INSTALLATION INSTRUCTIONS FOR MPR D2 / SPG D2

INTRODUCTION

It's the company's pleasure to enlist you as one of our esteemed customers. Thank you for selecting & purchasing Minilec make motor / submersible pump protection relay MPR D2 / SPG D2.

The following installation instructions would guide you in installing your MPR D2 / SPG D2 and making the best use of it.

MPR D2/SPG D2 is operating on negative sequence current component sensing principle for phase failure protection & sensing motor current for overload protection & dry run protection (for submersible pumps in SPG D2 only). It offers protection against :

- Overloading condition.
- Unbalanced current condition.
- Phase failure condition. / Phase reversal condition.
- Dry running condition (in SPG D2 only).

Being current operated it is to be used with Minilec make current sensors CTS only . Refer selection chart for CTS.Your MPRD2 / SPG D2 is an auxiliary relay & is to be used alongwith the motor starter only. The effective working of MPR D2 / SPG D2 will depend on efficient working of the electromagnetic motor starter. Before installing your MPRD2/SPGD2 check whether the motor starter is operating perfectly by starting the motor with the " START" push button and switching it by "STOP" push button . If the motor does not "Start" or "Stop" on respective operations the starter needs to be serviced **Do not install your MPR D2 / SPG D2 with faulty motor starter.**

TRIP SETTING , TRIP DELAY & RESETTING

The MPR D2 / SPG D2 is factory set to trip the starter for unbalanced currents between any two phases exceeding 50 % of full load currents (F.L.C). The trip time delay is between 5.5 1.5 secs . In MPR D2 & SPG D2, the inverse time characteristic (IDMTL) is given selectable type by link (i.e. PUT LINK for 2 SEC CHA . & REMOVE LINK for 5.SEC CHA. at terminal No.17 & 18). For other characteristics user has to specify while ordering & unit will follow inverse time current characteristic as specified on front plate. Depending upon the percentage of excess load on the motor above 100% rated load , the MPR D2 / SPGD2 decides the trip time delay as per inverse time current characteristics.

(Ref. Fig 8 for typical inverse time current characteristic chart). In SPG D2, site selectable dry run setting facility is given by link (i.e. PUT LINK 75% dry run setting & REMOVE LINK for 50 % dry run setting at terminal No. 5 & 6). The Dry Run Trip Time Delay is between 3.5 1.5 secs for SPG D2 only Unit can be set in Auto Reset mode or Manual Reset & Remote Reset mode by removing or putting an external short link at terminals 11 &12 respectively.

MOUNTING

MPR D2/ SPG D2 units & CTS are RAIL mounted or PANEL mounted . They are suitable for 35 mm RAIL (For Panel mounting & Drilling details see Fig. 3 &4).

CAUTION

1. Ensure that your MPR D2 / SPG D2 is

- Not installed near any heat sources like burner, Sunlight, electric arc etc.
- Not subjected to abnormal vibrations.
- Not subjected to direct rains, stormy wind & dust
- Installed as near to the starter as possible.

2. Your MPR D2/ SPG D2 with AUTO RESET mode should not be used with

* Fully automatic reset starter.

* When any other auto resetting type control switches Are used in series with no volt coil of the starter.

For using with fully automatic reset starter if MPR D2 / SPG D2 is to be set in Auto Rest mode a reset time delay should be induced externally preferably with Minilec Electronic Time Delay Relay.

ELECTRICAL CONNECTIONS OF MPR D2/ SPG D2

See Fig.6 for electrical connection details of MPR D2 / SPG D2 .

Connect Auxiliary Supply Voltage at terminals 7 & 8 as marked on front cover plate of the unit. Connect the output of CTS at A,B,C to terminals 1,2,3 of MPR D2/ SPG D2 respectively . The output relay contacts 13 & 14 are to be connected in series with the no volt coil of the contactor .

SELECTION CHART FOR CTS FOR USE WITH MPR D2 / SPGD2 (for 415 VAC, 50 Hz 3 phase)

CURRENT RANGE			MODEL
HP From - To	KW From - To	FULL LOAD AMPS RANGES	CURRENT SENSORS
0.30 - 0.75	0.22 - 0.56	0.5 to 1.25 AMPS	CTS 1.25
0.75 - 1.75	0.56 - 1.31	1to 2.5 AMPS	CTS 2.5
1.75 - 3.00	1.30 - 2.25	2 to 5 AMPS	CTS 05
3.00 - 6.00	2.20 - 4.50	4 to 10 AMPS	CTS 10
6.00 -12.50	4.50 -9.40	8 to 20 AMPS	CTS 20
12.50 - 30.0	9.40 - 22.50	16 to 40 AMPS	CTS 40
30.0 - 60.0	22.5 - 45.0	32 to 80 AMPS	CTS 80
40.0 - 75.0	30.0 - 56.25	48 to 120 AMPS	CTS 120

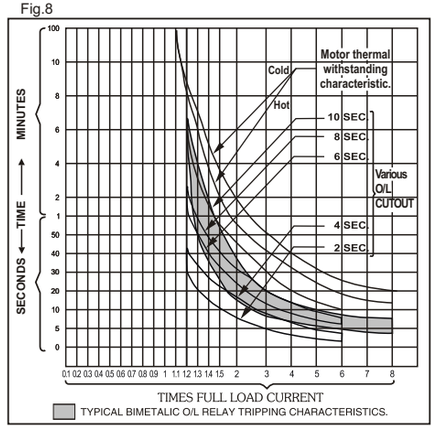
NOTE : For motors above this range (above 75 H.P.) MPR D2 / SPG D2 can be used with CTS 5, CTS 1.25 alongwith external 5 amp. or 1 amp. Secondary CT (Ref. Fig. 5). CTS 20 / CTS 40 / CTS 80 / CTS 120 pair has feed through type construction. Power cables for two phases R & B are to be passed through it for CTS 20 / CTS 40 / CTS 80 (Ref.Fig.2). But for CTS 1.25 / CTS 2.5 / CTS 5 / CTS 10 the incoming / outgoing power cables (Secondary of 5 A or 1A CTS) for R & B phases are to be terminated on the CTS (Ref.Fig.1). For CTS 120, R & B phase CTS are enclosed in two different enclosures. Power cables for two phases R & B are to be passed through respective CTS separately (Ref. Fig. 7).

TECHNICAL SPECIFICATION OF MPR D2 / SPG D2

1. **Voltage :**
   System Supply
   220 / 230 / 240 / 380 / 415 / 440 VAC 20 %
   Aux. Supply
   110 / 220 / 230 / 240 / 380 / 415 / 440 VAC 20 %
2. **Frequency :** 50 Hz / 60 Hz 3%
3. **Power Consumption :** 3 VA max.
4. **Output Relay Contacts :** 1 Changeover
5. **Output Contact Rating** [**Resistive**] : 5A, 240 VAC
6. **Life Expectancy :** 0.5 x10^6 operations at 100% rating
7. **Operating Condition :**
   Temperature : -5°C to 60°C
   Humidity : Upto 95% R.H.
8. **Test Push Button Delay :** Less then 2 sec.
9. **Trip Settings (current) :**
   Phase to Phase Unbalance : 50% 10% of motor current. Under Current (Dry run) : 50% or 75% 5% of set current (site selectable type by link at terminal 5 & 6 - SPG D2 only)
   Overloading : 2 sec. or 5 sec. IDMT Curve (site selectable type by link at terminal 17 & 18) OR any other IDMT Curve (factory set type)
10. **Set Accuracy :** 10% of set value
11. **Trip Time Delay :**
    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)
12. **Resetting :** Auto / Manual / Remote
13. **Indications :**
    ON : Green : Power On
    SP : Red : Phase Failure
    OL : Red : Overload
    DR : Red : Dry Running (In SPG D2 only).
14. **Enclosure :** ABS
15. **Unit Weight :** 440 gms (approx)
16. **Sensor Weight :** [gms]
    225 (For CTS 1.25 / CTS 2.5)
    320(For CTS 5 / CTS 10 / CTS 20 / CTS 40)

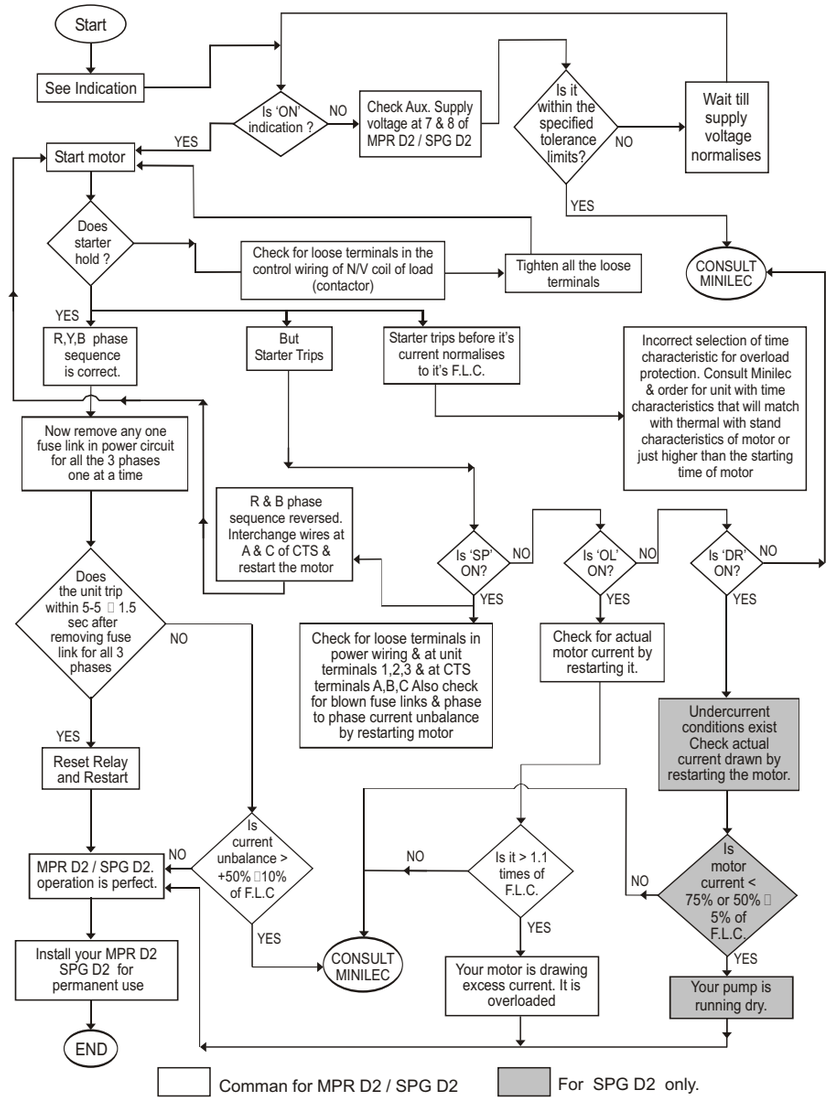
INVERSE TIME CHARACTERISTICS (IDMTL) GRAPH

Fig.8



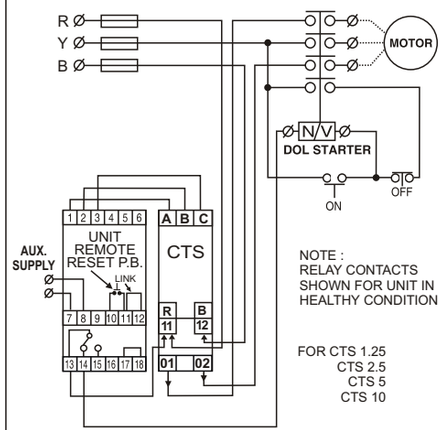
TESTING PROCEDURE

TESTING :If you need to test the functioning of MPR D2 / SPG D2 without connecting it in the control circuit of the motor starter, check it as per the following procedure. Connect required auxiliary supply at terminals 7 & 8 of the unit. Check the output relay contacts at 13 & 14. Indication 'ON' should be ON. Press "TEST" push button on the front plate of the unit . Wait for 4-7 secs. Check dis-continuity at terminals 13 & 14 of the unit. Reset your MPR D2 / SPG D2 by either pressing 'RESET' push button on the front plate of the unit or by shorting terminals 10 & 11 of unit . If these operations are perfect, connect your MPR D2 / SPG D2 in the motor circuit. Consult MINILEC if you find any irregularities in the above mentioned operations. After making the electrical connections as per connection diagram, functioning of the unit can be checked as per flow chart given below.



ELECTRICAL CONNECTION IN POWER AND CONTROL WIRING

Fig. 1



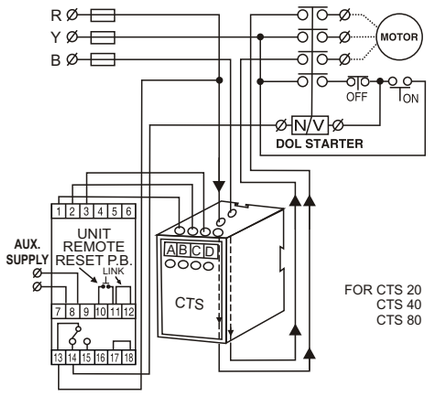
NOTE :
RELAY CONTACTS SHOWN FOR UNIT IN HEALTHY CONDITION

FOR CTS 1.25
CTS 2.5
CTS 5
CTS 10

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

ELECTRICAL CONNECTION IN POWER AND CONTROL WIRING

Fig. 2



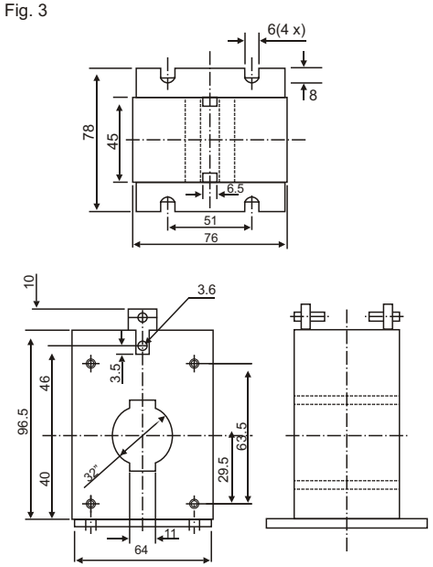
FOR CTS 20
CTS 40
CTS 80

NOTE :
RELAY CONTACTS SHOWN FOR UNIT IN HEALTHY CONDITION

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

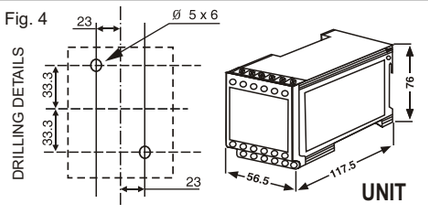
MOUNTING DIMENSIONS

Fig. 3

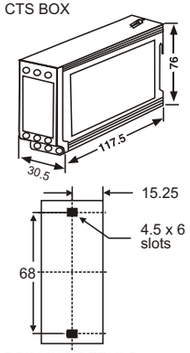


MOUNTING DIMENSIONS

Fig. 4

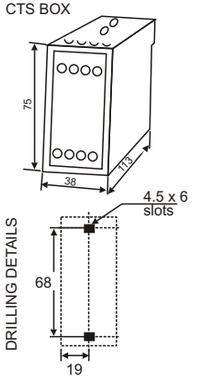


CTS BOX



DRILLING DETAILS
(CTS 1.25 / 2.5 / 5 / 10)

CTS BOX



(CTS 20 / 40 / 80)

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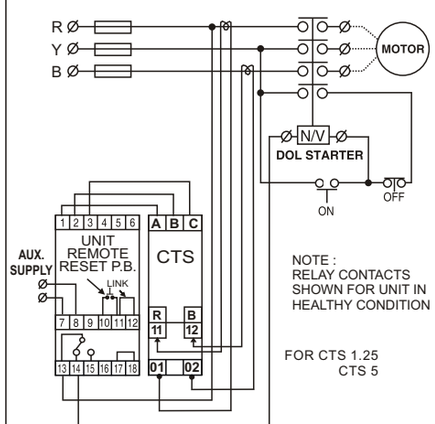
MPR D2 / SPG D2

ELECTRICAL CONNECTION IN POWER AND CONTROL WIRING

Fig. 5



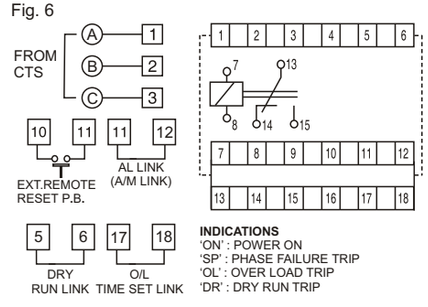
NOTE :
RELAY CONTACTS SHOWN FOR UNIT IN HEALTHY CONDITION

FOR CTS 1.25
CTS 5

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

CONNECTION DIAGRAM

Fig. 6



INDICATIONS
'ON' : POWER ON
'SP' : PHASE FAILURE TRIP
'OL' : OVER LOAD TRIP
'DR' : DRY RUN TRIP

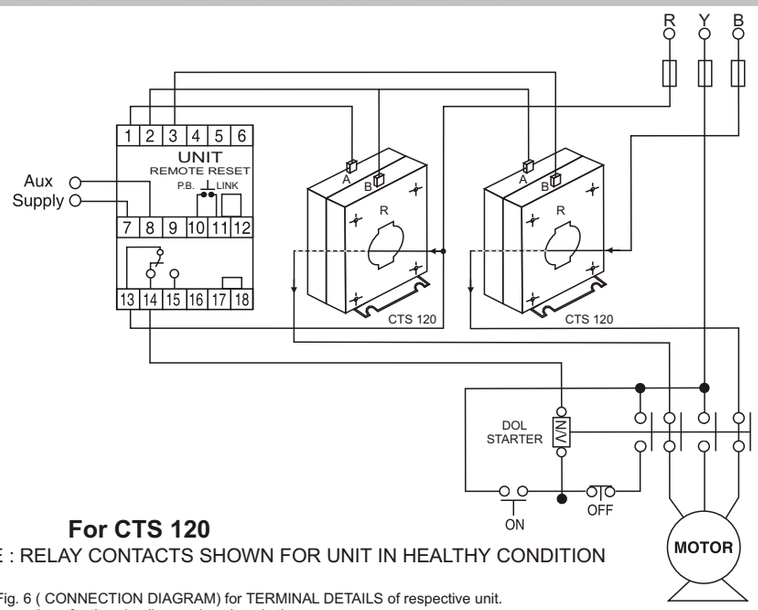
Terminal Details

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-NO)	
16	DUMMY	DUMMY
17-18	LINK FOR IDMT CURVE 2 SEC. WITH LINK 5 SEC - NO LINK FOR OTHER IDMT CURVE DUMMY	

NOTE : RELAY CONTACTS SHOWN FOR UNIT IN HEALTHY CONDITION

ELECTRICAL CONNECTIONS IN POWER & CONTROL WIRING

Fig. 7



For CTS 120

NOTE : RELAY CONTACTS SHOWN FOR UNIT IN HEALTHY CONDITION

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

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

Manufactured by :

minilec®

S.NO. 1073/1-2-3,
AT POST : PIRANGOOT,
TAL : MULSHI, DIST. : PUNE (INDIA)
PIN : 412 111

VERSION - 06
(13/07/04)