PROJECTS DEPARTMENT

TECHNICAL SPECIFICATIONS FOR 415V STAR-DELTA STARTER MCC/PCC/SWITCH BOARD

This specification covers design, manufacture, testing at manufacturer's works, packing and dispatch to site of Power control centre or Switch board. The boards shall be supplied with the following features and materials, unless otherwise indicated in the enquiry.

SWITCH BOARD FEATURES:
The boards shall be compartmentalized, modular in construction, free standing, Floor mounting, dust and vermin proof type construction with enclosure protection of IP-54 category.

SERVICE REQUIREMENTS:
The MCC/PCC will be located indoor. This equipment will be subject to the ambient temperature conditions limited to 40^0C above ambient of 50^0C.

RATING: One Star-Delta Starter MCC panel is required with different combination (as mentioned below).

Sl No.	Model No. / Part Name	Particulars/ Specification	Make	Qty
	INCOMER			
1	500 A TPN Fuse Switch Unit +Aux.	DIN	SIEMENS/L&T/C&S/Schneider/CG	2
2	500 A HRC Fuses	DIN	SIEMENS/L&T/Eq	6
3	RYB Indicating Lamps	LED	MG/SIEMENS/Eq	6
4	ON/OFF Indicating Lamps	LED	MG/SIEMENS/Eq	4
4	96 Sq. mm KWH Meter		Conzerve/ AE / IMP / UBHA / NIPPON	2
5	96 Sq. mm Volt Meter	0-500V	Conzerve/ AE / IMP / UBHA / NIPPON	2
6	Volt Meter Selector Switch	6A/10A	Salzer/ L & T / SIEMENS / GECA / NGEF	2
7	96 Sq.mm. Ammeter	0-1000A	Conzerve/ AE / IMP / UBHA / NIPPON	2
8	Ammeter Selector Switch	10A	Salzer/ L & T / SIEMENS / GECA / NGEF	2
9	Control MCB	6A-TPN	C&S/GEPC/L&T/Siemens	2
10	Resin Cast Current Transformer	500/1A	Kalpa/Eq	6
	OUT GOINGS			
	30 Kw S/D STARTER FEEDER - 9 Nos.			
1	100 A TPN Fuse Switch Unit		SIEMENS/L&T/C&S	9
2	100 A HRC Fuses		SIEMENS/L&T/Eq	27
3	63 A TP Contactor with 2NO+2NC Aux. Contacts- DELT & MAIN		SIEMENS/L&T/C&S	18

4	50 A TP Contactor with 2NO+2NC Aux. Contacts - STAR		SIEMENS/L&T/C&S	9
5	Bi_Metal Over Load Relay		SIEMENS/L&T/c&s	9
6	Control MCB	6A DP	SIEMENS/L&T/Eq	9
7	S/D Timer		SIEMENS/L&T	9
8	ON/OFF Illuminated Push Buttons		SIEMENS/L&T/Eq	18
9	TRIP Indicating Lamps		SIEMENS/L&T/Eq	9

STANDARDS :

The PCC/MCC shall be classified as FBA (Factory Built Assemblies) and shall comply with the latest issue of the following standards:

a)IS 8623 -Factory built assemblies of Switchgear and Control gear for Voltages upto including 1000V A.C and 1200V D.C
b)IS 4237 - General requirements for switchgear and control gear for Voltages not exceeding 1000 volts.
c) IS 2147 - Degrees of protection provided by enclosures for low voltage switchgear and control gear.
d) IS 4064 - Specification for Heavy Duty Air break switches and composite units of air – break switches and fuses for voltages not exceeding 1000 volts.
e) IS 2959 - Specification for AC contactors of voltage not exceeding 1000 volts.
f) IS 13947 - Specification for AC Motor starters of voltage not exceeding (Part 3) 1000 volts.
g) IS 9224 - Specification for HRC cartridge fuse links upto 650 volts.
h) IS 2705 -Specification for current transformers.
i) IS 1248 -Specification for direct acting electrical indicating instruments.
j) IS 375 -Marking and arrangement for switchgear busbars, main connections and auxiliary wiring.
k) IS 3156 - Specification for voltage transformers
l) IS 13947 - Low voltage switchgear and controlgear Part – 2 Air Circuit (Part 2) Breakers.
m) IS 6875 - Control Switches for voltages up to and including 1000V AC and 1200V D.C.
n) IS 8828 – Miniature Circuit Breakers.
o) IS 3231 – Specification for Electrical Relays and Power System Protection.
p) IS 5578 – Guide for marking of insulated conductors.
q) IS 1353 – Guide for uniform system of marking and identification of Conductors and Apparatus.
r) IS 10118 – Code of practice for installation and maintenance of Switchgear.

BUSBARS:

a) Main Bus - 3 Phase and Neutral of 50x10mm size each.
b) Short Time Rating 50 kA for One Sec.
c) Material - Aluminium.
d) Perforated enclosure for bus bars - Yes
e) Sleeving for the bus bars - Yes.
f) Colour coding of the bus bars - Yes.
g) Sleeving / shrouding for Joints - Yes.
h) Temp. rise when carrying rated current shall be limited to 35°C above ambient temperature of 50°C.
i) Location of bus bars - Top.
j) Bus bar supports - Moulded fibre glass reinforced thermosetting plastic.
k) Facility for extension at both ends - Yes.
l) Antitracking barriers at every dropper support - Yes.
m) Inter leaving basbar arrangement.

EARTHING:

Earth bus - 50 x 6 mm size galvanized steel shall be provided for connecting to station M.S. Grid. The horizontal earth bus shall project out of the panel and shall have at least two holes for purchaser's earth connections.

CURRENT TRANSFORMERS : (Make : Siemens / Prayag / kappa/ Precise)
All C.T's shall be bar primary resin cast type and shall be provided with shorting terminals links.

METERING C.T.s:

a) Secondary current- 1A
b) Instrument security factor - Less than 5
c) Burden - 5/7.5 VA
d) Accuracy class - Cl. 1.0

SWITCHES: (Make: L & T / SIEMENS / GECA / NGEF/ Merlin Gerin)

a) Voltmeter selector switches - 4 Position
b) Ammeter selection switches - 4 Position

FUSE PULLERS :

2 Nos. Fuse Pullers required.

PAINTING :

Paint shade: EPOXY PEBBLE/FLINT GREY (RAL 7032)

INDICATING LAMPS : (Make : Siemens / L&T/ Teknic / E.Q.)

a) ON/OFF indicating lamps for all SFU module. i.e. in RED/GREEN colour.
b) All indicating lamps shall be LED type with series resistance.

INDICATING METERS :(Make : AE / IMP / UBHA / NIPPON (TAUT B type only).

a) Size- 96 Sq.mm
b) Accuracy- Cl. 1.0

Switch Fuse Unit (SFU): Make siemens/L&T/CG
Door interlock plus door defeat interlock for all SFUs are to be provide.
All SFUs and control switches shall be operable without opening the module door.

WIRING:

a) Red, Yellow and blue coloured leads shall be used for power wiring phases and black for neutral.
b) Control wiring shall be of gray colour
c) Control wiring size for CTs shall be of 2.5 mm sq. and for other wiring 1.5 mm sq. multistrand Cu. Conductors for all circuits.
d) All control wires & Power leads shall be provided with identification ferrules at both ends and they shall be interlocked type.
e) All power and control wiring terminations shall be done through lugs.

CABLE ALLEY :
Suitable cable supports clamps shall be provided in the cable alley for routing purchaser's cables.

GENERAL:

1) Refer to attached drawings and schedules for ratings of individual components and equipment.

2) The FBA (Factory Built Assemblies) shall consist of vertical sections, joined together to form a rigid, free standing, completely enclosed assembly.

3) The FBA shall have adequate strength to withstand all stresses imposed shipping, handling, installation and operation, without distortion or damage.

4) The FBA shall be as completely assembled as possible within shipping and handling limitations, completely wired and ready for installation in accordance with this specification.

5) The Switchboard shall be fabricated out of pressed and shaped sheet steel. The manufacturer of the switchboards shall have a well equipped fabrication shop in-house.

   All members of the frame which have to bear the load of the structure and the modules shall be of not less than 2 mm thick sheet steel. The sheet steel for non load bearing members, doors and covers shall be not less than 1.6 mm thick, cold rolled sheet steel shall be used for doors and covers.

6) The FBA shall be of single front and of multi-tier construction in order to achieve optimum dimensions. All vertical sections incorporating air-circuit breakers/ MCCBs/SFUs shall be of **uniform width**.

7) Switchgear shall be extensible at both ends by the addition of vertical sections.

8) The Switchboard shall be totally enclosed dust and vermin proof. Neoprene Gaskets of durable material shall be provided for doors and cutouts.

9) The panel shall have a provision for bus duct entry or cable entry as specified. The cabling chamber shall be at the rear of each section. The cabling area and the area of the gland plate shall be suitable for entry and termination of cables for the ACBs/MCCBs/SFUs located in the section. Provision for increasing the area of the cable chamber, if required, shall be made available.

10) On each compartment a sheet steel, hinged, removable door shall be provided. Indicating lamps, push buttons, ammeters, voltmeters and selector switches shall preferably be mounted on their respective feeder compartment doors.

11) Each circuit breaker shall be housed in a separate fully enclosed compartment. The segregation between various compartments shall be achieved by using sheet steel and / or insulating partitions. There shall be complete compartmentalization of vertical busbars, ACB and cabling area.

12) FBA shall be provided with integral base channel 50 mm in height and 3.15 thick (HR Sheet Steel) for facilitating grouting / welding on the floor / trench.

13) All doors shall be hinged at one end and shall be bolted (knob type) on the other end. All hinges shall be of concealed design for elegant appearance.

14) All barriers used shall be manufactured from fire retardant non – inflammable & non hygroscopic materials such as FRBP/FR-2 only.
HYLAM IS NOT ACCEPTABLE

15) Operating devices shall be located only in the front of switchgear. No equipment shall be located below 250mm and above 1800mm.

16) In the ACB panels all equipment associated with a single circuit shall be housed in a separate comportment in the fixed portion of the vertical section. The compartment shall be enclosed on all sides except on the cable alley side.

TESTS :

1) The Switchgear design shall have undergone all the type tests as per IS 8623. Type test certificates shall be submitted along with the bid.

2) Routine tests as per IS 8623 on each completed switchboard shall be carried out in the factory before dispatch and test certificates for the same shall be submitted.

3) All major components incorporated in the switchgear (such as circuit breakers/MCCBs/SFUs) shall have undergone type tests as per their respective standards. Type test certificates for the same shall be submitted with the bid.

PACKING

1) The switchboard shall be shipped to site packed in full wooden packing cases. They shall be wrapped in polyethylene sheets before being placed in cases to prevent damage to the finish. Cases shall have skid bottoms for handling.
2) The board shall be properly packed before dispatch to avoid damage during transport, storage and handling at site anywhere in India.
3) The packing box shall contain a copy of the installation, operation and maintenance manual.
4) A sign to indicate the upright position of the panels to be placed during transport and storage shall be clearly marked. Also proper arrangement shall be provided to handle the equipment.

GUARANTEE

Equipment shall be guaranteed for a period of 12 months from the date of commissioning.

GA drawing & SLD of the MCC/PCC/ switch Board and Bill of Materials to be enclosed along with offer