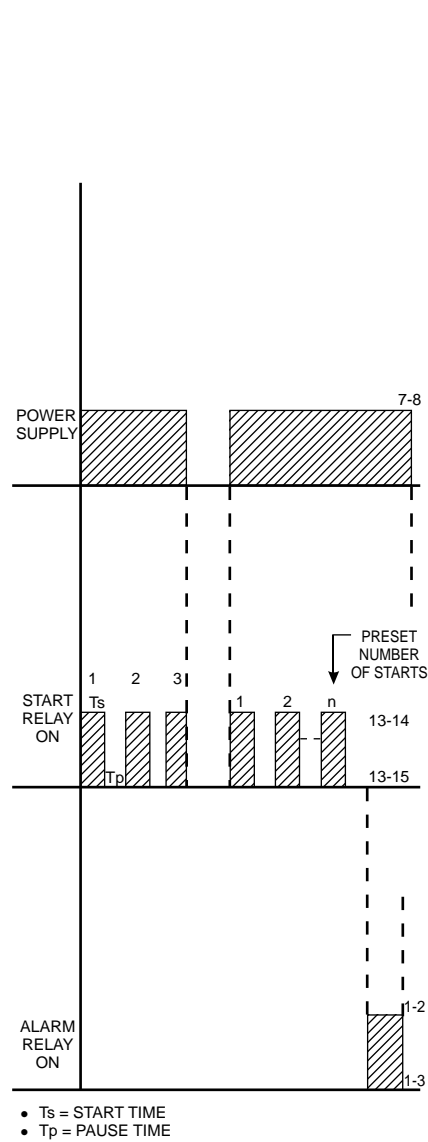


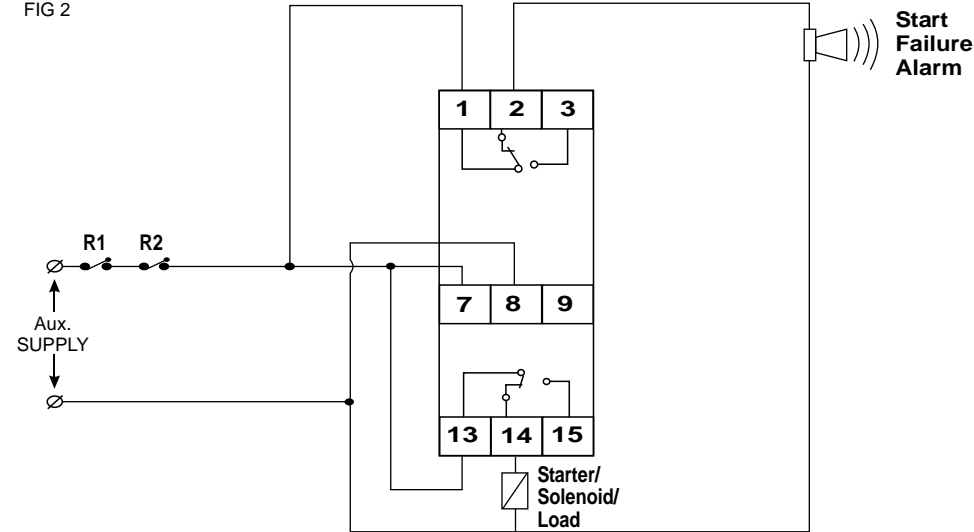
TIMING DIAGRAM

FIG 1



ELECTRICAL CONNECTIONS IN POWER AND CONTROL WIRING

FIG 2

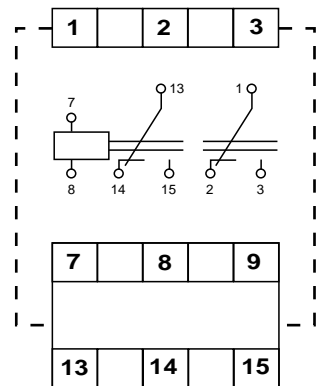


Typical wiring:

- R1 - mains failure contact, closing when starting is required.
- R2 - Start inhibit contact, opening when engine set has started. (see "engine startup detection" in description of function)
- Relay contacts shown for relays in energized condition

ELECTRICAL CONNECTIONS DIAGRAM

FIG 2



INDICATIONS:
 ■ ST - Start Relay
 ■ AL - Alarm Relay

TERMINAL DETAILS

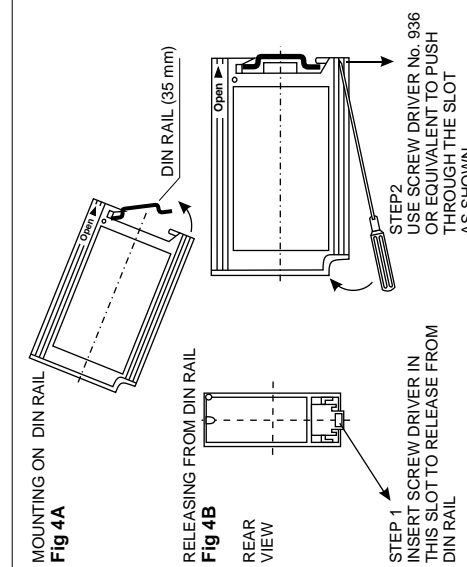
- 7-8 : AUX. SUPPLY
- 13-14-15 : C1 - NO1 - NC1 (ST).
- 1-2-3 : C2 - NO2 - NC2 (AL)
- 9 : DUMMY

NOTES

- AUX. SUPPLY TO BE CONNECTED AS MENTIONED ON THE UNIT.
- RELAY CONTACTS SHOWN FOR RELAY IN ENERGISED CONDITION.
- THE TIME RANGE AND START ATTEMPTS SELECTION, DETAILED CHART IS GIVEN ON THE SIDE OF THE UNIT.
- ALARM RELAY ENERGISES IF THE START ATTEMPTS GETS OVER.
- FOR ZERO ATTEMPT SET, ALARM GETS ON IMMEDIATELY.

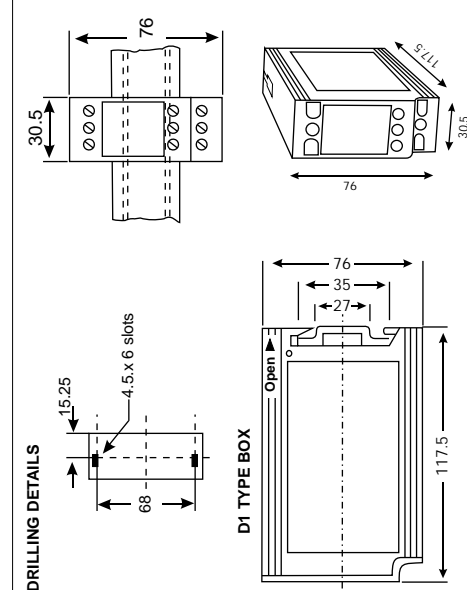
MOUNTING ON AND RELEASING FROM DIN RAIL

FIG 4



MOUNTING DIMENSIONS

FIG 5



INSTALLATION INSTRUCTION MANUAL FOR ELECTRONIC ENGINE START RELAYS

ESR D1



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, Pirangoot,
 Tal. Mulshi, Dist. Pune - 412 111 (India)

VERSION 01
 (20 / 05 / 2001)

INSTALLATION INSTRUCTIONS FOR ESR D1

INTRODUCTION

Thank you for selecting and purchasing Minilec make Electronic Engine Start Relay ESR D1. The following installation instructions would guide you in installing your ESR D1 and making the best use of it. ESR D1 is an electronic engine start timer operating on digital timing principle. It offers two 1 Change over relay contacts. The contact rating of each relay is 5A, 240 VAC (Resistive). ESR D1 is an auxiliary relay & should be used in control circuit only.

MOUNTING

Your ESR D1 can be RAIL mounted or PANEL mounted. (See Fig. 4 for mounting on and for releasing from DIN RAIL. Also see Fig. 5 for PANEL mounting & Drilling Details Dimensions.)

CAUTION

Ensure that your ESR D1 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 and dust.
- Installed as near to the starter/solenoid as possible.
- It external noisy environment. it is advisable to use minilec make (RC N/W) noise suppressor across start relay contacts (13& 14).

ELECTRICAL CONNECTIONS OF ESR D1

See Fig. 3 for electrical connection details of SER D1. See Fig. 2 for power and control wiring. Aux. supply must be as marked on front cover plate. The output relay contacts 13& 14 are to be connected in series with the no - volt coil of the contractor / Solenoid.

TIME SETTING

This engine start relay ESR D1 is provided with individual start time & pause time setting facility. The start time duration is from 1 Sec. to 15 Sec. variable via. potentiometer. Pause time duration is 2 sec. 4 sec, 8 sec, 16 sec, & can be selected by DIP SW. 5,6,7,8 provided on the front of the unit. For pause time setting refer pause time selection chart (Chart-1).

START ATTEMPT SELECTION

No. of start attempts are selectable from 1 to 15 via DIP SW 1,2,3 & 4 provided on the front of the unit. For attempt selection refer chart-2.

FUNCTIONING

Select the start time, pause time & start attempts as per requirement. Terminal 7 & 8 is aux. supply Terminal 13 - 14 - 15 are start relay contact (C - NO - NC). Terminal 1 -2 -3 are alarm relay contacts (C - NO - NC).

STARTING : As supply is applied to the ESR D1. The ST relay energises for the set start time duration & provides cranking to the engine. If the aux. supply to the ESR D1. remain uninterrupted the first start attempt will be followed by a succession of starts with set pause time in between. If start attempt is successful, power supply to ESR D1 should be interrupted as soon as the engine starts running. thus preventing further Cranking. Attempt = Start time + Pause time.

START FAILURE ALARM : If the engine set fails to start after the set number of attempts, the starter sequence will be terminated and the start failure alarm relay will energized.

ENGINE STARTUP DETECTION : Successful start up can be detected by : 1) Monitoring the O/P frequency the engine set with the OFS D1 or FCS D2 relay. 2) Monitoring the O/P voltage of the engine set with minilec U/V & O/V relays.

CHART -1 :

- DIP SWITCH SETTING FOR PAUSE TIME SELECTION.

PAUSE TIME SELECTION	DIP SWITCH NOS			
	5	6	7	8
2 SECONDS	ON	OFF	OFF	OFF
4 SECONDS	OFF	ON	OFF	OFF
8 SECONDS	OFF	OFF	ON	OFF
16 SECONDS	OFF	OFF	OFF	ON

NOTES :

- Refer these charts for setting of DIP Switches provided at the front of the unit *. If all DIP Switches are off (i.e. 5,6,7&8) then pause time will be considered as 16 Sec *. If more than one switches are on, then pause time of the lowest DIP Switch will be considered, out of the selected ones.

CHART -2

START ATTEMPTS SELECTION	DIP SWITCH NOS			
	1	2	3	4
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

TECHNICAL SPECIFICATIONS OF ESR D1

- Auxiliary Supply**
12 / 24 VDC $\pm 20\%$
110 / 220 / 230 / 240 VAC $\pm 20\%$
- Frequency** : 50/60 Hz $\pm 3\%$
- Output Relay Contact** :
Start Attempt : 1 Change Over
Alarm On : 1 Change Over
- Output Contact Rating** : 5 A, 240 VAC (Resistive)
- No Of Start Attempt** :
1 to 15 (Via. 4 Way DIP Switch)
0th Attempt = Alarm On
- Time Range** :
Start Time : 1 to 15 (Via Potentiometer)
(1, 2.5, 5, 7.5, 10, 12.5, 15)
Pause Time : 2 to 16 Sec. (In multiple of 2)
i.e. (2, 4, 8, 16) (Via 4 way DIP SW)
- Set Accuracy** : $\pm 10\%$ max. w.r.t. full scale
- Repeat Accuracy** : $\pm 1\%$ (At normal aux. Supply at 250C)
A) For Temperature variation of 25°C to 60°C:
 $\pm 3\%$ max. of set value
B) For Supply variation of $\pm 10\%$:
 $\pm 3\%$ max. of set value
C) For Frequency variation of $\pm 10\%$:
 $\pm 2\%$ max. of set value
- Reset** : Power On
- Reset Time** : 0.5 Sec. (Approx)
- Indication** :
ST (Green) : Start Time On
AL (Red) : Alarm On
- Enclosure** : ABS
- Dimensions (mm)** :
Overall : 76 x 30.5 x 117.5
Mounting : 68 (Center to Center)
- Mounting** : 35mm Rail Mounting and Panel Mounting
- WEIGHT** : 175 gms Approx.
- Life** : Mechanical - 1×10^7
Electrical - 0.5×10^7 @ 100% Ratings
- Operating Conditions** :
a) Temperature : -5°C to +60°C
b) Humidity : Upto 95%RH
- Consumed Power** :
1VA for 12 VDC
3VA for 24 VDC
10 VA for 110 VAC
20 VA for 220/230/240 VAC

TESTING PROCEDURE

