



## SF6 Type SF6 Gas Circuit Breakers (Spring-Spring Mechanism)

CPSI assembles SFM type Outdoor SF6 Gas Circuit Breakers (GCBs) ranging from 72.5kV to 170kV. These GCBs are of live-tank design, with motor / manual charged spring-opening spring-closing operating mechanism and are capable of interrupting all possible switching duties. The breakers are single break interrupter design and employ dual flow puffer action for current interruption ensuring high operational reliability and safety of power transmission systems.

The GCBs are capable of clearing the severe rate of rise of recovery voltage due to short line faults and high recovery voltage peak due to out of phase switching. Small currents such as capacitor bank switching current, transformer magnetizing current, cable / line charging current are interrupted smoothly without any re-strikes or re-ignition and the over-voltages observed are minimum.

### Construction & Operation

Depending upon the application, type SFM GCBs are divided into two types as follows:

1. Three phase auto re-closing circuit breaker with one common mechanism for Transformer applications.
2. Single / Three phase auto re-closing circuit breaker with three separate spring mechanisms for Line applications.

The breaker consists of three main parts:

1. Vertical porcelain units containing puffer type interrupter.
2. Spring-spring operating mechanism and control equipment in a single housing.
3. Base Frame and support columns.

### The SF6 GCB Product Features

- Easy & convenient in installation, fault-detection and operation.
- In compliance with the new IEC-62271-100 and ANSI standards.
- Insulation with enhanced creepage distance allows for installation in highly polluted areas without changes in dimensions.
- Type tested at recognized international laboratories: CESI Italy, KERI Korea, KEMA Netherlands.
- All range of Circuit Breakers is certified to achieve C2 & M2 class as per IEC 62271-100.

The SF6 Gas Circuit Breaker (GCB) Products range is High Voltage Gas Circuit Breaker (HV GCB):

- 72.5kV outdoor type up-to 3150A, 40kA
- 170kV outdoor type up-to 3150A, 40kA

## Routine Testing

All routine tests as specified in IEC, are conducted on the fully assembled GCBs at our factory. In addition to the specified tests as per IEC, the following tests are also carried out on each breaker:

- MECHANICAL OPERATION TESTS
- CONTROL & AUXILIARY CIRCUIT CHECK
- MEASUREMENT OF SPEED & TIME (NO LOAD OPERATING CHARACTERISTICS)
- DCRM TEST as per Customer requirement.
- CONTACT RESISTANCE MEASUREMENT
- HIGH VOLTAGE TEST ON MAIN CIRCUIT
- HIGH VOLTAGE TEST ON CONTROL & AUXILIARY CIRCUIT
- GAS LEAKAGE TESTS
- GAS DENSITY SWITCH OPERATION TESTS
- MEASUREMENT OF TRIPPING & CLOSING COIL RESISTANCE

CPSI testing laboratory is fully equipped with the latest testing equipment:

- 1000 kV Resonant Test System
- Gas Leak Detector (with capability to detect leaks as low as 1 ppm).
- Multi-Channel Breaker Speed / Time Analyzers.
- Mechanical Endurance Controller
- Contact Resistance Meter (Static)
- Dynamic Contact Resistance (Signature)

### Transport & Site Installation

All the Circuit Breakers are factory tested and then depending on the type involved are partly dismantled into packing units which are dispatched. All the sub-assemblies are individually wrapped to reduce the harmful effects of atmosphere.

The Circuit Breaker Poles are filled with a small quantity of SF<sub>6</sub> Gas for Transportation (at a gauge pressure of 0.5 kg/cm<sup>2</sup>) to avoid moisture ingress and evacuation at site.

### Customer Support & After Sales Service

We provide solutions to all possible Technical requirements to Customer through our highly qualified Engineers.

Our Service Engineers, Technicians and Authorized Representatives can provide services supervision of Erection and Commissioning and After Sales Service at site.

**Guaranteed Technical Particular**  
**72.5kV SF6 Gas Circuit Breakers (Spring-Spring Mechanism)**

No.	Description	Units	3 Phase Auto Re-Closing			1 Phase Auto Re-Closing		
			70-SFM-32B	70-SFM-40AA	150-SFM-40B	70-SFM-32B	150-SFM-40B	
1	Type reference	:	-	70-SFM-32B	70-SFM-40AA	150-SFM-40B	70-SFM-32B	150-SFM-40B
2	Rated Voltage	:	kV	72.5	72.5	170	72.5	170
3	Rated Lightning Impulse Withstand	:	kVp	350		750	350	750
4	Rated Power Frequency Withstand	:	kV	160		325	160	325
5	Creepage Distance	:	mm	1815		4250	1815	4250
6	Applicable Standards	:	-	IEC-62271-100				
7	Type of Mechanism	:	-	Spring - Spring				
8	Rated Normal Current	:	A	3150				3150/4000
9	Rated Operating Sequence	:	-	0 - 0.3sec - CO - 3min - CO/CO - 15sec - CO				
10	Rated Frequency	:	Hz	50 / 60				
11	Rated Duration of Short Circuit	:	sec.	3				
12	Rated Closing/Tripping Voltage	:	VDC	110/125/220				
13	Current of Closing/Tripping Coil	:	A	6A Max at 110 V DC				
14	Rated Break Time	:	≤ ms	50				
15	Rated Closing Time	:	≤ ms	130	80	100	130	100
16	Rated Short Circuit Breaking Current	:	kA	31.5	40	40	31.5	40
17	Rated Short Circuit Making Current	:	kAp	80	100	100	80	100
18	Rated Line Charging Breaking Current and Over Voltage	:	A / pu			50 / <2.5		50 / <2.5
19	Rated Cable Charging Breaking Current and over Voltage	:	A / pu	250 / < 2.5	125 / < 2.5	160 / < 2.5	250 / < 2.5	160 / < 2.5
20	Rated Single Capacitor Bank Breaking Current & Over Voltage	:	A / pu	600 / < 2.5	400 / < 2.5	400 / < 2.5	600 / < 2.5	400 / < 2.5
21	Rated out of Phase Breaking Current	:	kA	7.9	10	10	7.9	10
22	First Pole to Clear Factor	:	-	1.5				
23	Auxiliary Contacts	:	-	8 NO + 8 NC				
24	SF6 Gas Pressure (at 20 deg. C)							
	- Normal	:	Kg/cm2	5	6	7	5	7
	- Alarm	:	Kg/cm2	4.5	5.5	6.5	4.5	6.5
	- Lockout	:	Kg/cm2	4	5	6	4	6
25	Dimension							
	- A	:	mm	1100	1100	2200	3000**	3000**
	- B	:	mm	3070	3525	4310	3070	4010
	- H	:	mm	3998	4574	6089	3998	5776
26	Weight (Approx.)	:	Kg	1100	820	2200	2100	3300

Standard Altitude 1000 m

\*\* Adjustable

**Optionals**

No.	Description	Units	3 Phase Auto Re-Closing			1 Phase Auto Re-Closing	
			48/60/110/125/220/250	125/220/250	48/60/110/125/220/250	125/220/250	
1	Creepage Distance	mm/kV	31				
2	Closing / Tripping Coil Voltage	V DC	48/60/110/125/220/250	125/220/250	48/60/110/125/220/250	125/220/250	
3	Clearance of Live Parts to Ground	-	As Per Customer Specifications				
4	Max. Altitude Above Sea Level	m	Up-to 2300	-	Up-to 2300	-	



## Current Transformers (72.5 kV and 170 kV)



CPSI assembles type CT and Type IOSK, CTs are of live tank type with rated voltage of 72.5 and 170 kV. All our Current Transformers adhere to the requirements of the international quality standards and our quality system, environment management system, safety management systems are certified to ISO 9001–2008, ISO 14001 and ISO 18001 respectively.

### Design

The primary winding consists of aluminum sections accommodated in the top housing. The primary winding is rigid, concentric and distributed uniformly around the insulated secondary winding in order to have optimum mechanical endurance against short circuit forces.

The primary windings are terminated on the sides of the top housing with provisions for convenient primary ratio change over. The cores and secondary windings are enclosed in a well-contoured, rigid aluminum shell, which is fully insulated from the top housing.

The secondary leads are taken to the base of the CT through an oil impregnated paper (OIP) insulated condenser bushing. The insulation structure is specially designed to have a uniform drop of electric field radially as well as longitudinally across the bushing. This is achieved by specially-contoured electrodes, uniform insulation around the electrodes and fine potential grading along the bushing. High quality insulating Kraft paper is used for insulation. The paper insulation is dried under heat and vacuum and impregnated with oil to achieve excellent insulation as well as ageing properties. The fully assembled CTs are dried and oil filled under vacuum in evacuated heating chambers.

### Construction

Brown glazed porcelain Insulator with shed profile as per IEC 815 is used. Gray porcelains or variant shed profiles can also be supplied on request. The porcelains are cemented to aluminum alloy flanges on

both sides with port land cement for providing optimum mechanical strength.

The top housing is made of corrosion resistant aluminum alloy, form fitted to the internal active body. The insulated primary and secondary windings are assembled in the top housing. Primary terminals, with ratio changeover arrangements are accessible on the sides.

Stainless steel bellow mounted at the top compensates for expansion/contraction of oil due to ambient temperature variations. Thus the CT is hermetically sealed. The bellow position viewed through the window on the Hood indicates the operational status and the oil level in the CT. An oil-filling plug is provided at the top of the bellow.

The fully encapsulated CT is impervious to rain, snow and ice and can sustain considerable temperature variations. High quality CRGO grade silicon steel, Mu-metal cores of wound ring type are used. Up to 6 cores of various accuracy classes, burdens and Rated Normal Current can be accommodated in one CT to meet different metering and protection requirements. The secondary winding is uniformly distributed over the circumference of the core. This minimizes the reactance of the winding and helps in obtaining accurate transformation ratio.

The CT base structure is made of Aluminum Alloy. The secondary terminal box, oil sampling valve and earthing pads are provided on the base. Main lifting lugs and mounting holes are also provided on the base.

To provide stability during lifting and for erecting up from prone position, two additional lugs are provided on the top housing.

### Tests And Performance

The performance and reliability of these Current Transformers has been verified at renowned international testing laboratories like KEMA(Netherlands) and CPRI (India). The CTs are type tested for short circuit performance, Thermal Stability Test, Multiple Chopped wave Impulse test, wet Lightning Impulse Test, partial discharge etc. as per IEC 44-1 - 1996, IEC: 61869-1 (2007) & IEC: 61869-2(2012)

### Transport

All CTs are to be transported in horizontal position only. For further details please refer to the instruction manual.

### Maintenance

The product is self-contained, maintenance free and does not require spares. For regular and periodic checks on the equipment, please refer the instruction manual supplied with the CTs.

**Guaranteed Technical Particular  
Current Transformers**

1	Type Designation	:	Unit	CT 72.5/140/325	IOS K 170/325/750
2	Applicable Standard	:	IEC - 60044-1:2003, IEC 61869 - 1&2		
3	Highest System Voltage	:	kV	72.5	170
4	One Min. Power Frequency Voltage	:	kV	140	325
5	Lighting Impulse	:	kVp	325	750
6	Switching Impulse	:	kVp	NA	
7	Rated Frequency	:	Hz	50/60	
8	Ambient Temperature	:	°C	-25 To 50	
9	Seismic Acceleration	:	g	0.3	
10	Altitude	:	m	Upto 1000	
11	One Min P.F Voltage On Secondary				
	- Metering	:	kV	3	
	- Protection	:	kV	3	
12	Rated Primary Current	:	A	50-2000-4000	
13	Rated Secondary Current	:	A	1 OR 5	
14	Short Time Thermal Current / Duration	:	kA/s	31,5/1&3 Sec	50/1&3 Sec
15	Dynamic Withstand Current	:	kA	78.75	125
16	Cantilever Load	:	kg	In Accordance with IEC - 60044 - 1 : 2003 & IEC : 61869 - 1&2	
17	Total Creepage Distance	:	mm	1810	4250
18	Arcing Distance	:	mm	700	1345
19	Dimensions	L1	:	mm	1530
		L2	:	mm	2175
		A3	:	mm	600
20	Mounting Dims	A1	:	mm	560
		A2	:	mm	670
21	Total Weight	:	kg	325	525
22	Quantity Of Oil	:	kg	80	110
23	Oil Level Indication	:	-	Bellow Level Indicator Provided At The Top	
24	Pressure Relief Device	:	-	Stainless Steel Bellow Provided At The Top	
25	Provision For Compensation Of Oil Volume Expansion Contraction	:	-	Stainless Steel Bellow Provided At The Top	
26	Type Of Secondary Terminal Blocks	:	-	Clip On Stud Type	

**Optional**

Type Designation		Unit	CGC 36/70/170	IOS K 170/325/750
1	Rated Thermal Current	:	A	Upto 4000 (FORk=1)
2	Altitude	:	m	Upto 1500
3	Seismic Acceleration	:	g	0.5
4	Creepage	:	mm/kV	31



## Capacitive Voltage Transformers (72.5 kV and 170 kV)



Our CVTs adhere to the requirements of the International quality standards and our quality and environment management system, safety management systems are certified to ISO 9001–2000, ISO 14001 and ISO 18001 respectively.

### Design and Construction

Each CVT consists of a coupling capacitor (CC) which acts as a voltage divider and an Electro Magnetic Unit (EMU), which transforms the medium voltage to standard low voltage. Depending on the system voltage the CC can be a single or a multi stack unit. The CC and the EMU are individually hermetically sealed to ensure accurate performance and high reliability.

### Coupling Capacitor

The Coupling Capacitor (CC) acts as a voltage divider and converts the system voltage to a medium voltage. The active part of the CC consists of a large number of oil impregnated paper (paper and film) capacitor elements connected in series.

Super calendared capacitor tissue paper and pure aluminum foils are used to make the capacitor elements. The capacitor elements are pressed and held in insulating supports to ensure a stable capacitance even for large temperature variations. The electrical connections between the capacitor elements are designed for a natural frequency much above 600 KHz in order to avoid interference with carrier communication.

The processed capacitor stack is assembled inside a porcelain insulator with corrosion resistant aluminum alloy end fittings. Brown glazed porcelain insulators with shed profile as per IEC 815 are used.

The insulators are cemented to aluminum alloy flanges for improved strength. Oil volume changes due to temperature variations are compensated by a stainless steel bellow installed at the upper end of the CC. The unit is completely filled with degassed insulated oil under vacuum. The bellow is pressurized by inert gas (from the top surface) to maintain a positive oil pressure even at lowest ambient temperatures. The CVT thus has very low PD levels even at low ambient temperatures.

### Electromagnetic Unit

The Electromagnetic Unit (EMU) consists of a medium voltage transformer, compensating reactor, damping element and surge protection device. The unit is housed inside a steel tank, which is filled with insulating oil leaving a largely dimensioned air cushion at the top in order to take care of changes in the oil volume due to fluctuations in the ambient temperature. An oil level indicator is mounted on the side wall of the tank.

The CC unit is mounted on the EMU tank and the insulated earth terminal of the CC is also accessible for connecting to power line carrier communication equipment. A surge arrester across this terminal and earth serves as the surge protection device. The NHF terminal must always be connected to earth if the CVT is not connected to carrier equipment.

The secondary terminal box is provided on the EMU tank. The EMU is calibrated and adjusted at factory for all burden and accuracy requirements. No site adjustments or measurements are necessary. The EMU is given adequate surface treatment for corrosion protection for life long service.

### Maintenance

The product is self-contained, maintenance free and requires no spares over its entire life span. We recommend regular and periodic checks as per pre-specified schedules (specified in the Instruction Manual supplied with the CVTs).

### Optional / Accessories

- Terminal Connector (Aluminum/Bimetallic, NEMA or as per customer specifications)
- Three element Carrier Protection Device Level (comprising Drain Coil, surge Arrester & Earth Switch)
- Cable Glands

**Guaranteed Technical Particular  
Capacitive Voltage Transformer**

1	Type Designation	:	Unit	CT 72.5/325/50	IOS K 170/750/50
2	Applicable Standard	:		IEC - 60044-1:2003, IEC 61869 - 1&2	
3	Highest System Voltage	:	kV	72.5	170
4	One Min. Power Frequency Voltage	:	kV	140	325
5	Lighting Impulse	:	kVp	325	750
6	Switching Impulse	:	kVp	NA	
7	Rated Frequency	:	Hz	50/60	
8	Ambient Temperature	:	°C	-25 To 50	
9	Seismic Acceleration	:	G	0.3	
10	Rated Voltage Factor	:	-	1,2 (CONT) / 1,5 (30 SEC)	
11	One Min P.F Voltage On Secondary	:	kV	3	
12	Secondary Voltage	:	V	100, 100/√3, 110, 110/√3 , 120 , 120/ √3.	
13	Total Creepage Distance	:	mm	1815	4250
14	Equivalent Capacitance	:	pF	8800	6000
15	Total Simultaneous Burden / Accuracy	:		-	200VA / CL 0,5
16	Total Thermal Burden	:	VA	500vA	750VA
17	Cantilever Load	:	kg	125	250
18	Arcing Distance	:	mm	820	1415
19	Total Height (H)	:	mm	1950	2550
20	Maximum Depth (A)	:	mm	785	785
21	Mounting Dimension (W)	:	mm	450	450
22	Total Weight	:	kg	315	450
23	Qty.of Oil	:	kg	75	100
24	Oil Volume Compensation (CC Unit)	:	-	Stainless SteelBellow	
25	Altitude	:	m	Up-to 1000	

**Optional**

1	Highest System Voltage	:	kV	72.5	170
2	Voltage Factor	:	-	1.9 For 30 Sec	
3	Creepage Distance	:	mm/kV	31.35	
4	Total Simultaneous Burden / Accuracy	:	-	100 VA / CL 0.2	
5	Seismic Acceleration	:	g	0.5	



## Surge Arresters



Components in any power system, face, in service, over voltages that arise either due to natural lightning or inevitable switching operations.

Surge arresters are used to protect power system installations and equipment against Lightning, Over-Voltages, Switching Surges etc. Generally arresters are connected across the equipment to be protected, typically between phase and earth for three phase installations.

CG metal oxide Surge Arresters consist of active part, which is a series of highly nonlinear ceramic resistors made essentially of Zinc Oxide. Fine Zinc Oxide crystals are surrounded by other metal oxides (additives).

### Special Features

- Unique doughnut construction of ZnO elements offers high-energy capability; provide uniform density and temperature distribution.
- Shatter proof performance.
- Simple, robust construction of Arresters.
- Extremely high non-linearity of ZnO elements.
- Positive locking of Zinc Oxide elements.
- Low power loss resulting in enhanced performance at elevated temperatures.
- Controlled environment assembly line.
- Ultra stable elements resulting in enhanced over voltage protection capacity.
- Available in Brown & ANSI-Grey Porcelains & composite.

All Arresters in this Catalogue are designed in line with the requirements of ANSI-IEEE Standard C62.11 & IEC 60099-4.

**Note:** CG Ltd. reserves the right to change design and specifications in this catalogue without notice, due to continuous product improvements.

## Explanation of Terms

### Voltage Rating

The voltage rating of an arrester is that voltage which can be applied for a limited time after the arrester has absorbed a large amount of energy as established in the operating duty tests. The rated voltage is used as a reference parameter for the specification of operating characteristics.

### Maximum Continuous Operating Voltage (MCOV)

The MCOV is the maximum permissible rms value of power frequency voltage that may be applied continuously between the terminals of the arrester.

### Temporary Over-Voltage Capability

An arrester must be selected with a high enough voltage rating to withstand temporary over voltages, which might be caused by various occurrences on the system. The most common event causing a temporary overvoltage is a single line to ground fault. For an effectively grounded system such faults will normally be cleared in less than one second. Therefore an overvoltage capability based on duration of one second is usually recommended. Also, below table shows Temporary Overvoltage Capability for a time range of 0.1 to 1,000 seconds.

### Arrester Voltage Ratings

The chart below indicates the minimum MCOV customers need to specify for an arrester as a function of system voltage. The minimum recommended ratings for solidly grounded systems allow for a temporary voltage rise of at least 40% over a period of one second.

Higher temporary over voltages may require higher MCOV.

Over Voltage Period (in sec)	TOV per unit of MCOV with prior duty
0,1	1,21
1	1,16
10	1,1
100	1,05
1000	1,02

### Arrester Application Information

CG Arresters are designed to use at altitudes of 1000 m. Arresters can be customized to meet requirements for higher altitudes. CG arresters can be used at an average temperature of 40°C & where daily maximum temperature does not exceed 60°C (140°F). The energy absorption capability – a two shot energy discharge within one minute, signifies the switching surge capability of these arresters.

Wherever Grading Ring is a requirement, it is dispatched along with the Arresters.

The base mounting & Terminal options can be customized to specific needs in addition to the options provided in this Catalogue. Surge Counters to monitor Arrester discharges are available with built in milli-

am meter. Where Surge Counters is a requirement, it is supplied with suitable Insulating bases (IBs) for Arrester isolation.

Ultrasonic Cleaning Arrangement from earth. All Arresters are identified with a unique serial number; multi-stack arresters have unit nameplates indicating position of the unit in the column. Arrester nameplates have information on the rated voltages, MCOV, Pressure relief current, serial number, etc.

## Surge Arrester Selection Process

No.	SYSTEM PARAMETERS	SURGE ARRESTER PARAMETER
1	System Voltage	Rated Voltage Maximum Continuous Operating Voltage (MCOV)
2	Maximum System Voltage	Rated Voltage Maximum Continuous Operating Voltage (MCOV)
3	System Earthing	Rated Voltage Maximum Continuous Operating Voltage (MCOV)
4	Basic Insulation Levels (LI,SI)	Residual Voltage (LI,SI)
5	Line Length, Energy Involved	Line discharge class
6	Short Circuit Level	Pressure relief class
7	System Over Voltages	Temporary over voltages
8	Pollution Level	Creepage distance
9	Altitude	Arcing distance, Creepage

With available Surge Arrester parameters and from appropriate table, other ratings of Surge Arrester can be determined. The tables show typical requirements from customers. Surge Arrester with different parameters can also be supplied.

### Class – 2

Reference Standard	-	IEC 60099-4, ANSI IEEE Std C62.11, IS 3070 (Part-3)
Arrester Type & Class	-	Gapless, Station class
Rated Frequency	Hz	48-62 Hz
Line Discharge	-	Class 2
Nominal Discharge Current	kAp	10
Pressure Relief Class	kArms	A / 40
Energy Handling Capability	kJ / kV of Rating	4.0
Continuous Leakage current at MCOV	Resistive (Max.)	micro-amps – 400 & Capacitive (Max.) – micro-amps – 1500
Cantilever strength	Kg-m	325
Product Range		2.7 kV to 144 kV

### Guaranteed Technical Particular Surge Arrester Class-2

Unique Ref. No.	Rated Voltage	MCOV	Steep Impulse RV at 10kA (1/2 microsec)	Switching Impulse RV at 125A (30/60 microsec)	Switching Impulse RV at 500A (30/60 microsec)	Lightning Impulse RV (8/20 micro-sec) at					Creepage distance mm	Overall Height (H) mm
						1.5kA	3kA	5kA	10kA	20kA		
ZLA2048	60	48	172	226	119	134	140	145	153	171	1815	1160
ZLA2057	72	57	205	139	143	161	169	174	183	205	1815	1160
ZLA2106	132	106	342	232	238	292	305	315	332	372	3625	1825
ZLA2115	144	115	376	255	262	321	336	347	365	409	3625	1825

### Class –3

Reference Standard	-	IEC 60099-4, ANSI IEEE Std C62.11, IS 3070 (Part-3)
Arrester Type & Class	-	Gapless, Station class
Rated Frequency	Hz	48-62 Hz
Line Discharge	-	Class 3
Nominal Discharge Current	kAp	10kAp
Pressure Relief Class	kArms	A / 65
Energy Handling Capability	kJ / kV of Rating	6.0
Continuous Leakage current at MCOV	Resistive (Max.)	micro-amps — 400 & Capacitive (Max.) micro-amps – 1500
Cantilever strength	Kg-m	725
Product Range	-	2.7 kV to 420 kV
Residual Voltage Values for ZLA3 in Doughnut Block (D7) Design		



**Guaranteed Technical Particular**  
**Surge Arrester Class-3**

Unique Ref. No.	Rated Voltage	MCOV	Steep Impulse RV at 10kA (1/2 microsec)	Switching Impulse RV at 250A (30/60 microsec)	Switching Impulse RV at 1kA (30/60 microsec)	Lightning Impulse RV (8/20 micro-sec) at					Creepage distance mm	Overall Height (H) mm
						1.5kA	3kA	5kA	10kA	20kA		
ZLA3048	60	48	171	124	127	144	146	147	155	174	1815	1090
ZLA3057	72	57	202	147	151	171	173	175	184	206	1815	1090
ZLA3106	132	106	374	272	279	316	320	323	340	381	3625	1600
ZLA3115	144	115	407	296	303	344	348	352	370	414	4495	1600

**Class –3**

Reference Standard	-	IEC 60099-4, ANSI IEEE Std C62.11, IS 3070 (Part-3)
Arrester Type & Class	-	Gapless, Station class
Rated Frequency	Hz	48-62 Hz
Line Discharge	-	Class 3
Nominal Discharge Current	kAp	10 kAp
Pressure Relief Class	kArms	A/40
Energy Handling Capability	kJ / kV of Rating	6
Continuous Leakage Current at MCOV	-	Resistive (Max.) micro-amps — 400 & Capacitive (Max.) micro-amps – 1500
Cantilever Strength	Kg-m	725
Product Range	-	2.7 kV to 216 kV
Residual Voltage Values for ZLA3 in Solid Block (D6) Design		

**Guaranteed Technical Particular**  
**Surge Arrester Class-3**

Unique Ref. No.	Rated Voltage	MCOV	Steep Impulse RV at 10kA (1/2 micro sec)(in kV)	Switching Impulse RV at 250A (30/60 micro sec) (in kV)	Switching Impulse n RV at 1kA (30/60 micro sec) (in kV)	Lightning Impulse RV (8/20 micro-sec) at			Creepage distance mm	Overall Height (H) mm
						5kA	10kA	20kV		
ZLA3E048	60	48	170	118	125	147	157	171	1815	950
ZLA3E048	72	57	204	142	150	176	189	205	1815	950
ZLA3E106	132	106	374	260	274	323	346	376	3625	1800
ZLA3E131	144	115	408	283	299	353	377	410	4495	1800

**Class –4**

Reference Standard	-	IEC 60099-4, ANSI IEEE Std C62.11, IS 3070 (Part-3)
Arrester Type & Class	-	Gapless, Station class
Rated Frequency	Hz	48-62 Hz
Line Discharge	-	Class 4
Nominal Discharge Current	kAp	20 kAp
Pressure Relief Class	kArms	A/65
Energy Handling Capability	kJ / kV of Rating	8 - 12
Continuous Leakage current at MCOV	-	Resistive (Max.) micro-amps — 500 & Capacitive (Max.) micro-amps – 2000
Cantilever strength	Kg-m	725
Product Range	-	2.7 kV to 420 kV

**Guaranteed Technical Particular**  
**Surge Arrester Class-4**

Unique Ref. No.	Rated Voltage (in kV)	MCOV	Steep Impulse RV at 20kA (1/2 micro sec)(in kV)	Switching Impulse RV at 500A (30/60 micro sec)(in kV)	Switching Impulse RV at 500A (30/60 micro sec)	Lightning Impulse RV (8/20 micro-sec) at			Creepage distance (min) mm	Overall Height (H) mm
						10kA	20kA	40kA		
ZLA4048	60	48	160	120	128	142	150	165	1815	1090
ZLA4057	72	57	192	144	153	171	180	198	1815	1090
ZLA4106	132	106	353	264	281	313	330	363	3625	1600
ZLA4115	144	115	385	288	306	342	360	396	4495	1600

**Class —4 (High Creepage)**

Reference Standard	-	IEC 60099-4, ANSI IEEE Std. C62.11, IS 3070 (Part-3)
Arrester Type & Class	-	Gapless, Station class
Rated Frequency	Hz	48-62 Hz
Line Discharge	-	Class 4
Nominal Discharge Current	kAp	20 kAp
Pressure Relief Class	kArms	A/65
Energy Handling Capability	kJ / kV of Rating	8 - 12
Continuous Leakage current at MCOV	-	Resistive (Max.) micro-amps — 500 & Capacitive (Max.) micro-amps — 2000
Cantilever strength	Kg-m	725
Product Range	-	2.7 kV to 420 kV

**Guaranteed Technical Particular**  
**Surge Arrester Class-4 High Creepage**

Cat. No	Highest System Voltage (kVrms)	Rated Voltage	MCOV	Steep Impulse RV at 20kA (1/2 micro sec) (in kV)	Switching Impulse RV at 500kA (30/60 micro sec) (in kV)	Switching Impulse RV at 2kA (30/60 micro sec) (in kV)	Lightning Impulse RV (8/20 micro-sec) at (in kV)					Creepage distance mm	Overall Height (H) mm
							10kA	20kA	20kA	20kA	40kA		
ZLA5048-H	72.5	60	48	196	128	133	153	155	158	166	186	2251	1350
ZLA4057-H	72.5	72	57	228	148	154	177	180	183	193	216	2251	1350
ZLA4106-H	170	132	106	432	282	293	337	342	348	366	410	4495	1600
ZLA4115-H	170	144	115	470	306	318	366	372	378	398	446	5574	2790

**Accessories:**

Surge Arrestors may be supplied with following accessories on request:

- **Surge counter**
- **Insulating base (required in case surge counter is to be used)**

- **Cable conductor of specific length (required in case surge counter is to be used)**

Note: Grading rings are supplied with CG Surge Arresters for CLASS 3& 4 and for KV rating higher than or equal to 144 KV.

**Class - 3 Polymeric LA**

Reference Standard	-	IEC 60099-4, ANSI IEEE Std C62.11, IS 3070 (Part-3)
Arrester Type & Class	-	Gapless, Station Class
Rated Frequency	Hz	48-62 Hz
Line Discharge	-	Class 3
Nominal Discharge Current	kAp	10 kAp
Pressure Relief Class	kArms	A/65
Energy Handling Capability	kJ / kV of Rating	6 to 10
Continuous Leakage current at MCOV	-	Resistive (Max.) micro-amps — 400 & Capacitive (Max.) micro-amps — 1500
Cantilever strength	Kg-m	225
Product Range	-	54kV to 420kV
Model No.	-	ZPL-3

**Guaranteed Technical Particular**  
**Surge Arrester Class-3 Polymeric LA**

Unique Ref. No.	Rated Voltage (in kV)	MCOV	Steep Current Impulse RV at 10kA (1/2 micro sec)(in kV)	Switching Impulse RV at 250A (30/60 micro sec)(in kV)	Switching Impulse RV at 1kA (30/60 micro sec)(in kV)	Lightning Impulse RV (8/20 micro-sec) at (in kV)					Creepage distance (min) mm	Overall Height (H) mm approx..
						1.5kA	3.0kA	5kA	10kA	20kA		
ZPL3048	60	48	171	124	127	144	146	147	155	174	1815	860
ZPL3057	72	57	202	147	151	171	173	175	184	206	1815	860
ZPL3106	132	106	374	272	279	316	320	323	340	381	3625	1530
ZPL3115	144	115	407	296	303	344	348	352	370	414	4495	2540

**Class - 4 Polymeric LA**

Reference Standard	-	IEC 60099-4, ANSI IEEE Std C62.11, IS 3070 (Part-3)
Arrester Type & Class	-	Gapless, Station Class
Rated Frequency	Hz	48-62 Hz
Line Discharge	-	Class 4
Nominal Discharge Current	kAp	20 kAp
Pressure Relief Class	kArms	A/65
Energy Handling Capability	kJ / kV of Rating	8 to 12
Continuous Leakage current at MCOV	-	Resistive (Max.) micro-amps — 500 & Capacitive (Max.) micro-amps — 2000
Cantilever strength	Kg-m	225
Product Range	-	54kV to 420kV
Model No.	-	ZPL-4

**Guaranteed Technical Particular**  
**Surge Arrester Class-4 Polymeric LA**

Unique Ref. No.	Rated Voltage (in kV)	MCOV	Steep Current RV at 20kA (1/2 micro sec)(in kV)	Switching Impulse RV at 500A (30/60 micro sec)(in kV)	Switching Impulse n RV at 500A (30/60 micro sec)(in kV)	Lightning Impulse RV (8/20 micro-sec) at (in kV)			Creepage distance (min) mm	Overall Height (H) mm approx
						10kA	20kA	40kA		
ZPL4048	60	48	160	120	128	142	150	165	1815	860
ZPL4057	72	57	192	144	153	171	180	198	1815	860
ZPL4106	132	106	353	264	281	313	330	363	3625	1530
ZPL4115	144	115	385	288	306	342	360	396	4495	2540



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