

**INSTALLATION INSTRUCTION MANUAL  
MOTOR / SUBMERSIBLE PUMP PROTECTION RELAY**

**MPR D2**



**SPG D2**



**D2 MPR2**



**D2 MPR3**



**PGS D2**



**S2 CMR1**



Thank you for selecting and purchasing MINILEC make current monitoring relay. The following installation instructions would guide you in installing your MPR D2/SPG D2, D2 MPR2, D2 MPR3, S2 CMR1, PGS D2, making the best use of it. These units offers following protections against-

- Phase Unbalance, Phase failure,
- Phase sequence reversal condition.
- Over load and Dry run
- Under Voltage.
- Over Voltage.

All above mention relays are auxiliary relay and it should be used along with the starter only or similar contactor circuit. The effective working of the unit will depend on efficient working of the starter.

Before installing your unit check whether the starter circuit 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 circuit needs to be serviced. Do not install your unit with faulty starter circuit.

**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. Program the relay to suit your application. refer table 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 diagram 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.

**MOUNTING -**

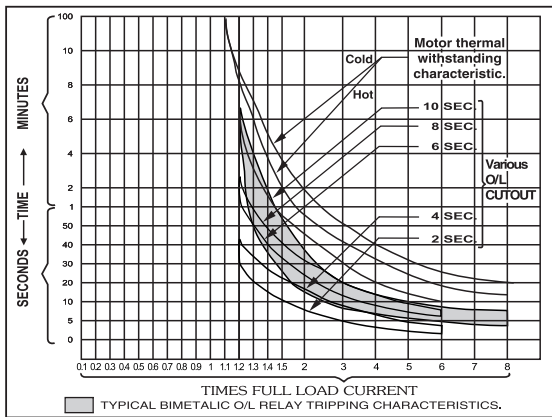
All models are suitable for DIN RAIL mounting.

TECHNICAL SPECIFICATIONS OF	D2 MPR2	MPR D2 / SPG D2	D2 MPR3	S2 CMR1	PGS D2	
1. System Supply :	380 / 415 VAC ± 20 %	220 / 230 / 240 / 380 / 400 / 415 / 440 VAC ± 20 %	220-240 / 380-440 VAC ± 20%	180 / 110 / 120 VAC± 20 % 220 / 230 / 240 VAC± 20 %	220-240 VAC ± 20%	
2. Aux. Supply :	380-440/220-240/100-120 VAC ± 20 %	24 / 110 / 220 / 230 / 240 / 380 / 400 / 415 / 440 VAC ± 20 % 2W 2C ± 10%	100-120/220-240 / 380-440 VAC ± 20%	100 - 120, 220 - 240, 415 VAC± 20% 24VDC ± 20%	220-240 VAC ± 20%	
3. Frequency :	48 Hz - 63 Hz.	50 Hz / 60 Hz ± 3%	48Hz - 63Hz.	48Hz - 63Hz.	50/60 Hz ± 3%	
4. Output Relay Contacts :	2 CO	1CO / (2CO)	2CO	2CO	1CO / (2CO)	
5. Output Contact Rating :	5A, 240 VAC [Resistive]	5A, 240 VAC	5A, 240 VAC	5 Amp, 240VAC [resistive]	5A, 240 VAC	
6. Power Consumption :	5 VA (max)	30 VA max.	22 VA max.	30 VA max.	30 VA max.	
7. Current UB trip setting :	50% of motor current [Fixed]	50% ± 10% of motor current. (Fixed.)	50% ± 10% of FLC [fixed]	50% ± 10% of FLC [fixed]	NA	
8. Under current setting :	50% of Set current [Fixed]	40% to 80% ± 5% of set current (Site selectable)	40% to 80% ± 5% of set current (Site selectable)	40% to 80% ± 5% of set current (Site selectable)	75% OF SET ± 10%	
9. Current setting [FLC] :	0.4 to 1.0 of CTS [max(40% to 100% of CTS I <sub>max</sub> )]	0.4 to 1.0 of CTS I <sub>max</sub> (40% to 100% of CTS I <sub>max</sub> )	type by Front Knob with bypass facility)	Current setting [FLC] 40% - 100% of I <sub>max</sub> (Adjustable)	0.4 to 1.0 of CTS I <sub>max</sub> (40% to 100% of CTS I <sub>max</sub> )	
10. Overload Trip time setting :	2 Sec IDMTL Curve	2 / 5 / 10 / 15 / 20 sec. IDMT Curve	2 / 5 / 10 / 15 / 20 sec. IDMT Curve	2 / 5 / 10 / 15 / 20 sec. IDMT Curve	Above 120%	
11. Voltage UB trip setting :	10% ± 1% as per IEEE Method [fixed]	NA	NA	NA	NA	
12. Under Voltage Trip setting :-	- 20% of System supply	NA	NA	NA	NA	
13. Over Voltage Trip setting :	+ 20% of System supply	NA	NA	NA	NA	
14. Trip Time Delay :	• Phase Failure • Current & voltage BU • Dry Running • Overloading • Under & Over voltage • Phase Reversal	4 Sec ± 1 Sec 4 Sec ± 1 Sec 4 Sec ± 1 Sec As per IDMTL Char. 4 Sec ± 1 Sec Less than 2 sec	Phase Failure : 5.5 ± 1.5 secs Dry Running (in SPG D2 only) : 3.5 ± 1.5 secs. Overloading : As per inverse time characteristics (IDMTL)	Phase Failure : 4.0 ± 1.0 secs. Dry Running : 4.0 ± 1.0 secs. Over loading : As per IDMTL char.	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)	Phase Failure: Less than 2 Sec. As per selectable inverse time Characteristics
15. Set Accuracy :	For UV & OV : ± 2 Sec of set value For others : ± 5 Sec of set value	± 10% of set value	± 5% of set value	± 5% of set value	10% of set value	
16. Resetting :	Delayed Auto Reset [15 Min] or Manual [Remotely wired] with 'NO' Push button	Auto / Manual / Remote	Auto / Manual / remote	Auto / Manual	Auto / Manual / remote	
17. Indications :	• ON : Steady On: Power On • RP/ SP,UB : Flashing : Phase Reversal Steady On: Phase Failure, Unbalance • DR / OL : Flashing : Dry Run (No Load) Steady On: Over Load Flashing : Under Voltage Steady On: Over Voltage	ON : Green : Power On SP : Red : Phase Failure OL : Red : Overload DR : Red : Dry Running (In SPG D2 only)	ON : Green : Power On PF : Red : Phase Failure / Unbalance OL : Red : Overload UC : Red : Dry Running	Power on (Green) - ON Phase failure / Reverse Phasing (Red) - RP / RP Over load / Dry run - OL / DR [For SRP & OL fault LED Steady] [For DR LED Flashing]	ON : Green : Power On OL : Red : Overload UC : Red : Dry Running	
18. Enclosure :	ABS	ABS	ABS	S2 series - ABS / PC ABS	ABS	
19. Dimensions (mm) : Overall :	16 x 56.5 x 117.5	76 X 56.5 X 117.5	76 X 56.5 X 117.5	Overall ( L X W X D ) = 90 x 35 x 60	76 x 56.5 x 117.5 67 x 46 / 35 mm Rail Mounting	
20. Mounting :	35mm Rail Mounting & Panel Mounting	35mm Rail Mounting & Panel Mounting	35 mm rail mounting & panel mounting	35mm Rail Mounting & Panel Mounting	35mm Rail Mounting & Panel Mounting	
21. Unit Weight (Approx.) :	460 gms.	250 gms (approx)	250 gms (approx)	UNIT - 140g S2 CTS - 100g	600gms	
22. Sensor Weight (Approx.) : [gms]	320gms (For CTS 5/CTS 10/ CTS20/ CTS40) 330 gms (For CTS 80) 380 gms (For CTS120 pair)	225 (For CTS 1.25 / CTS 2.5) 320 (For CTS 5 / CTS 10 / CTS 20 / CTS 40) 330 (For CTS 80) & 380 (For CTS 120 pair)	140 ( for S2 CTS 1/5, S2 CTS 1/10, S2 CTS 1/20, S2 CTS 1/40, S2 CTS 1/80 ) 320 ( For CTS 120 pair )	140 ( for S2 CTS 1/5, S2 CTS 1/10, S2 CTS 1/20, S2 CTS 1/40, S2 CTS 1/80 ) 320 ( For CTS 120 pair )	-	
23. Operating Condition :	Temperature: -5°C to +60°C Humidity : Up to 90%	Temperature : -5°C to 60°C Humidity : Up to 95% R.H.	Temperature : -5°C to 60°C Humidity : Up to 95% R. H.	Temperature = - 5°C to + 60°C Humidity = upto 95 % rh.	Temperature = - 5°C to + 60°C Humidity = upto 95 % rh.	
24. Life Expectancy :	0.5 x 10 <sup>6</sup> operations at 100% rating	0.5 x 10 <sup>6</sup> operations at 100% rating	0.5 x 10 <sup>6</sup> operations at 100% rating	0.5 x 10 <sup>6</sup> operations at 100% rating	0.5 x 10 <sup>6</sup> operations at 100% rating	
25. Test Push Button Delay :	Less than 2 sec.	Less than 2 sec.	Less than 2 sec.	Less than 2 sec.	Less than 2 sec.	
26. Test Facility :	With front push button.	With front push button.	With front push button.	With front push button.	With front push button.	

Note: Wherever not specified Contact Rating : 5A @ 230 V AC (resistive)

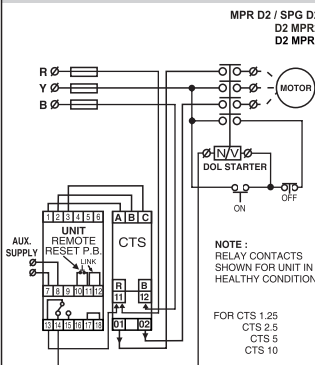
**WARRANTY - AGAINST ALL MANUFACTURING DEFECTS FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM INSTALLATION WHICHEVER IS EARLIER**

**INVERSE TIME CHARACTERISTICS (IDMTL) GRAPH**

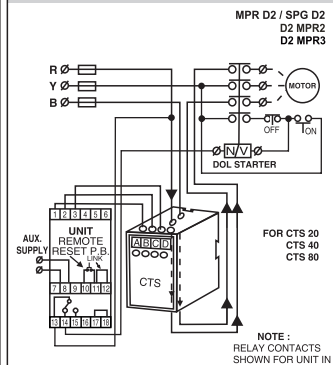


MPR D2 / SPG D2  
D2 MPR2  
D2 MPR3  
S2 SMR1  
PGS D2

**ELECTRICAL CONNECTION IN POWER AND CONTROL WIRING**



**ELECTRICAL CONNECTION IN POWER AND CONTROL WIRING**



FOR UNITS WITH 2CO, RELAY CONTACT PRESENT BETWEEN 13,14,15 & 16,17,18 IN THAT CASE LINK AT 17& 18 IS ABSENT & FIXED OVERLOAD CHARACTERISTICS IS APPLICABLE.  
Refer Fig. 6 (CONNECTION DIAGRAM) for TERMINAL DETAILS of respective unit. Link connections & other details are also given in the same.

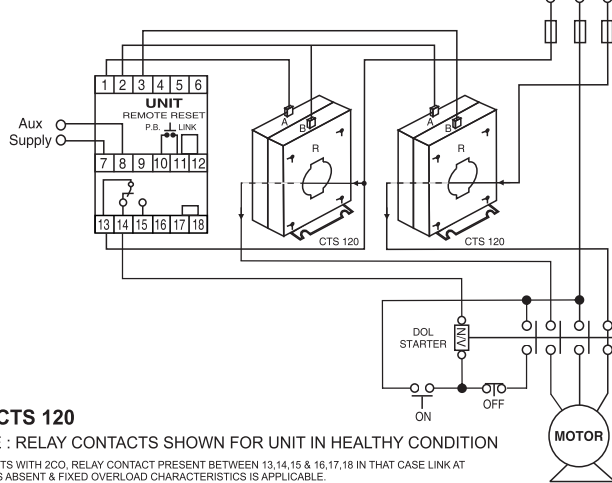
FOR UNITS WITH 2CO, RELAY CONTACT PRESENT BETWEEN 13,14,15 & 16,17,18 IN THAT CASE LINK AT 17& 18 IS ABSENT & FIXED OVERLOAD CHARACTERISTICS IS APPLICABLE.  
Refer Fig. 6 (CONNECTION DIAGRAM) for TERMINAL DETAILS of respective unit. Link connections & other details are also given in the same.

**COMPLIANCE TO STANDARDS**

TEST	IEC STD.
1. EFT Test of Auxiliary Supply	61000-4-4
2. Surge Test of Auxiliary Supply	61000-4-5
3. Voltage Interruption, Variation & Dip Test	61000-4-11
4. ESD Test (Contact Discharge)	61000-4-2
5. ESD Test (Air Discharge)	61000-4-2
6. H.V. Test (Dielectric Test)	60255-5
7. Insulation Resistance Test	60255-5
8. Dry Heat Test	60068-2-2
9. Damp Heat test (Steady State)	60068-2-30
10. Damp Heat test (cyclic test)	60068-2-78

**ELECTRICAL CONNECTIONS IN POWER & CONTROL WIRING**

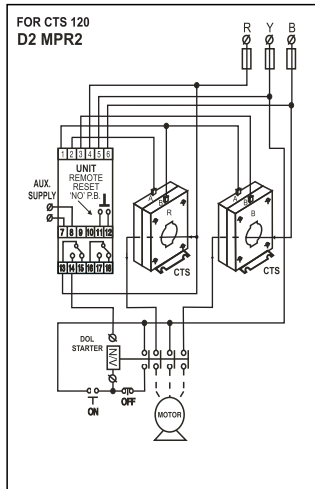
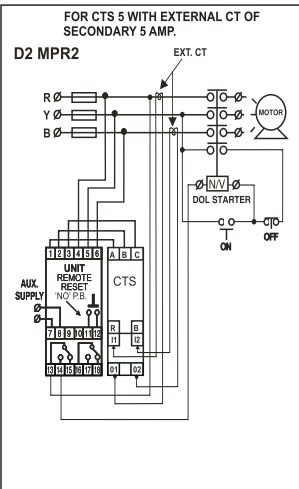
MPR D2 / SPG D2



For CTS 120

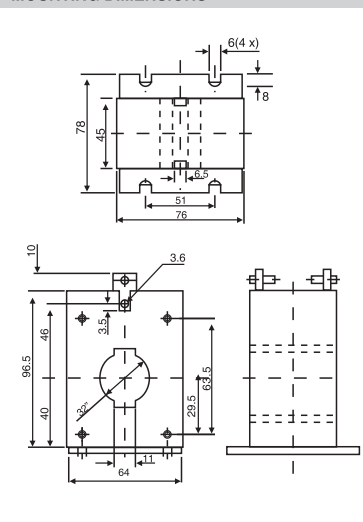
NOTE : RELAY CONTACTS SHOWN FOR UNIT IN HEALTHY CONDITION  
FOR UNITS WITH 2CO, RELAY CONTACT PRESENT BETWEEN 13,14,15 & 16,17,18 IN THAT CASE LINK AT 17& 18 IS ABSENT & FIXED OVERLOAD CHARACTERISTICS IS APPLICABLE.

Refer Fig. 6 ( CONNECTION DIAGRAM) for TERMINAL DETAILS of respective unit. Link connections & other details are also given in the same

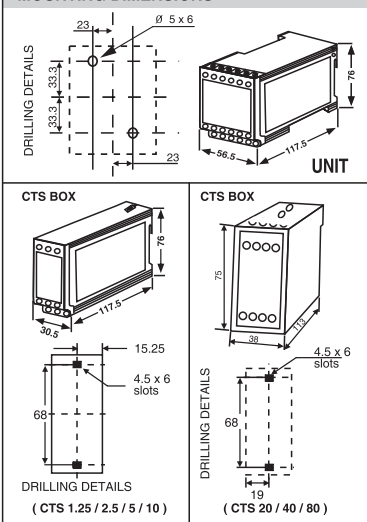


MPR D2 / SPG D2 D2 MPR2 D2 MPR3

**MOUNTING DIMENSIONS**



**MOUNTING DIMENSIONS**



**CURRENT RATING SELECTED AS PER FRONT SCALE PRINTED ON THE UNIT**

D2 MPR2

SCALE AS PRINTED ON UNIT	CTS 5 (Amp.)	CTS 10 (Amp.)	CTS 20 (Amp.)	CTS 40 (Amp.)	CTS 80 (Amp.)
0.4	2.0	4.0	8.0	16.0	32.0
0.5	2.5	5.0	10.0	20.0	40.0
0.6	3.0	6.0	12.0	24.0	48.0
0.7	3.5	7.0	14.0	28.0	56.0
0.8	4.0	8.0	16.0	32.0	64.0
0.9	4.5	9.0	18.0	36.0	72.0
1.0	5.0	10.0	20.0	40.0	80.0

MPR D2 / SPG D2 D2 MPR2 D2 MPR3 S2 SMR1

TABLE : 1

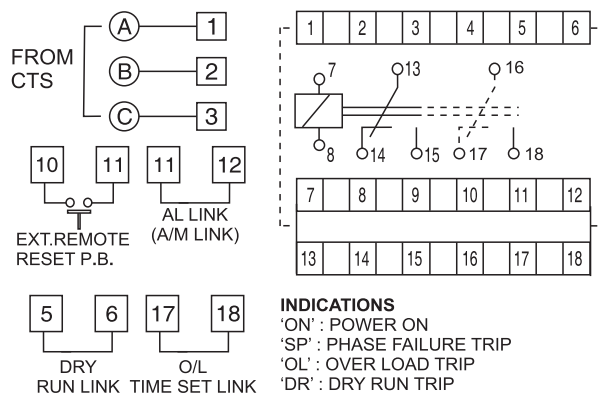
S2 CTS1 SELECTION CHART			MODEL
HP From - To	KW From - To	FULL LOAD AMPS RANGES	CURRENT SENSORS
1.75 - 3.00	1.30 - 2.25	2 to 5 AMPS	S2 CTS 1/5
3.00 - 6.00	2.20 - 4.50	4 to 10 AMPS	S2 CTS 1/10
6.00 - 12.50	4.50 - 9.40	8 to 20 AMPS	S2 CTS 1/20
12.50 - 30.0	9.40 - 22.50	16 to 40 AMPS	S2 CTS 1/40
30.0 - 60.0	22.5 - 45.0	32 to 80 AMPS	S2 CTS 1/80
40.0 - 75.0	30.0 - 56.25	48 to 120 AMPS	CTS 120

**CURRENT RATING SELECTED AS PER FRONT SCALE PRINTED ON THE UNIT**

SCALE AS PRINTED ON UNIT	S2 CTS 1/5 (AMP.)	S2 CTS 1/10 (AMP.)	S2 CTS 1/20 (AMP.)	S2 CTS 1/40 (AMP.)	S2 CTS 1/80 (AMP.)
0.4	2.0	4.0	8.0	16.0	32.0
0.5	2.5	5.0	10.0	20.0	40.0
0.6	3.0	6.0	12.0	24.0	48.0
0.7	3.5	7.0	14.0	28.0	56.0
0.8	4.0	8.0	16.0	32.0	64.0
0.9	4.5	9.0	18.0	36.0	72.0
1.0	5.0	10.0	20.0	40.0	80.0

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

**CONNECTION DIAGRAM MPR D2 / SPG D2**



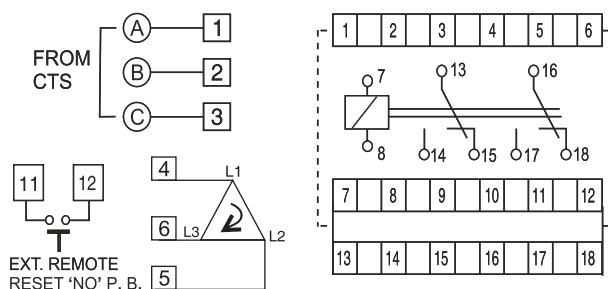
FOR UNITS WITH 2CO, RELAY CONTACT PRESENT BETWEEN 13,14,15 & 16,17,18 IN THAT CASE LINK AT 17& 18 IS ABSENT & FIXED OVERLOAD CHARACTERISTICS IS APPLICABLE.

**Terminal Details**

TERMINAL NO.	MPR D2	SPG D2
1-2-3	CURRENT INPUT FROM CTS(A-B-C)	
4	ALL DUMMY	DUMMY
5		DRY RUN LINK
6		75 % WITH LINK 50 % NO LINK
7-8	AUX. SUPPLY AS MARKED ON THE UNIT	
9	DUMMY	
10-11	EXT. REMOTE RESET PUSH BUTTON	
11-12	MANUAL & REMOTE RESET- WITH LINK AUTO RESET- NO LINK	
13-14-15	1 CHANGEOVER OUTPUT RELAY CONTACT (C-NO-NC)	
16	DUMMY for 1CO	
17-18	LINK FOR IDMTL CURVE 2 SEC. WITH LINK 5 SEC - NO LINK FOR OTHER IDMTL CURVE DUMMY } For 1CO	
16-17-18	RELAY CONTACT FOR 2CO	

NOTE : RELAY CONTACTS SHOWN FOR UNIT IN HEALTHY CONDITION

**TERMINAL DETAILS D2 MPR2**



**INDICATIONS**

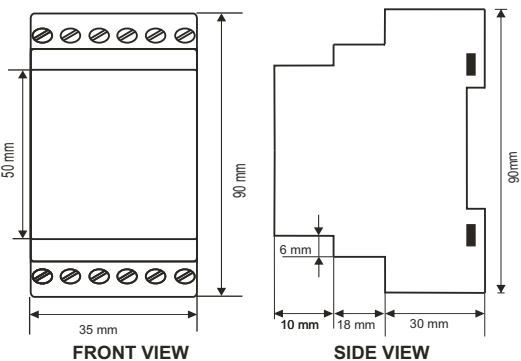
- 'ON' : Steady On : Power On
- 'RP / SP,UB' : Flashing : Phase Reversal  
Steady On : Unbalance, Phase Failure
- 'DR / OL' : Flashing : Dry Run(No Load)  
Steady On : Over load
- 'UV/ OV' : Flashing : Under Voltage  
Steady On : Over Voltage

**TERMINAL DETAILS**

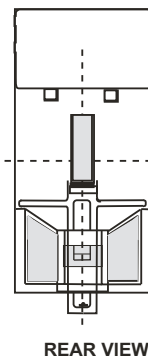
TERMINAL NO.	D2 MPR2
1 - 2 - 3	CURRENT INPUT FROM CTS ( A - B - C )
4, 5, 6	DUMMY
7 - 8	AUX. SUPPLY AS MARKED ON THE UNIT
9 - 10	DUMMY
11 - 12	EXT. REMOTE RESET 'NO' PUSH BUTTON
13 - 14 - 15	C1 - NO1 - NC1
16 - 17 - 18	C2 - NO2 - NC2

■ NOTE : RELAY CONTACTS SHOWN FOR UNIT IN POWER OFF CONDITION

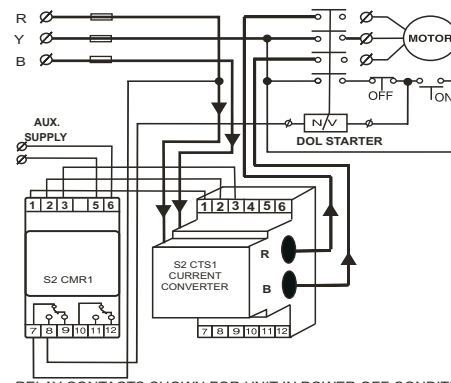
**ENCLOSURE DIMENSIONS**



**S2 CMR1**



**S2 CMR1**

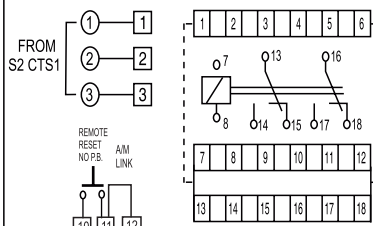


- RELAY CONTACTS SHOWN FOR UNIT IN POWER OFF CONDITION
- FOR VDC SUPPLY, CONNECT +ve TO 5 & -ve TO 6 TERMINALS.

**PROGRAMMING MODE SETTING**

PRESS TEST/ RESET PUSH BUTTON FOR	S2 CMR1 LED STATUS		
	ON LED	SP/RP LED	OL/DR LED
≧ 8 SEC	●	○	○
≧ 4 SEC	☆	☆	☆
WAIT 3 SEC	●	●	●
≧ 4 SEC	☆	○	○
≧ 4 SEC	●/○	○	○
≧ 4 SEC	—	—	—
≧ 4 SEC	—	—	—
IF P. B. IS NOT PRESSED FOR >10 SEC	☆	☆	☆

**CONNECTION DIAGRAM D2 MPR3**

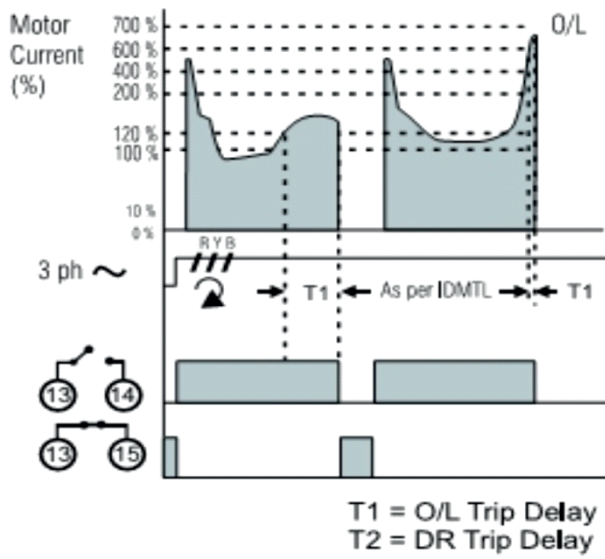


- INDICATIONS**  
 'ON' : POWER ON  
 'PF' : PHASE FAILURE TRIP / UNBALANCE TRIP  
 'OL' : OVER LOAD TRIP  
 'UC' : UNDER CURRENT

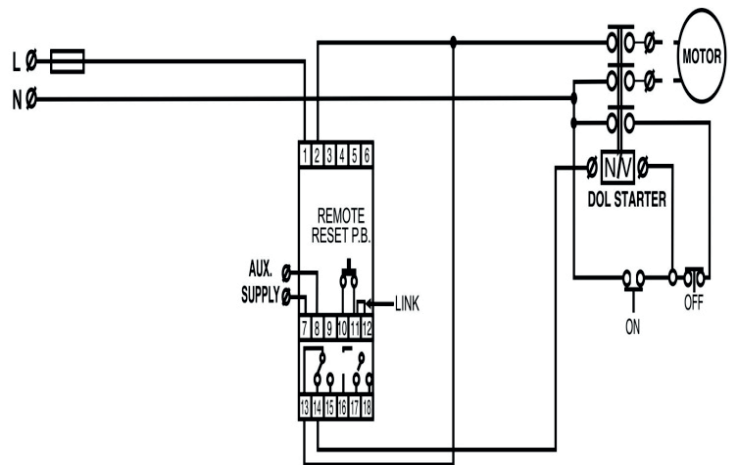
TERMINAL NO	Terminal Details D2 MPR3
1-2-3	CURRENT INPUT FROM S2 CTS 1 (1-2-3)
4, 5, 6, 9	ALL DUMMY
7-8	AUX. SUPPLY AS MARKED ON THE UNIT
10-11	EXT REMOTE RESET PUSH BUTTON (NO TYPE)
11-12	MANUAL & REMOTE RESET - WITH LINK AUTO RESET - NO LINK
13-14-15	C1 - NO1 - NC1
16-17-18	C2 - NO2 - NC2

NOTE : RELAY CONTACTS SHOWN FOR UNIT IN POWER OFF CONDITION

**Timing/ Relay logic Diagram PGS D2**



**Electrical Connection Diagram PGS D2**



Instructions for Screw Gun torque adjustment -  
 • Torque should be 1 Nm max.  
 • Max 2.5 sq. mm size wire can be used.

WEEE (Waste Electrical & Electronic Equipment)  
 Regulations: After end of equipment life, recycle or disposal needs to be done as per guidelines or handover it to Waste processing authorized agencies. For more details contact us.

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[www.minilecgroup.com](http://www.minilecgroup.com)

**Minilec (India) Pvt. Ltd.**

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