

NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST  
 2. FOR EPC CONTRACTS ONLY

EPC works only

LIST OF STANDARD TECHNICAL DATA



Rating - 120kV , 10kAp, Class 3, SM Type Porcelain Housed SURGE ARRESTER

Sr.No	Drawing No	Rev.No	Description
1	31810	R0	GENERAL ARRANGEMENT FOR 120kV, 10kA SM TYPE PORCELAIN HOUSED SURGE ARRESTER(Qrs-1.6C)
2	G-033 / 120/ 31810	R0	ARRESTER AND UNIT NAME PLATE FOR 120kV 10kA SM TYPE SURGE ARRESTER (Qrs-1.6C)
3	G-075 / 120 / 31810	R0	INSULATING BASE ASSY. AND SURGE COUNTER MOUNTING DETAILS FOR 120kV, 10kA SM TYPE LA(Qrs-1.6C)
4	G-056/31810	R0	TOP TERMINAL PLATE FOR 120kV 10kA,SM-TYPE, SURGE ARRESTER(Qrs-1.6C)
5	G-016 / 120 / 31810	R0	CROSS SECTIONAL VIEW AND PRESSURE RELIEF ARRANGEMENT FOR 120kV 10kA SM TYPE , LA(Qrs-1.6C)
6	G-008 / 120/ 31810	R0	PORCELAIN INSULATOR FOR 120kV 10kA SM TYPE ,(Qrs-1.6C)LA
7	G-083 / 3180	R0	GENERAL ARRANGEMENT DRAWING AND SCHEMATIC DIAGRAM OF SURGE COUNTER
8	G-057/31810	R0	V-I & V-T CHARACTERISTICS
9	G-007/31810	R0	MIN. RECOMMENDED CLEARANCES
10	G-110 / 120 / 31810	R0	ZnO ELEMENT FOR 120kV, 10kA,SM TYPE SURGE ARRESTER
11	S4/GTP/APTRANSCO/120kV-SM/25/POR/002	R0	GUARANTEED TECHNICAL PARTICULARS FOR 120kV LA

Drawing approval subject to valid vendor registration

**MANUFACTURER**  
**CG Power and Industrial Solutions Limited**  
 A-3, MIDC Ambad  
 Nashik-422010

**CLIENT**



Transmission Corporation Of Andhra Pradesh Ltd

Prepared : PSB      Checked: PSB      Approved: NJ

LOA NO :-

AS APPLICABLE

**PROJECT**

AS APPLICABLE

List of drawing for 120kV ,10kAp , SM Type Porcelain Housed Lightning Arrester (Class 3)  
**Title:**

**Doc No.** CGPISL / S4/STD/APTRANSCO/002  
**DATE** 30.05.2022

**CHIEF ENGINEER**  
**PLANNING & POWER SYSTEMS**  
**APTRANSCO**

1. Minimum 300mm plinth shall be maintained for CT/PT/CVT/Isolators/IV/LA/Breakers in the Substation during foundation works to ensure safe live to ground clearance as per IE rules.

2. Since the supply of terminal connectors is not in the scope of manufacturer as mentioned in the drawings. The EPC contractor shall be instructed to supply the same in line with CT/PT/CVT/Isolator/IVT/LA/Breakers requirement and compatibility.

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**BILL OF MATERIAL**

ITEM NO.	ITEM	MATERIAL
1	LINE TERMINAL (PAD)	MS H.D.G.
2	FLANGE	AL. ALLOY
3	INSULATOR	PORCELAIN (BROWN)
4	FRP TUBE	FIBER REINFORCED PLASTIC
5	ZnO ELEMENT	ZnO & ADDITIVES
6	INTERCONNECTING PLATE	MS H.D.G.
7	BASE PLATE	MS H.D.G.
8	BASE INSULATOR	POLYCRETE / EPOXY
9	CONNECTING LINK (L-1.5 M)	70 sq. mm Cu CABLE PVC INSULATED
10	SURGE COUNTER	ALUMINIUM
11	ARRESTER NAME PLATE	ALUMINIUM
12	M12 STUD	S.S.
13	ADAPTER STOOL	NOT IN CGPISL SCOPE
14	SUPPORT STRUCTURE	NOT IN CGPISL SCOPE

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**NOTE:**

- 1. RATED VOLTAGE : 120kV
- 2. CREEPAGE (min) : 3625mm(25mm/kV)
- 3. WEIGHT (Approx) : 100±10%kg
- 4. CANTILEVER STRENGTH : 150kg  
(DEFLECTION LESS THAN 200mm).

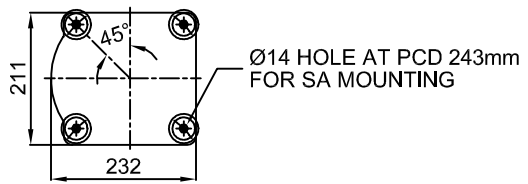
**EPC works only**

UNIT NAME PLATE

PRESSURE RELIEF PORT

Ø230±10  
 Ø192±10

Ø13 HOLE, 2NOs. FOR S.C. MOUNTING, AT DIST. 190  
 GROUND CONNECTION (SUITABLE FOR M12 LUG)



SA BASE MOUNTING DETAIL VIEW 'A-A'




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IF IN DOUBT ,ASK




CUSTOMER		TRANSMISSION CORPORATION OF ANDHRA PRADESH			TITLE: GENERAL ARRANGEMENT FOR 120KV, 10KA SM TYPE PORCELAIN HOUSED SURGE ARRESTER(Qrs-1.6C)	
3		THIRD ANGLE PROJECTION			DRG NO. : 31810	REV 0
		SCALE: NTS		INITIALS		
2		ALL DIMN. IN mm. UNLESS OTHERWISE SPECIFIED.	DRN	NNJ	CG Power and Industrial Solutions Limited SURGE ARRESTER DIVISION, AMBAD, NASIK.	
			CHD	PSB		
1		GEN. TOL. ±6%	APPD	NJ		
NO	REVISION	DATE	DATE: 24.05.2022	CGL W.O.: APTRANSCO_STD_120KV	SH 1 OF 1	

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REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS  
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

 <b>CG Power &amp; Industrial Solutions Limited</b> <b>ZINC OXIDE SURGE ARRESTER</b>		 30 
Model No. : ZLA-3E	Sr.No. **	
Rated Voltage of Unit 60 kV	MCOV 53 kV	
Position Of Unit TOP	Qrs 1.6 C	
Year of Mfg. 2022	TYPE : SM	
105		

TOP UNIT

 <b>CG Power &amp; Industrial Solutions Limited</b> <b>ZINC OXIDE SURGE ARRESTER</b>		 30 
Model No. ZLA-3E	Sr.No. **	
Rated Voltage of Unit 60 kV	MCOV 53 kV	
Position Of Unit BOT	Qrs 1.6 C	
Year of Mfg. 2022	TYPE : SM	
105		

BOTTOM UNIT


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 <b>CG Power &amp; Industrial Solutions Limited</b> <b>ZINC OXIDE SURGE ARRESTER</b>		 50 
Model No. : ZLA-3E	Sr.No. : ****	
HSV : 145	Rated Voltage (kV <sub>rms</sub> ) : 120	
N.D.C (kAp) : 10	MCOV (kV <sub>rms</sub> ) : 106	
Year of Mfg : 2022	Pr. Rel. Current (kArms) : 40	
Designation : SM	Appr. Wt. (kg) : 100	
Qrs (C) : 1.6C	Rated Freq. (Hz) : 50	
CREEPAGE DISTANCE : 3625MM		
105		

ARRESTER NAME PLATE

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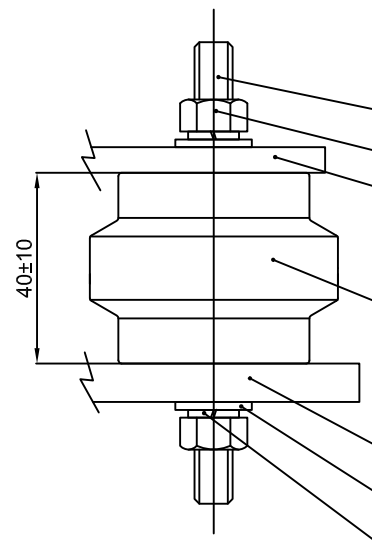
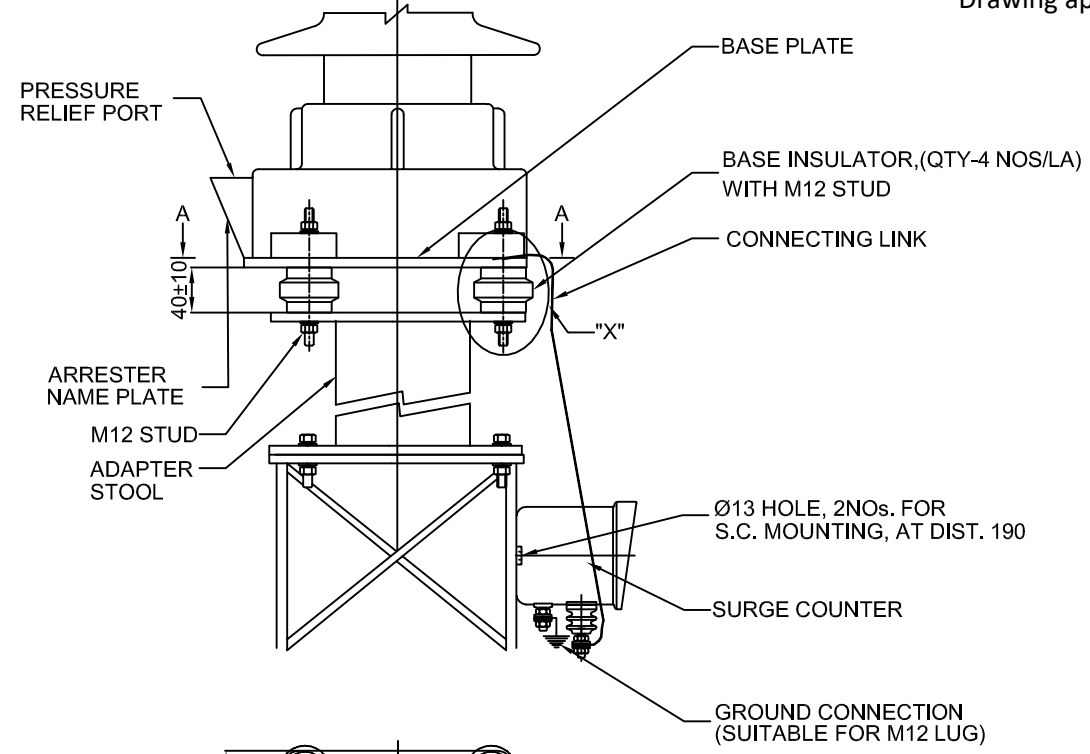
CUSTOMER		TRANSMISSION CORPORATION OF ANDHRA PRADESH				TITLE: ARRESTER AND UNIT NAME PLATE FOR 120kV 10kA SM TYPE SURGE ARRESTER (Qrs-1.6C)	
3		THIRD ANGLE PROJECTION			DRN	NNJ	 <b>CG Power and Industrial Solutions Limited</b> SURGE ARRESTER DIVISION, AMBAD, NASIK.
2		SCALE: NTS		INITIALS	NAME	DRG NO. : G-033 / 120 /31810 CGL W.O.: APTRANSCO_STD_120KV	
1		ALL DIMN. IN mm. UNLESS OTHERWISE SPECIFIED.	CHD	PSB			
		GEN. TOL. ±6%	APPD	NJ		DATE: 24.05.2022	SH 1 OF 1
NO	REVISION	DATE					

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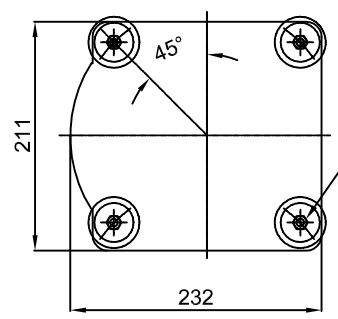
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DETAIL "X"

**BILL OF MATERIAL**

DESCRIPTION	QTY. NOS./LA
M12 STUD	8
M12 NUT	8
BASE PLATE	1
INSULATOR	4
STRUCTURE TOP PLATE	1
M12 PLAIN WASHER	8
M12 SPRING WASHER	8



SA BASE MOUNTING DETAIL VIEW 'A-A'

1. Minimum 300mm plinth shall be maintained for CT/PT/CVT/Isolators/IV/LA/Breakers in the Substation during foundation works to ensure safe live to ground clearance as per IE rules.
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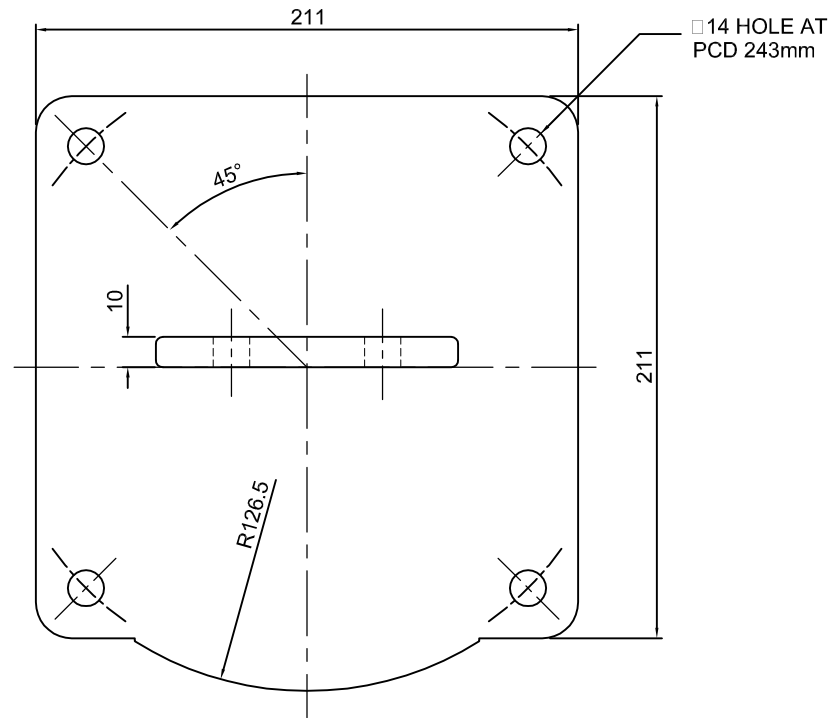
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CUSTOMER		TRANSMISSION CORPORATION OF ANDHRA PRADESH				TITLE: INSULATING BASE ASSY. AND SURGE COUNTER MOUNTING DETAILS FOR 120KV, 10kA SM TYPE SA(Qrs-1.6C)	
3		THIRD ANGLE PROJECTION			DRN	NNJ	
		SCALE: NTS		INITIALS	NAME		
2		ALL DIMN. IN mm. UNLESS OTHERWISE SPECIFIED.		CHD	PSB		
1		GEN. TOL. ±6%	APPD	NJ			
NO	REVISION	DATE	DATE:	24.05.2022	DRG NO. : G-075 / 120 / 31810	REV	0
CGL W.O.: APTRANSCO_STD_120KV						SH 1 OF 1	

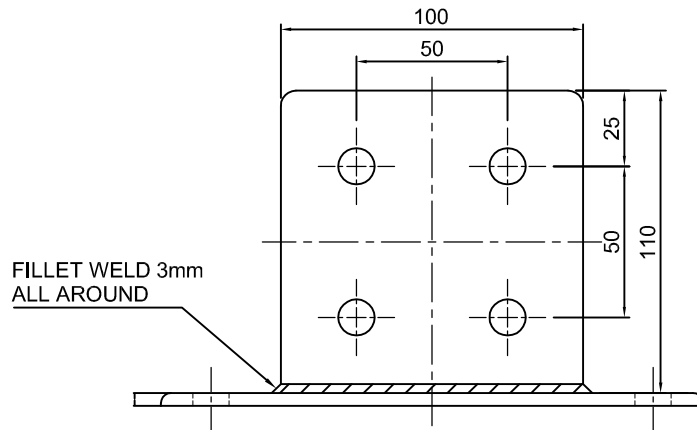
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FILLET WELD 3mm ALL AROUND

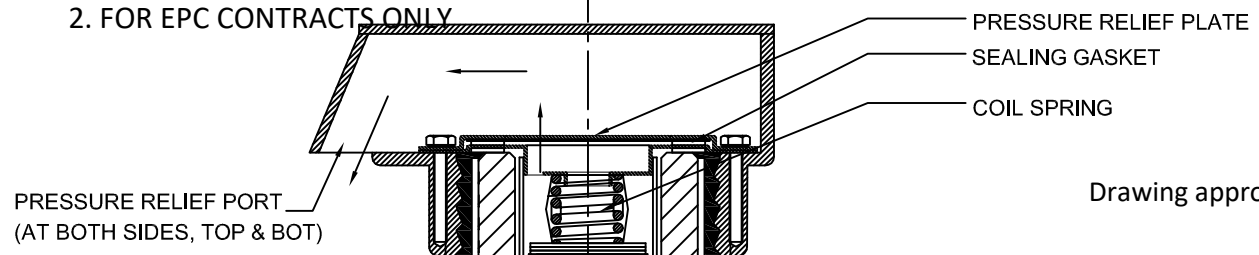
NOTE:-

1. FINISH : HDG
2. HDG 85 MICRONS MIN. THK.

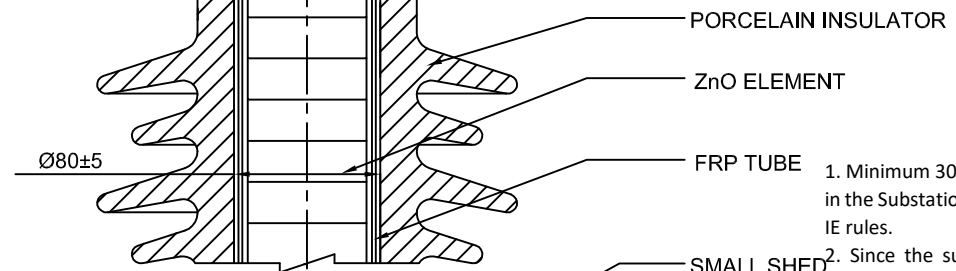
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CUSTOMER		TRANSMISSION CORPORATION OF ANDHRA PRADESH				TITLE: TOP TERMINAL PLATE FOR 120kV 10kA, SM-TYPE, SURGE ARRESTER (Qrs-1.6C)	
3		THIRD ANGLE PROJECTION			DRN	NNJ	
		SCALE: NTS		INITIALS	NAME		
2		ALL DIMN. IN mm. UNLESS OTHERWISE SPECIFIED.		CHD	PSB		
1		GEN. TOL. ±6%	APPD	NJ			
NO	REVISION	DATE	DATE:	24.05.2022	DRG NO. : G-056 / ZN0288	REV	0
CGL W.O.: APTRANSCO_STD_120KV						SH 1 OF 1	

NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS  
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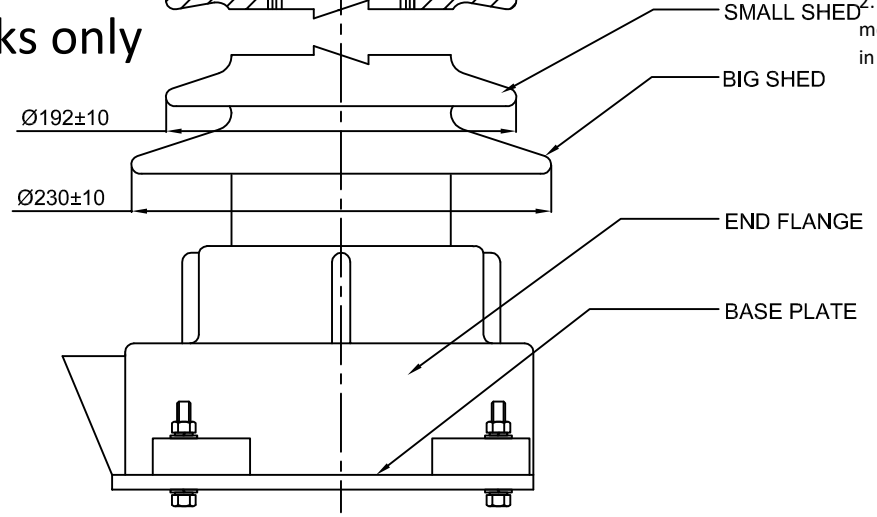


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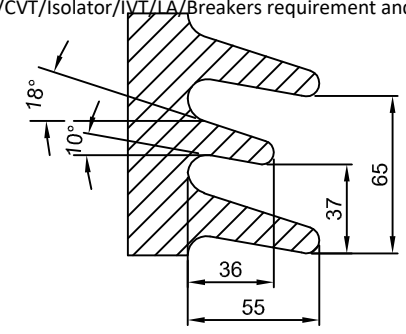
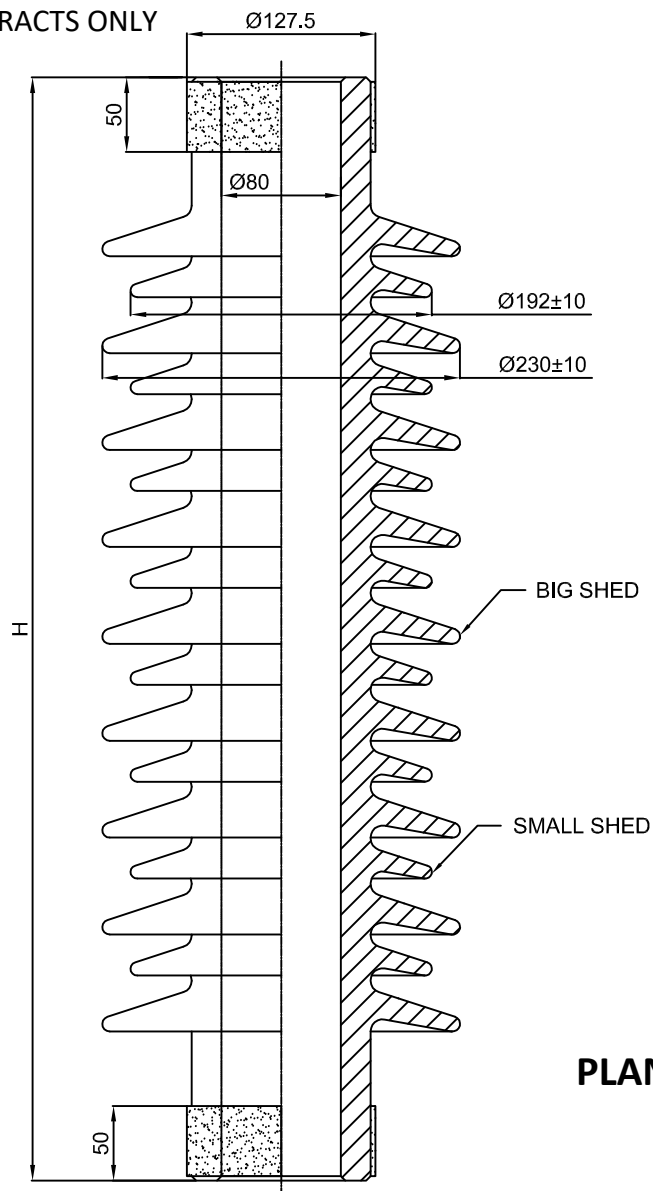
NOTE:  
1. BURSTING PRESSURE OF ARRESTER : 3kg/cm<sup>2</sup> (Max.)  
2. APPLICABLE FOR 2 UNITS.

CUSTOMER		TRANSMISSION CORPORATION OF ANDHRA PRADESH			
3		THIRD ANGLE PROJECTION			TITLE : CROSS SECTIONAL VIEW AND PRESSURE RELIEF ARRANGEMENT FOR 120kV 10kA SM TYPE , SA(Qrs-1.6C)
		SCALE: NTS		INITIALS	
2		ALL DIMN. IN mm. UNLESS OTHERWISE SPECIFIED.	DRN	NNJ	 <b>CG Power and Industrial Solutions Limited</b> SURGE ARRESTER DIVISION, AMBAD, NASIK.
			CHD	PSB	
1		GEN. TOL. ±6%	APPD	NJ	DRG NO. : G-016 / 120 / 31810
NO	REVISION	DATE	DATE:	24.05.2022	CGL W.O. : APTRANSCO_STD_120KV SH 1 OF 1

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SLED FORM

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RATED VOLTAGE (kV)	HEIGHT (H) mm	TOTAL CREEPAGE (mm)
120kV (TOP & BOT 60kV EACH)	740	3625

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CUSTOMER		TRANSMISSION CORPORATION OF ANDHRA PRADESH			TITLE:	
3		THIRD ANGLE PROJECTION			PORCELAIN INSULATOR FOR 120kV 10kA SM TYPE ,(Qrs-1.6C) SA	
2		SCALE: NTS	DRN	NNJ	CG Power and Industrial Solutions Limited SURGE ARRESTER DIVISION, AMBAD, NASIK.	DRG NO. : G-008 / 120 / 31810
1		ALL DIMN. IN mm. UNLESS OTHERWISE SPECIFIED.	CHD	PSB		
NO		REVISION	DATE	DATE:	24.05.2022	CGL W.O.: APTRANSCO_STD_120kV SH 1 OF 1

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NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST

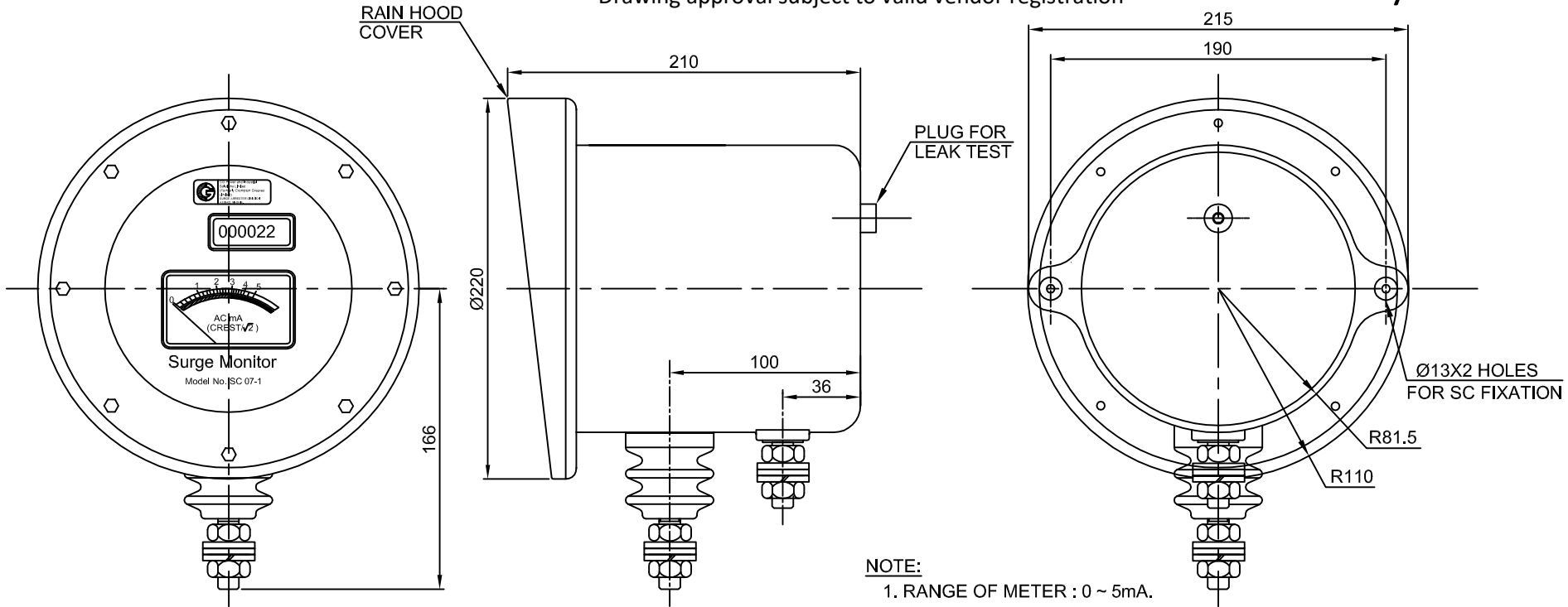
REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS

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EPC works only

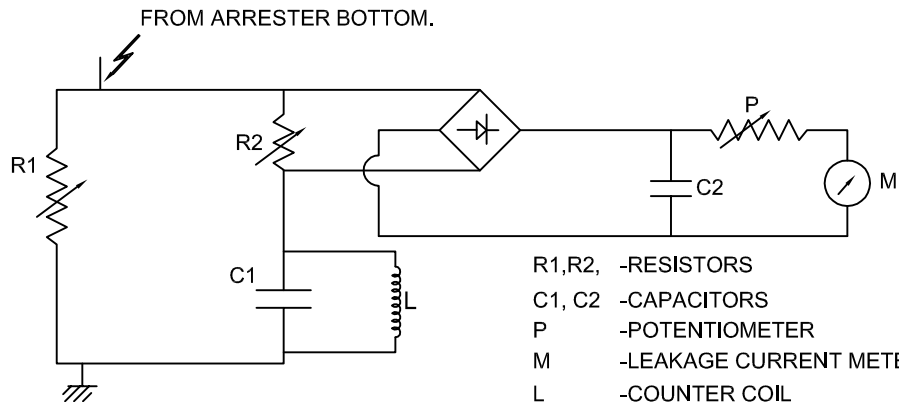
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NOTE:

- 1. RANGE OF METER : 0 ~ 5mA.  
\* 0 ~ 3mA GREEN ZONE &  
\* 3 ~ 5mA RED ZONE.
- 2. HOUSING :-  
\* MATERIAL : AL. ALLOY.  
\* PROTECTION : IP 67.
- 3. WEIGHT OF S.C. : 4kg APPROX.
- 4. MODEL NO. : SC 07-1
- 5. ELECTROMECHANICAL TYPE.

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SCHEMATIC DIAGRAM

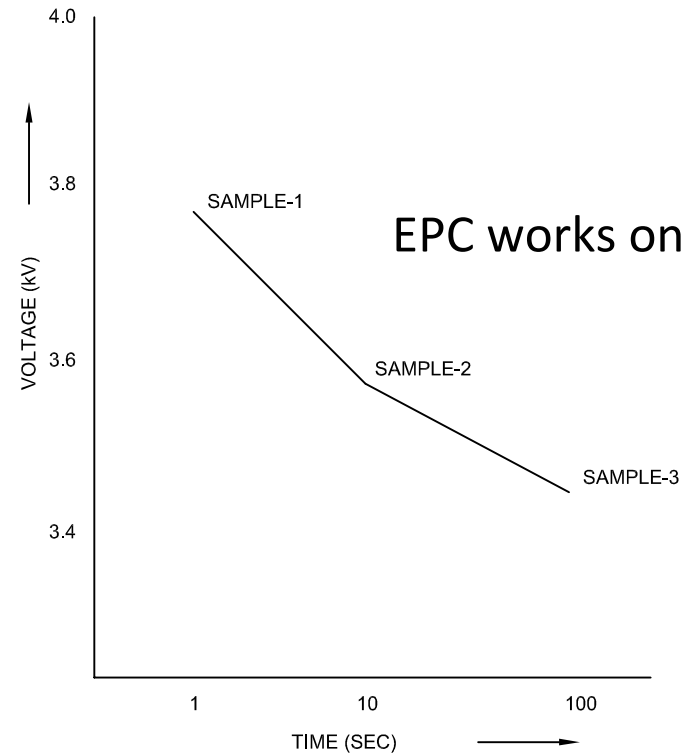
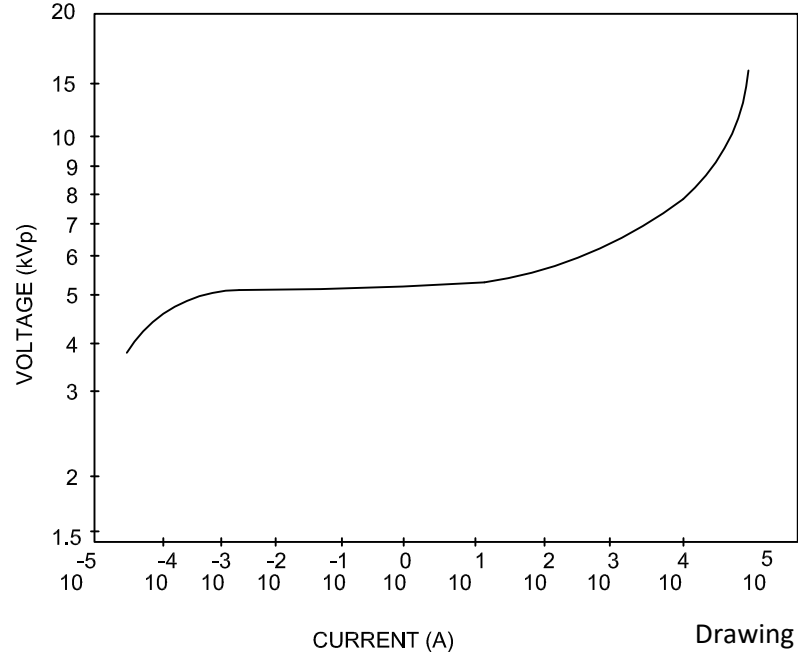
- R1,R2, -RESISTORS
- C1, C2 -CAPACITORS
- P -POTENTIOMETER
- M -LEAKAGE CURRENT METER
- L -COUNTER COIL

CUSTOMER		TRANSMISSION CORPORATION OF ANDHRA PRADESH				TITLE: GENERAL ARRANGEMENT DRAWING AND SCHEMATIC DIAGRAM OF SURGE COUNTER	
3		THIRD ANGLE PROJECTION			DRN	NNJ	
		SCALE: NTS		INITIALS	NAME		
2		ALL DIMN. IN mm. UNLESS OTHERWISE SPECIFIED.	CHD	PSB			
1		GEN. TOL. ±6%	APPD	NJ			
NO	REVISION	DATE	DATE: 24.05.2022	DRG NO. : G - 083 / 31810		REV	0
CGL W.O.: APTRANSCO_STD_120KV						SH 1 OF 1	

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 POWER FREQUENCY VOLTAGE Vs CUREENT CHARACTERISTICS

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POWER FREQUENCY VOLTAGE Vs TIME CHARACTERISTICS



EPC works only

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NOTE :  
 1. Ur = 3kV  
 2. Uc = 2.8kV  
 3. NDC = 10kAp  
 4. GRAPH REPRESENT ONLY CHARACTERISTICS OF SINGLE ZnO ELEMENT FOR OFFERED RATING.

CUSTOMER		TRANSMISSION CORPORATION OF ANDHRA PRADESH				TITLE:		V - I & V-T CHARACTERISTICS	
3		THIRD ANGLE PROJECTION			DRN	NNJ			
		SCALE: NTS		INITIALS	NAME				
2		ALL DIMN. IN mm. UNLESS OTHERWISE SPECIFIED.	CHD	PSB					
1		GEN. TOL. ±6%	APPD	NJ	DRG NO. : G-057 / 31810		REV	0	
NO	REVISION	DATE	DATE:	24.05.2022	CGL W.O.: APTRANSCO_STD_120KV		SH 1 OF 1		

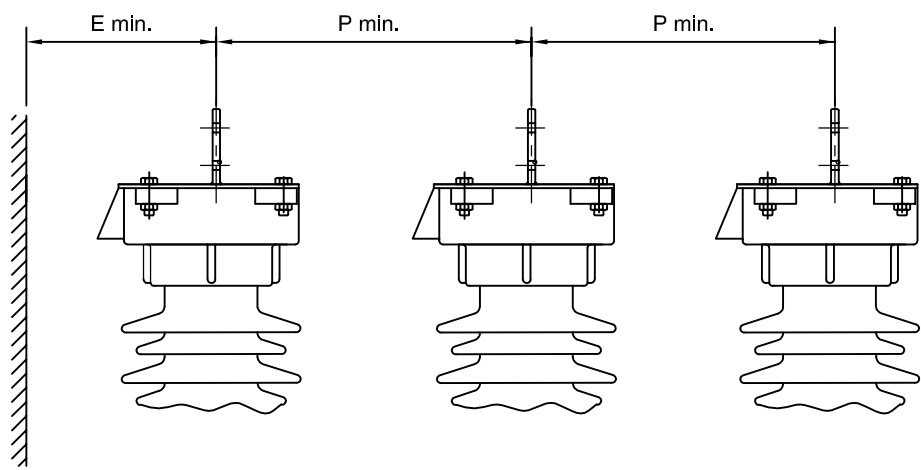
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E min. - MINIMUM RECOMMENDED CLEARANCES BETWEEN CENTRE OF ARRESTER AND EARTHED OBJECT.  
P min. - MINIMUM RECOMMENDED CLEARANCE BETWEEN TWO ADJACENT PHASE OF ARRESTER.

TABLE

SR.NO.	LA RATED VOLTAGE (kV)	E min. (mm)	P min. (mm)
1.	120	1500	1700

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CUSTOMER		TRANSMISSION CORPORATION OF ANDHRA PRADESH			
3		THIRD ANGLE PROJECTION			TITLE :
		SCALE: NTS		INITIALS	NAME
2		ALL DIMN. IN mm. UNLESS OTHERWISE SPECIFIED.	DRN	NNJ	<b>CG Power and Industrial Solutions Limited</b> SURGE ARRESTER DIVISION, AMBAD, NASIK.
			CHD	PSB	
1		GEN. TOL. ±6%	APPD	NJ	DRG NO. : G - 007 / 31810
NO	REVISION	DATE	DATE:	24.05.2022	CGL W.O.: APTRANSCO_STD_120KV
					SH 1 OF 1

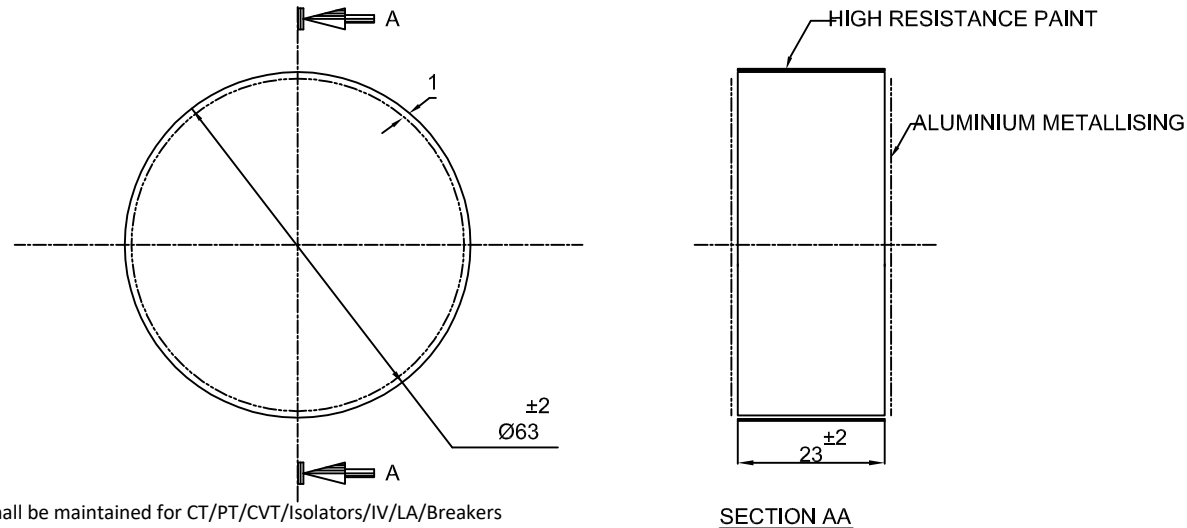
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ZnO ELEMENT



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1. RATED VOLTAGE : 3kVrms
2. MCOV : 2.80 kVrms
3. NDC : 10kA
4. ARRESTER CLASS : STATION
5. DESIGNATION : SM
6. Qrs : ≥1.6C
7. With : 7kJ/kV
8. LINE DISCHARGE CLASS : CLASS 3 [ AS PER IEC 60099-4 (2009) ]

**CHIEF ENGINEER  
PLANNING & POWER SYSTEMS  
APTRANSCO**

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CUSTOMER		TRANSMISSION CORPORATION OF ANDHRA PRADESH			
3		THIRD ANGLE PROJECTION			TITLE: ZnO ELEMENT FOR 120kV, 10kA, SM TYPE SURGE ARRESTER
		SCALE: NTS		INITIALS	NAME
2		ALL DIMN. IN mm. UNLESS OTHERWISE SPECIFIED.	DRN	NNJ	
			CHD	PSB	
1		GEN. TOL. ±6%	APPD	NJ	
NO	REVISION	DATE	DATE:	24.05.2022	DRG NO. : G - 110 /120/31810
					REV 0
					CGL W.O.: APTRANSCO_STD_120KV
					SH 1 OF 1

5987110/2022/EE/MT/ENE/51

# CG Power and Industrial Solutions Limited

## Switchgear Division: Power Systems

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Smart solutions.  
Solving Problems

NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS  
2. FOR EPC CONTRACTS ONLY

S4/GTP/APTRANSCO/120kV-SM/25/POR/002

Sr. No	Description	132kV
1	Name of Manufacturer	CG Power and Industrial Solutions Limited
2	Arrester Class & Type	Station Class, Gapless type
3	Applicable Standard	IEC 60099-4 (2014)
4	Rated Arrester Voltage (kV)	120
5	Maximum continuous operating Voltage (kV)	106
6	Nominal Discharge current (kA) with 8/20 micro-sec wave	10
7	Designation of Arrester	Station Class, Gapless type, SM Type
8	a. Thermal Energy Rating Wth in kJ/kV of Ur b. Repetitive charge transfer rating (Qrs) in coulomb c. Line Discharge Class	≥ 7 kJ/kV: Qrs : 1.6C Class 3 [ As per IEC 60099-4 (2009)]
9	Maximum Switching current impulse residual voltage at	
	i) 1000Amps	294
	ii) 500Amps	280
	iii) 250Amps	260
10	Maximum steep current impulse residual voltage with 1/20 micro second current wave at 10kA (kVp)	386
11	Maximum residual voltage with 8/20 micro-sec wave (kVp)	
	i) 5 kA	333
	ii) 10kA	355
	III) 20kA	390
12	Safe Fault current (kArms)	40kArms at 0. 2sec
13	Lightning Impulse withstand voltage of Arrester Housing with 1.2/50 micro-second wave (kVp)	650
14	One minute power frequency withstand voltage of housing (Dry/Wet) - kVrms	275
15	High current short duration impulse withstand level with 4/10 micro-sec wave (kA) Peak	100
16	Pressure Relief Class	A

Registered Office:

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Sugappa



**S4/GTP/APTRANSCO/120kV-SM/25/POR/002**

17	Over-voltage withstand Capability kVp	
	0.1 second	220
	1 second	212
	10seconds	203
	100seconds	190
18	a) Reference Voltage (kV)	>= 120kV
	b) Reference current (mA)	5 mA
19	Number of units per phase and rating of each unit.	2(each of 60kV)
20	Minimum total creepage distance (mm)	3625 (25mm/kV)
21	Leakage current (mA)	<= 3 mA
22	Total weight of Arrester (kg)	100kG approx
23	Maximum cantilever strength of Surge Arrester (Including wind load)	150kG with deflection less than 200mm
24	Overall Height of Surge Arresters (mm)	Ref GA Drg.
25	Maximum distance recommended from equipment to be protected by Surge Arrester (mm)	As per IE rules
26	Minimum distance between grounded object	As per IE rules
27	Minimum distance between arrester phase legs	As per IE rules
29	Seismic Acceleration	0.3g
28	Any other particulars	No
29	Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz. in all positions	Less than 2500µV
30	Corona Extinction Voltage	92kVrms
31	Partial Discharge Level at 1.05*MCOV	Less than 10pC

EPC works only

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