INSTALLATION INSTRUCTIONS
FOR S2 CMR1, S2 CMR2, S2 CMR3
S2 CMR4, S2 CMR5

INTRODUCTION

Thank you for selecting and purchasing **MINILEC** make current monitoring relay.The following installation instructions would guide you in installing your S2 CMR1 TO S2 CMR5 making the best use of it.These units offers following protections against-

S2 CMR1 -

* Phase Unbalance, Phase failure,
* Phase sequence reversal condition.
* Over load and Dry run

S2 CMR2 / S2 CMR5 **-**

* Under current.
* Over current.

S2 CMR3 - Earth fault protection.
S2 CMR4 - Earth leakage protection.

All above mention relays are anauxiliary relay and it should be used along with the starter only.The effective working of the unit will depend on efficient working of the starter.Before installing your unit check whether the starter is operating perfectly by starting with the "ON" push button and switching off by "OFF"push button. If the operation of START and STOP are imperfect the starter needs to be serviced. Do not install your unit with faulty starter

CAUTION

1 . Ensure that all above relay are -

* Not installed near any heat sources like Burner, Sunlight, Electric arc etc.
* Not subjected to abnormal vibrations.
* Installed as near to starter as possible.
* Not subjected to Direct heat, Sunlight, Rain, Stormy wind and Dust.

2. Working of the products is affected by frequency variations and Harmonic distortion in applications. like Genset Supply or UPS Supply. Care should be taken to ensure that net resultant unbalance Supply is not beyond the unbalance trip limits of your unit.
3. Programm the relay to suit your application. refer table 1 for programming the relay.
4. **If the product is not installed as per guideline given by Minilec,Our company will not be responsible for any wrong connection,damage, Injury,accident,Etc.**

ELECTRICAL CONNECTION

See Fig. 1 to 5 for installation of the unit in the power and control wiring.

PROGRAMMING/ SETTING

With the help of push button provided on front, you can Program the relay for suitable operation. Please see Table 1.

MOUNTING -

All models are suitable for DIN RAIL mounting.

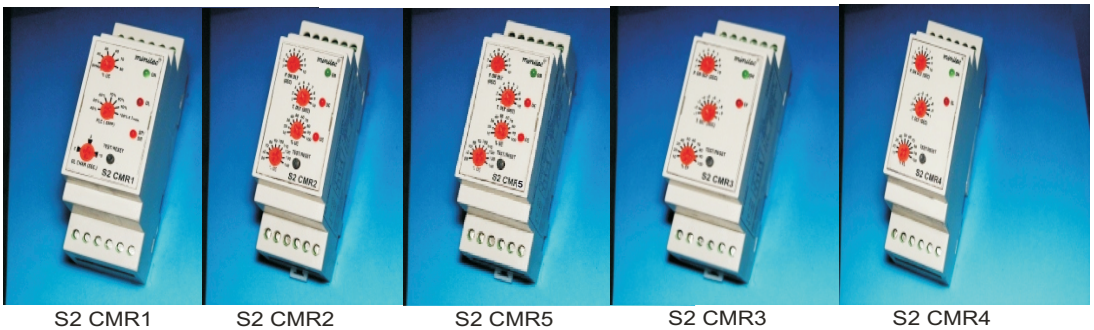
WARRANTY

AGAINST ALL MANUFACTURING DEFECTS FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM DATE OF INSTALLATION WHICHEVER IS EARLIER

MANUFACTURED BY:
minilec®
www.minilecgroup.com
S. NO. 1073/ 1-2-3, AT POST : PIRANGUT, TAL: MULSHI, DIST: PUNE (INDIA) PIN : 412 111
VERSION 06 (26/06/2013)

INSTALLATION INSTRUCTION CURRENT MONITORING RELAYS

S2 CMR1, S2 CMR2, S2 CMR3, S2 CMR4, S2 CMR5



S2 CMR1 S2 CMR2 S2 CMR5 S2 CMR3 S2 CMR4

Sr. No.	PARAMETERS	S2 CMR1	* S2 CMR2/ S2 CMR5	S2 CMR3	S2 CMR4
1	System supply voltage	100 / 110 / 120 VAC± 20 % 220 / 230 / 240 VAC± 20 % 380 / 415 / 440 VAC± 20 %	100 / 110 / 120 VAC± 20 % 220 / 230 / 240 VAC± 20 % 380 / 415 / 440 VAC± 20 %	100 / 110 / 120 VAC± 20 % 220 / 230 / 240 VAC± 20 % 380 / 415 / 440 VAC± 20 %	100 / 110 / 120 VAC± 20 % 220 / 230 / 240/VAC± 20 % 380 / 415 / 440 VAC± 20 %
2	Aux. Supply	100 - 120, 220 - 240 , 415 VAC± 20% 24VDC ± 20%	100 - 120, 220 - 240, 415 VAC± 20% 24VDC ± 20%	100 - 120, 220 - 240, 415 VAC± 20% 24VDC ± 20%	100 - 120, 220 - 240, 415 VAC± 20% 24VDC ± 20%
3	Frequency	48 to 63 Hz.	48 to 63 Hz.	48 to 63 Hz.	48 to 63 Hz.
4	Output relay contacts	2CO	2CO	2CO	2CO
5	Output contact rating	5 Amp, 240VAC [resistive]	5 Amp, 240VAC [resistive]	5 Amp, 240VAC [resistive]	5 Amp, 240VAC [resistive]
6	Rated input current	As per S2 CTS selected (Refer table 2 & 3)	5Amp/ 1Amp (selection on terminal) Terminal 1 & 2 current input 5A (# 0.5A) Terminal 1 & 3 current input 1A (# 0.25A) (# - 0.5/0.25A MODEL OPTIONAL)	5Amp / 1Amp (selection on terminal) Terminal 1 & 2 current input 5 Amp Terminal 1 & 3 current input 1 Amp	30 TO 300 mA
7	Under current trip setting	40% - 80% of set current(Adj) ± 5% of set value	* 10 % TO 100% of rated current input (variable) ± 5 % w.r.t full scale.	N.A	N.A
8	Current Trip setting (O/L, OC, EF, EL)	Current setting (FLC) 40% -100% of I.max (Adjustable)	50 % TO 140% of rated current input variable ± 5 % w.r.t full scale	10 % to 100% of rated current input variable ± 5 % w.r.t full scale	10 % to 100% of rated current input variable ± 5 % w.r.t full scale
9	Current unbalance trip setting	50% ± 10% of FLC [fixed]	N.A	N.A	N.A
10	Trip time delay	Unbalance - 4 sec ± 1 sec Phase failure - 4 sec ± 1 sec. Dry running - 4 sec ± 1 sec. Overloading - As per IDMTL Char. (2 / 5 / 10 sec. IDMTL characteristics)	1 -10 sec ± 1 sec (Adj)	0.1 -1 sec ± 0.1 sec (Adj).	0.1 -1 sec ± 0.1 sec (Adj).
11	Power on delay	N.A	1 -10 sec ± 1 sec (Adj).	1 -10 sec ± 1 sec (Adj).	1 -10 sec ± 1 sec (Adj).
12	Resetting	Auto / Manual	Auto / Manual	Manual	Manual
13	Reset gap	N.A	10% ± 1% w.r.t. Set current (Fixed)	N.A	N.A
14	Current sensor	S2 CTS: INPUT - Motor primary current carrying cables for R & B phases. OUTPUT - 3 wire output.	External CT having 5Amp or 1Amp secondary.	External CT having 5Amp or 1Amp secondary.	External CT/ CBCT having 300 mA secondary.
15	Indications	Power on (Green) - ON Phase failure / Reverse Phasing (Red) - SP / RP Over load / Dry run - OL / DR [For SP,RP & O/L fault LED Steady] [For DR LED Flashing]	Power on (Green) - ON Under current (Red) - UC Over current (Red) - OC [For UC & OC fault respective Red LED Steady ON]	Power on (Green) - ON Earth fault (Red) - EF [For EF fault Red LED Steady ON]	Power on (Green) - ON Earth Leakage (Red) - EL [For EL fault Red LED Steady ON]
16	Enclosure	S2 series - ABS / PC ABS	S2 series - ABS / PC ABS	S2 series - ABS / PC ABS	S2 series - ABS / PC ABS
17	Dimensions (mm)	Overall (L X W X D) = 90 x 35 x 60 Mounting = Rail Mounting	Overall (L X W X D) = 90 x 35 x 60 Mounting = Rail Mounting	Overall (L X W X D) = 90 x 35 x 60 Mounting = Rail Mounting	Overall (L X W X D) = 90 x 35 x 60 Mounting = Rail Mounting
18	Weight (gms.)	UNIT - 140 S2 CTS - 100	140	140	140
19	Operating conditions	Temperature = - 5℃ to + 60℃ Humidity = upto 95 % rh.	Temperature = - 5℃ to + 60℃ Humidity = upto 95 % rh.	Temperature = - 5℃ to + 60℃ Humidity = upto 95 % rh.	Temperature = - 5℃ to + 60℃ Humidity = upto 95 % rh.
20	Programming mode for [BY FRONT PUSH BUTTON]	Test facility, Auto / manual Reset	Test facility, Auto / manual Reset Fail safe / Non Fail safe Facility	Test facility, Fail safe / Non fail safe	Test facility,Fail safe / Non fail safe

* NOTE:- 1) FOR S2 CMR 2 - BELOW 5% OF RATED CURRENT INPUT, HEALTHY CONDITION(UC LED OFF). 2) FOR S2 CMR 5 - ZERO CURRENT, UC TRIP CONDITION. 3) 4) # - 0.5/0.25A MODEL AVAILABLE IN S2CMR5 ON REQUEST.

CE cULus NA for 415V AC Aux supply models

Table 1 -

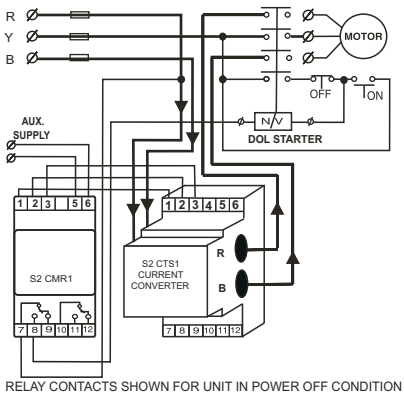
PROGRAMMING MODE SETTING

PRESS TEST/ RESET PUSH BUTTON FOR	S2 CMR1 LED STATUS			S2 CMR2 / S2 CMR5 LED STATUS			S2 CMR3 LED STATUS		S2 CMR4 LED STATUS		Mode
	ON LED	SP/RP LED	OL/DR LED	ON LED	UC LED	OC* LED	ON LED	EF LED	ON LED	EL LED	
	●	○	○	●	☆/●	○	●	○	●	○	Run Mode
≥ 8 SEC	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Program Mode
≤ 4 SEC	●	●	●	●	●	●	●	●	●	●	Test Facility.
WAIT 3 SEC	○	○	○	○	○	○	○	○	○	○	Exit Test Mode.
≥ 4 SEC	☆	○	○	☆	○	○	—	—	—	—	Auto / manual Reset selection
≤ 4 SEC	●/○	○	○	●/○	○	○	—	—	—	—	● Auto Reset / ○ Manual Reset
≥ 4 SEC	—	—	—	○	☆	○	☆	○	☆	○	Fail Safe/ Non Fail Safe selection
≤ 4 SEC	—	—	—	○	●/○	○	●/○	○	●/○	○	● Fail Safe / ○ Non Fail Safe
IF P. B. IS NOT PRESSED FOR>10 SEC	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	AUTO EXIT program mode after flashing for 3 sec.

● LED ON ○ LED OFF ☆ LED FLASHING

NOTE:- 1. BY PRESSING P. B. CONTINUOUSLY ENTER IN DESIRED MODE, SKIPPING IN BETWEEN MODES.
2. S2 CMR2,3,4,5 BY DEFAULT IN NON FAIL SAFE MODE.

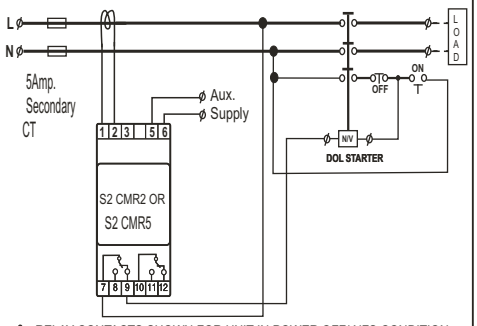
Fig.1 S2 CMR1



- RELAY CONTACTS SHOWN FOR UNIT IN POWER OFF CONDITION
- FOR VDC SUPPLY, CONNECT +ve TO 5 & -ve TO 6 TERMINALS.

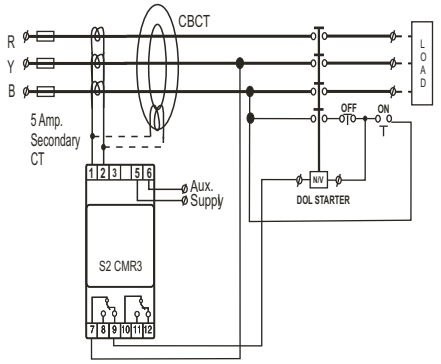
Fig.2 S2 CMR2 / S2 CMR5

(FOR SINGLE PHASE SYSTEM)



- RELAY CONTACTS SHOWN FOR UNIT IN POWER OFF/ NFS CONDITION.
- TERMINAL 1 & 3 =1Amp SECONDARY CT
  1 & 2 = 5Amp SECONDARY CT
- FOR VDC SUPPLY, CONNECT +ve TO 5 & -ve TO 6 TERMINALS.

Fig.3 S2 CMR3



- RELAY CONTACTS SHOWN FOR UNIT IN POWER OFF/ NFS CONDITION.
- TERMINAL 1 & 3 = 1Amp SECONDARY CT / CBCT
  1 & 2 = 5 Amp SECONDARY CT/ CBCT
- FOR VDC SUPPLY, CONNECT +ve TO 5 & -ve TO 6 TERMINALS.

Table 2 -

CT SELECTION CRITERIA AND CURRENT SETTING FOR S2 CMR1

S2 CTS1 SELECTION CHART			
S2 CTS1 TYPE	HP	KW	AMP
S2 CTS1/5	< 3	< 2.25	2 - 5
S2 CTS1/10	< 6	< 4.5	4 -10
S2 CTS1/20	< 12.5	< 9.4	8 - 20
S2 CTS1/40	< 30.0	< 22.5	16 - 40
S2 CTS1/80	< 60.0	< 45.0	32 - 80

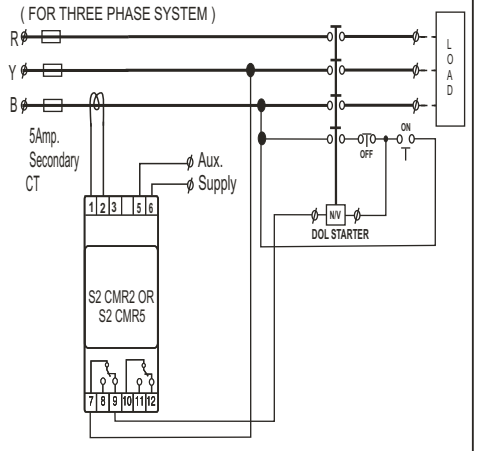
Table 3 -

FULL LOAD CURRENT SELECTION CHART

SCALE AS PRINTED ON THE UNIT	CORRESPONDING CURRENT RATING SELECTED FOR DIFFERENT S2 CTS1 (Amp)				
	S2 CTS1/5	S2 CTS1/10	S2 CTS1/20	S2 CTS1/ 40	S2 CTS1/80
0.4	2.00	4	8	16	32
0.5	2.50	5	10	20	40
0.6	3.00	6	12	24	48
0.7	3.50	7	14	28	56
0.8	4.00	8	16	32	64
0.9	4.50	9	18	36	72
1.0	5.00	10	20	40	80

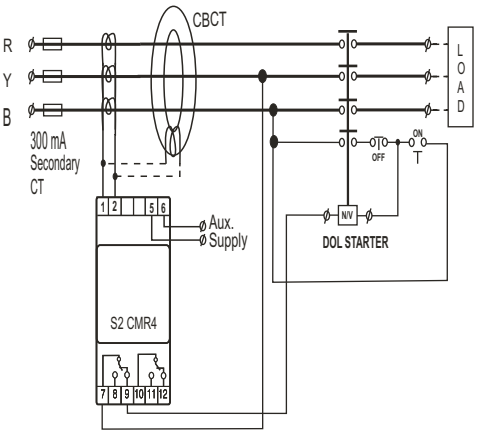
Fig.5 S2 CMR2 / S2 CMR5

(FOR THREE PHASE SYSTEM)



- RELAY CONTACTS SHOWN FOR UNIT IN POWER OFF/ NFS CONDITION.
- TERMINAL 1 & 3 = 1Amp SECONDARY CT
  1 & 2 = 5Amp SECONDARY CT
- FOR VDC SUPPLY, CONNECT +ve TO 5 & -ve TO 6 TERMINALS.

Fig- 4 S2 CMR4



- RELAY CONTACTS SHOWN FOR UNIT IN POWER OFF/ NFS CONDITION.
- FOR VDC SUPPLY, CONNECT +ve TO 5 & -ve TO 6 TERMINALS.

SETTING OF EARTH FAULT RELAY S2 CMR3

Typical Earth fault Relay setting for electrical low voltage system of 415 VAC,3phase, 50Hz,maximum demand of 150 KW at lagging power factor of 0.85 are shown bellow.

Power = $\sqrt{3} \times V \times I \times \cos\phi$

Load current = $\frac{150 \times 1000}{1.732 \times 415 \times 0.85}$

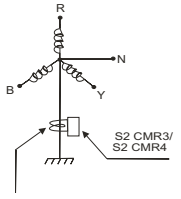
Load current = 245.50 Amps.

Current transformer selected = 300 / 5A , 15 VA, Class 5P10.
Minilec make S2 CMR3 is provided with Earth Fault current settingbetween 10% to 100%.

Hense Earth Fault at 10% setting = 10% x 300A = 30 Amps.
Similarly Earth fault at 30% setting = 30% x 300A = 90 Amps.

These are typical Earth fault current calculations and setting given as an Example.
Individual user can make the earth fault settings as per their requirements.

For Generator and transformer application, with 3P- 4 Wire system, connection of CT can be made as follows



External CT having 5Amp or 1Amp secondary
For S2 CMR3 and 300 mA for S2 CMR4

Fig - 6 ENCLOSURE DIMENSIONS