INSTALLATION INSTRUCTION MANUAL
MOTOR PROTECTION RELAY

minilec®

D2 MPR2

D2 MPR2 is operating on negative sequence current component sensing principle for phase failure protection & sensing motor current for overload protection & dry run protection, & operating on IEEE/NEEMA standard method for voltage unbalance detection.
It offers protecting against:
- Overloading condition.
- Unbalanced Voltage & current condition.
- Phase failure condition/ Phase reversal condition.
- Dry running condition.
- Under & Over voltage condition.

Being current operated it is to be used with Minilec make current sensors CTS only. Table 1 for CTS selection chat & Table 2 for current rating selected as per front scale printed on the unit.

D2 MPR2 is an auxiliary relay & is to be used along with the motor starter only. The effective working of D2 MPR2 will depend on efficient working of the electromagnetic motor starter. Before installing D2 MPR2 check whether the motor starter is operating perfectly by starting the motor with the "START" push button and switching it off by "STOP" push button. If the motor does not "START" or "STOP" on respective operations the starter needs to be serviced.
Do not install D2 MPR2 with faulty motor starter.

TRIP SETTING, TRIP DELAY & RESETTING

D2 MPR2 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 4.0 ± 1.0 sec. In D2 MPR2, fixed inverse time characteristic (IDMTL) of 2 sec is provided. For other characteristics user has to specify while ordering. Depending upon the percentage of excess load on the motor above 100% rated load, D2 MPR2 decides the trip time delay as per inverse time current characteristics. (Ref. Fig 4 for typical inverse time current characteristic chart). In D2 MPR2, fixed Dry run setting facility of 50 % of full load currents is given.The Dry Run Trip Time Delay is between 4.0 ± 1.0 sec. D2 MPR2 model offers a delayed Auto reset facility. The time delay is factory set for 15 min ± 10 sec. This delayed time resetting function can be bypassed depressing the externally connected Remote reset push button ('NO' type) between terminals 11 & 12.

MOUNTING

D2 MPR2 unit & CTS are RAIL mounted or PANEL mounted. They are suitable for 35 mm RAIL (For Panel mounting & Drilling details see Fig.2).

CAUTION

1. Ensure that D2 MPR2 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. D2 MPR2 with AUTO RESET mode should not be used with Fully automatic reset starter.

ELECTRICAL CONNECTIONS OF D2 MPR2

See Fig.3 for Terminal details of D2 MPR2.
Do all connections in Power Off Condition.
Connect Auxiliary Supply Voltage at terminals 7 marked on front cover plate of the unit. Connect the output of CTS at A, B, C to terminals 1,2,3 of D2 MPR2 respectively, Connect L1, L2 & L3 phases at terminal 4,5 & 6 respectively. The output relay contacts 13 & 14 are to be connected in series with the no volt coil of the contactor. Refer Table 1 & 2 for CTS selection.

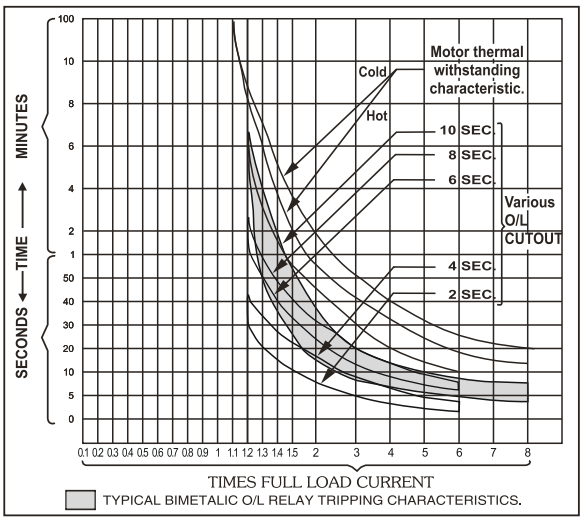
NOTE: For motors above 75 H. P. D2 MPR2 can be used with CTS 5 along with external 5 amp. Secondary CT (Ref. Fig. 1C).
CTS 20 / CTS 40 / CTS 80 / CTS 120 pair has feed through type construction. Power cables for two phases R & B are to be passed through it for CTS 20 / CTS 40 / CTS 80 (Ref. Fig. 1B). But for CTS 5 / CTS 10, the incoming / outgoing power cables (Secondary of 5 A CT) for R & B phases are to be terminated on the CTS (Ref. Fig. 1A).
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. 1D).

TECHNICAL SPECIFICATIONS OF D2 MPR2

1.	**System Supply :**	380 / 415 VAC ± 20 %
2.	**Aux. Supply :**	380-440/220-240/100-120 VAC ± 20 %
3.	**Frequency :**	48 Hz - 63 Hz.
4.	**Output Relay Contacts :**	2 CO
5.	**Output Contact Rating :**	5A, 240 VAC [Resistive]
6.	**Power Consumption :**	5 VA (max)
7.	**Current UB trip setting :**	50% of motor current [Fixed]
8.	**Under current setting :**	50% of Set current [Fixed]
9.	**Current setting [FLC] :**	0.4 to 1.0 of CTS Imax[40% to 100% of CTS Imax]
10.	**Overload Trip time setting :**	2 Sec IDMTL Curve
11.	**Voltage UB trip setting :**	10% ± 1% as per IEEE Method [fixed]
12.	**Under Voltage Trip setting : -**	- 20% of System supply
13.	**Over Voltage Trip setting :**	+ 20% of System supply
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
15.	**Set Accuracy :** **For UV & OV :** **For others :**	± 2 Sec of set value ± 5 Sec of set value
16.	**Resetting :**	Delayed Auto Reset [15 Min] or Manual [Remotely wired] with 'NO' Push button
17.	**Indications :** • **ON :** • **RP/ SP,UB :** • **DR / OL :** • **UV/ OV :**	Steady On: Power On Flashing : Phase Reversal Steady On: Phase Failure,Unbalance Flashing : Dry Run (No Load) Steady On: Over Load Flashing : Under Voltage Steady On: Over Voltage
18.	**Enclosure :**	ABS
19.	**Dimensions (mm) :Overall :** **Mounting :**	16 x56.5x117.5 67 x 46
20.	**Mounting :**	35mm Rail Mounting & Panel Mounting
21.	**Unit Weight (Approx.) :**	460 gms.
22.	**Sensor Weight (Approx.) :**	320gms (For CTS 5/CTS 10/ CTS20/ CTS40) 330 gms (For CTS 80) 380 gms (For CTS120 pair)
23.	**Operating Condition :**	Temperature: -5°Cto +60° C Humiditiy : Up to 90%
24.	**Life Expectancy :**	0.5 x10^6 operations at 100% rating

INVERSE TIME CHAR. (IDMTL) GRAPH

Fig. 4



CTS SELECTION CHART

Table 1

CURRENT RANGE			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	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

ELECTRICAL CONNECTION IN POWER AND CONTROL WIRING

Fig. 1A : FOR CTS 5 / 10

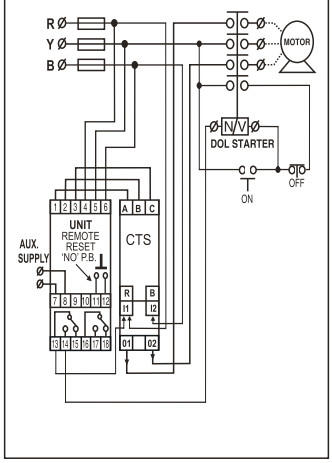


Fig. 1B : FOR CTS 20 / 40 / 80

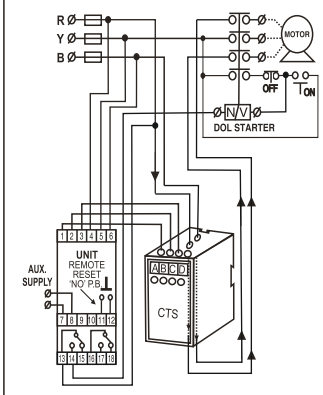


Fig. 1C : FOR CTS 5 WITH EXTERNAL CT OF SECONDARY 5 AMP.

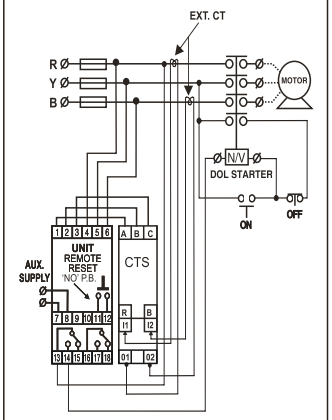
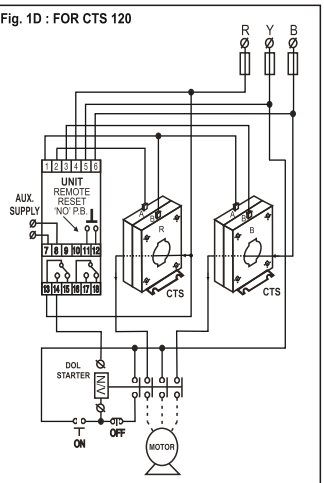


Fig. 1D : FOR CTS 120



MOUNTING DIMENSIONS

Fig. 2A : D2-03 TYPE BOX

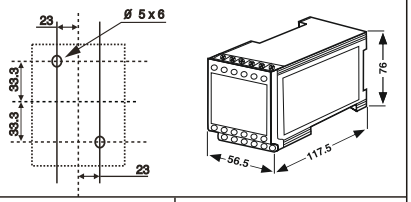


Fig. 2B : CTS 5 / 10

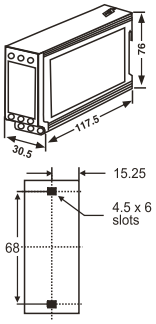


Fig. 2C : CTS 20 / 40 / 80

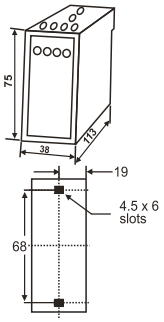
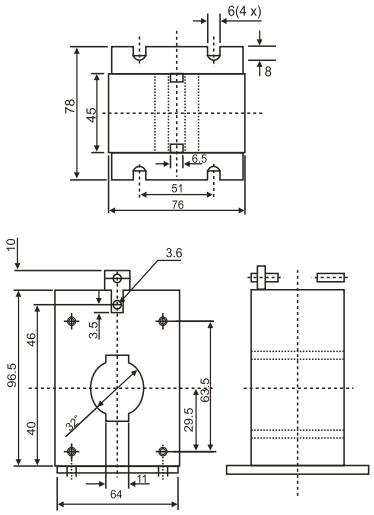
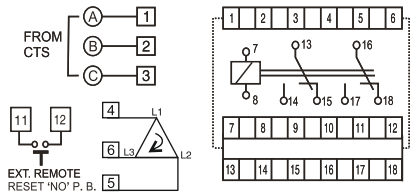


Fig. 2D : CTS 120



TERMINAL DETAILS

Fig. 3



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

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
	ESD Teast (Air Discharge)	61000-4-2
5.	H.V. Test (Dielectric Test)	60255-5
	H.V. Test (Dielectric Test)	60255-5
6.	Insulation Resistance Test	60255-5
7.	Dry Heat Test	60068-2-2
8.	Damp Heat test (Steady State)	60068-2-30
9.	Damp Heat test (cyclic test)	60068-2-78

CURRENT RATING SELECTED AS PER FRONT SCALE PRINTED ON THE UNIT

Table 2

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

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