

**CONTROL AND DISTRIBUTION PANEL FOR
COLOUR LIGHT SIGNALING SUPPLY
WITH AUTOMATIC CHANGEOVER FACILITY**

ACDP

User Manual



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CONTENTS

➤	SAFETY REQUIREMENTS	ACDP- I
➤	INTRODUCTION	ACDP-II
➤	TECHNICAL DATA	ACDP- III
➤	TROUBLE SHOOTING	ACDP-IV
➤	COMMISSIONING	ACDP-V

SAFETY REQUIREMENTS

INTRODUCTION

Before using this product, be sure to read this chapter carefully. This chapter describes safety precautions when using the panel. Before installing and using the equipment, read and understand this chapter thoroughly.

It's not a secret – electricity can be dangerous and when things go wrong lives can be at stake!

Electrical engineers are Industrial safety doctors, so it's our duty to keep employees health and maintain a quality of life that we all deserve by providing safe work practices to avoid electrical accidents.

How much electricity is dangerous?????

CURRENT	EFFECT
<i>0.5 – 3mA</i>	<i>Tingling sensations</i>
<i>3 – 10mA</i>	<i>Muscle contractions (painful)</i>
<i>10 – 40mA</i>	<i>"can't let go" phenomena</i>
<i>40 – 75mA</i>	<i>Respiratory paralysis (possibly fatal)</i>
<i>75 – 200mA</i>	<i>Ventricular fibrillation (likely fatal)</i>
<i>200 – 500mA</i>	<i>Heart clamps tight</i>
<i>>1.5A</i>	<i>Tissue and organs began to burn</i>

Fact: circuit breaker was designed to protect equipment – not people!

The panel is designed with zero percentage of risk factor by its own design. The current carrying paths and circuits are isolated from the metal case and structure. Suitable clearance depending on the type of insulation required for different classes are provided.

HEALTH AND SAFETY

It deals with the handling of panel in proper way. An individual to be considered as 'qualified' with regard to certain equipment in the workplace, but 'unqualified' as to other equipment. "An employee, who is undergoing on the job training and who, in the course of such training, has demonstrated the ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified person also considered to be a qualified person for the performance of those duties."

The following requirements must be met, in the order given, before circuits or equipment's are re-energized, even temporarily.

- People handling the equipment should be aware about the panel safety handlet.
- Ensure that the product is in the off condition before working on the conducting or terminal side.
- A qualified person must conduct tests and visual inspections, as necessary, to verify that tools electrical jumpers, shorts, grounds and other such devices have been removed, so that the circuits and equipment's can be safely re-energized.
- Employees exposed to the hazards associated with re-energizing the circuit or equipment must be warned to stay clear of the circuits and equipment.
- Each lock and tag must be removed by the employee who applied it or someone else under that employee's direct supervision.
- A visual determination that all employees are clear of the circuits and equipment's must be made.

For any queries related to panels, feel free to contact ALIND.

INTRODUCTION

CLS DESCRIPTION

The Control and Distribution Panel for Colour Light Signaling Supply in 25KV AC Traction System is manufactured in accordance with RDSO Specification No.TI/SPC/PSI/CLS/0022 with A&C slip No. 1 to 4 and Drawing No.990616 approved by CORE Allahabad for 5KVA / 10KVA / 25KVA / 50KVA Panels respectively, copies of these drawings are attached to this manual.

Panel Consists of following

- 1) Rotary Switch
- 2) Contactors
- 3) Miniature Circuit Breakers
- 4) Alarm Accept Push Button
- 5) Internal Piezo Alarm
- 6) ALIND Electronic Control Unit (**AECU**)
- 7) Source selector switch
- 8) Bus Bars

Colour Light Signal is a signal, which displays lights of different colours, depending upon the phase of supply visibility range. Operation time of switching is very less and only less maintenance is required. Compact size saves panel space and allows the usage of a smaller enclosure. Robust and efficient quick make & break mechanism opening & closing of the contacts independent of the speed of actuation. High electrical and mechanical life even in extreme conditions. The advance controllers utilized in the synchronizing systems provides a power full, inbuilt logic module to take control of the automatic sequence control. The circuits are normally be fed from the main

the two standby sources is done automatically through suitable contactors in the panel. On restoration of the main source of supply, the circuits are connected back to the main source of supply automatically. Whenever an automatic change over occurs in the event of main supply going off (or whenever the main supply is again restored) an alarm buzzer will sound which can be silenced by pressing alarm accept push button. Four outgoing circuits are connected to the 240 V bus bar through individual miniature circuit breakers.

Provision is made that in case main supply voltage goes below 165V, main supply will be cut off and standby one supply shall be put on automatically, similarly this shall be applicable to stand by supply one and two also. However if main supply voltage become normal, standby supply one or two will automatically be cut off and main supply will feed the load.

Provision is done in case if main supply voltage goes above 270V +5%, the main supply is cut off and standby one supply is put on automatically. Similarly this is applicable to standby supply one and two also. However if main supply voltage become normal, standby one or two will automatically be cut off and main supply will feed the load.

TECHNICAL DATA

CIRCUIT DESCRIPTION

The Control and Distribution Panel for colour light signaling with Auto changeover facility circuit, can be divided into different functional blocks as follows:

1. Input current sensing
2. Auto Manual Selection
3. Signal Processing and limit sensing
4. Priority sensing
5. Output Driver circuits.

The Control and Distribution Panel for colour light signaling with Auto changeover facility circuit caters to three sources of 240V ac 50Hz power supplies. The three supplies are, usually a main supply from Electricity Board and two standby supplies from the 10KVA/5KVA/25KVA/50KVA, 25kV/240V auxiliary transformer (AT) connected to 25KV ac 50Hz, single phase traction overhead equipment of UP and DOWN tracks at the station. However, in exceptional cases where local supply is unreliable, one of the ATs, may be used as the Main source of supply, the other AT being the standby supply.

The panel is fed with the inputs from three sources of power supplies, 1-main, or most reliable supply, 2-standby 1 and 3- standby 2. Input and output currents are sensed by miniature circuit breakers. The breakers trip, in case of current exceeds rated current capacity, as per the characteristics of MCBs specified by the manufacturer. The panel can be switched to either MANUAL or AUTO mode

MODES OF OPERATION

Manual mode

The Rotary switch has three positions in manual mode. If the switch is placed in 1 position the main source of supply is connected to the output. Similarly switching to 2 position outputs standby 1 supply and 3 position, standby 2 supply. This provision is made, in the event of defects or maintenance of the contactors or other circuitry.

Auto mode

In auto switch position, if all three supplies are present and are in the specified voltage level limits, (165V to 270V) the supply with the top priority (1) will be fed to the output terminals automatically. In case of failure of say 1, output will be fed from 2 and from 3 if 2 fails Also incoming supplies have Hold ON limits of 165V to 270V So if there is no failure of an incoming supply but is within Hold ON limit of 165V to 270V, the incoming supply will keep feeding to the output and will change only if incoming supply is below 165V or above 270V, to next within limit supply. However, if in the meantime supply of higher priority is restored, and remains within- normal limit of. 165V to 270V, higher priority supply will be fed to the output automatically.

Priority of the input supplies is starting with 1 as top priority followed by 2 and 3 and tile supply is considered to be within normal limits if it is greater than 165V ac and less than 270V ac.

CONTROL AND THEIR FUNCTIONS

Rotary Selector Switch (4-pole, 6-way 240V ac 50Hz)

The Rotary selector switch is of flush type. The contacts are of robust design and have ample cross section for carrying continuously 60A/30A and of positive make type to avoid any sparking. The selector switch has following positions:

- 1) OFF
- 2) MAIN SUPPLY (1)
- 3) STANDBY SUPPLY (2)
- 4) STANDBY SUPPLY (3)
- 5) OFF
- 6) AUTO

Contactors (240V, AC, 50Hz with 2 or 3 Pole with 2No and 2NC)

Contactors are of electro-magnetic air break type of robust design having a continuous rating of 240V AC 50 Hz 60/30A with three N/O main contacts. The contacts are bounce proof and have ample cross section for carrying the rated current continuously without exceeding the permissible temperature rise, when contactor picks, the contacts connect input to the contactor to the output terminals of the contactor.

Miniature Circuit Breaker

Miniature Circuit Breakers are suitable for operation on 240V ,50Hz,a.c.and have a breaking capacity of over 100 KVA. (10KA, @ 240 VA.C).

Bus Bar

One each for LIVE Phase and Neutral Bus bar is made of tinned copper. The section of the bus bar is of adequate capacity for carrying 60/30/150/300A continuously.

Indicating lamps

1. Input supply indications
2. Auto indications
3. Output supply indications

An indicating lamp is provided on the cover of the panel to indicate the availability of each supply.

Piezo Alarm

Internal alarm is activated every time changeover of the incoming supplies takes place in AUTO mode and also when incoming supply is cut off. The alarm is resettable by alarm accept switch provided on front panel.

TROUBLESHOOTING

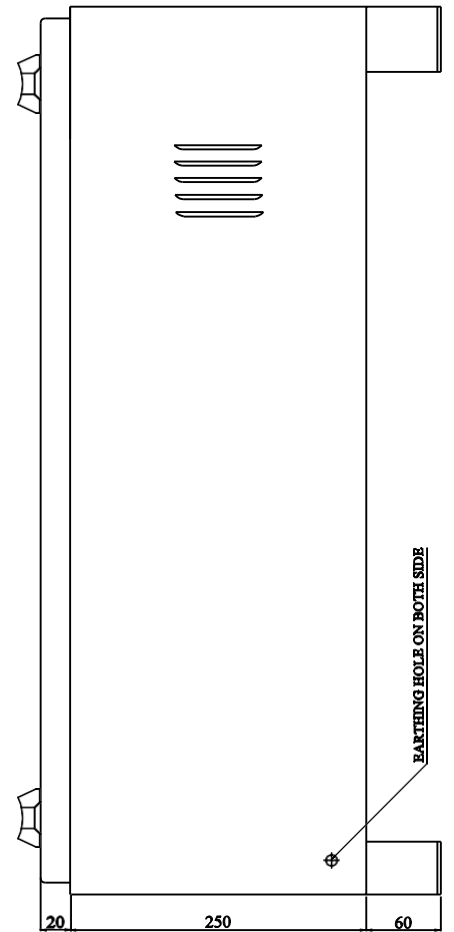
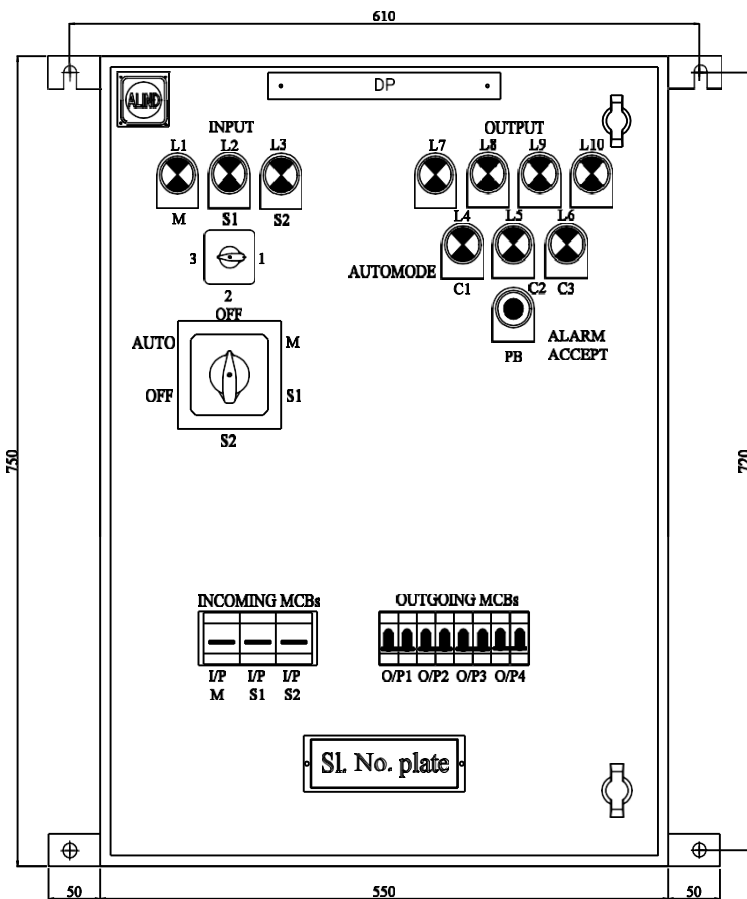
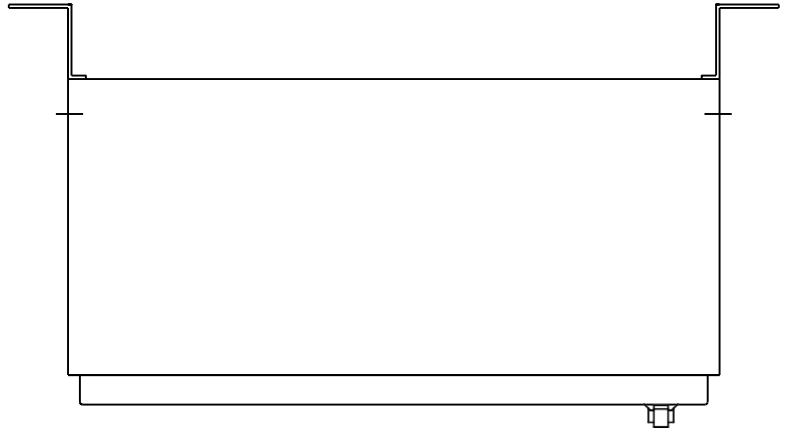
Sl. No.	Faults	Checks
1	No Incoming Power to panel	1) Check Input & Output voltages of incoming MCB's(M,S1,S2) 2) Check external input supply voltage (AT UP,AT DOWN,LOCAL)
2	Input Indication not working	1) Check status of incoming MCB's 2) Check input indicating lamp
3	Output indication not working	1) Check status of outgoing MCB's 2) Check output indicating Lamp
4	No output in Manual Mode (M,S1,S2)	1) Check functioning of Rotary Switch 2) Check outgoing MCB's
5	No output in Auto Mode	1) Check 3 input voltage of AECU 2) Check auxiliary voltage of contactors (C1,C2,C3) 3) Check NO contact of contactors (C1,C2,C3) 4) Check status of isolating MCB 5) Check status of outgoing MCB's
6	Buzzer not working	1) Check Buzzer switch ON or OFF
7	Buzzer not Accept	1) Check Push Button Contact

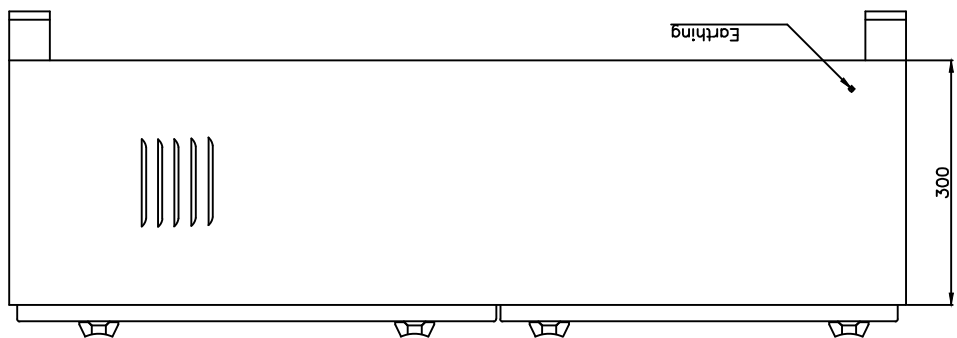
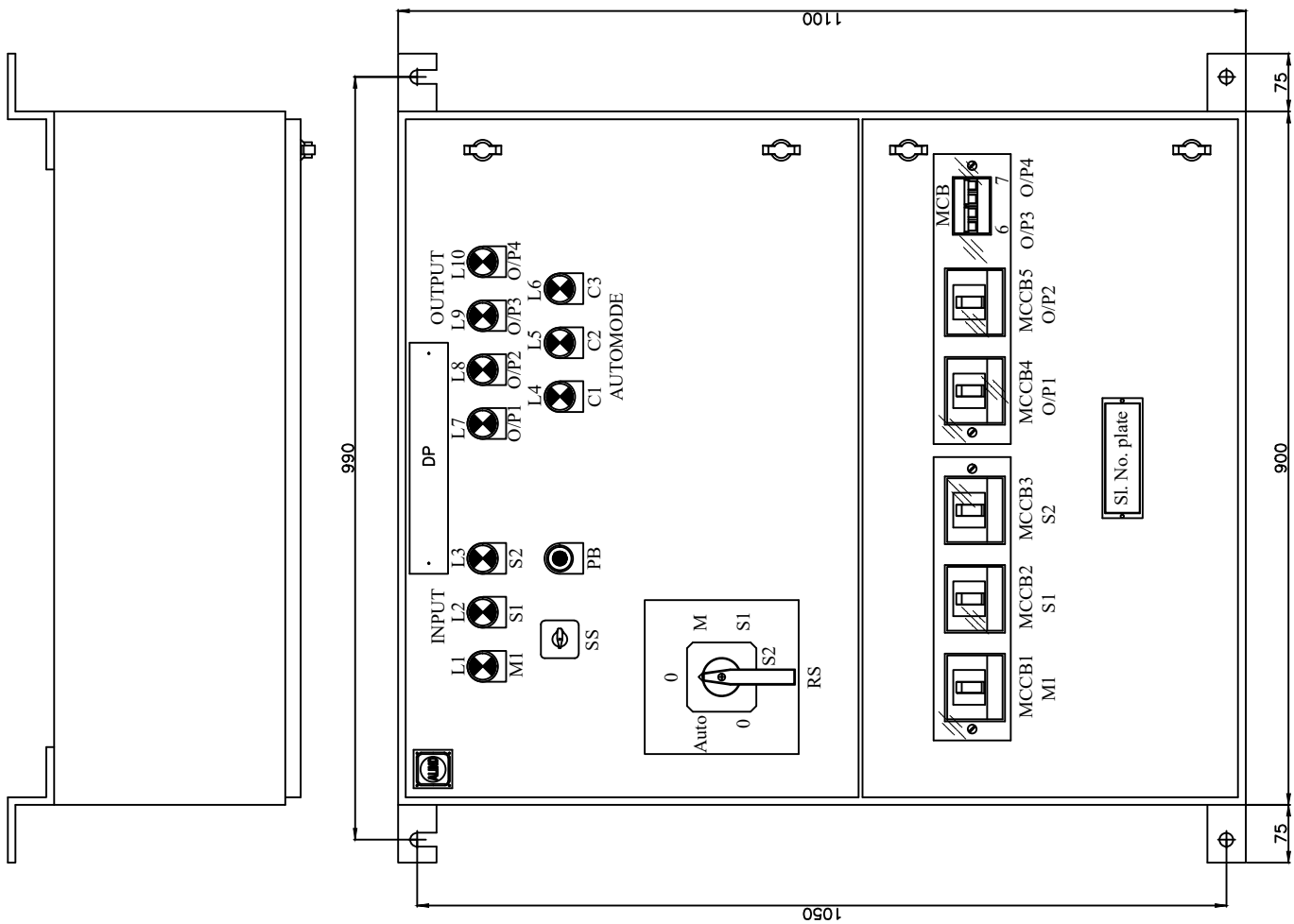
COMMISSIONING

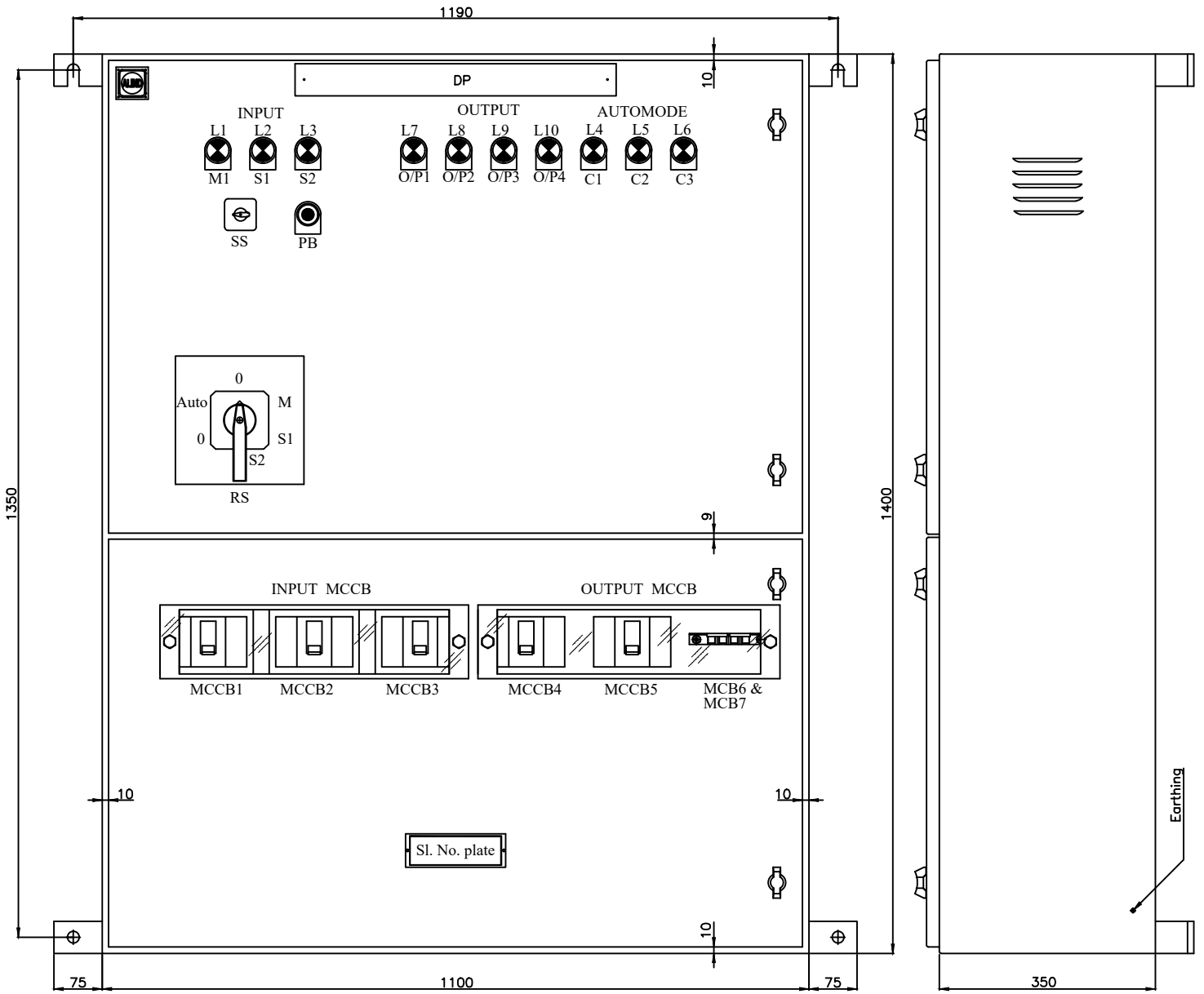
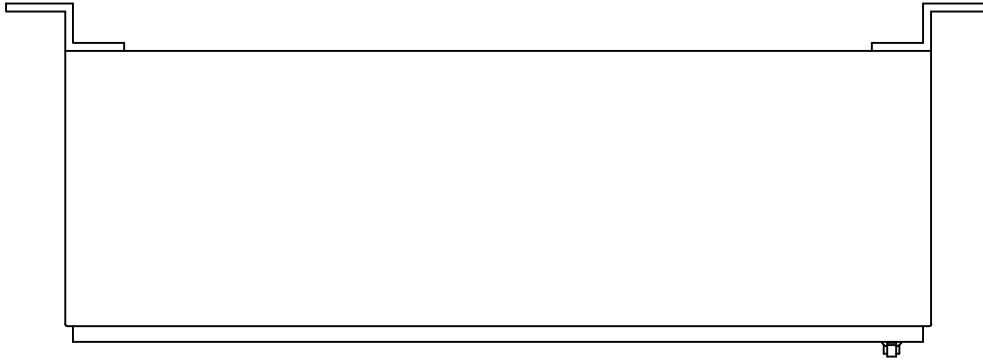
COMMISSIONING DESCRIPTION

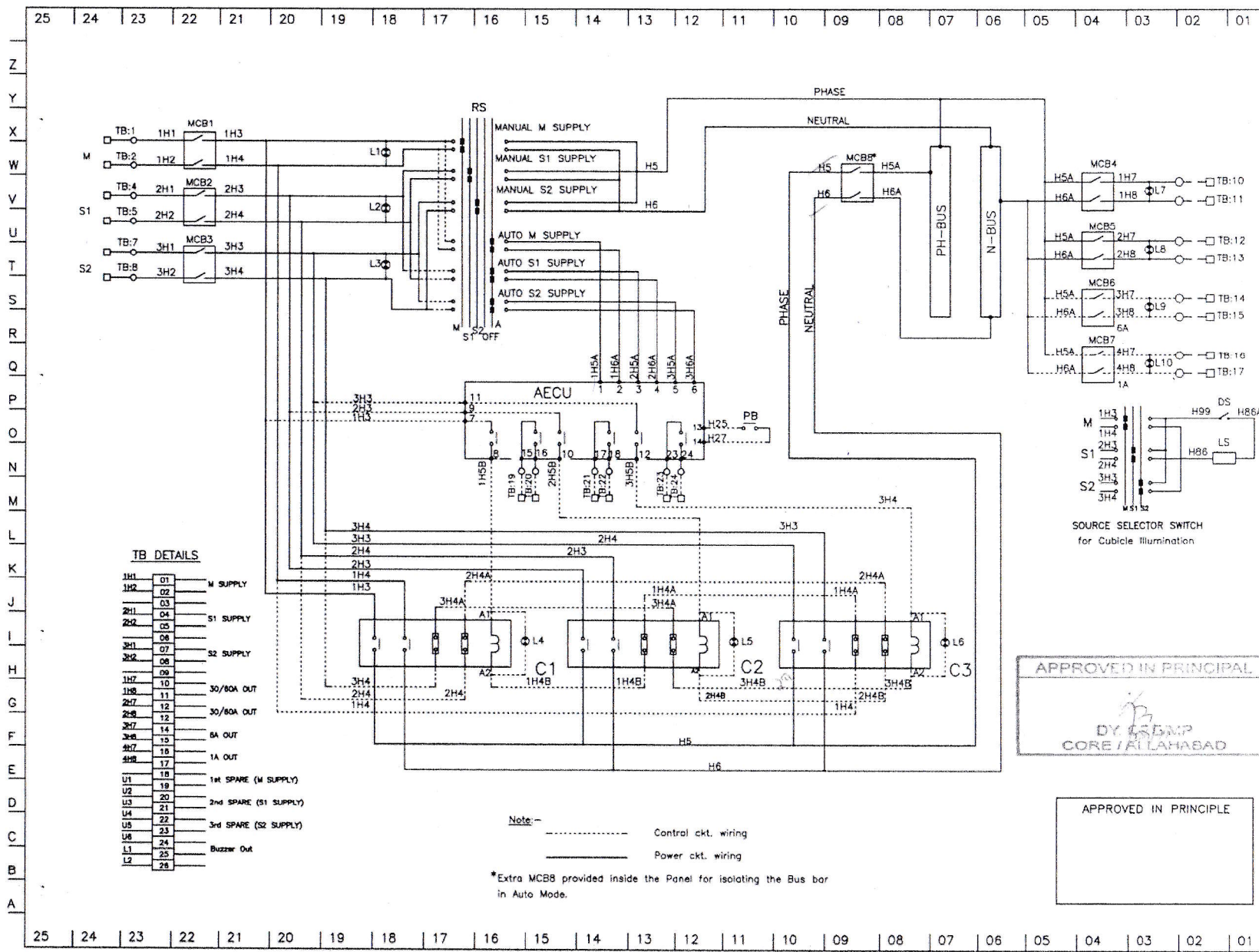
- Unpack the Panel and check for any physical damage. In case of damage, inform concerned authorities.
- Mount the panel in vertical position at proper place where necessary input power supplies are present.
- Pass the cables through the holes and with proper glands and terminate on Input MCB's.
- Connect outgoing cables to output MCB's with correct power rating. (Note: There are two MCB's with 32/63/150A and one 6A & 1A MCB's rating at output terminals), connect 6A load to 6A MCB and 1A, load to 1A MCB.
- Whenever there is a changeover of incoming supply due to any reason internal alarm sounds.
- Panel is now ready for initial switch ON.
- Keep all MCB's in OFF position
- Set the Rotary switch to OFF position.
- Switch on the input power to the panel (All the supplies M, S1, S2).
- Switch on the MCB for supply M.
- Check if input indicating lamp M is ON.
- Switch the Rotary switch to manual M position (position 1 clockwise).
- There will be no out indication.
- Switch on output MCB's one by one and output indicating lamp will glow. Indicating power availability at the output terminals.
- Turn rotary switch clockwise to position S1 & S2.
- Repeat with S1 & S2 with same results from S1 & S2 source.

- Turn the Rotary switch further and now the panel will be in Auto mode
- In case of all supplies present in Auto mode indicating lamp glows and output indicating lamp also glows.
- To check auto operation off input Main MCB OFF and the Standby 1 indicating lamp of auto mode will be ON. Standby 1 source will feed the output. Input Main indicating lamp will be OFF.
- Internal buzzer will sound. Accept the buzzer with alarm accept push button on the front panel.
- Repeat with Standby 2 with similar results.
- Switch ON Main input MCB and automatically Main will feed output as Main supply priority is the highest, followed by Standby 1
- To check door lamp using Source Selector Switch from one supply to another supply.
- Panel is now ready for on line operation









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TB DETAILS

1H1	01	M SUPPLY
1H2	02	
	03	
2H1	04	S1 SUPPLY
2H2	05	
	06	
3H1	07	S2 SUPPLY
3H2	08	
	09	
1H7	10	30/60A OUT
1H8	11	
2H7	12	30/60A OUT
2H8	13	
3H7	14	6A OUT
3H8	15	
4H7	16	1A OUT
4H8	17	
	18	
U1	19	1st SPARE (M SUPPLY)
U2	20	2nd SPARE (S1 SUPPLY)
U3	21	
U4	22	3rd SPARE (S2 SUPPLY)
U5	23	
U6	24	
L1	25	Buzzer Out
L2	26	

Note:-
 - - - - - Control ckt. wiring
 _____ Power ckt. wiring

MODIFICATIONS

910 614			
Rev.	GSS	AKS	RMS
DRN	CHD	RVD	APPD
SCHEMATIC DRAWING			
APPROVED IN PRINCIPAL			
 D.Y. G. D. M. P. CORE / ALLAHABAD			
APPROVED IN PRINCIPLE			
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