

1 - DESCRIPTION

Purpose of this Panel is to provide a effective control on capacitor bank installations in Substation to maintain power factor near unity under varying load conditions,

Type 1: Thereby reducing Maximum Demand, reduction in transformer and line losses increase in life of associated equipments under the same load conditions. This will improve system efficiency by reduced losses keeping power billed to consumer the same (revenue generation remaining the same)

OR

Type 2: Availability of additional power at existing Maximum Demand with transformer and line losses remaining at the earlier level and maintaining normal life of associated equipment. This will generate more revenue by supplying additional available power to consumer and cost of additional investment in this scheme will be recovered very fast System efficiency will also improve to some extent due to better utilization of available capacity.

2.a - Panel Outer View



2.b - Panel Inner View



3 – CONSTRUCTION

This is a sheet steel fabricated cubicle painted with two coats of epoxy bushed primer followed by polyurethane final coat after degreasing, de-rusting and phosphating, suitable for outdoor applications. It is provided with fiberglass canopy at top. The cubicle has to be mounted on RCC / Concrete foundation. All control protection cable entries are provided at bottom. HT connection from outdoor type VCB / SF6 Breaker is made by 3 core XLPE cable of appropriate size. A suitable cable termination box is provided on the cubicle for terminal of HT Cable.

Fig. 2 a shows the outer view of the panel.

The cubicle is in modular form. Each module consists of two steps with accessories. The cubicle is designed to accommodate:

Manually operated one isolator per step for manually operated cubicle. Alternately,

Manual Three phase 11 KV vacuum contactor, electrically operated, for automatic cubicle along with HT HRC fuses for each capacitor cell.

1. Required number of capacitor cells as per bank rating connected in star.
2. 0.2 % AN cooled series reactor single phase per phase.
3. 3 phase Residual Voltage Transformer.
4. Three epoxy cast 11 KV CT of appropriate current ratio.
5. Aluminium bus bars of suitable section
6. Space Heaters with thermostats, contactor, fuses etc.

7. Panel lamp to give visibility from outside of HT HRC Fuses, Isolators etc.
8. Electrical door interlocks to prevent operation of isolators in ON Condition.

4 - SALIENT FEATURES

- Compact Outdoor type unit.
- Necessary protection for individual capacitor cell and safety interlocks for preventing malfunctioning.
- Easy for transportation and erection particularly in remote and hilly terrain.
- User friendly microprocessor based intelligent AFPC Relay.
- Optional facility for data logging through telephone lines from remote place.

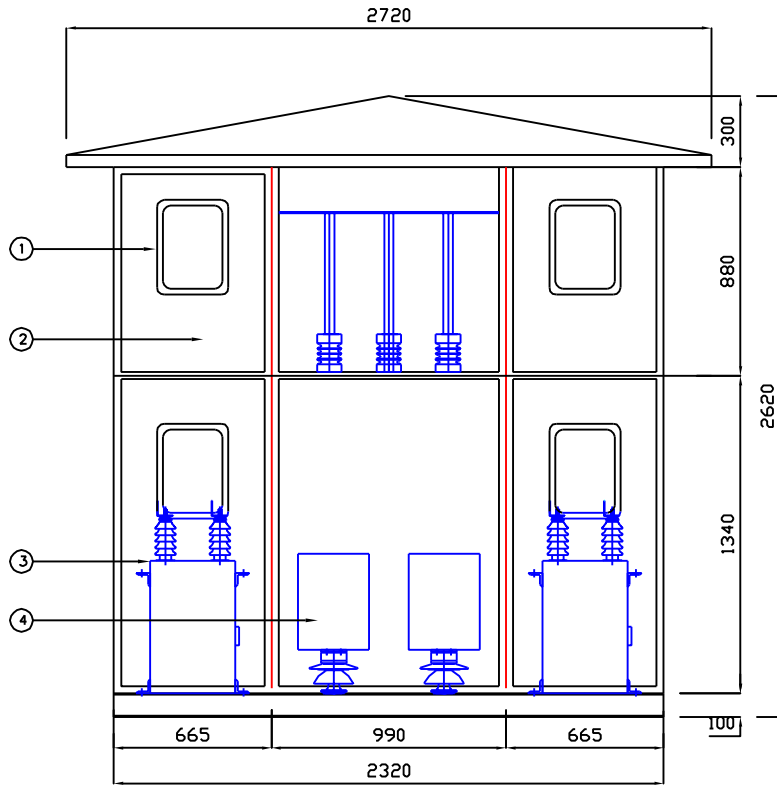
- Panel Back View



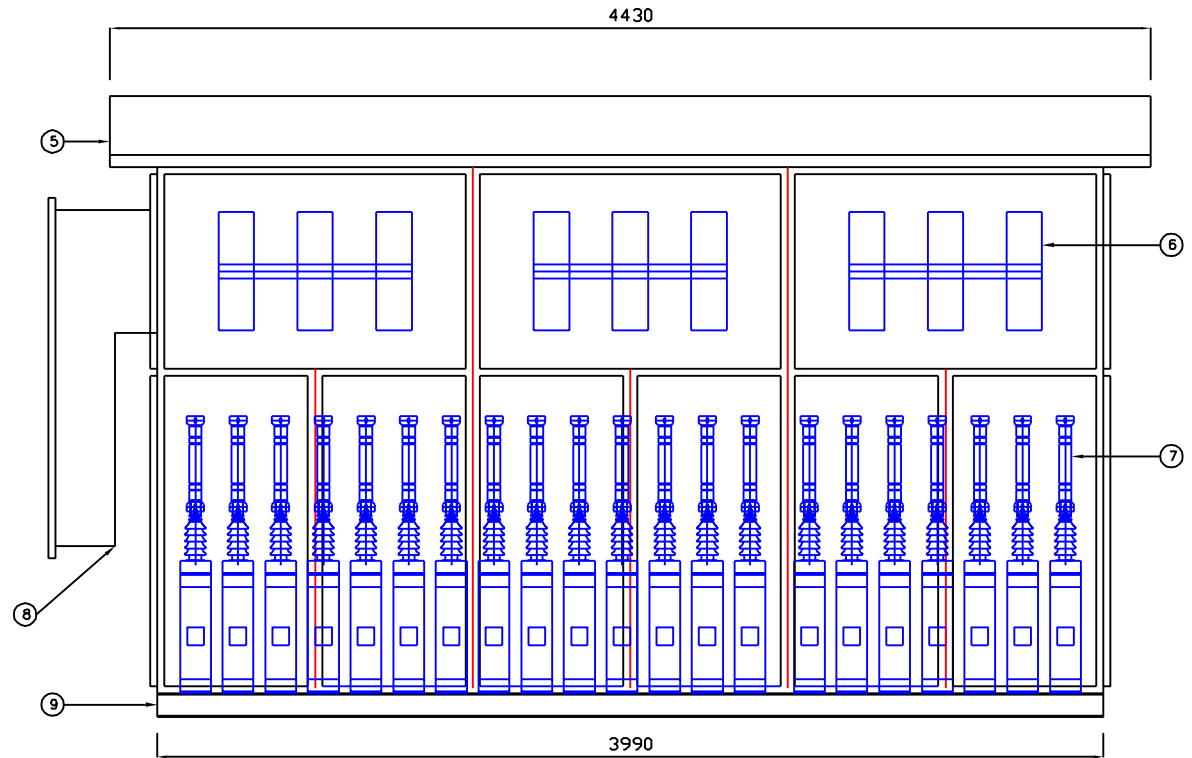
5 - TECHNICAL DETAILS:

Automatic Power Factor Control System for HT Capacitor in Substations General Technical Particulars

Sr. No.	Description	Rating					Rating			
1	Nominal System Voltage	11 KV					11 KV			
2	Frequency	50 Hz.					50 Hz.			
3	Connection	Star					Star			
4	Capacitor Bank Rating in KVAR at Max. Voltage of 12.65 KV	2400	3000	3600	4200	4800	5400	6000	6600	7200
5	No. of Steps per each bank	Automatic switching in 4 Steps					Automatic switching in 6 Steps			
6	Step Configuration	600 x 4	600 x 3 + 1200 x 1	600 x 2 + 1200 x 2	600 x 1 + 1200 x 3	1200 x 4	600 x 3 + 1200 x 3	600 x 2 + 1200 x 4	600 x 1 + 1200 x 5	1200 x 6
7	Individual Capacitor Cell	200 KVAR, 7.3 KV, 1 Phase					200 KVAR, 7.3 KV, 1 Phase			
8	HT HRC Fuse for individual Capacitor cells.	45 Amps, 12KV					45 Amps, 12KV			
9	Capacitor Cells per bank	12 Nos.	15 Nos.	18 Nos.	21 Nos.	24 Nos.	27 Nos.	30 Nos.	33 Nos.	36 Nos.
9.01	CT Primary Current in Amp.	200	300	300	400	400	500	500	600	600
9.02	Quantity of CT per bank. For Capacitor bank current measurements	3 Nos.					3 Nos.			
10	Resin Cast 11 KV Current Transformer for measuring capacitor bank current. Over current & Earth fault protection.	Core Burden		I 15 VA	II 15 VA	Core Burden		I 15 VA	II 15 VA	
		Accuracy Class		0.5	5P10	Accuracy Class		0.5	5P10	
		Secondary Current		5A	5A	Secondary Current		5A	5A	
		Suitable for mounting inside the panel.					Suitable for mounting inside the panel.			
11.0	Resin Cast 11 KV Residual Voltage Transformer. For unbalance voltage protection & capacitor bank voltage measurement.	11000/110 – 190 Volts, 3 Phase, 50 HZ, 100 VA per phase, Star/Star-Open Delta. Accuracy Class 0.5/3P					11000/110 – 190 Volts, 3 Phase, 50 HZ, 100 VA per phase, Star/Star-Open Delta. Accuracy Class 0.5/3P			
11.01	Quantity	1 Per Bank					1 Per Bank			
12	Series reactor	0.2 %, AN Cooled per phase, per step					0.2 %, AN Cooled per phase, per step			
13	Space Heater	Provided					Provided			
14	Panel Light	Provided					Provided			
15	Door Interlock	Provided					Provided			
16	Dimensions	W=2320, L=2660, H= 2620					W=2320, L=3990, H= 2620			
17	Dimensions with clamp	W=2720, L=3100, H= 2620					W=2720, L=4430, H= 2620			
18	Weight	3600 to 4200 Kg.					5400 to 630 Kg.			



FRONT VIEW



SIDE VIEW

ITEM NO	DESCRIPTION
9	BASE FRAME
8	HT CABLE END BOX
7	HT HRC FUSES
6	3 PHASE ISOLATOR
5	FIBER GLASS CANOPY
4	REACTOR
3	CAPACITOR
2	BUSBAR CHAMBER
1	VIEWING GLASS

11 KV, 3 PHASE, 50 HZ. 6 STEP HT OUTDOOR TYPE CAPACITOR PANEL FOR 5400 TO 7200 KVAR, 12.65 KV, 3 PHASE CAPACITOR BANK COMPLETE WITH ISOLATOR / CONTACTOR, CAPACITOR, HT FUSES, REACTOR, RVT & CT (TOTAL WEIGHT : 5400 TO 6300 KGS.)

ALL DIMENSIONS IN M.M. SCALE - N.T.S.

11 KV 3 PHASE 6 STEP HT OUTDOOR TYPE CAPACITOR PANEL

MAX ENERGY PVT. LTD.

F-23-24, MIDC SATPUR, NASIK 422 007

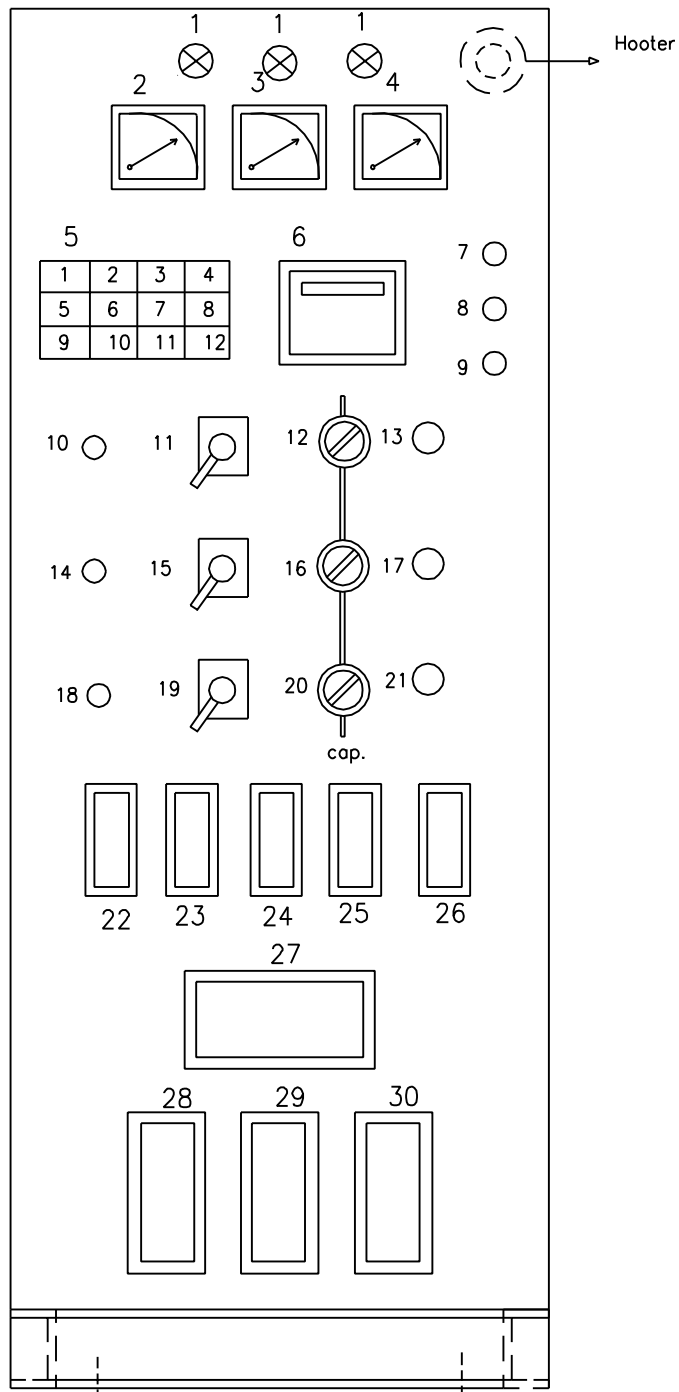
	SIGN	NAME	DATE
DRN.		UBB	16/01/06
CHD.		AVA	16/01/06
APPD.		AVA	16/01/06

SHEET: 1 OF 1

DRG.NO. MEPL/A4/08/HT-003

REV. 0

IF IN DOUBT, ASK



SR.NO	Description	SR.NO	Description
1	R,Y,B, Indication	23	Trip circuit supervisory relay
2	KV METER	24	Time Delay Relay
3	MVAR meter	25	Auxiliary relay for alarm
4	Ammeter	26	auxiliary relay for tripping
5	Annunciator - 10/12/14 window as req.	27	20/C+1E/F IDMT relay
6	APFC Relay with data logging alternately with facility of access through telephone line	28	Under-voltage relay
		29	Oversvoltage relay
7	Trip circuit healthy indicating lamp	30	Neutral voltage displacement relay
8	Auto trip indicating lamp		
9	DC supply healthy indicating lamp		
10	Isolator 'OFF' indicating lamp		
11	Isolator control switch only in case of motorised isolator		
12	Semaphore indicator for isolator		
13	Isolator 'ON' indicating lamp		
14	Circuit breaker 'OFF' indicating lamp		
15	Circuit breaker control switch		
16	Semaphore indicator for circuit breaker		
17	Circuit breaker 'ON' Indicating lamp		
18	Second Isolator 'OFF' indicating lamp		
19	Isolator control switch only in case of motorised isolator		
20	Semaphore indicator for second isolator		
21	Second Isolator 'ON' indicating lamp		
22	High speed relay		

CUSTOMER :-			TITLE:- CAPACITOR, BREAKER CONTROL & RELAY PANEL
ALL DIMENSIONS IN M.M.			
	SIGN	NAME	DATE
DRN.		U PP	20/02/06
CHD.			
APPD.		AVA	20/02/06
SCALE - N.T.S.			DRG.NO.

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