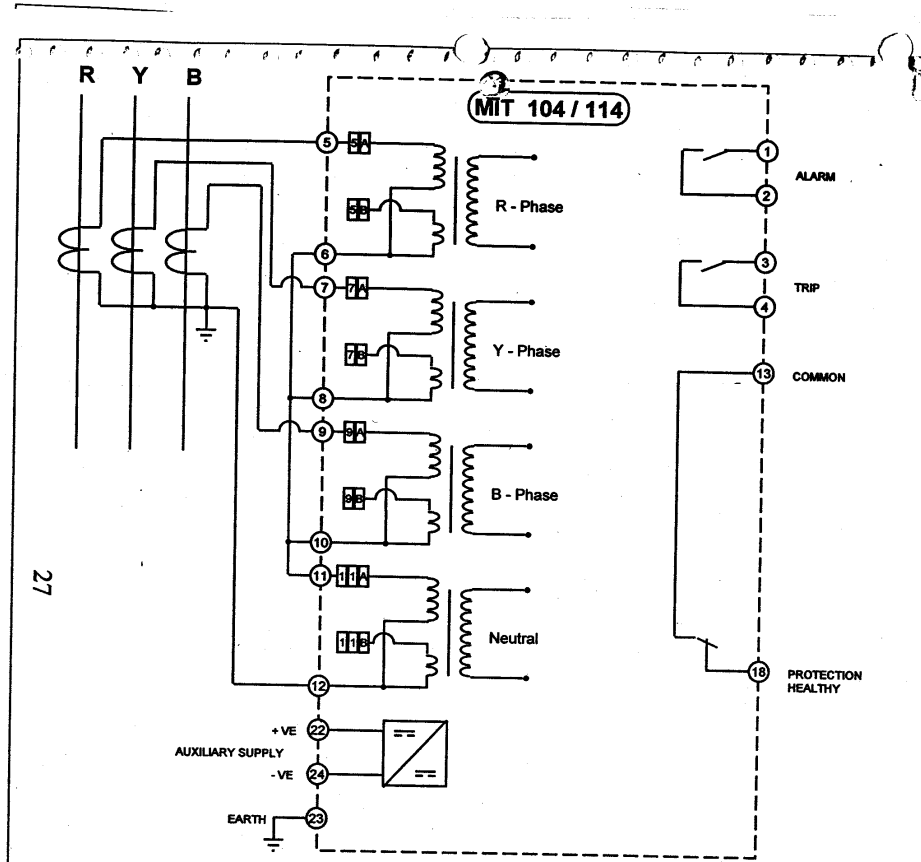


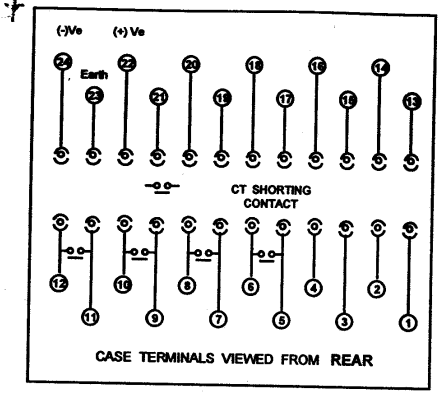


Note :

1. CT Circuits are shown connected to Relay 1A tap. For 5A tap remove 5A 9A 11A wires and connect 5B 9B 11B wires to terminal numbers 5,9 & 11 respectively. unused current terminals are fitted with additional boot (dummy) and tightly fixed to dummy terminals in the terminal block in the backside of the chassis.
2. Terminal No.23 (Earth) is to be connected directly to Earthbar.

	WIRING DIAGRAM FOR MIT 103 / 113 RELAY										Drawing No. :- 8431W20023			
EASUN REYROLLE LIMITED, HOSUR, INDIA.	REV.	No.	Sig. DATE	No.	Sig. DATE	No.	Sig. DATE	DATE	27.09.2K	CHECKED	Ravi Sankar	SUPERSEDES		
								DRAWN	Ravi Sankar	APPROVED				

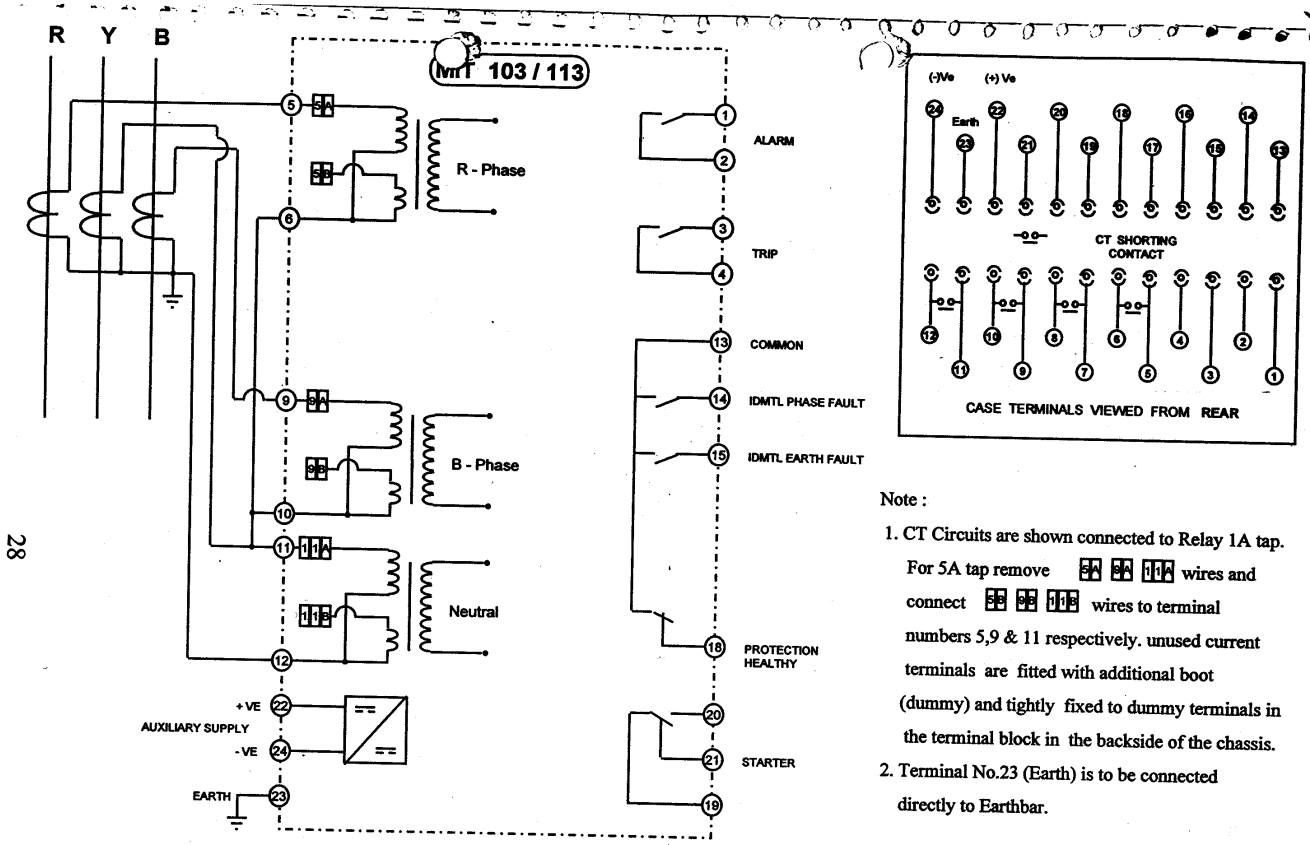




Note :

1. CT Circuits are shown connected to Relay 1A tap. For 5A tap remove 5A 7A 9A 11A wires and connect 5B 7B 9B 11B wires to terminal numbers 5,9 & 11 respectively. unused current terminals are fitted with additional boot (dummy) and tightly fixed to dummy terminals in the terminal block in the backside of the chassis.
2. Terminal No.23 (Earth) is to be connected directly to Earthbar.

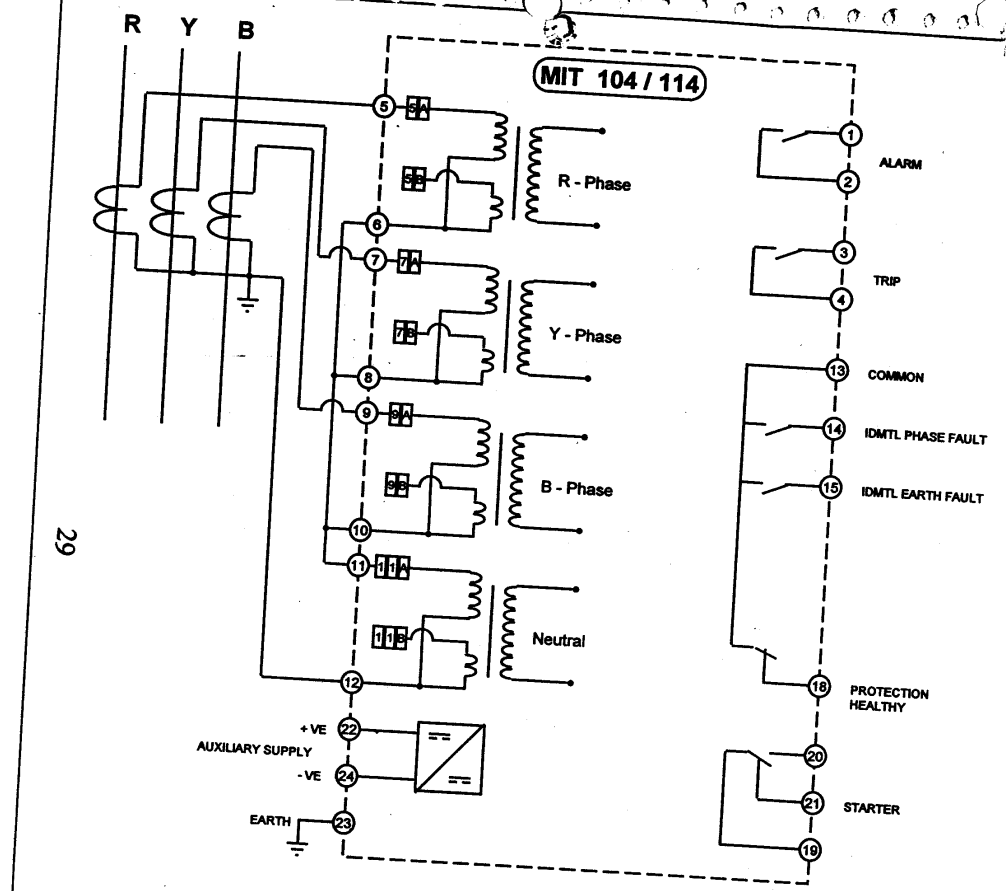
WIRING DIAGRAM FOR MIT 104 / 114 RELAY											Drawing No. :- 8431W20024
EASUN REYROLLE LIMITED, HOSUR, INDIA.	REV.	No.	Sig. DATE	No.	Sig. DATE	No.	Sig. DATE	DATE	27.09.2K	CHECKED	Ravi Sankar	SUPERSEDES
								DRAWN	Ravi Sankar	APPROVED		

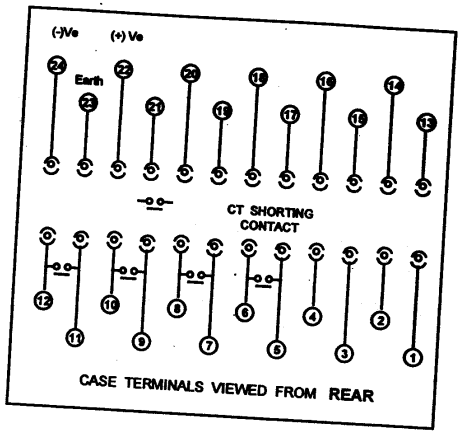


Note :

1. CT Circuits are shown connected to Relay 1A tap. For 5A tap remove 5A 9A 11A wires and connect 5B 9B 11B wires to terminal numbers 5,9 & 11 respectively. unused current terminals are fitted with additional boot (dummy) and tightly fixed to dummy terminals in the terminal block in the backside of the chassis.
2. Terminal No.23 (Earth) is to be connected directly to Earthbar.

	WIRING DIAGRAM FOR MIT 103 / 113 RELAY									Drawing No. :- 8431W20053				
EASUN REYROLLE LIMITED, HOSUR, INDIA.	REV.	No.	Sig. DATE	No.	Sig. DATE	No.	Sig.	DATE	DATE	27.09.2K	CHECKED	Ravi Sankar	SUPERSEDES	
									DRAWN	Ravi Sankar	APPROVED			

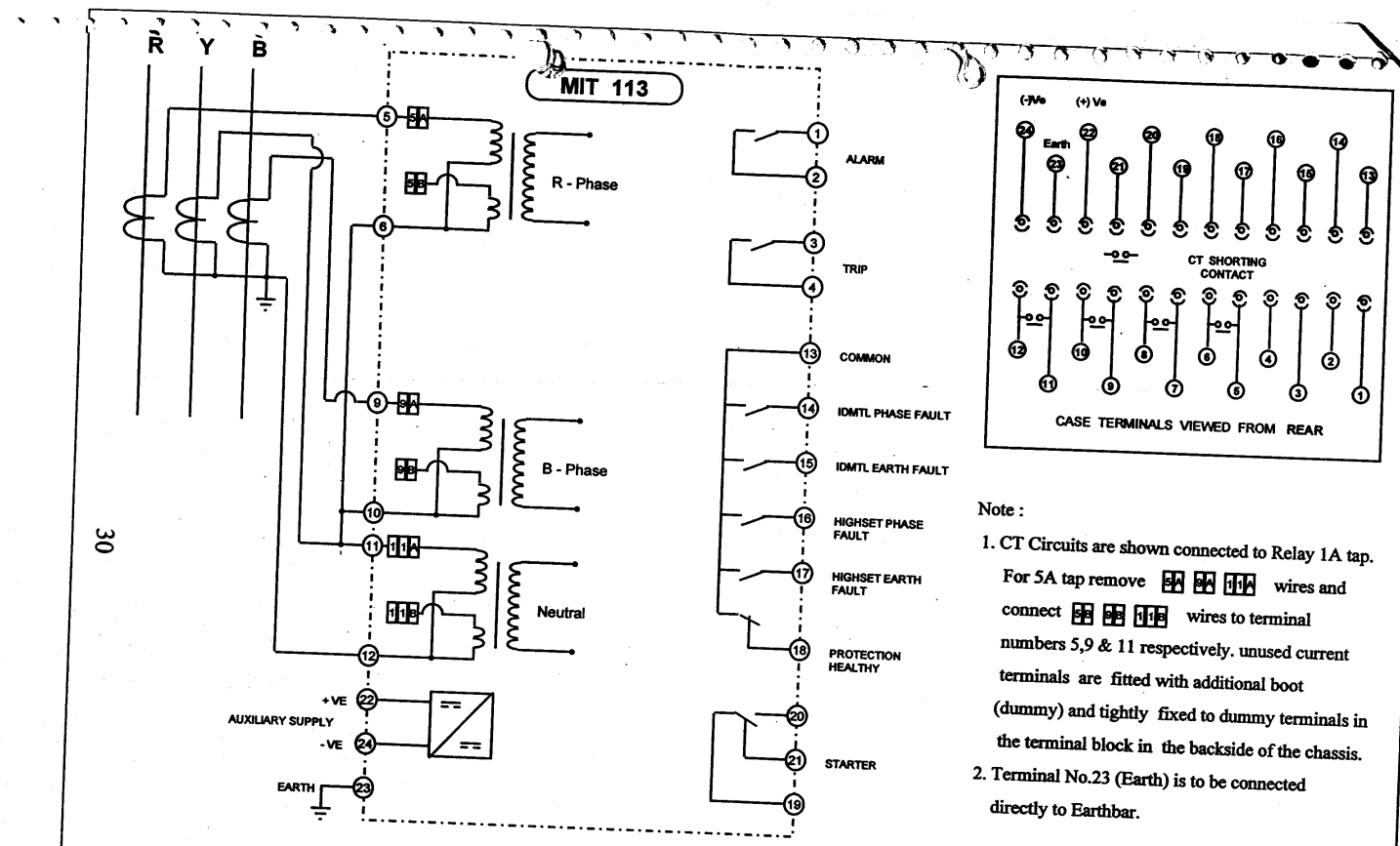




Note :

1. CT Circuits are shown connected to Relay 1A tap. For 5A tap remove 5A 7A 9A 11A wires and connect 5B 7B 9B 11B wires to terminal numbers 5,9 & 11 respectively. unused current terminals are fitted with additional boot (dummy) and tightly fixed to dummy terminals in the terminal block in the backside of the chassis.
2. Terminal No.23 (Earth) is to be connected directly to Earthbar.

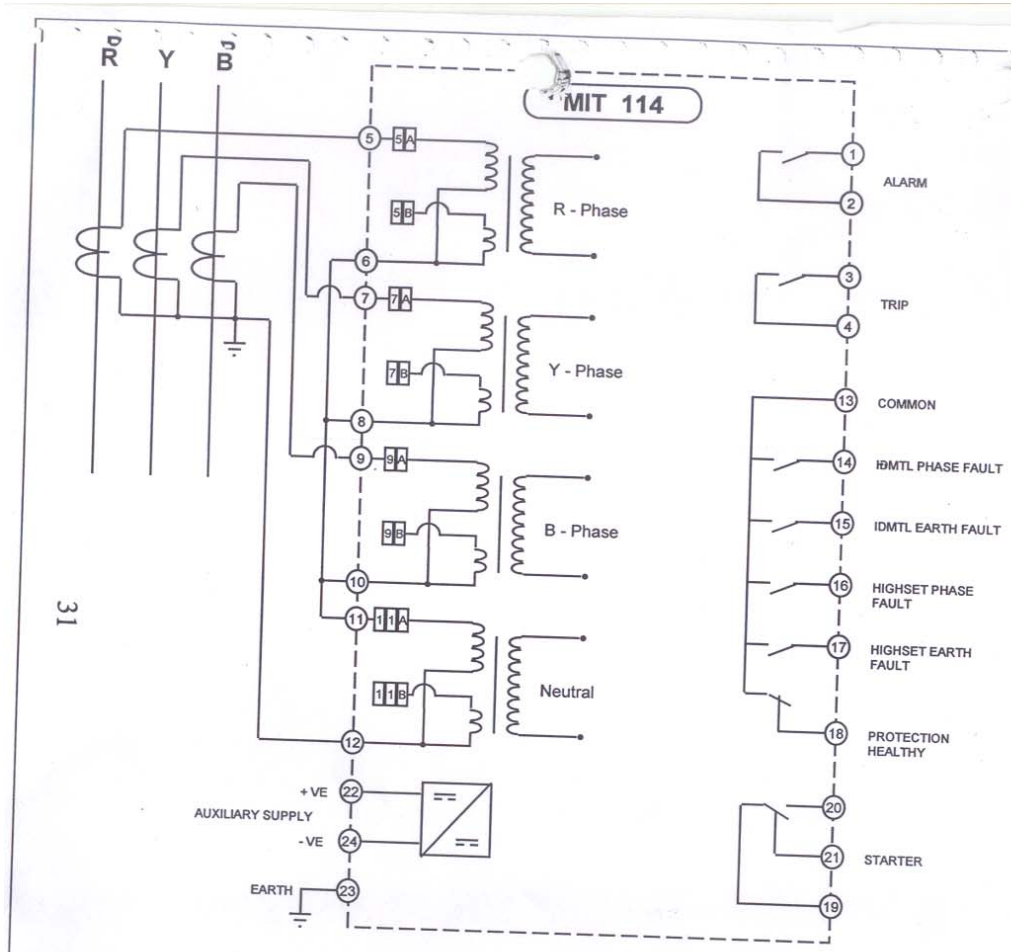
	WIRING DIAGRAM FOR MIT 104 / 114 RELAY														Drawing No. :- 8431W20054
	EASUN REYROLLE LIMITED, HOSUR, INDIA.	REV.	No.	Sig. DATE	No.	Sig. DATE	No.	Sig. DATE	DATE	27.09.2K	CHECKED	Ravi Sankar			SUPERSEDES
									DRAWN	Ravi Sankar	APPROVED				

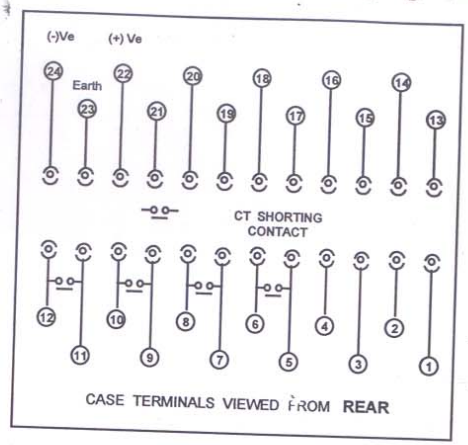


Note :

1. CT Circuits are shown connected to Relay 1A tap. For 5A tap remove 5A 9A 11A wires and connect 5B 9B 11B wires to terminal numbers 5,9 & 11 respectively. unused current terminals are fitted with additional boot (dummy) and tightly fixed to dummy terminals in the terminal block in the backside of the chassis.
2. Terminal No.23 (Earth) is to be connected directly to Earthbar.

	WIRING DIAGRAM FOR MIT 113 RELAY										Drawing No. :- 8431W21503			
EASUN REYROLLE LIMITED, HOSUR, INDIA.	REV.	No.	Sig. DATE	No.	Sig. DATE	No.	Sig. DATE	DATE	15.04.1999	CHECKED	P.K. Kalleah	SUPERSEDES		
								DRAWN	S.R.RaviSankar	APPROVED				





Note :

1. CT Circuits are shown connected to Relay 1A tap. For 5A tap remove 5A 7A 9A 11A wires and connect 5B 7B 9B 11B wires to terminal numbers 5,9 & 11 respectively. unused current terminals are fitted with additional boot (dummy) and tightly fixed to dummy terminals in the terminal block in the backside of the chassis.
2. Terminal No.23 (Earth) is to be connected directly to Earthbar.

	WIRING DIAGRAM FOR MIT 114 RELAY										Drawing No. :-	8431W21504			
EASUN REYROLLE LIMITED, HOSUR, INDIA.	REV.	No.	Sig. DATE	No.	Sig. DATE	No.	Sig.	DATE	DATE	15.04.1999	CHECKED	P.K. Kailash	SUPERSEDES		
									DRAWN	S.R.Ravi/Sankar	APPROVED				