INSTALLATION INSTRUCTION MANUAL
ELECTRONIC MULTIFUNCTION TIMER

minilec®

D1 ETM1

This Relay is auxiliary relay and should be used in control circuit only.

MOUNTING

D1 ETM1 unit can be Rail mounted or Panel mounted.

ELECTRICAL CONNECTIONS

See the corresponding Electrical wiring for your unit (Refer fig.1, 2,4 & 6). Auxiliary supply voltage should be as marked on the front cover plate of your unit. Connect the load (N/V coil) with the output relay contacts as required.

RESETTING

D1 ETM1 unit resets only when you cut off its auxiliary supply voltage and will restart its timing cycle when the auxiliary supply is switched ON again.

FUNCTIONING :

MODES OF OPERATION(M 1 TO M 7) :

Set the desired Mode, Time Range,Time scale factor by potentiometer provided at the front of the unit. Before Aux. Supply voltage is switched ON, the O/P relay contacts at 13 - 14 (RELAY 1) and at 1-2 (RELAY - 2) are in De- Energised state (NO). After switching ON the supply, the timer starts counting the timing and when the set time delay elapses the O/P contacts change their state from the original status (from NO to NC).

MODE 1- ON DELAY

As soon as power is applied, the set time period (T) begins,Relay 1 & 2 are off during set time (T) & at the end of the set time delay, Relay 1 & 2 energizes & remains on till power on.

MODE 2- INTERVAL DELAY

As soon as power is applied, the set time period (T) begins, Relay 1 & 2 are on during set time (T). At the end of set time delay, Relay 1&2 get de-energize and remains off till power on.

MODE 3 : CYCLIC OFF FIRST

As soon as power is applied, Relay 1 & 2 are off during the set time (T), at the end of the set time Relay 1 & 2 get energize for the same set time (T). This ON/ OFF action continues till power on.

MODE 4 : CYCLIC OPERATION ON FIRST

As soon as power is applied, Relay 1 & 2 get energize for the set time (T), at the end of the set time Relay 1 & 2 get releases for the same set time (T).This ON/ OFF action continues till power on.

MODE 5 : STAR - DELTA

As soon as power is applied, Relay 1 (STAR RELAY) energizes for the set time period (T) . At the end of set time period (T) Relay 1 gets off, there will be PAUSE TIME of 100 ms & at the end of the pause time delay Relay 2 (DELTA RELAY) energizes and remains on till power on.

MODE 6 : INSTANT & DELAYED OPERATION

As soon as power is applied, the time period (T) begins & Relay 1 (INSTANT RELAY) energizes. At the end of set time period (T), Relay 2 (DELAYED RELAY) energizes. Relay 1 & 2 remains on till power on.

MODE 7 : ENGINE START RELAY

Refer RED marking on front anodized plate. Set attempts (n) by Range selection switch & Set time by time selection pot. As soon as power is applied, Relay 1 (IGNITION RELAY) remains de - energize for time (2T).At the end of time (2T), Relay 1 gets energize for set time (T) & at the end off the set time, again gets de-energize for time (2T).This process continues till set attempts (n). At the end of these attempts, Relay 2 (ALARM RELAY) gets energize till power on. During set attempt operation if aux. Supply cuts off, further operation halts.

MODE SELECTION SWITCH

Select required mode by using ROTARY SWITCH provided on front plate of the unit as follows-

MODE SELECTION SWITCH POSITIONS	MODE OPERATION
1 (M1)	ON DELAY
2 (M2)	INTERVAL DELAY
3 (M3)	CYCLIC OPERATION OFF FIRST
4 (M4)	CYCLIC OPERATION ON FIRST
5 (M5)	STAR - DELTA OPERATION
6 (M6)	INSTANT - DELAYED OPERATION
7 (M7)	ENGINE START RELAY OPERATION

SELECTION OF RANGE / ATTEMPTS SWITCH

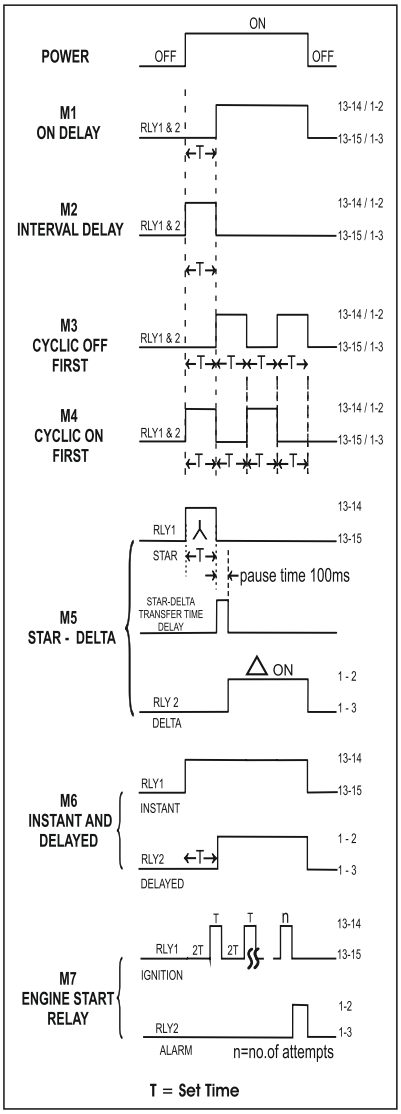
Select the time required range. It is suitable for (Mode1 to Mode 6) time delays within the time range of 0.1 sec to 100Hrs in 10 different time ranges. The time setting can be done by rotary switch & POT which is provided at the front of the unit as follows -:

POSITION	MODE 1 - 6	MODE 7 ATTEMPTS
1	0.1 SEC - 1 SEC	1
2	1 SEC - 10 SEC	2
3	6 SEC - 60 SEC	3
4	60 SEC - 600 SEC	4
5	0.1 H - 1 H	5
6	1 H - 10 H	6
7	10 H - 100 H	7

TECHNICAL SPECIFICATIONS

	PARAMETER	DESCRIPTION
1.	Auxiliary Supply:	24/ 110/ 220/ 230/ 240/ 380/ 415 VAC ±20%, 12/ 24 VDC, ±20% 24 -240VAC/DC(+10,-20%)
2.	Power : Consumption (max) At Normal aux. Supply	15VA for AC models, 3W for 24VDC 4.5 VA for 24 - 240V.
3.	Operating Modes : (Variable/ Adjustable)	ON DELAY INTERVAL DELAY CYCLIC OFF FIRST CYCLIC ON FIRST STAR - DELTA INSTANT & DELAYED ENGINE START RELAY
4.	Time Range : (Variable/ Adjustable)	0.1 to 1 SEC, 1 to 10 SEC, 6 to 60 SEC 60 to 600 SEC 0.1 to 1H, 1 to 10 H, 10 to 100 H
5.	Star to Delta Transfer Delay :	100 ms (±20%)
6.	Output Relay Contact :	1 CO + 1 CO
7.	Contact Rating (Resistive) :	5A at 240 VAC
8.	Indications:	L1 POWER ON L2 RELAY 2 ON
9.	Resetting Time :	200 msec (Max.)
10	Frequency of AC voltage :	50/ (60) Hz ± 3%
11.	Operating Conditions	Tempreature : 5° to $+60^{\circ}$C Humidity : Upto 95% RH
12.	Life Expectancy :	0.5 X 10^{6} Operations At 100% Rating
13.	Enclosure :	ABS (D1)
14.	Mounting :	35mm Rail Mounting & Panel mounting
15.	Dimensions (mm) Overall : Mounting:	76 X 30.5 X 117 68 Centre to Centre
16.	Weight (gms.) :	200gms
17	Time Setting Accuracy :	± 5% max. w.r.t. Full scale.
18.	Repeat Accuracy : a. Temp.Variation of 25 to 60°C : b. Supply Variation of ±10% : c. Freq. Variation of ±1%:	± 1% (at normal Aux.) ± 3% max. of set value ± 3% max. of set value ±2% max. of set value

TIMING CYCLE

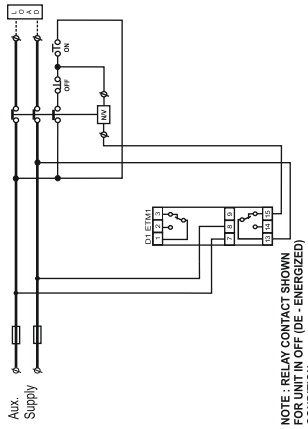


COMPLIANCE TO STANDARDS

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

ELECTRICAL CONTROL WIRING AND CONNECTION DIAGRAM

Fig. 1(FOR MODE 1 TO 4 ONLY)



ELECTRICAL CONTROL WIRING AND CONNECTION DIAGRAM D1 ETM1

Fig. 2A

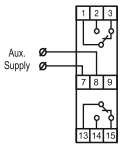
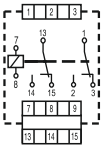


Fig. 2B



NOTE:
1. Relay Contacts shown for Delay Elapsed condition.
2. Relay Contacts shown for Relay In OFF (De-ENERGIZED) Condition

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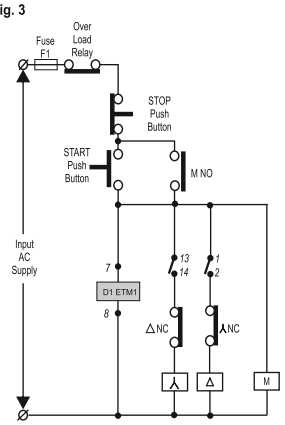
INDICATIONS :
L1 (GREEN) : POWER ON
L2 (RED) : RELAY 1 & 2 ON [FOR MODE 1 TO 4]
RELAY 2 ON [FOR MODE 5 TO 7].

TERMINAL DETAILS :
7-8 : Aux. Supply as marked on Unit
13-14-15 : C1-NO1-NC1 (RELAY1)
1-2-3 : C2-NO2-NC2 (RELAY 2)

TYPICAL APPLICATION DIAGRAM FOR STAR-DELTA STARTER MODE

Fig. 3



Y, M and Δ are STAR, MAINS and DELTA contactors

ELECTRICAL CONTROL WIRING AND CONNECTION DIAGRAM FOR STAR DELTA MODE

Fig. 4A

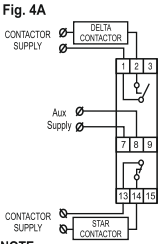
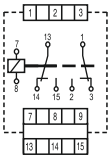


Fig. 4B



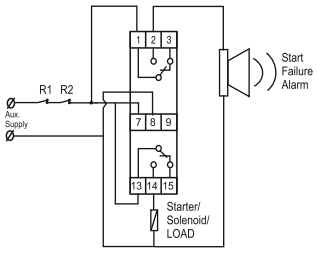
NOTE:
Relay Contacts shown for STAR condition i.e. when STAR relay is in HEALTHY (ENERGIZED) condition.

INDICATIONS :
L1 (GREEN) : POWER ON
L2 (RED) : DELTA Relay in Healthy (ENERGIZED) condition

TERMINAL DETAILS :
7-8 : Aux. Supply as marked on Unit
13-14 : STAR relay output contact (NO)
1-2 : DELTA relay output contact (NO)

ELECTRICAL CONTROL WIRING AND CONNECTION DIAGRAM FOR ENGINE START RELAY MODE

Fig. 5



- RELAY 1 : IGNITION RELAY
- RELAY 2 : ALARM RELAY
- R1 : MAINS FAILURE CONTACT, CLOSING WHEN STARTING IS REQUIRED
- R2 : START INHIBIT CONTACT, OPENING WHEN SET HAS STARTED.
- RELAY CONTACTS SHOWN IN OFF CONDITION.

ELECTRICAL CONTROL WIRING AND CONNECTION DIAGRAM FOR ENGINE START MODE

Fig. 6A

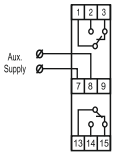
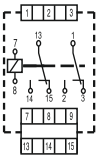


Fig. 6B



NOTE:
1. Relay Contacts shown for Delay Elapsed condition.
2. Relay Contacts shown for Relay In OFF (De - ENERGIZED) Condition

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INDICATIONS :
L1 (GREEN) : POWER ON
L2 (RED) : RELAY 2 ON

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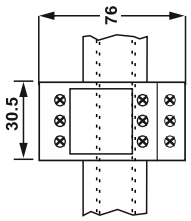
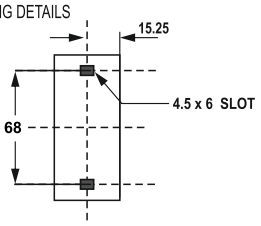
TERMINAL DETAILS :
7-8 : Aux. Supply as marked on Unit
13-14-15 : C1-NO1-NC1 (RELAY1)
1-2-3 : C2-NO2-NC2 (RELAY2)

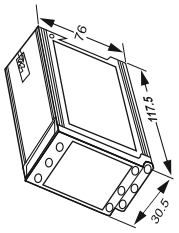
MOUNTING DIMENSIONS

Fig. 8



DRILLING DETAILS





D1 TYPE BOX