

M/S. Reliance Electricals.	TECHNICAL/MAINTENANCE/OPERATING MANUAL OF (FACS)	Doc. No. RE/RDSO/FACS 01 of w.e.f.
----------------------------	---	---------------------------------------

FUSE AUTO CHANGEOVER SYSTEM

Reliance Electricals 

Manufactured by :

Reliance Elecricals

206,Godavari, LaxmiIndustrial Complex,
Vartaknagar, THANE.

PH : 022-25854225

ISSUE : REV. No. : PAGE : 01	SECTION : DATE :
------------------------------------	---------------------

Prepared By	Checked By	Approved By
M/S. Reliance Electricals.	TECHNICAL/MAINTENANCE/OPERATING MANUAL OF (FACS)	Doc. No. RE/RDSO/FACS 01 of w.e.f.

Reliance Electricals

GENERAL

SCOPE

This manual provides operating & maintenance instructions for FUSE AUTO CHANGEOVER SYSTEM. This system is designed & manufactured by Reliance Electricals, Thane.

DESCRIPTION

The AUTO CHANGEOVER TYPE FUSE ALARM SYSTEM can be broadly divided into

- a) Fuse Voltage sensing cables
- b) Auto change over type fuse alarm module

Auto change over type fuse alarm module is made to mount on relay racks. The cabinet is upright with removable type of back cover for wiring.

Each module consists of 8 control cards. Each card contains 4 individual fuse failure detection & change over circuits. All control cards are accessible from front side. All control cards are plug in type connectors which facilitates easy isolation of a control card for maintenance & repairs. Working supply for the system can be derived from 24V DC or 60V DC to 110V AC/DC. (User should specifically order for module working on 24V DC. Otherwise DEFAULT working supply is 60V DC to 110V AC)

ISSUE :	SECTION :
REV. No. :	DATE :
PAGE : 02	

Prepared By	Checked By	Approved By
M/S. Reliance Electricals.	TECHNICAL/MAINTENANCE/OPERATING MANUAL OF (FACS)	Doc. No. RE/RDSO/FACS 01 of w.e.f.

Reliance Electricals

INSTALLATION

Installation part mainly consists of wiring from output of relay rack fuses to terminals mounted on backside of Fuse alarm system panel.

Output of the fuse to be monitored is to be connected to the terminals marked as F1, F2, F3, F4, F5 & so on. +VE & -VE of the supply is to be connected to the terminals marked +VE / -VE of respective card. Any one card can be used for same type of supply. That means it can detect four different fuses connected to same type of supply having one common Phase & Neutral. For example one card cannot be used for detecting 60V DC & 24V DC or 110V AC at a time.

If any circuit is unused or used as a spare circuit Terminal marked as +Ve should be looped with respective terminals (F1,F2,F3,F4) & supply should be connected across +VE & -VE terminals.

THEORY OF OPERATION

Four LED indications are provided for each fuse. Two Green LEDs show intactness of main fuse as well as spare (Standby) fuse. When any of the fuses blows, Red LED glows instead of Green LED. Voltage across fuse is sensed so that when fuse is intact no current is drawn from each fuse for each circuit. When fuse blows approximately 1mA current is drawn from the supply. The logic is set such that when no current is drawn output of the IC given to LED & changeover relay is low. Therefore LED does not glow. If the current is drawn because of fuse failure the logic is reversed. Output of IC goes high.

ISSUE :	SECTION :
REV. No. :	DATE :
PAGE : 03	

Prepared By	Checked By	Approved By
M/S. Reliance Electricals.	TECHNICAL/MAINTENANCE/OPERATING MANUAL OF (FACS)	Doc. No. RE/RDSO/FACS 01 of w.e.f.

Reliance Electricals

The standby fuse gets connected through relay preventing failure of signaling circuit. IC output is given to alarm circuit, which triggers the audible alarm, which continues until it is reset. Red LED will glow until the blown fuse is restored & **TEST/RESET** button is pressed. If before restoring the blown fuse another fuse fails again panel gives audible & visual indication. Audible Alarm can be acknowledged using **ALARM ACCEPT** push button but LED indication will remain until fuse is restored. Every time after restoring main fuse (in relay racks) **TEST/RESET** button must be pressed.

POWER SUPPLY: SMPS type 12 V DC regulated power supply is generated for the operation of a control circuit, LED indication & audible alarm.

CONTROL CARD: Each control card is made plug in type using 16 pin FRC connector. Each control card consists of 4 Nos. of fuse failure detection circuits corresponding to 32 LEDES. Each Type I module detects **32** fuses.

OPERATION: All circuits are provided with resistor at the input. AC voltage is rectified using 4 nos. of IN 4007 diodes to get DC voltage. On fuse failure approximately 1 Milliamp current is passed through Opto-isolator LED. Opto-isolator transistor is goes in saturation. Therefore collector of a transistor goes low, which is given to non-inverting terminal of a comparator. Inverting terminal of comparator is fed with a fixed reference (approximately 6V). When current through Opto-isolator LED reduces, its transistor goes out of saturation & collector voltage gives high output. Therefore LED which is connected to comparator output glows showing fuse fail indication. The high output is differentiated through a capacitor & a pulse is sent to Alarm circuit mounted in power supply box.

ISSUE : REV. No. : PAGE : 04	SECTION : DATE :
------------------------------------	---------------------

Prepared By	Checked By	Approved By
M/S. Reliance Electricals.	TECHNICAL/MAINTENANCE/OPERATING MANUAL OF (FACS)	Doc. No. RE/RDSO/FACS 01 of w.e.f.


OPERATION

Reliance Electricals

OPERATING CONTROLS & INDICATORS: Table – 1 lists the functions of operating controls & indication in fuse Alarm System & gives brief description of the front view drawing.

Table – 1

1. Power on LED: Indicates that the indicator panel is energized & ready to indicate failure of fuse.
2. Fault LED: Common Red LED indicates failure of fuse.
3. Alarm Accept Push Button: It provides means to reset only audible alarm.
4. Buzzer: Dual tone sounds to indicate fuse failure.
5. Test / Reset: In case of main fuse failure standby fuse will be in circuit. When main fuse is replaced press 'TEST/RESET' button to reset main fuse in circuit.
When 'TEST/RESET' button is pressed also all LEDs light up.
6. LEDs: Corresponding Red LED glows only when fuse Failure occurs, or 'TEST' push button is pressed.

OPERATING INSTRUCTION 
Once in a day check the working of the system using Test push button.

CAUTION

CONTROL CARD REPLACEMENT: Control card Replacement must be made only with the type specified. Any substitution without manufacturer's consent may blow up main fuse in racks or destroy control card & void the warranty.

ISSUE :	SECTION :
REV. No. :	DATE :
PAGE : 05	

Prepared By	Checked By	Approved By
M/S. Reliance Electricals.	TECHNICAL/MAINTENANCE/OPERATING MANUAL OF (FACS)	Doc. No. RE/RDSO/FACS 01 of w.e.f.

Reliance Electricals

REPAIRS & REPLACEMENT

Do not try to repair control card in actual system. Repair the cards in laboratory by exciting actual conditions. While replacing the components, observe the following.

- 1 When soldering avoid excessive heat which may damage associated components
- 2 Be careful while making all soldered joints as a poorly soldered joint can cause further trouble and is one of the most difficult faults to locate
- 3 Do not damage leads of other components by pushing or pulling them aside
- 4 Maintain a log of all repairs and adjustments. Comprehensive notes and an accurate log makes it possible to reverse the procedure or to facilitate the communication regarding repair procedure
- 5 Whenever one or more components have been replaced, testing & readjustment of appropriate circuit is necessary

MAINTENANCE

GENERAL: The FUSE ALARM SYSTEM has been conservatively designed. It is completely static to wear & tear associated with moving parts. The FUSE ALARM SYSTEM will provide many hours of trouble free service with maintenance reduced to minimum. However a regular periodic program inspection should be maintained as follows.

ISSUE : REV. No. : PAGE : 06	SECTION : DATE :
------------------------------------	---------------------

Prepared By	Checked By	Approved By
M/S. Reliance Electricals.	TECHNICAL/MAINTENANCE/OPERATING MANUAL OF (FACS)	Doc. No. RE/RDSO/FACS 01 of w.e.f.

Frequency	Activity
Inspection Two times in a week	Press 'TEST' of each sub-rack; one at a time. All the LEDs in use except the one marked as Spare should glow. It shows that all Indicators & its associated circuits are working OK.
Once in 3 months	Test the system by removing actual fuses one by one.

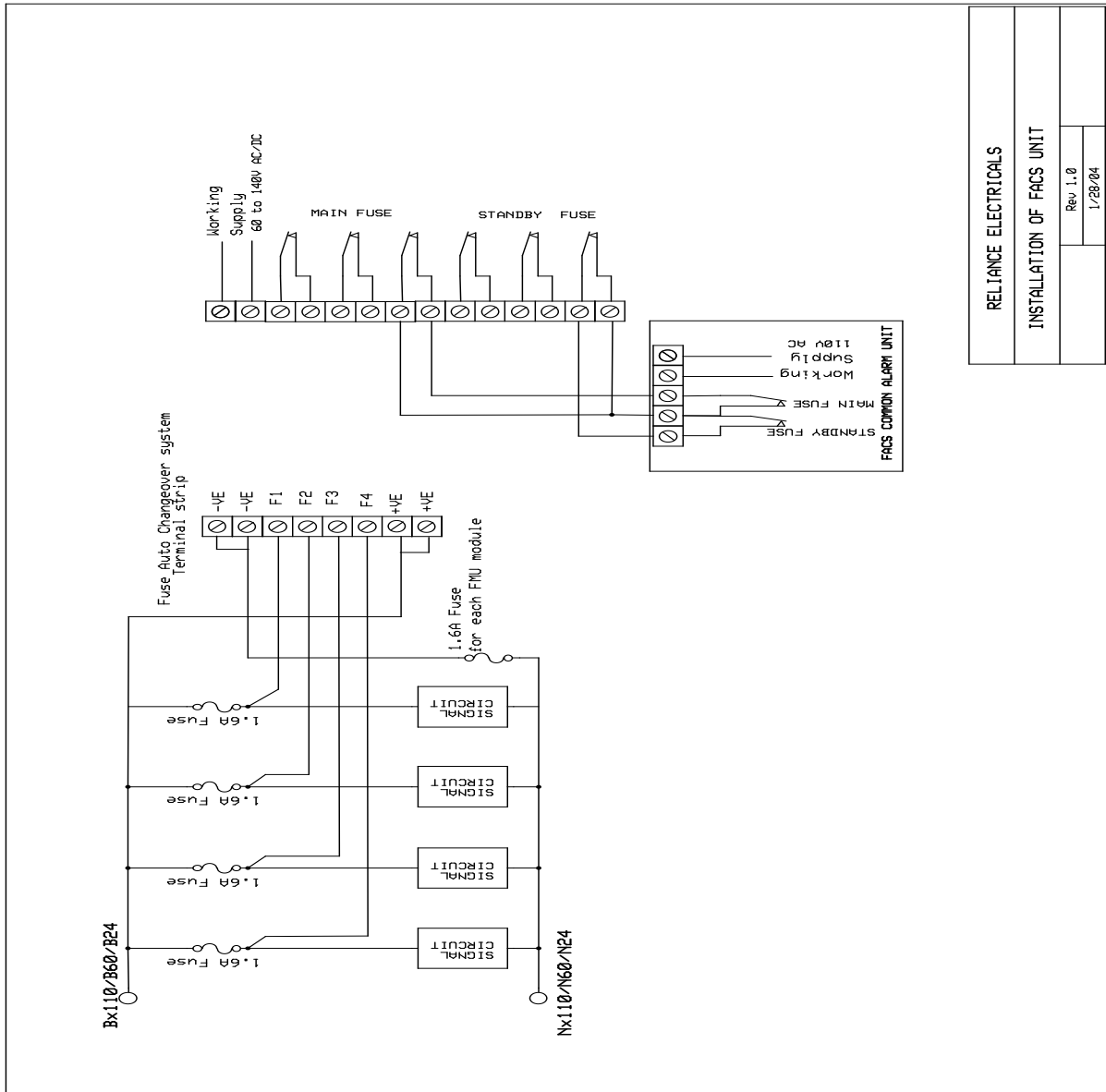
TROUBLESHOOTING

In case there is any fault in the FUSE ALARM SYSTEM it is preferable to test the system step by step as given below. It is desirable that basic principle of operation of the system should be kept in mind before doing any trouble shooting. However a brief trouble shooting chart is given below.

Fault	Reason	Solution
Any one or more indicator LEDs are glowing	Input wire to the card might be open	Connect wire properly
	Supply voltage of that fuse low	Check supply voltage
Any one or more indicator LEDs are not glowing after pressing TEST button.	LED faulty	Replace LED.
	Control card faulty	Replace the card
Neither 'Power On' LED nor any other LEDs glowing.	Fuse of the power supply mounted inside panel blown	Replace with same rating of fuse

ISSUE : REV. No. : PAGE : 07	SECTION : DATE :
------------------------------------	---------------------

Prepared By	Checked By	Approved By
M/S. Reliance Electricals.	TECHNICAL/MAINTENANCE/OPERATING MANUAL OF (FACS)	Doc. No. RE/RDSO/FACS 01 of w.e.f.



RELIANCE ELECTRICALS	
INSTALLATION OF FACS UNIT	
Rev. 1.0	1/28/04

ISSUE :	SECTION :
REV. No. :	DATE :
PAGE : 08	

Prepared By	Checked By	Approved By
M/S. Reliance Electricals.	TECHNICAL/MAINTENANCE/OPERATING MANUAL OF (FACS)	Doc. No. RE/RDSO/FACS 01 of w.e.f.