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2.For EPC contractors only.

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GREEN SECURE ENERGY SYSTEMS

DOCUMENT:	**STANDARD DRAWING**
OWNER:	**M/s. AP TRANSCO**
PRODUCT:	**BATTERY CHARGER WITH DCDB**
CHARGER RATING:	**220V DC / 100AH, 10A FC & 16A FCBC BATTERY CHARGER**

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BATTERY CHARGER PANEL

This Battery charger is designed to feed the load & to charge the battery both continuously with rated current at rated voltage. This is floor mounting freestanding type cabinet made of CRCA sheet with 2.5mm load bearings and 2mm non-load bearing and removable side doors. The heavy components like transformers, chokes are mounted at the backside on channel platform. Natural air cooling (Exhaust fans are mounted to forcibly cool the power devices, transformers, and others if the cooling fans fails it doesn't affect the system), All the other components will be mounted on a component plate and Mounting channel to the possible extent. The control Switches, Meters, Indicating Lamp, annunciator are mounted on front door with legends. Bottom gland plate is provided to take all connections from the bottom TB. The panel will have louvers for good ventilation. The panel will be chemically treated before it is painted by powder coating of shade 631 of IS-5.

The Float and Float cum Boost Charger will be connected to AC input power through individual circuit breaker CB-101/102. The transformer TRF1/TRF7 step down the AC input to the required level and this AC power is fed to the respective power bridge (SCR (TH1-TH3/TH4-TH6)). The transformer (Tfr-2 & 8) has winding of 20V for supplying power to control circuit and (Tfr-3-6 & 9-12)24V for triggering circuit. The overall system is protected against overload and short circuit by fuses, circuit breakers, contactors with thermal overload relays OLR1 & OLR2. The Charger control & triggering PCB-1 and Control & triggering PCB-2 provide the regulation and current limit to the Charger circuit, in addition to supplying gate pulses to the power SCRs. The output voltage of Float Charger, independent of AUTO/Manual selection, is adjusted by using the potentiometer P1. The output Float voltage of FCBC in VRLA mode can be adjusted independent of AUTO/Manual selection is adjusted by using Potentiometer P2. The output Boost Voltage of FCBC in VRLA mode can be adjusted independent of AUTO/Manual selection is adjusted by using the Potentiometer P3. For NVRLA mode, float voltage of FCBC can be adjusted by using Potentiometer P4 (In NVRLA mode FCBC works only in Manual Mode). For NVRLA mode, Boost voltage of FCBC can be adjusted by varying potentiometer P5 (In NVRLA mode FCBC works only in Manual Mode). Equalizing voltage in NVRLA can be adjusted by varying P6. Potentiometer P7 (FCBC) is used to increase or decrease current setting of the Battery current Limit circuit. NVRLA & Auto mode are selected charger should work in Float mode.

The potentiometers provided externally (P1, P2, P3, P4, P5) work in parallel with the Internal Potentiometers provided on the PCB s. Hence, the Internal and external Potentiometers act as a combined unit and so, any change in the settings of either the external Potentiometers (P1, P2, P3, P4, and P5) or the internal Potentiometers mounted on the PCBs will cause change in the Set Voltage values.

The DC power is filtered and smoothened using filter chokes L-11 & L-21 and DC capacitors Bank FC1/FC2. Normally the charger will charge the battery in constant current mode when battery is highly discharged. Once the battery is charged then it will be charging in constant voltage mode. While charging in constant voltage mode charger will be supplying trickle current to meet the leakage current and any loads connected to the battery.

Important points:

1. The float charger (FC) has an internal Charging Voltage setting and the charging voltage is decided by the external Potentiometer P1 only, irrespective of the position of selector switches SW1, SW2.

2. The Float charger has an internal current setting of 9 Amps DC for battery current (set by potentiometer VR8 on card GSSCB02B-1 which when rotated in clockwise fashion increases the set value and vice versa) which

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acts as a Pickup current beyond which, the FCBC will start automatically in Boost mode and feed the battery, while the Float charger keeps feeding the load.

3. The FCBC has two internal Charging Voltage settings for AUTO mode only. One for VRLA Float and the other for VRLA boost. These charging voltage settings are decided by the internal Potentiometer VR1 for VRLA Float and Potentiometer VR4 for VRLA Boost. This makes the charger operation not possible for NVRLA battery in AUTO mode. NVRLA battery can be charged in Manual mode only.

4. The FCBC has an internal current setting which acts as a Drop Off current Set Value, below which the FCBC switches off the Boost voltage. This setting (battery current /Float charger output current drop off value) is set at 3 Amps DC by potentiometer VR11 on card GSSCB02B-2. The set value can be increased by turning the pot in clockwise fashion and vice versa.

Auto Operation

For AUTO operation of the charger, the AUTO/MANUAL FLOAT/MANUAL BOOST selector switch (SW2) must be kept in AUTO position.

When the selector switch SW2 is in AUTO mode, the Float charger works in float mode and will feed the Loads as well as the battery through the K3 contactor which shall be in closed condition as per the internal logic of the control card of the float charger. But if the Battery charging current exceeds 9 amps the Following actions take place.

1. K3 contactor will drop and simultaneously, the FCBC will start charging the Battery in the boost mode automatically and will improve the battery voltage.

2. The Float charger continues to feed the Loads at Float voltage.

3. When K3 is OFF, if the Mains supply fails, a permanent connection of Tap Cell to the load is provided to prevent loss of DC voltage to loads.

4. As soon as the battery charging current falls below a preset value of 3 amps the FCBC will stop its action, the K3 contactor will pick up again and the battery and load will be fed from the Float Charger (FC) and normalcy will be restored.

5. In the AUTO mode, if the Float charger becomes faulty, the FCBC will act as a Float charger only and will feed the Loads and the battery.

6. Similarly, in AUTO mode, if the FCBC becomes faulty, the Float charger will work in FLOAT mode and will feed the load and battery.

Manual Mode

The charger has a selector switch SW1 by which either VRLA mode or NVRLA mode can be selected. Once this switch is selected in either VRLA mode or NVRLA mode, the next step is to select either AUTO mode or Manual Float mode or Manual Boost mode.

If the Manual Float mode is selected in SW2 and SW1 is selected in VRLA, the Potentiometer P2 will decide the set voltage. If SW2 is in Manual Boost mode and SW1 is in VRLA, Potentiometer P3 will decide the set voltage. If the Manual Float mode is selected in SW2 and SW1 is selected in NVRLA, the Potentiometer P4 will decide the set voltage. If the Manual Boost mode is selected in SW2 and SW1 is selected in NVRLA, the

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Potentiometer P5 will decide the set voltage. If the Manual Equalize Mode is selected in SW2 and SW1 is selected in NVRLA, the Potentiometer P6 will decide the set voltage.

INTERLOCKING CONTACTOR (K3) OPERATION:

When the selector switch SW2 is in auto position, Provision is made to close the K3 for various condition of operation. The contactor operates on battery through potential free contact of FC & FCBC output voltage

sensing boards GSS-0718-1D and GSS-0718-2D relay board FFR-1/FFR-2. The precautions are taken for the following conditions.

a. In case of mains power supply failure or any system abnormality signals received through GSS-0718-1D/2D, FFR-1/FFR-2 relays, the contactor K3 is energized, and it is ensured that the Load Bus is fed from the Battery.
b. In Float cum boost charger, if SF4-SF6 is blown or charger fails (when the battery is fed from float cum boost charger FCBC), the contactor K3 closes through FCBC output relay sensing board FFR-1 & 2 so that the battery is connected to float charger.

c. If float Charger or Float cum Boost charger failed, then also the contactor K3 is closed and providing full battery voltage to load.

d. If float charger fails, then the Float cum Boost Charger should come in to Float mode automatically (whatever may be the mode selector switch position of SW1 & SW2) and supplies Load requirement by closing the contactor K3.

Logic matrix for FC & FCBC operations (For VRLA mode)

Condition of AC Supply	Mode	Condition of FC	Condition of FCBC	Battery Current	Interlocking contactor-K3	Load	Battery
AC supply available	Auto	Healthy	Healthy	Less than set value	ON	Supplied by FC (On float voltage)	On float voltage (By FC)
AC supply available	Auto	Healthy	Healthy	Greater than set value	OFF	Supplied by FC (On float voltage)	On boost voltage (by FCBC)
AC supply available	Auto	Fail	Healthy	Less/greater than set value	ON	Supplied by FCBC (On float voltage)	On float voltage (By FCBC)
AC supply available	Auto	Healthy	Fail	Less/greater than set value	ON	Supplied by FC (On float voltage)	On float voltage (By FC)
AC supply available	Manual float	Healthy	Healthy	Less/greater than set value	ON	Supplied by FCBC (On float voltage) and FC should be automatically off	On float voltage (By FCBC)
AC supply available	Manual boost	Healthy	Healthy	Less/greater than set value	OFF	Supplied by FC (On float voltage)	On boost voltage (by FCBC)
AC supply available	Manual float/boost	Fail	Healthy	Less/greater than set value	ON	Supplied by FCBC (On float voltage)	On float voltage (By FCBC)
AC supply available	Manual float/boost	Healthy	Fail	Less/greater than set value	ON	Supplied by FC (On float voltage)	On float voltage (By FC)
AC supply available	Any mode	Fail	Fail	Less/greater than set value	ON	Supplied by battery	On discharge
AC supply fail	Any mode	Healthy	Healthy	Less/greater than set value	ON	Supplied by battery	On discharge

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Logic matrix for FC & FCBC operations (For Tubular mode)

Condition of AC Supply	Mode	Condition of FC	Condition of FCBC	Interlocking contactor-K3	Load	Battery
AC supply available	Manual float	Healthy	Healthy	OFF	Supplied by FC (On float voltage)	On float voltage (By FCBC)
AC supply available	Manual float	Healthy	Fail	ON	Supplied by FC (On float voltage)	On float voltage (By FC)
AC supply available	Manual float	Fail	Healthy	ON	Supplied by FCBC (On float voltage)	On float voltage (By FCBC)
AC supply available	Manual boost	Healthy	Healthy	OFF	Supplied by FC (On float voltage)	On boost voltage (by FCBC)
AC supply available	Manual boost	Healthy	Fail	ON	Supplied by FC (On float voltage)	On float voltage (By FC)
AC supply available	Manual boost	Fail	Healthy	ON	Supplied by FCBC (On float voltage)	On float voltage (By FCBC)
AC supply available	Any Mode	Fail	Fail	ON	Supplied by battery	On discharge
AC supply fail	Any Mode	Healthy	Healthy	ON	Supplied by battery	On discharge

No auto mode selection for a NVRLA battery.

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GREEN SECURE ENERGY SYSTEMS

TECHNICAL SPECIFICATION

Type : FLOAT & FLOAT CUM BOOST CHARGER

Rating : 220V 10A FC & 16A FCBC with DCDB and battery bank.

Technology : Thyristor based technology, for 220V/100Ah VRLA/NVRLA

AC INPUT :

1. Voltage : 415VAC ±15%
2. Frequency : 50Hz ±5%
3. Phase, Wires : 3 Phase, 4Wire
4. Operating temperature: 0°c to +50 °c

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DC OUTPUT :

SL.NO	DESCRIPTION	VRLA	NVRLA
1	No. of cells	110	110
2	Float voltage	247.5V	247.5C
3	Boost voltage	253V	302.5V
4	Equalizing Voltage		302.5V
5	Charger output voltage	247.5V	247.5V
6	Charger output current - FC	10A	10A
7	Charger output current - FCBC	16A	16A
8	Ripple	Less than 2% RMS	
9	Efficiency	≥85% at full Load	
10	Voltage Regulation	±1%	

METERS:

SLNO	Meter Description	Type	Class	Qty
1	AC VAF meter	Digital	1	1
2	FC VA METER	Digital	1	1
3	FCBC VA METER	Digital	1	1
4	BATTERY VA METER	Digital	1	1
5	LOAD VA METER	Digital	1	1
6	Earth Leakage Ammeter	Analog	0.5	1

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INDICATIONS: Clustered LED will be provided for the following condition:

1. L1-L3 : Phase indicating lamp (RYB)
2. L4 : Float ON
3. L5 : Boost ON
4. L6 :K3(Contactor ON)
5. DCDB & FDR 1-24 : DCDB Incomer & Feeder ON

ALARM ANNUNCIATOR WITH RS485 WILL BE PROVIDED FOR THE FOLLOWING CONDITIONS WITH AUDIO ALARM WITH PFCs FOR ABNORMALITIES:

1. AC mains fail.
2. FC AC I/P Circuit Breaker Trip/Fail
3. FCBC AC I/P Circuit Breaker Trip/Fail
4. FC DC O/P Circuit Breaker Trip/Fail
5. FCBC DC O/P Circuit Breaker Trip/Fail
6. DC under voltage.
7. DC over voltage.
8. Battery earth fault.
9. FC Rectifier/Thyristor Fuse Fail
10. FCBC Rectifier/Thyristor Fuse Fail
11. FC Filter/Capacitor Fuse Fail
12. FCBC Filter/Capacitor Fuse Fail
13. DC Contactor off and DCDB incomer Trip/Off
14. Battery I/P Circuit Breaker Trip/Off
15. DC Fail

PROTECTION: Following Protections will be provided in the system.

1. AC Input protection MCCB for both FC & FCBC
2. Protective Relay (Over / Under Voltage, Phase Failure, Sequence).
3. Battery current limiter.
4. DC Short Circuit Protection.
5. Galvanic isolation by transformer
6. DC output protection MCB for both FC & FCBC
7. Fast acting semiconductor fuses for both FC & FCBC
8. Charger over load protection
9. MCCB for Battery input protection
10. Blocking diodes

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CONTROLS & SWITCHES:

1. Auto/float/boost mode selector switch
2. VRLA/NVRLA mode selector switch
3. Potentiometers & Selector switch for float/boost/equalizing voltage variations of ±10%
4. MCB for Door lamp /Heater/ socket power supply
5. MCCB for AC input and DC output and also for battery

DCDB incomer	:	63A 3P MCCB
FEEDER1-6	:	20A 2P MCB
FEDDER7-12	:	10A 2P MCB

4-20mA Transducer for DC earth leakage – 1 No.

SPECIAL FEATURES: The following features are provided in the system

1. Soft starting on DC side.
2. Class-F insulation with class –F temperature limits for all magnetic materials.
3. Charger and battery current limiting feature
4. Filters to reduce ripple.
5. Automatic Float to Boost changeover based On current drawn by Battery.
6. Space Heaters and thermostat for Temperature.

GENERAL :

1.	Cabinet	:Freestanding cabinet, floor mounting type.
2.	CRCA Sheet Thickness	:2.5mm for load bearing sections. 2.0mm for non-load bearing sections.
3.	Cabinet Dimensions	:As per G.A drawings enclosed.
4.	Cable entry	:Bottom
5.	Paint	:Interior/Exterior:631 of IS-5
6.	Paint thickness	:80-120microns
7.	Protection	:IP42
8.	Temperature range of operation	:0-50°C
9.	Earth Bus Bar (Tinned Copper)	:25 x 3 Sq.mm.
10.	Input & output terminals	:Screw & Stud type.
11.	Nature of Cooling	:Natural Air Cooling.(If exhaust fan fails System doesn't get affected)

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GREEN SECURE ENERGY SYSTEMS

BATTERY CHARGER PANEL

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RATING

AC INPUT VOLTAGE	:	415V ± 15%, 50Hz ± 5%, 3Ph 4WIRE
CHARGER RATING	:	220V/100Ah 10A FC & 16A FCBC WITH DCDB
BATTERY TYPE	:	SUITABLE FOR 220V 100AH VRLA/NVRLA
DC OUTPUT	:	247.5V DC

REVISION	01				DOMESTIC ☑	EXPORT ☐		
PURPOSE OF ISSUE	INFORMATION ☐	REVIEW/ APPROVAL ☑	RELEASE FOR SITE ☐	AS-BUILT ☐				

REV	DATE	MODIFICATIONS
01	26.06.2023	STANDARD DRAWING
00	21.06.2023	STANDARD DRAWING

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GREEN SECURE ENERGY SYSTEMS,.

TITLE: 220V,100Ah, 10A FC & 16A FCBC WITH DCDB

PAGE TYPE: TITLE SHEET

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1	TITLE SHEET.	21.06.2023	26.06.2023
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5	GENERAL ARRANGEMENT.	21.06.2023	26.06.2023
6	AC SCHEMATIC CIRCUIT	21.06.2023	26.06.2023
7	DC SCHEMATIC CIRCUIT	21.06.2023	26.06.2023
8	METER CIRCUIT	21.06.2023	26.06.2023
9	FEEDER CIRCUIT	21.06.2023	26.06.2023
10	CONTROL & TRIGGER CIRCUIT	21.06.2023	26.06.2023
11	FUSE FAILURE RELAY CIRCUIT	21.06.2023	26.06.2023
12	ALARM ANNUNCIATOR	21.06.2023	26.06.2023
13	ALARM ANNUNCIATOR	21.06.2023	26.06.2023
14	PFC TERMINALS	21.06.2023	26.06.2023
15	TERMINAL BLOCK DETAILS	21.06.2023	26.06.2023
16	TERMINAL BLOCK DETAILS	21.06.2023	26.06.2023

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01	26.06.2023	STANDARD DRAWING
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GREEN SECURE ENERGY SYSTEMS,.

TITLE: 220V,100Ah, 10A FC & 16A FCBC WITH DCDB

PAGE TYPE: TABLE OF CONTENTS

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- ROTARY SWITCH WITHOUT OFF
- ROTARY SWITCH WITH OFF
- AC PLUG WITH SWITCH
- BATTERY
- CAPACITOR (NON POLARIZED)
- CHOKE
- CONTACTOR/RELAY COIL
- CURRENT TRANSFORMER
- DIODE
- EARTH(GROUND)
- RESISTOR
- ELECTROLYTIC CAPACITOR
- HRC FUSE LINK
- GLASS FUSE
- HRC FUSE
- HOOTER (HOOTER)
- INDICATION LAMP
- LIGHT EMITING DIODE
- LIMIT SWITCH
- MINIATURE CIRCUIT BREAKER
- MODULED CASE CIRCUIT BREAKER
- 'NORMALLY OPEN' CONTACT
- 'NORMALLY CLOSE' CONTACT
- 'NORMALLY OPEN' PUSH BUTTON
- 'NORMALLY CLOSE' PUSH BUTTON
- ROTARY ON/OFF SWITCH
- TG ON/OFF TOGGLE SWITCH
- OVER LOAD RELAY
- PANEL ILLUMINATION LAMP
- POTENTIAL TRANSFORMER
- POTENTIOMETER
- COOLING FAN
- SEMI CONDUCTOR FUSE
- SHUNT
- SINGLE PHASE
- SPACE HEATER
- TERMINAL BLOCK
- THERMOSTAT
- THREE PHASE
- THYRISTOR
- VARIABLE RESISTOR
- SURGE PROTECTION DEVICE

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REV	DATE	MODIFICATIONS
01	26.06.2023	STANDARD DRAWING
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GREEN SECURE ENERGY SYSTEMS,.

TITLE: 220V,100Ah, 10A FC & 16A FCBC WITH DCDB

PAGE TYPE: BASIC SYMBOLS

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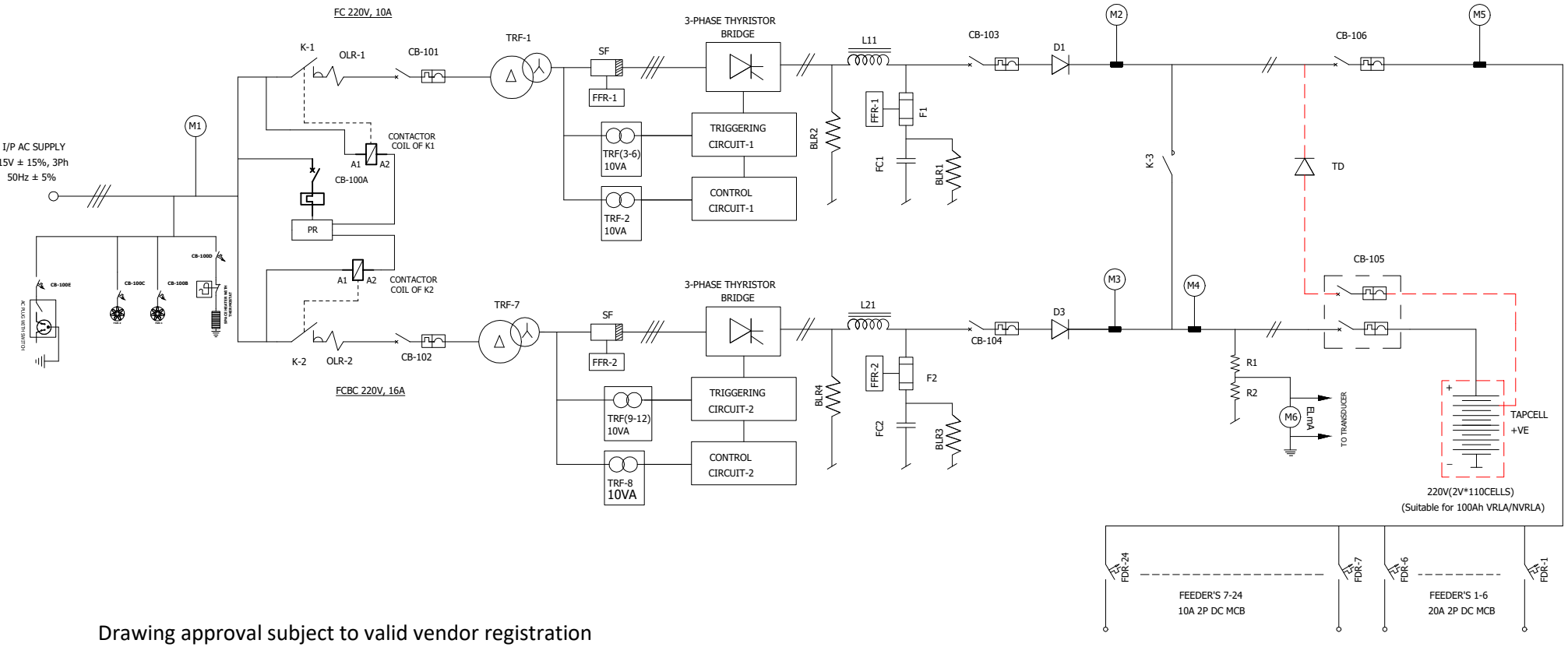
SINGLE LINE DIAGRAM



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GREEN SECURE ENERGY SYSTEMS,.

TITLE: 220V,100Ah, 10A FC & 16A FCBC WITH DCDB

PAGE TYPE: SINGLE LINE DIAGRAM

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GENERAL ARRANGMENT

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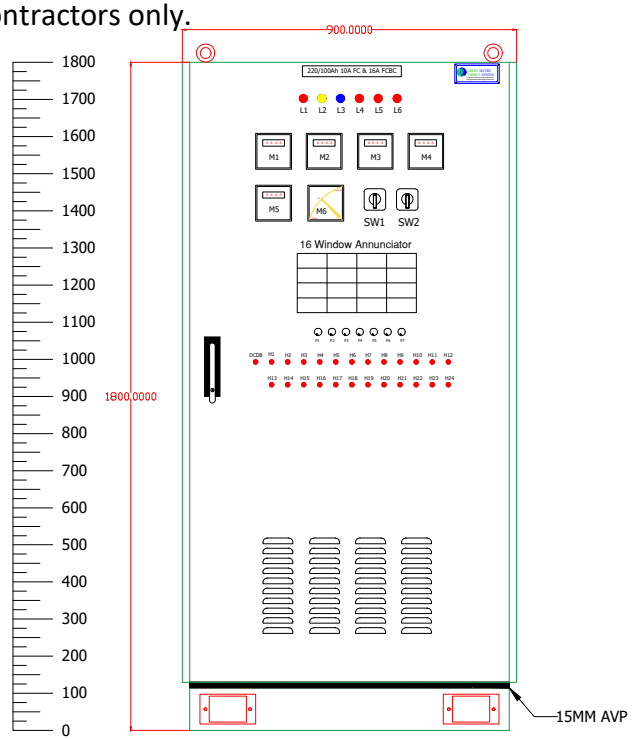
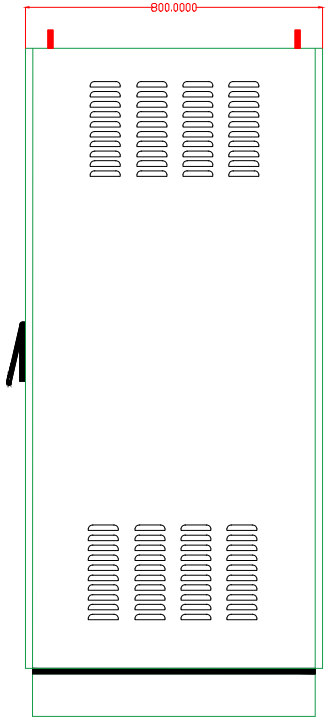
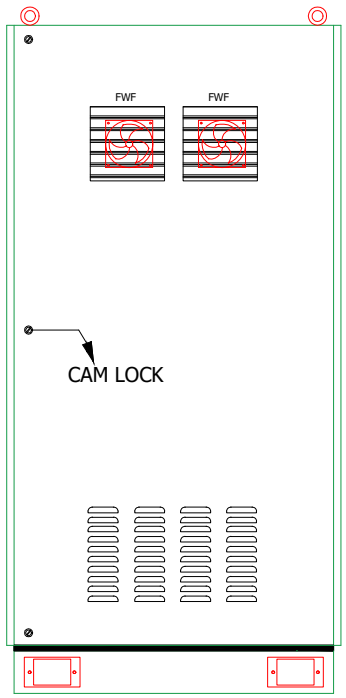


FRONT VIEW (DOOR CLOSED)



SIDE VIEW



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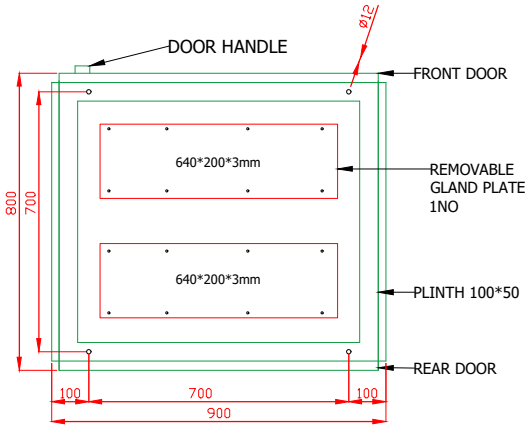

BOTTOM VIEW

NOTE :

1. PANEL WIDTH & DEPTH DIMENSIONS ARE INCLUDING DOORS
2. FRONT & REAR HINGED DOORS WITH FIXED SIDE DOORS.
3. MATERIAL : CRCA SHEET STEEL
4. GLAND PLATE : 3mm
5. LOAD BEARING :2.5mm
6. NON -LOAD BEARING :2mm
7. PAINT : 631 of IS-5
8. CABLE ENTRY : FROM BOTTOM
9. EARTH BUSBAR : 25 X 3 TINNED COPPER
10. IP PROTECTION : IP42

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CHIEF ENGINEER/PROJECTS

APTRANSCO/VS/VIJAYAWADA

REV	DATE	MODIFICATIONS
01	26.06.2023	STANDARD DRAWING
00	21.06.2023	STANDARD DRAWING

OWNER: M/s. AP TRANSCO.

ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.

GREEN SECURE ENERGY SYSTEMS,.

TITLE: 220V,100Ah, 10A FC & 16A FCBC WITH DCDB

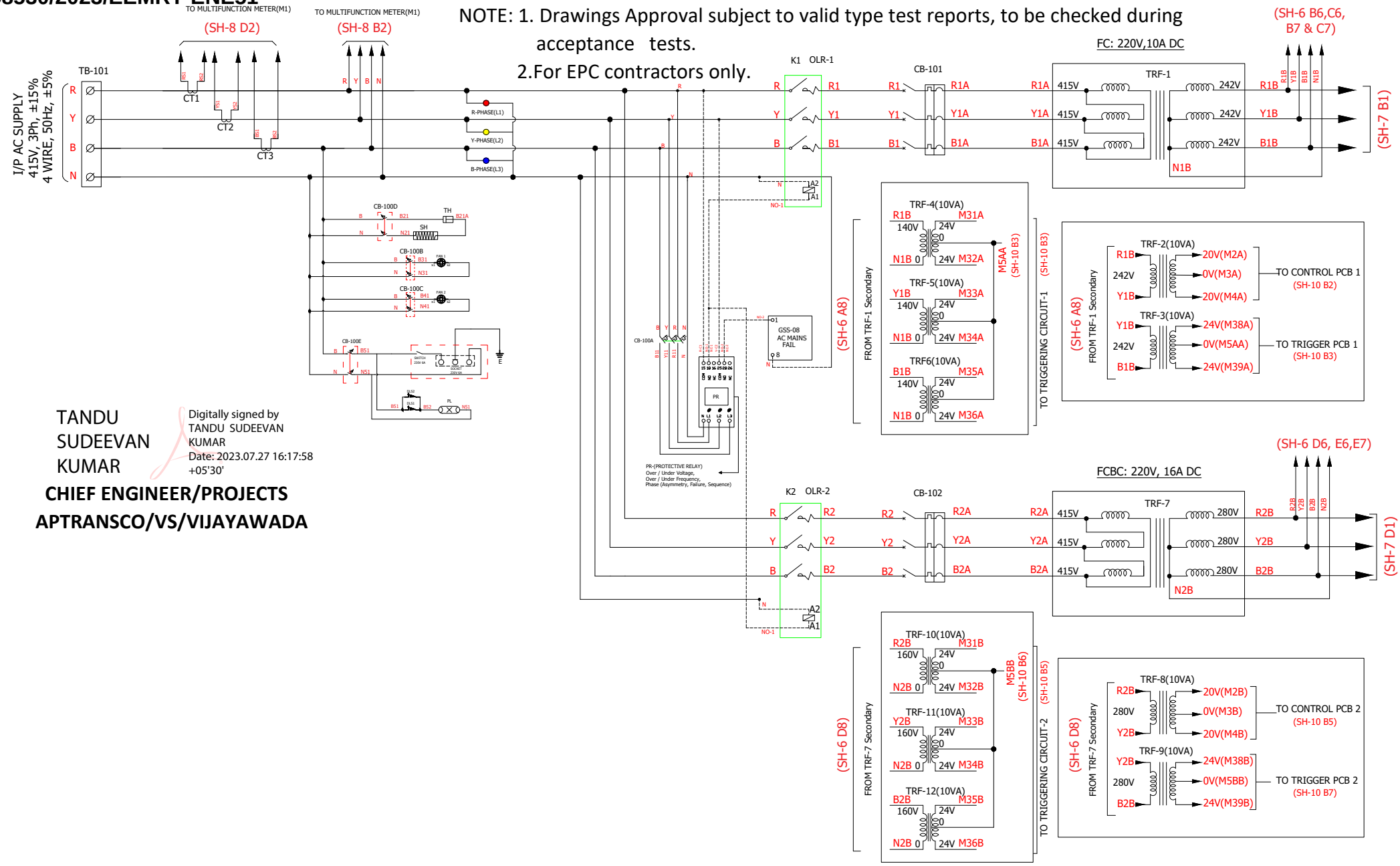
PAGE TYPE: GENERAL ARRANGEMENT

DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	05 OF 16
DRAWING No. APT STD		REV.	01

7558530/2023/EEMRT-ENE51

AC SCHEMATIC CIRCUIT

NOTE: 1. Drawings Approval subject to valid type test reports, to be checked during acceptance tests.
2.For EPC contractors only.



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CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

REV	DATE	MODIFICATIONS
01	26.06.2023	STANDARD DRAWING
00	21.06.2023	STANDARD DRAWING

OWNER: M/s. AP TRANSCO.

ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.

GREEN SECURE ENERGY SYSTEMS,.

TITLE: 220V,100Ah, 10A FC & 16A FCBC WITH DCDB

PAGE TYPE: AC SCHEMATIC CIRCUIT FOR FC & FCBC

DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	06 OF 16
DRAWING No.	APT STD	REV.	01

1. Drawing approved subject to valid type test reports, to be checked during acceptance tests.
2. For EPC contractors only.

DC SCHEMATIC CIRCUIT

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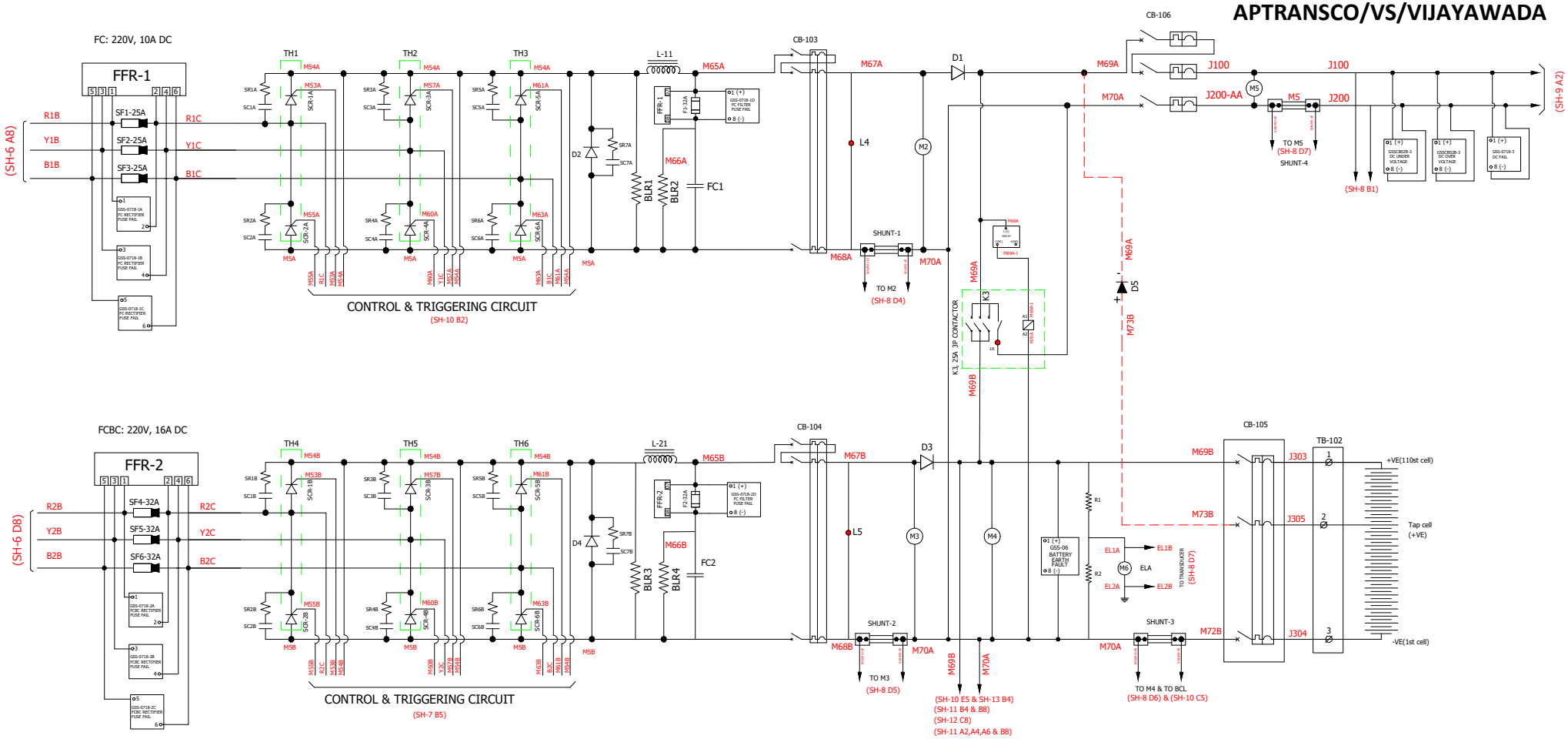
Drawing approval subject to valid vendor registration

CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA



REV	DATE	MODIFICATIONS
01	26.06.2023	STANDARD DRAWING
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ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.

OWNER	M/s. AP TRANSCO.
TITLE	220V,100Ah, 10A FC & 16A FCBC WITH DCDB
PAGE TYPE	DC SCHEMATIC CIRCUIT FOR FC & FCBC

GREEN SECURE ENERGY SYSTEMS,.

DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	07 OF 16
DRAWING No. APT STD		REV.	01

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NOTE: 1. Drawings Approval subject to valid type test reports, to be checked during acceptance tests.

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METER CIRCUIT

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APTRANSCO/VS/VIJAYAWADA

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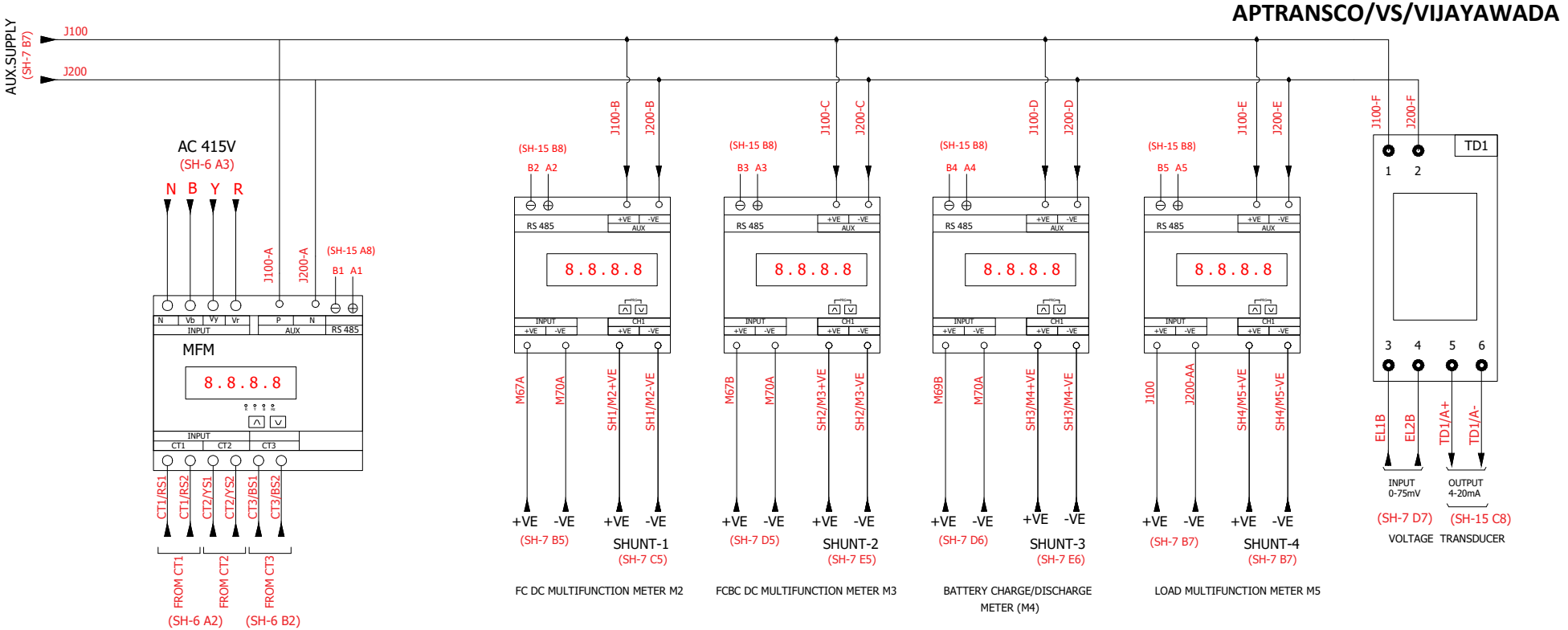
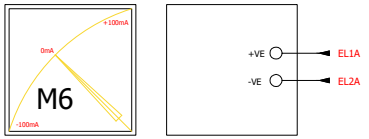


AC MULTI FUNCTION METER (M1)

ELA (ANALOG METER)



REV	DATE	MODIFICATIONS
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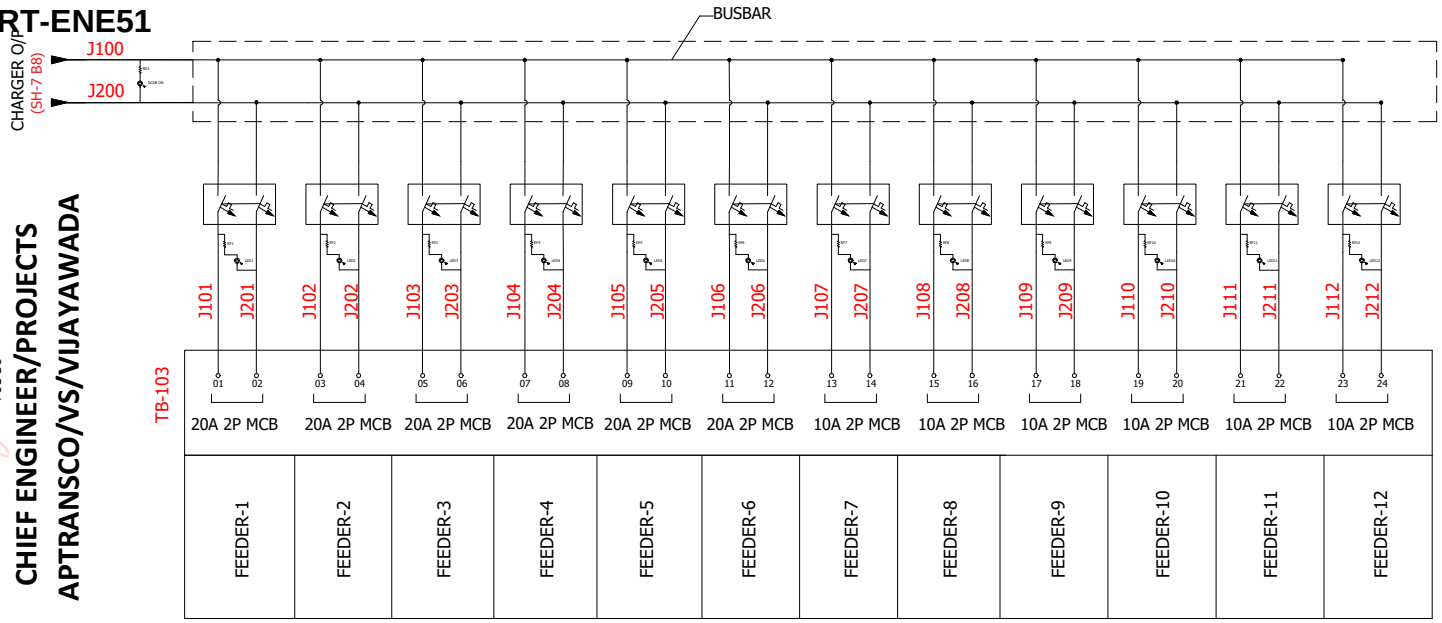
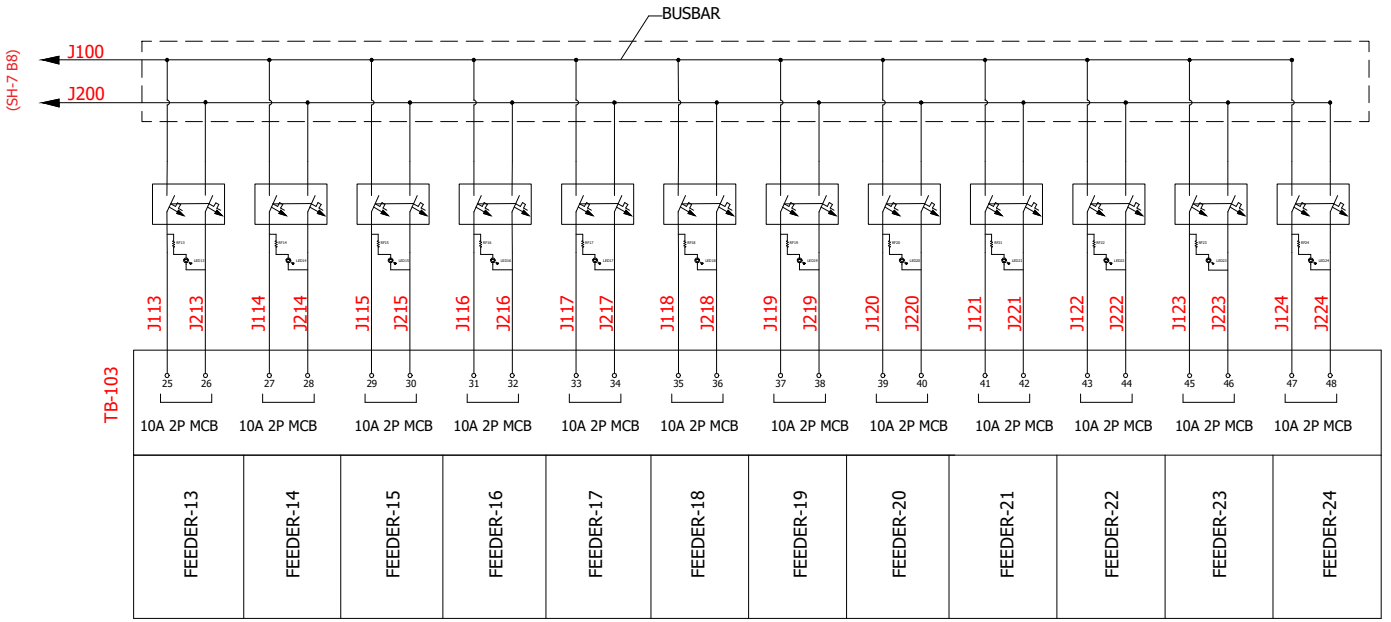
OWNER	M/s. AP TRANSCO.
TITLE	220V,100Ah, 10A FC & 16A FCBC WITH DCDB
PAGE TYPE	METER CIRCUIT

GREEN SECURE ENERGY SYSTEMS,.

DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	08 OF 16
DRAWING No.	APT STD	REV.	01

7558530/2023/EEMRT-ENE51





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CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

NOTE: 1. Drawings Approval subject to valid type test reports, to be checked during acceptance tests.
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OWNER	M/s. AP TRANSCO.
TITLE	220V,100Ah, 10A FC & 16A FCBC WITH DCDB
PAGE TYPE	FEEDER CIRCUIT

GREEN SECURE ENERGY SYSTEMS,.

DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	09 OF 16
DRAWING No.	APT STD	REV.	01

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NOTE: 1. Drawings Approval subject to valid type test reports, to be checked during acceptance tests.

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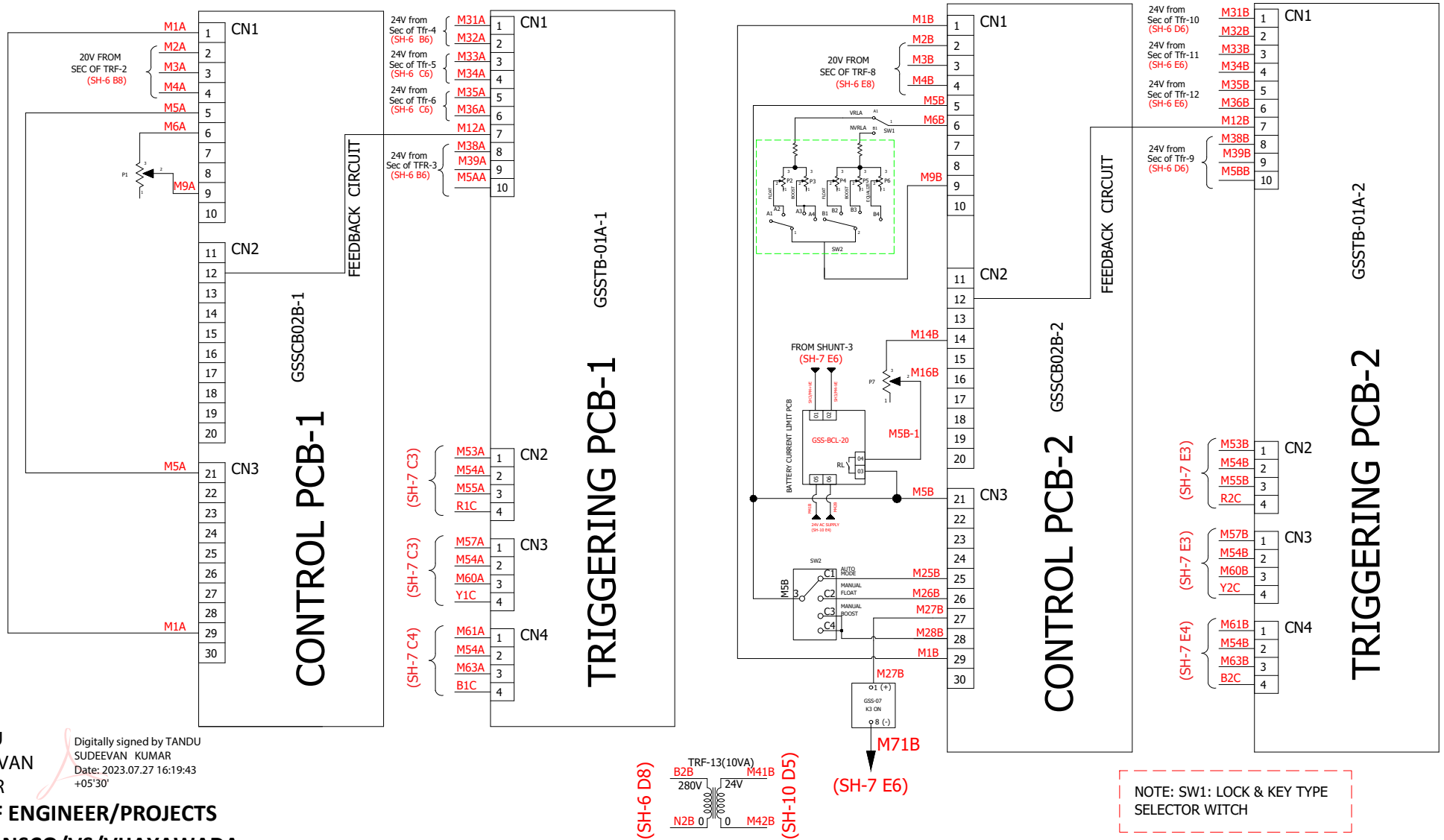
CONTROL & TRIGGER CIRCUIT

Drawing approval subject to valid vendor registration



NOTE: SW1: LOCK & KEY TYPE SELECTOR WITCH

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CHIEF ENGINEER/PROJECTS

APTRANSCO/VS/VIJAYAWADA

REV	DATE	MODIFICATIONS
01	26.06.2023	STANDARD DRAWING
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GREEN SECURE ENERGY SYSTEMS,.

TITLE: 220V,100Ah, 10A FC & 16A FCBC WITH DCDB

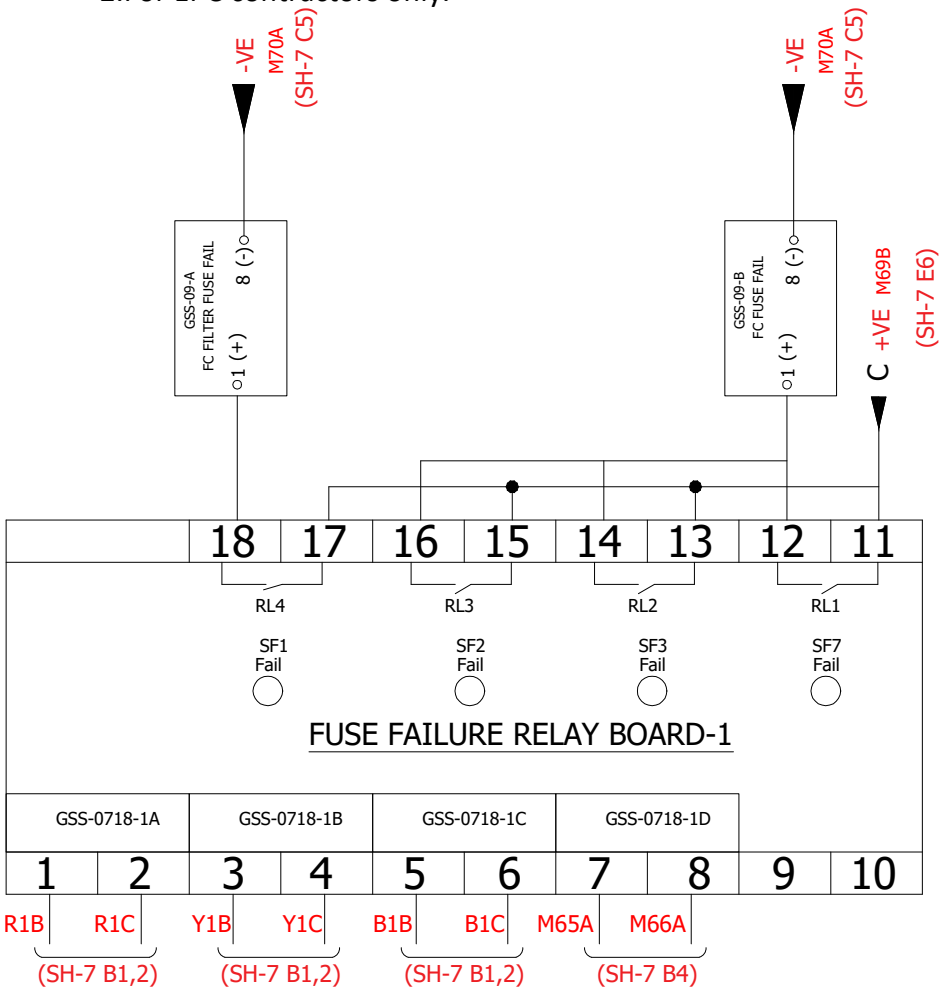
PAGE TYPE: CONTROL & TRIGGER CIRCUIT

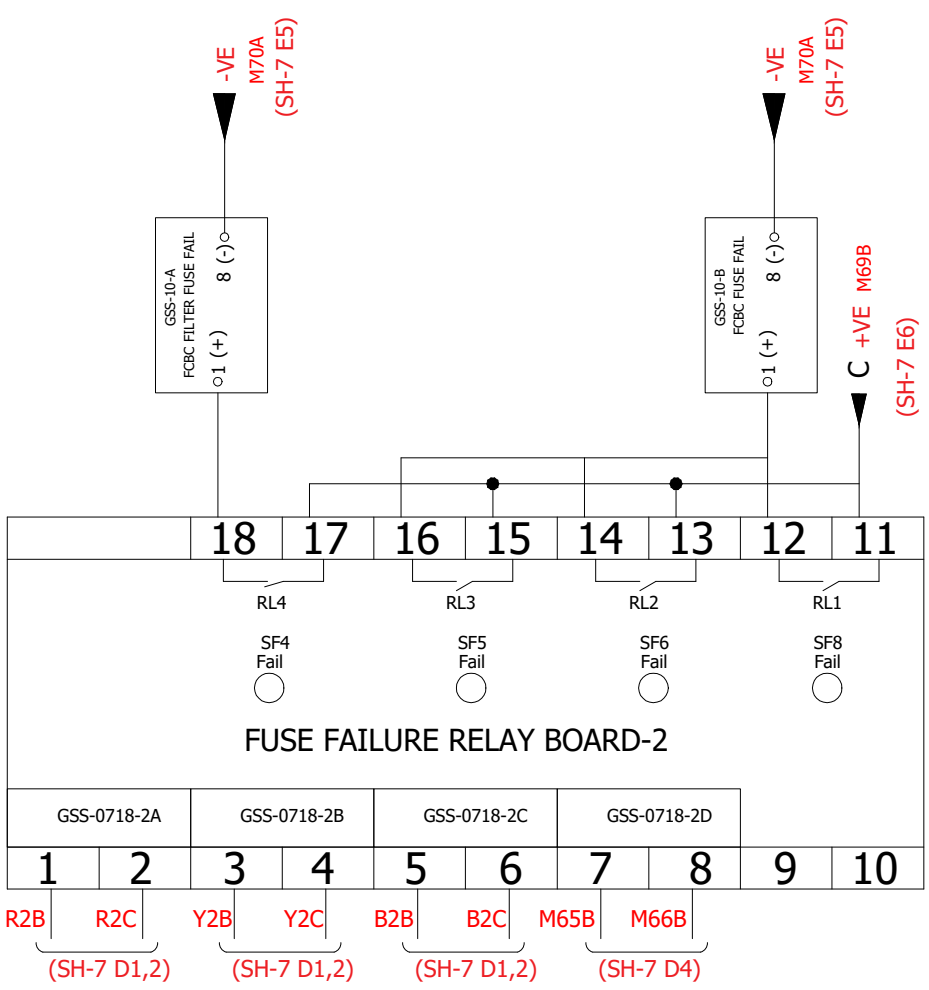
DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	10 OF 16
DRAWING No.	APT STD	REV.	01

NOTE: 1. Drawings Approval subject to valid type test reports, to be checked during acceptance tests.

2.For EPC contractors only.

FUSE FAILURE RELAY CIRCUIT





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CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

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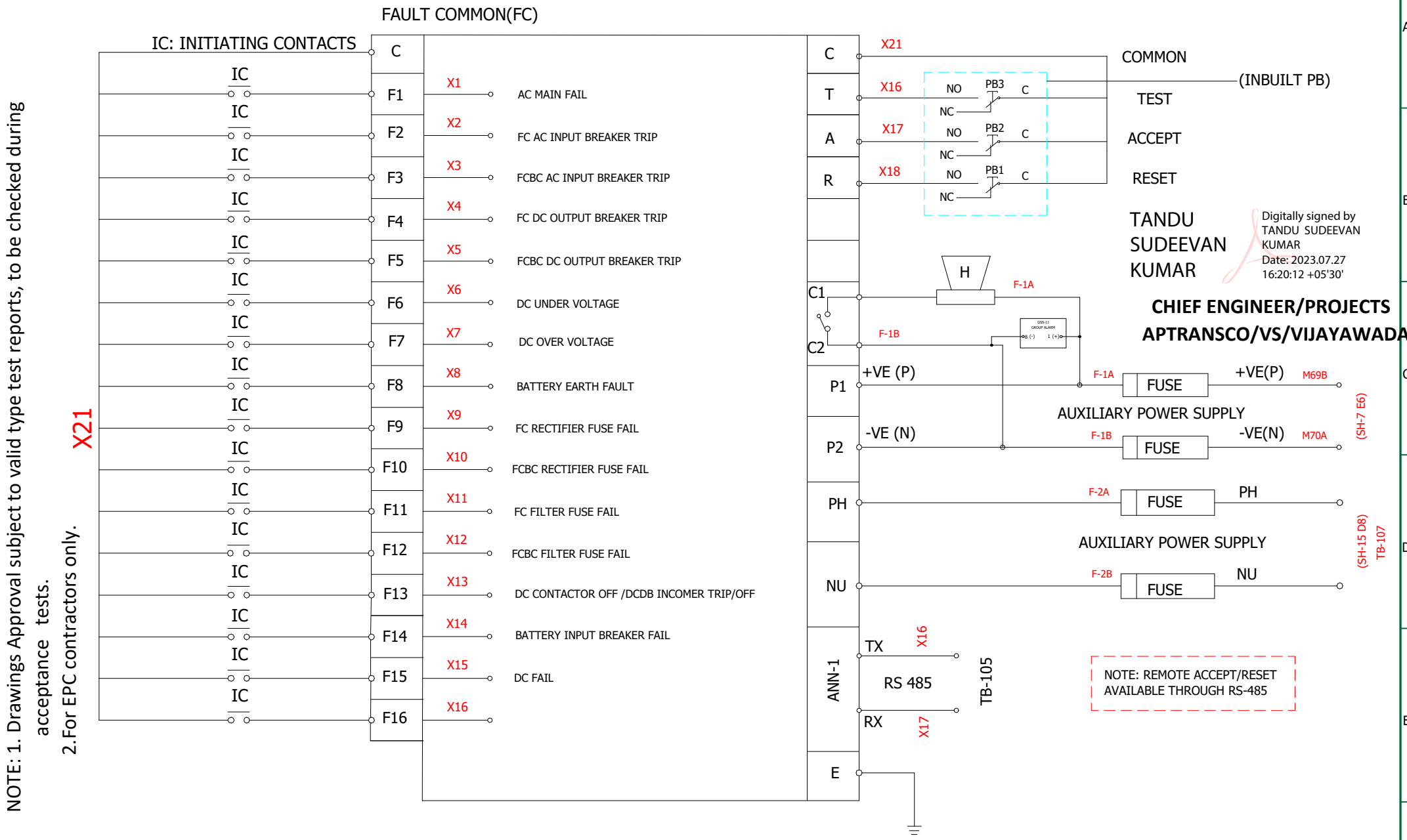
OWNER	M/s. AP TRANSCO.
	GREEN SECURE ENERGY SYSTEMS,.
TITLE	220V,100Ah, 10A FC & 16A FCBC WITH DCDB
PAGE TYPE	FUSE FAILURE RELAY CIRCUIT

DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	11 OF 16
DRAWING No.	APT STD	REV.	01

7558530/2023/EEMRT-ENE51

ALARM ANNUNCIATOR



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CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

REV	DATE	MODIFICATIONS
01	26.06.2023	STANDARD DRAWING
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OWNER: M/s. AP TRANSCO.

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GREEN SECURE ENERGY SYSTEMS,.

TITLE: 220V,100Ah, 10A FC & 16A FCBC WITH DCDB

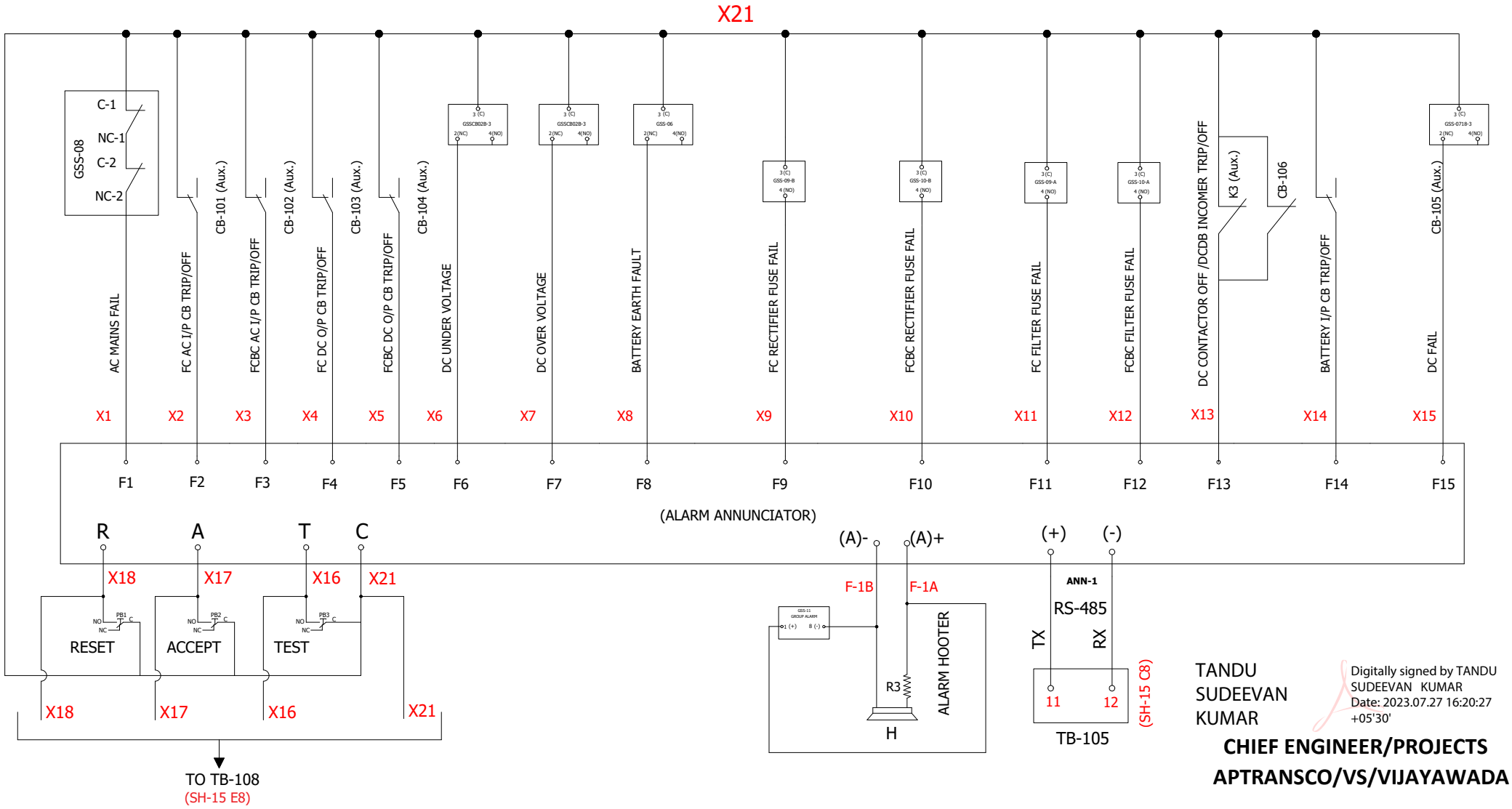
PAGE TYPE: ALARM ANNUNCIATOR

DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	12 OF 16
DRAWING No. APT STD		REV.	01

1. Drawing approval subject to valid type test reports, to be checked during acceptance tests.
2. For EPC contractors only.

Drawing approval subject to valid vendor registration

ALARM ANNUNCIATOR



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CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

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OWNER	M/s. AP TRANSCO.
TITLE	220V,100Ah, 10A FC & 16A FCBC WITH DCDB
PAGE TYPE	ALARM ANNUNCIATOR

GREEN SECURE ENERGY SYSTEMS,.

DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	13 OF 16
DRAWING No.	APT STD	REV.	01

NOTE: 1. Drawings Approval subject to valid type test reports, to be checked during [illegible].

2.For EPC contractors only.

PFC TERMINAL

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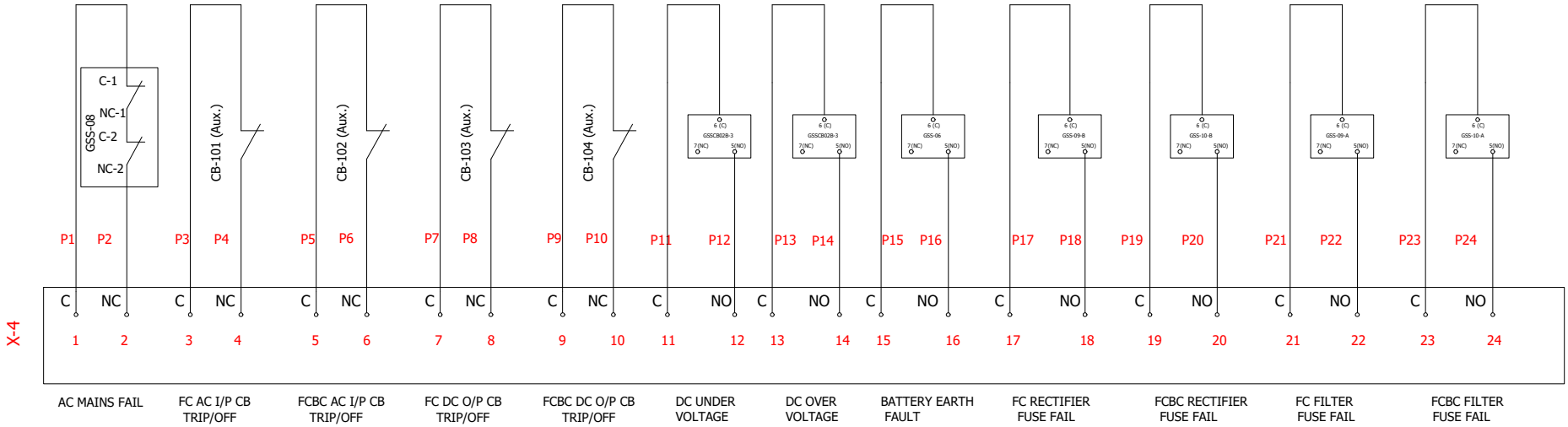

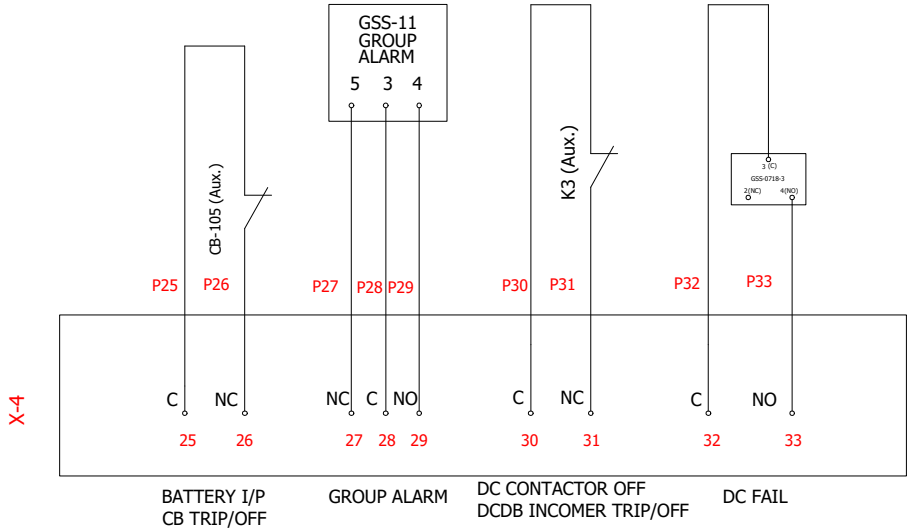

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CHIEF ENGINEER/PROJECTS

APTRANSCO/VS/VIJAYAWADA

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GREEN SECURE ENERGY SYSTEMS,.

TITLE: 220V,100Ah, 10A FC & 16A FCBC WITH DCDB

PAGE TYPE: PFC TERMINALS

DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	14 OF 16
DRAWING No.	APT STD	REV.	01

NOTE: 1. Drawings Approval subject to valid type test reports, to be checked during acceptance tests.

2.For EPC contractors only.

7558530/2023/EEMRT-ENE51

TERMINAL DETAILS

AC INPUT TERMINALS

(SH-6 A1)

TB-101

SOURCE 415VAC +/-15% 50 Hz +/-5%	R	1
	Y	2
	B	3
	N	4
SPARE		5

BATTERY TERMINALS

TB-102

(+VE)110th cell	J303	1
(Tapcell Diode)108rd cell	J305	2
(-VE)1st cell	J304	3
(Pg no.7)		4

BATTERY BANK

SPARE

(SH-7 D8)

TB-103

(SH-9)

FEEDER 1	J101	1
	J201	2
FEEDER 2	J102	3
	J202	4
FEEDER 3	J103	5
	J203	6
FEEDER 4	J104	7
	J204	8
FEEDER 5	J105	9
	J205	10
FEEDER 6	J106	11
	J206	12
FEEDER 7	J107	13
	J207	14
FEEDER 8	J108	15
	J208	16
FEEDER 9	J109	17
	J209	18
FEEDER 10	J110	19
	J210	20
FEEDER 11	J111	21
	J211	22
FEEDER 12	J112	23
	J212	24
FEEDER 13	J113	25
	J213	26
FEEDER 14	J114	27
	J214	28
FEEDER 15	J115	29
	J215	30
FEEDER 16	J116	31
	J216	32
FEEDER 17	J117	33
	J217	34
FEEDER 18	J118	35
	J218	36
FEEDER 19	J119	37
	J219	38
FEEDER 20	J120	39
	J220	40
FEEDER 21	J121	41
	J221	42
FEEDER 22	J122	43
	J222	44
FEEDER 23	J123	45
	J223	46
FEEDER 24	J124	47
	J224	48
SPARE		49
		50

PFC TERMINALS

(SH-14) TB-104

AC MAIN FAIL	P1	1
	P2	2
FC AC INPUT BREAKER TRIP	P3	3
	P4	4
FCBC AC INPUT BREAKER TRIP	P5	5
	P6	6
FC DC OUTPUT BREAKER TRIP	P7	7
	P8	8
FCBC DC OUTPUT BREAKER TRIP	P9	9
	P10	10
DC UNDER VOLTAGE	P11	11
	P12	12
DC OVER VOLTAGE	P13	13
	P14	14
BATTERY EARTH FAULT	P15	15
	P16	16
FC RECTIFIER FUSE FAIL	P17	17
	P18	18
FCBC RECTIFIER FUSE FAIL	P19	19
	P20	20
FC FILTER FUSE FAIL	P21	21
	P22	22
FCBC FILTER FUSE FAIL	P23	23
	P24	24
BATTERY INPUT BREAKER FAIL	P25	25
	P26	26
GROUP ALARM	P27	27
	P28	28
	P29	29
DC CONTACTOR OFF DCDB INCONER TRIP/OFF	P30	30
	P31	31
DC FAIL	P32	32
	P33	33
	SPARE	34
	SPARE	35

RS-485 TERMINALS

TB-105

(SH-8 C2)	M1	A1	1
		B1	2
(SH-8 C3)	M2	A2	3
		B2	4
(SH-8 C4)	M3	A3	5
		B3	6
(SH-8 C5)	M4	A4	7
		B4	8
(SH-8 C6)	M5	A5	9
		B5	10
(SH-13 E6)	ANN-1	X16	11
		X17	12
	SPARE		13
			14

TRANSDUCER TERMINALS

TB-106

TD1	TD1/A+	1
	TD1/A-	2
SPARE		3
		4

(SH-8 D7)

ANNUNCIATOR AC AUX SUPPLY TERMINALS

TB-107

AC SUPPLY	F-2A	1
	F-2B	2
SPARE		3
		4

(SH-12 D8)

TB-108

X21	1
X16	2
X17	3
X18	4
	5

(SH-13 E2)

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REV	DATE	MODIFICATIONS
01	26.06.2023	STANDARD DRAWING
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ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.

OWNER: M/s. AP TRANSCO.

GREEN SECURE ENERGY SYSTEMS,.

TITLE: 220V,100Ah, 10A FC & 16A FCBC WITH DCDB

PAGE TYPE: TERMINAL BLOCK DETAILS

DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	15 OF 16
DRAWING No.	APT STD	REV.	01

7558530/2023/EEMRT-ENE51

BATTERY CHARGER

TERMINAL GROUP	CABLE SIZE	TYPE	CABLE SIZE
TB-101	Wire Range:1.5 - 35 Sq.mm Current (A):125A Voltage (V):1000V	STUD TYPE	U10-AWG POWER CABLE
TB-102	Wire Range:6.0 - 70 Sq.mm Current (A):192A Voltage (V):1000V	STUD TYPE	U8-AWG POWER CABLE
TB-103	Wire Range:1.5 - 10 Sq.mm Current (A):57A Voltage (V):1000V	STUD TYPE	4 Sq.mm (20A FEEDER) 2.5 Sq.mm (10A FEEDER)
TB-104	Wire Range:0.2 - 4.0 Sq.mm Current (A):32A Voltage (V):1000V	SCREW TYPE	1.5 Sq.mm
TB-105	Wire Range:0.2 - 4.0 Sq.mm Current (A):32A Voltage (V):1000V	SCREW TYPE	1.5 Sq.mm
TB-106	Wire Range:0.2 - 4.0 Sq.mm Current (A):32A Voltage (V):1000V	SCREW TYPE	1.5 Sq.mm
TB-107	Wire Range:0.2 - 4.0 Sq.mm Current (A):32A Voltage (V):1000V	SCREW TYPE	1.5 Sq.mm
TB-108	Wire Range:0.2 - 4.0 Sq.mm Current (A):32A Voltage (V):1000V	SCREW TYPE	1.5 Sq.mm

NOTE: 1. Drawings Approval subject to valid type test reports, to be checked during acceptance tests.
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GREEN SECURE ENERGY SYSTEMS,.

TITLE: 220V,100Ah, 10A FC & 16A FCBC WITH DCDB

PAGE TYPE: TERMINAL BLOCK DETAILS

DRN	DP	SCALE	NTS
CHD	DP	DATE	26.06.2023
APPD	RJR	SHEET NO.	16 OF 16
DRAWING No.	APT STD	REV.	01

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GREEN SECURE ENERGY SYSTEMS

Bill of Material- Battery Charger with Integral DCDB

SL.NO	PART ID	DESCRIPTION	TYPE/RATING	MAKE	QTY
1	PANEL ENCLOSURE	Cubicle, Free standing, Floor Mounting, Hinged type front & back doors with 3 point lock arrangement.	Dimension : 1800 x 900 x 800 (HxWxD in mm) Paint Finish : To 631 OF IS-5 ,Protection : IP-42 Base Frame : RAL 9005, Black	MJN /HD SHEET METAL	1
2	ANN	ANNUNCIATOR	16 WINDOW(INBUILT HOOTER) with RS-485	SECO / MINLEC	1
3	BLR2, BLR4	BLEEDER RESISTOR	RATING: 1K ohm, 100W	NANDALALA	2
4	BLR1, BLR3	BLEEDER RESISTOR	RATING: 2K ohm, 100W	NANDALALA	2
5	BATT	220V BATTERIES	220V DC, 100AH (2V*110CELLS)	HBL/EXIDE	1
6	BB	BUS BAR	SIZE: 25 X 6 Sqmm TINNED COPPER	GREEN SECURE	1
7	CT 1-3	CURRENT TRANSFOMER	RATING:50/5A CLASS 1BURDEN:1.5VA	REPUTED	3
8	CC PCB	CONTROL CIRCUIT PCB	TYPE: GSSCB02B-1	GREEN SECURE	1
9	CC PCB	CONTROL CIRCUIT PCB	TYPE: GSSCB02B-2	GREEN SECURE	1
10	CC PCB	CONTROL CIRCUIT PCB	TYPE: GSSCB02B-3	GREEN SECURE	1
11	D1 TO D5	DIODE MODULE	RATING: 100A	SEMIKRON / NAINA / RUTTONSHA	5
12	DC PCB	BATTERY CURRENT LIMITTER PCB	TYPE:GSS-BCL-20	GREEN SECURE	1
13	DLS	DOOR LIMIT SWITCH	RATING: 230VAC, 6A, 1C/O,	SURAJ	2
14	EF	EARTH FAULT	TYPE:GSS-06	GREEN SECURE	1
15	FFR1	FUSE FAILURE RELAY	TYPE:GSS-0718-1A	GREEN SECURE	1
16		FUSE FAILURE RELAY	TYPE:GSS-0718-1B	GREEN SECURE	1
17		FUSE FAILURE RELAY	TYPE:GSS-0718-1C	GREEN SECURE	1
18		FUSE FAILURE RELAY	TYPE:GSS-0718-1D	GREEN SECURE	1
19	FFR2	FUSE FAILURE RELAY	TYPE:GSS-0718-2A	GREEN SECURE	1
20		FUSE FAILURE RELAY	TYPE:GSS-0718-2B	GREEN SECURE	1
21		FUSE FAILURE RELAY	TYPE:GSS-0718-2C	GREEN SECURE	1
22		FUSE FAILURE RELAY	TYPE:GSS-0718-2D	GREEN SECURE	1
23	AC MAILS FAILS	AC MAILS FAILS	TYPE:GSS-08	GREEN SECURE	1
24		FC FILTER FUSE FAIL	TYPE:GSS-09-A	GREEN SECURE	1
25		FC FUSE FAIL	TYPE:GSS-09-B	GREEN SECURE	1
26		FCBC FILTER FUSE FAIL	TYPE:GSS-10-A	GREEN SECURE	1
27		FCBC FUSE FAIL	TYPE:GSS-10-B	GREEN SECURE	1
28	GRP ALARM	GROUP ALARM	TYPE:GSS-11	GREEN SECURE	1
29	FILTER	MESH FILTER	7"	POWERMATT / ELECTROD	2
30	FAN1-FAN2	COOLING FAN	RATING: 230V AC 6"	HICOOL	2
31	FC1, FC2	FILTER CAPACITOR	RATING: 4700µF/350V DC	ALCON / SARADA	2
32	K1	AC CONTACTOR	12A 3P ,COIL : 230V AC, AC3 DUTY	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
33	OLR-1	OVER LOAD RELAY	RATING :4.5... 7.5A	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
34	K2	AC CONTACTOR	18A 3P ,COIL : 230V AC, AC3 DUTY	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
35	OLR-2	OVER LOAD RELAY	RATING :7.5 ... 11A	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
36	K3	DC CONTACTOR	25A 3P ,COIL : 220V DC	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
37	K3 ON	DC CONTACTOR ON	TYPE:GSS-07	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
38	L - 11	FC INDUCTOR(CHOKE)	RATING : 300V DC 13A ,Inductance : 8mH	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
39	L - 21	FCBC INDUCTOR(CHOKE)	RATING : 300V DC 20A,Inductance : 6mH	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1

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SL.NO	PART ID	DESCRIPTION	TYPE/RATING	MAKE	QTY
40	L1,L2,L3	CLUSTER LED LAMP INDICATIONS	RATING: 230V AC, COLOR: RYB, YELLOW,BLUE	JIGO / SIEMENS / TEKNIC	1set
41	L4,L5,L6	CLUSTER LED LAMP INDICATIONS	RATING: 220V DC, COLOR: RED	JIGO / SIEMENS / TEKNIC	3
42	DCBD &H1-24	CLUSTER LED LAMP INDICATIONS	RATING:5mm RED	JIGO / SIEMENS / TEKNIC	25
43	M1	AC VOLTMETER	Input : 0-500V AC 3Ph,Auxiliary : 80-300V AC,Class :1, 96*96, Digital Type	ELMEASURE /EIC/MULTISPAN	1
44	M2,M3,M4 &M5	MULTIFUNCTION METER	Input : 0-300V DC Range : 0-100A Auxiliary : 80-300V AC/DC Class :1,96*96, Digital Type	ELMEASURE /EIC/MULTISPAN	4
45	M6	EARTH LEAKAGE METER	Range :100ma-0-100ma ,Class : 0.5, Size : 96*96,Type : Analog	ELMEASURE /EIC/MULTISPAN	1
46	PR	PROTECTIVE RELAY	Over / Under VoltagePhase (Failure, Sequence):2C/O	SELEC	1
47	P1-P7	POTENTIO METER	POT PANEL MOUNT 20K	GREEN SECURE	7
48	CB-100A	CHARGER ON/OFF Breaker	6A AC, 3P MCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
49	CB-100B	FAN1 BREAKER	2A AC, 2P MCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
50	CB-100C	FAN2 BREAKER	2A AC, 2P MCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
51	CB-100D	THERMOSTAT BREAKER	6A AC, 2P MCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
52	CB-100E	BREAKER FOR SWITCH BOARD(6A)	6A AC, 2P MCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
53	CB-101	FC INPUT BREAKER	16A 3P MCCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
54	CB-102	FCBC INPUT BREAKER	20A 3P MCCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
55	CB-103	FC OUTPUT BREAKER	16A 3P MCCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
56	CB-104	FCBC OUTPUT BREAKER	20A 3P MCCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
57	CB-105	BATTERY BREAKER	63A 3P MCCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
58	CB-106	DCDB INCOMER BREAKER	63A 3P MCCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	1
59	FEEDERS	FDR 1-6	20A DC, 2P MCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	6
60	FDR	FDR 7-24	10A DC, 2P MCB	ABB/L&T/C&S/SIEMENS/SCHNEIDER	18
61	RD1 & RF1-RF24	Resistor	68K 2W	NANDALALA	25
62	R1-R2	Resistor	RESISTOR-2.5K-25W	NANDALALA	2
63	R3	Resistor	RESISTOR-1K-25W	NANDALALA	1
64	SC PCB	SNUBBER CIRCUIT PCB	TYPE:GSS-05	GREEN SECURE	1
65	SW1	SELECTOR SWITCH(LOCK & KEY TYPE)	25A 1P 2WAY	SALZER	1
66	SW2	SELECTOR SWITCH	25A 4P 4WAY	SALZER	1
67	SHUNT 1-2	SHUNT	RATING: 50A/75mV	KEW / MECO/RISHAB	2
68	SHUNT 3-4	SHUNT	RATING: 100A/75mV	KEW / MECO/RISHAB	2
69	SC	AC SOCKET WITH SWITCH	RATING: 230V, 6A	ANCHOR / GM	1
70	SF1 TO SF3	SEMICONDUCTOR FUSES WITH BASE	RATING: 25A	BUSSMAN	3
71	SF4 TO SF6	SEMICONDUCTOR FUSES WITH BASE	RATING: 32A	BUSSMAN	3
72	F1	HRC FUSE LINKS	RATING: 32A	BUSSMAN	1
73	F2	HRC FUSE LINKS	RATING: 32A	BUSSMAN	1
74		BASE FOR FUSE LINKS	RATING: 25A	BUSSMAN	1
75		BASE FOR FUSE LINKS	RATING: 32A	BUSSMAN	1
76	TRF-1	TRANSFORMER-FC	KVA RATING : 4 KVA,PRI : 415V +/-15% 50Hz,SEC : 242V 50Hz,TYPE : DELTA-STAR	REPUTED	1
77	TRF-2	TRANSFORMER	RATING : 10VA,PRI : 140V (L-N) +/-15% 50Hz 1Ph+N, SEC: 20V-0-20V	REPUTED	1
78	TRF-3	TRANSFORMER	RATING : 10VA, PRI : 140V (L-N) +/-15% 50Hz 1Ph+N,SEC : 24V-0-24V	REPUTED	1
79	TRF 4,5,6	TRANSFORMER	RATING : 10VA, PRI : 140V (L-N) +/-15% 50Hz 1Ph+N,SEC : 24V-0-24V	REPUTED	3
80	TRF-7	TRANSFORMER-FCBC	KVA RATING : 6.5 KVA,PRI : 415V +/-15% 50Hz,SEC : 280V 50Hz,TYPE : DELTA-STAR	REPUTED	1

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SL.NO	PART ID	DESCRIPTION	TYPE/RATING	MAKE	QTY
81	TRF-8	TRANSFORMER	RATING : 10VA, PRI : 160V(L-N) +/-15% 50Hz 1Ph+N,SEC : 20V-0-20V	REPUTED	1
82	TRF-9	TRANSFORMER	RATING : 10VA, PRI : 160V +/-15% 50Hz 1Ph+N, SEC : 24V-0-24V	REPUTED	1
83	TRF 10,11,12,13	TRANSFORMER	RATING : 10VA,PRI : 160V +/-15% 50Hz 1Ph+N,SEC : 24V-0-24V	REPUTED	4
84	TH1-TH3	THYRISTOR MODULE(SCR1A-6A)	RATING: 57A/1600 PIV (with Heat sink 150mm)	SEMIKRON / NAINA / RUTTONSHA	3
85	TH4-TH6	THYRISTOR MODULE(SCR1B-6B)	RATING: 57A/1600 PIV (with Heat sink 150mm)	SEMIKRON / NAINA / RUTTONSHA	3
86	TC PCB	TRIGGERING CIRCUIT PCB	TYPE: GSSTB-01A-1	GREEN SECURE	1
87	TC PCB	TRIGGERING CIRCUIT PCB	TYPE: GSSTB-01A-2	GREEN SECURE	1
88	TD1	Transducer	Input: 0-75mA,Auxiliary : 80-276 V AC/DC, Output : 4-20mA	SECURE / RISHABBH	1
89	TB-101	AC I/P TERMINALS	CSTSN6U-35mm² M6 STUD NUT DRIVER OPERATED TB	CONNECTWELL	5
90	TB-102	BATTERY TERMINALS	CBB70-70 mm² FD THRU BOLT/NUT TERMINAL BLOCK	CONNECTWELL	4
91	TB-103	FEERDER TERMINALS	CSTSN6U-35mm² M6 STUD NUT DRIVER OPERATED TB	CONNECTWELL	50
92	TB-104	PFC TERMINALS	CTS4UN,4 mm² FEED THRU SCREW CLAMP TERMINAL	CONNECTWELL	35
93	TB-105	RS-485 TERMINALS	CTS4UN,4 mm² FEED THRU SCREW CLAMP TERMINAL	CONNECTWELL	12
94	TB-106	TRANSDUCER TERMINALS	CTS4UN,4 mm² FEED THRU SCREW CLAMP TERMINAL	CONNECTWELL	4
95	TB-107	AC AUX SUPPLY OF ANNUNCIATOR	CTS4UN,4 mm² FEED THRU SCREW CLAMP TERMINAL	CONNECTWELL	4
96	TB-108	ANNUNCIATOR TERMINALS	CTS4UN,4 mm² FEED THRU SCREW CLAMP TERMINAL	CONNECTWELL	5
97		END PLATE		CONNECTWELL	16
98		MARKER PRINTED		CONNECTWELL	8

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