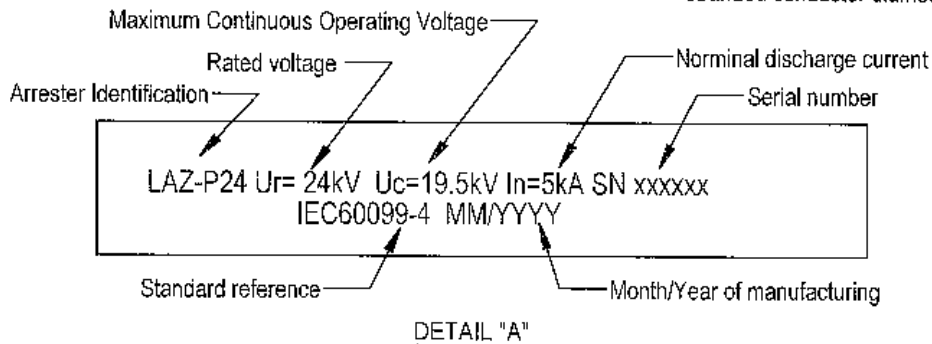
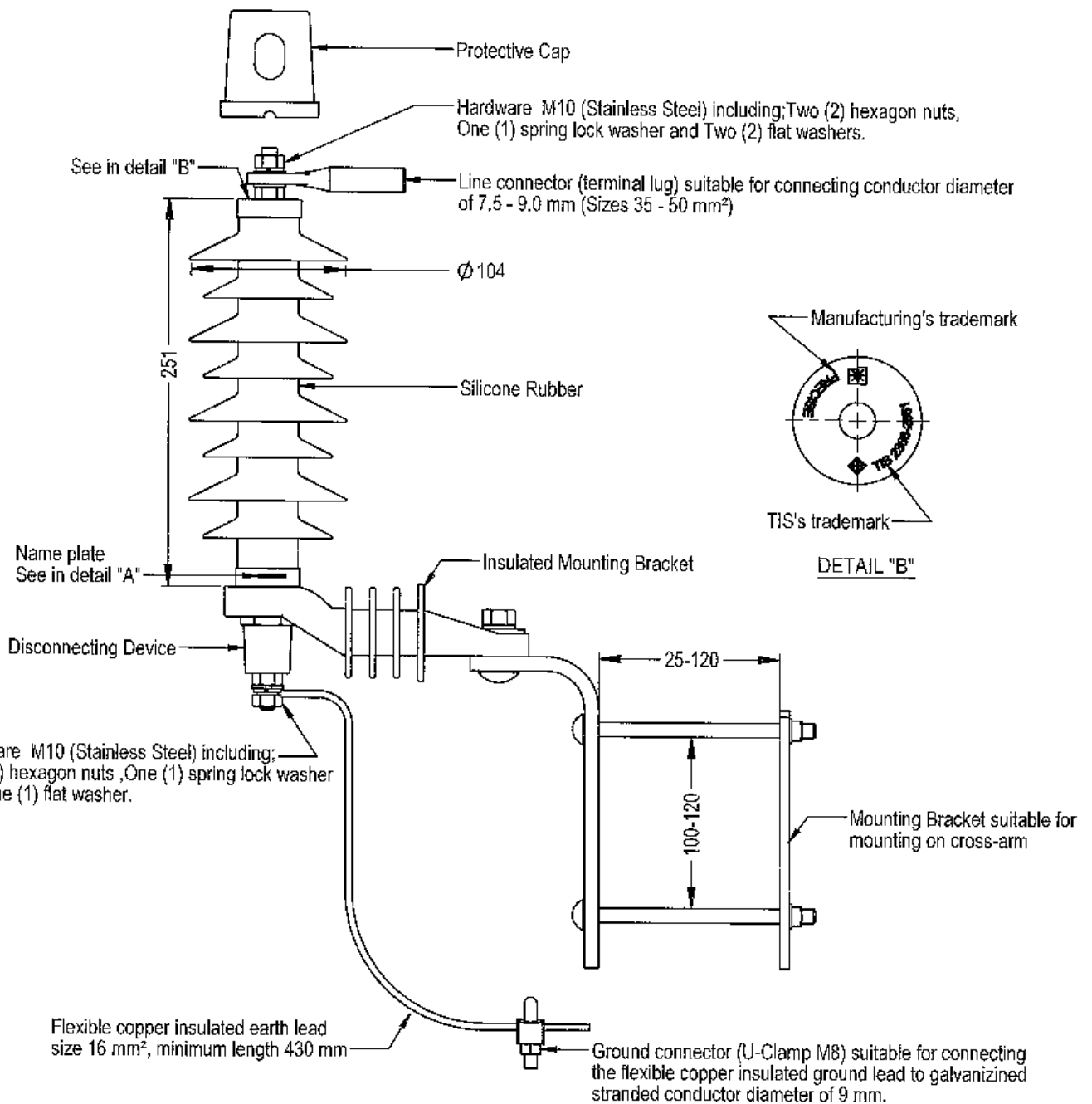


	APPROVE.	<i>[Signature]</i>	16/02/16	DESCRIPTION: SURGE ARRESTER RATED 21kV 5kA TYPE LAZ-P21		
	ENG. APPR.	<i>[Signature]</i>	11/02/16			
DIVISION PEM101	CHECKED	<i>[Signature]</i>	11/02/16	CODE NO. HS-F-99-0211		
	DRAWN	<i>[Signature]</i>	11/02/16	SURFACE TREATMENT: N/A		
STANDARD REFERENCE UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS TO TOLERANCES COMPLY WITH ± 10 % 	SIGNATURE		DATE	MATERIAL: SILICONE RUBBER (HOUSING)		
	RO. NEW DRAWING YEAR 2016			WEIGHT (kg): 3.3		
	REVISION DETAIL			SHEET 1 OF 1		
			SCALE: NTS		REV. NO. 0	



	APPROVE.	<i>[Signature]</i>	2/2/16	DESCRIPTION:		
	ENG. APPR.	<i>[Signature]</i>	9/2/16	SURGE ARRESTER RATED 24kV 5kA TYPE LAZ-P24		
DIVISION PEM101	CHECKED	<i>[Signature]</i>	9/2/16	CODE NO.	HS-F-99-0241	
	DRAWN	<i>[Signature]</i>	9/2/16	SURFACE TREATMENT: N/A		
STANDARD REFERENCE UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS TOLERANCES COMPLY WITH ± 10 % 	RO. NEW DRAWING YEAR 2016			MATERIAL: SILICONE RUBBER (HOUSING)		
	REVISION DETAIL			WEIGHT (kg):	3.4	SHEET 1 OF 1
				SCALE:	NTS	REV. NO. 0

The PRECISE's surge arrester rated $U_r = 3-36kV$, $I_n = 10kA$ class 1 with silicone housing were developed for medium voltage distribution system. They consist of gapless non-linear resistor. They seal and weather-proof by silicone rubber housing and stainless steel cap.

The surge arrester have manufactured certificate ISO 9001: 2008 and successfully pass the test requirements according to IEC 60099-4.

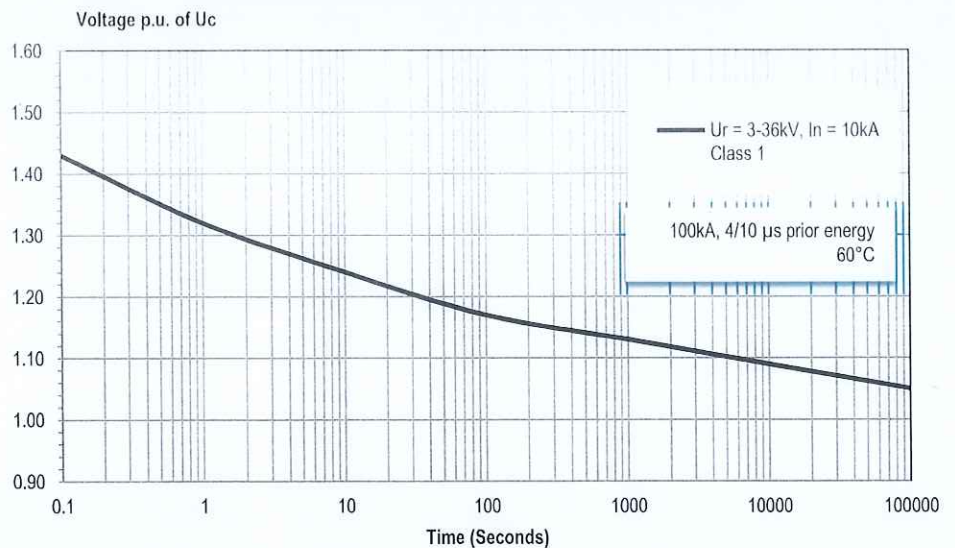
Type of surge arrester $I_n = 10kA$ Class 1	Rated voltage, U_r		Residual voltage			Insulation withstand			Silicone Housing				Maximum weight of surge arrester kg
	kVrms	kVrms	kVp	kVp	kVp	kVp	kVrms	kVrms	mm	Shed	mm	mm	
PAZ-P03-1	3	2.4	9.6	≤ 9.0	7.1								3.3
PAZ-P06-1	6	4.8	19.2	≤ 18.0	14.2								3.5
PAZ-P09-1	9	7.3	28.8	≤ 27.0	21.2	112	65	43	400	5	122	180	3.6
PAZ-P12-1	12	9.7	38.4	≤ 36.0	28.3								3.9
PAZ-P15-1	15	12.2	48.0	≤ 45.0	35.4								4.1
PAZ-P18-1	18	14.6	57.6	≤ 54.0	42.4								4.8
PAZ-P21-1	21	17.0	63.9	≤ 60.0	47.1	165	109	85	720	10	122	285	5.0
PAZ-P24-1	24	19.5	76.7	≤ 72.0	56.6								5.2
PAZ-P27-1	27	21.9	86.3	≤ 81.0	63.6								5.5
PAZ-P30-1	30	24.4	95.9	≤ 90.0	70.7	200	137	106	970	13	122	370	5.6
PAZ-P33-1	33	26.8	105.5	≤ 99.0	77.8								5.7
PAZ-P36-1	36	29.2	115.1	≤ 108.0	84.8								5.8

- o High current impulse wave shape $4/10 \mu s$ at 100 kAp
- o Long-duration current impulse $250A_p$ at 2 ms,
- o Rated frequency 48 – 62 Hz.
- o Energy absorption capability 3.10 kJ/k, U_r @ long duration 2 ms within 2 minutes.
- o Rated short-circuit current 20kArms at 0.2 second.
- o Tolerance dimensions are $\pm 10\%$.

Key property of surge arrester

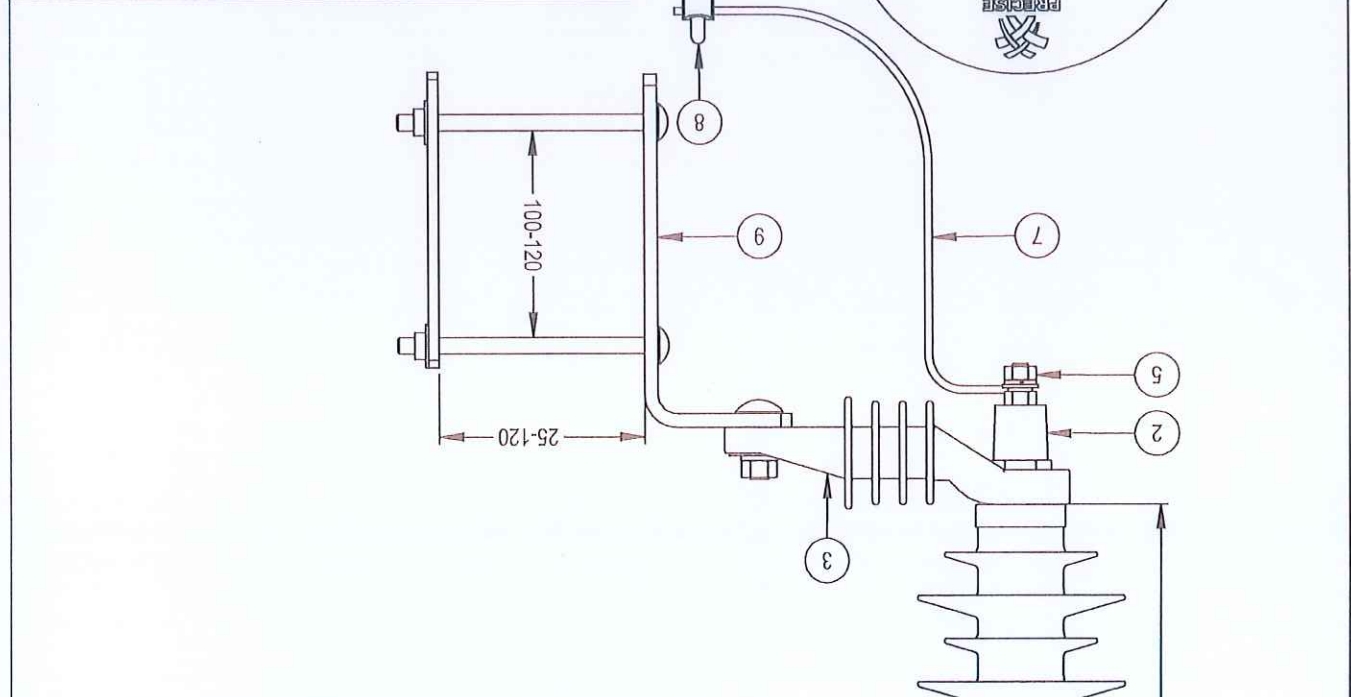
- **Zinc-Oxide advantage**
ZnO is the most advantage prevented against over-voltage in the world. ZnO has a good voltage-ampere characteristic when compared with SiC. While ZnO is operating under normal voltage, it conducts current less than 1mA but it will increase the current when the occur surge overvoltage.
- **Silicone rubber housing**
 - Excellent hydrophobicity property.
 - Not release toxic gas when burned.
 - Flame resistance.
 - No brittleness and no moisture ingress.
 - Self-cleaning.

Power frequency voltage versus time curve (TOV curve)



REMARK	PRECISE	DIVISION	PEM101
		STANDARD REFERENCE	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS TOLERANCES: COMPLY WITH
STANDARD PRODUCT FOR LOCAL MARKET	SUPPORT STANDARD IEC 60099-4	REVISION DETAIL	
		R1. EDIT HEIGHT AS "285"	R2. CHANGE POSITION MARKING
MATERIAL: SILICONE RUBBER (HOUSING)		WEIGHT (kg):	Approx. 5.0
SCALE:		NTS	REV. NO. 3

APPROVE:	DATE: 20/03/17	SIGNATURE:	DATE: 02/03/17
ENG. APPR.:	DATE: 02/03/17	SIGNATURE:	DATE: 02/03/17
CHECKED:	DATE: 02/03/17	SIGNATURE:	DATE: 02/03/17
DRAWN:	DATE: 02/03/17	SIGNATURE:	DATE: 02/03/17
DESCRIPTION: SURGE ARRESTER RATED 21KV 10KA CLASS 1 TYPE PAZ-P21-1			
CODE NO. HS-F-99-1211			
SURFACE TREATMENT: N/A			
MANUFACTURING'S TRADEMARK: PRECISE			



Item	Descriptions
1	Arrester module with silicone housing
2	Disconnecting Device
3	Insulated Mounting Bracket
4	Hardware M10 (Stainless Steel) including: Two (2) hexagon nuts, One (1) spring lock washer and Two (2) flat washers.
5	Hardware M10 (Stainless Steel) including: Two (2) hexagon nuts, One (1) spring lock washer and One (1) flat washer.
6	Protective Cap
7	Flexible copper insulated ground lead size 16 mm ² minimum length 430 mm
8	Ground connector (U-Clamp M8) suitable for connecting the flexible copper insulated ground lead to galvanized stranded conductor diameter of 9 mm
9	Mounting Bracket type "A" suitable for mounting on cross-arm
10	Line connector (terminal lug) suitable for connecting conductor diameter of 7.5 - 9.0 mm (sizes 35 - 50 mm ²)

The PRECISE's surge arrester rated $U_r = 3-36kV$, $I_n = 10kA$ class 1 with silicone housing were developed for medium voltage distribution system. They consist of gapless non-linear resistor. They seal and weather-proof by silicone rubber housing and stainless steel cap.

The surge arrester have manufactured certificate ISO 9001: 2008 and successfully pass the test requirements according to IEC 60099-4.

Type of surge arrester $I_n = 10kA$ Class 1	Rated voltage, U_r		Continuous operating voltage, U_c or MCOV			Steep current impulse 1/20 μs at I_n	Lightning impulse 8/20 μs at I_n , U_{res}	Switching impulse 30/60 μs at 500A	Lightning impulse 1.2/50 μs	Power-frequency, Dry condition	Power-frequency, Wet condition	Minimum creepage distance	Number of shed	Diameter of shed	Height	Maximum weight of surge arrester				
	Residual voltage			Insulation withstand													Silicone Housing			
	kVrms	kVrms	kVp	kVp	kVp												kVp	kVrms	kVrms	mm
PAZ-P03-1	3	2.4	9.6	≤ 9.0	7.1											3.3				
PAZ-P06-1	6	4.8	19.2	≤ 18.0	14.2											3.5				
PAZ-P09-1	9	7.3	28.8	≤ 27.0	21.2	112	65	43	400	5	122	180				3.6				
PAZ-P12-1	12	9.7	38.4	≤ 36.0	28.3											3.9				
PAZ-P15-1	15	12.2	48.0	≤ 45.0	35.4											4.1				
PAZ-P18-1	18	14.6	57.6	≤ 54.0	42.4											4.8				
PAZ-P21-1	21	17.0	63.9	≤ 60.0	47.1	165	109	85	720	10	122	285				5.0				
PAZ-P24-1	24	19.5	76.7	≤ 72.0	56.6											5.2				
PAZ-P27-1	27	21.9	86.3	≤ 81.0	63.6											5.5				
PAZ-P30-1	30	24.4	95.9	≤ 90.0	70.7	200	137	106	970	13	122	370				5.6				
PAZ-P33-1	33	26.8	105.5	≤ 99.0	77.8											5.7				
PAZ-P36-1	36	29.2	115.1	≤ 108.0	84.8											5.8				

- o High current impulse wave shape 4/10 μs at 100 kAp
- o Long-duration current impulse 250Ap at 2 ms,
- o Rated frequency 48 – 62 Hz.

- o Energy absorption capability 3.10 kJ/k, U_r @ long duration 2 ms within 2 minutes.
- o Rated short-circuit current 20kArms at 0.2 second.
- o Tolerance dimensions are $\pm 10\%$.

Key property of surge arrester

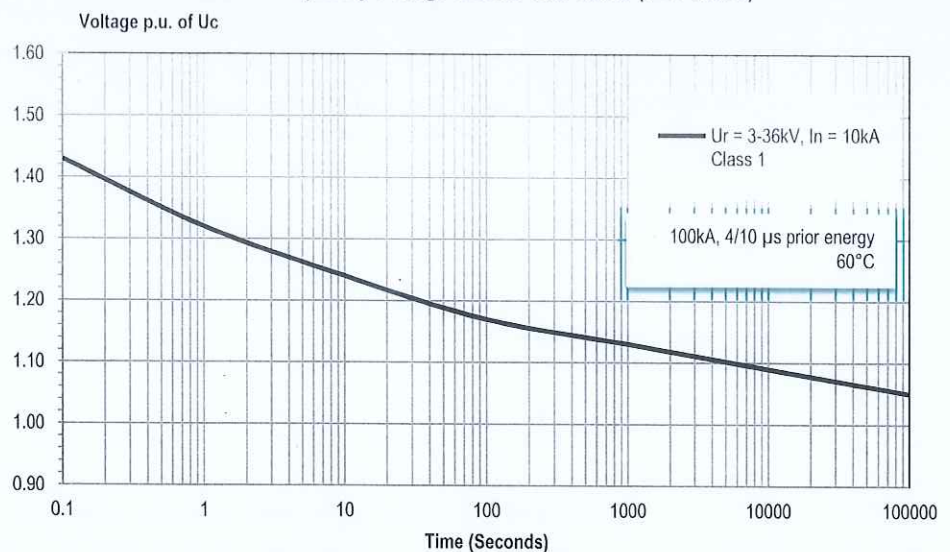
▪ Zinc-Oxide advantage

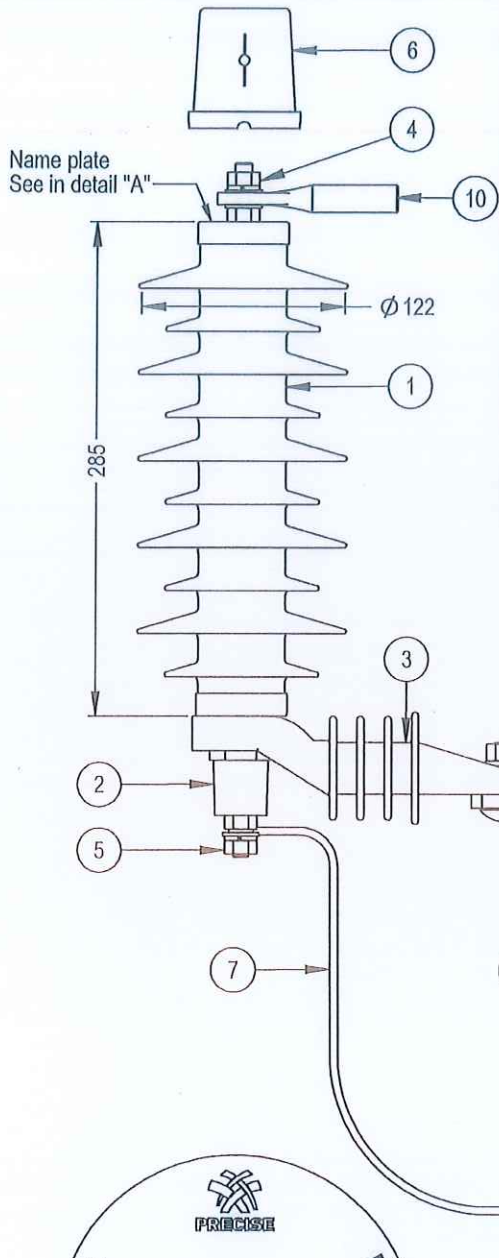
ZnO is the most advantage prevented against over-voltage in the world. ZnO has a good voltage-ampere characteristic when compared with SiC. While ZnO is operating under normal voltage, it conducts current less than 1mA but it will increase the current when the occur surge overvoltage.

▪ Silicone rubber housing

- Excellent hydrophobicity property.
- Not release toxic gas when burned.
- Flame resistance.
- No brittleness and no moisture ingress.
- Self-cleaning.

Power frequency voltage versus time curve (TOV curve)





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1	Arrester module with silicone housing
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6	Protective Cap
7	Flexible copper insulated ground lead size 16 mm ² , minimum length 430 mm
8	Ground connector (U-Clamp M8) suitable for connecting the flexible copper insulated ground lead to galvanized stranded conductor diameter of 9 mm
9	Mounting Bracket type "A" suitable for mounting on cross-arm
10	Line connector (terminal lug) suitable for connecting conductor diameter of 7.5 - 9.0 mm (sizes 35 - 50 mm ²)



DETAIL "A"

Symbol	Description of nameplate
PAZ-P24-1	Arrester type
Ur 24kV	Rated voltage, r.m.s
Uc 19.5kV	Maximum continuous operating voltage, r.m.s
MM/YYYY	Month/Year of manufacturing
SN xxxxxx	Serial number
In 10kA	Nominal discharge current
Class 1	Line discharge class
Is 20kA	Short-circuit current withstand
IEC 60099-4	Standard reference
48-62Hz	Rated frequency
PRECISE	Manufacturing's trademark

REMARK		APPROVE. ^{NPP} [Signature] 30/03/17	DESCRIPTION: SURGE ARRESTER RATED 24KV 10KA CLASS 1 TYPE PAZ-P24-1
		ENG. APPR. ^{PTC} [Signature] 07/03/19	
STANDARD PRODUCT FOR LOCAL MARKET	DIVISION PEM101	CHECKED ^{PTC} [Signature]	CODE NO. HS-F-99-1241
		DRAWN ^{JRS} [Signature] 07/03/17	SURFACE TREATMENT: N/A
SUPPORT STANDARD IEC 60099-4	STANDARD REFERENCE UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS TOLERANCES: COMPLY WITH ± 10 %	R1. EDIT HEIGHT AS "285" R2. CHANGE POSITION MARKING AND DESIGN R3. CHANGE DESIGN PROTECTIVE CAP	MATERIAL: SILICONE RUBBER (HOUSING) WEIGHT (kg): Approx. 5.2 SCALE: NTS
		SIGNATURE DATE	SHEET 1 OF 1 REV. NO. 3

The PRECISE's surge arrester rated $U_r = 3-36kV$, $I_n = 5kA$ with silicone housing were developed for medium voltage distribution system. They consist of gapless non-linear resistor. They seal and weather-proof by silicone rubber housing and stainless steel cap.

The surge arrester have manufactured certificate ISO 9001: 2008 and successfully pass the test requirements according to IEC 60099-4.

Type of surge arrester $I_n = 5kA$	Rated voltage, U_r		Steep current impulse $1/20 \mu s$ at I_n	Lightning impulse 8/20 μs at I_n , U_{res}	Switching impulse 30/60 μs at 500A	Lightning impulse 1.2/50 μs	Power-frequency, Dry condition	Power-frequency, Wet condition	Minimum creepage distance	Number of shed	Diameter of shed	Height	Maximum weight of surge arrester
	kVrms	kVrms											
			kVp	kVp	kVp	kVp	kVrms	kVrms	mm	Shed	mm	mm	
LAZ-P03	3	2.4	10.7	≤ 10.0	-								2.3
LAZ-P06	6	4.8	21.4	≤ 20.0	-								2.5
LAZ-P09	9	7.3	32.1	≤ 30.0	-	100	43	35	300	4	112	150	2.7
LAZ-P12	12	9.7	42.8	≤ 40.0	-								2.9
LAZ-P15	15	12.2	53.5	≤ 50.0	-								3.1
LAZ-P18	18	14.6	64.2	≤ 60.0	-				600	8	104	231	3.2
LAZ-P21	21	17.0	74.8	≤ 70.0	-	165	91	73					3.3
LAZ-P24	24	19.5	85.5	≤ 80.0	-				620	8	104	251	3.4
LAZ-P27	27	21.9	96.2	≤ 90.0	-								3.5
*LAZ-P30	30	24.4	106.9	≤ 100.0	-	200	124	105	900	12	104	340	3.6
LAZ-P33	33	26.8	117.6	≤ 110.0	-								3.7
LAZ-P36	36	29.2	128.3	≤ 120.0	-								3.8

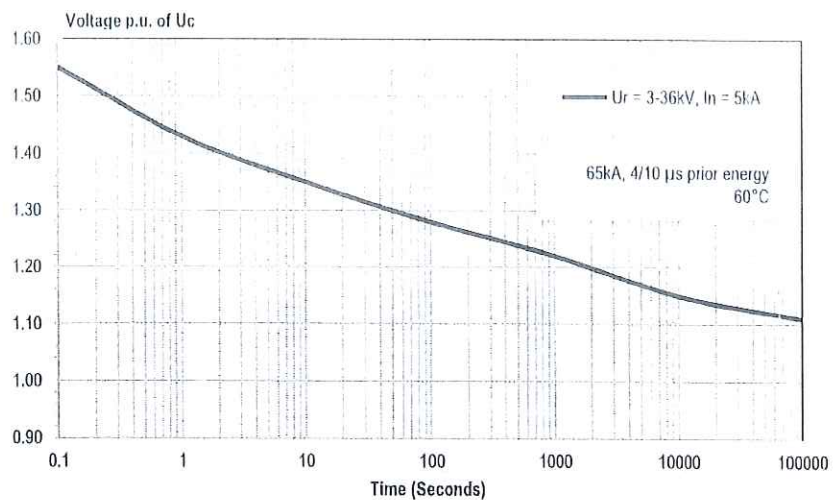
- o High current impulse wave shape 4/10 μs at 65 kAp
- o Long-duration current impulse 75Ap at 1 ms,
- o Rated frequency 48 – 62 Hz.

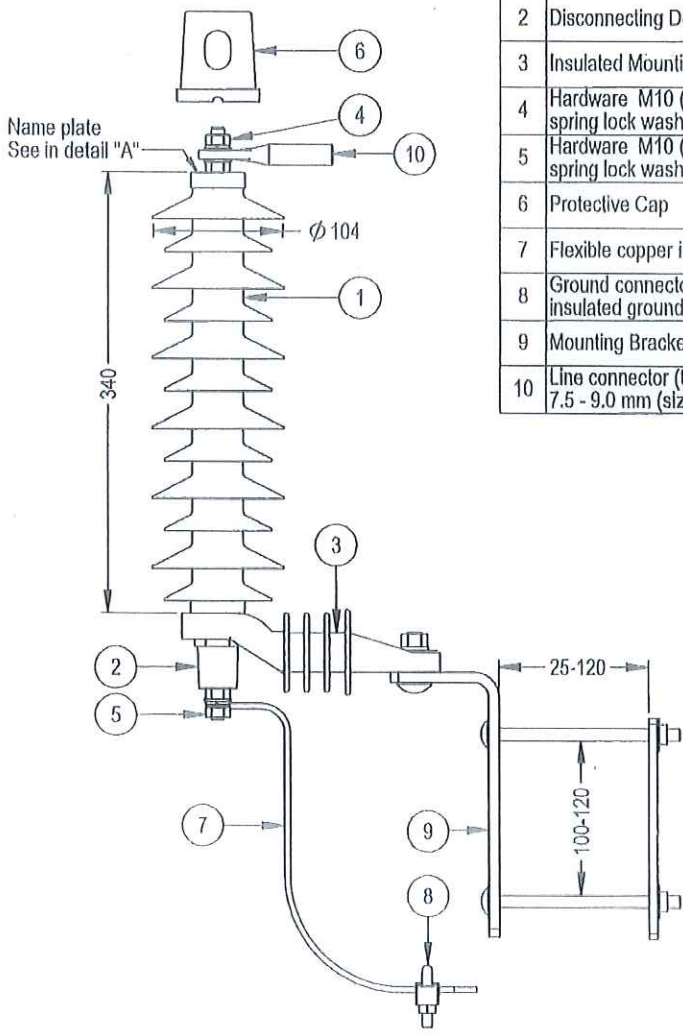
- o Energy absorption capability 0.61 kJ/kV, U_r @ long duration 1ms within 2 minutes.
- o Rated short-circuit current 16kArms at 0.2 second.
- o Tolerance dimensions are $\pm 10\%$.

Key property of surge arrester

Power frequency voltage versus time curve (TOV curve)

- Zinc-Oxide advantage
ZnO is the most advantage prevented against over-voltage in the world. ZnO has a good voltage-ampere characteristic when compared with SiC. While ZnO is operating under normal voltage, it conducts current less than 1mA but it will increase the current when the occur surge overvoltage.
- Silicone rubber housing
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9	Mounting Bracket type "A" suitable for mounting on cross-arm
10	Line connector (terminal lug) suitable for connecting conductor diameter of 7.5 - 9.0 mm (sizes 35 - 50 mm ²)



DETAIL "A"

Symbol	Description of nameplate
LAZ-P30	Arrester type
Ur 30kV	Rated voltage, r.m.s
Uc 24.4kV	Maximum continuous operating voltage, r.m.s
MM/YYYY	Month/Year of manufacturing
SN xxxxxxx	Serial number
In 5kA	Nominal discharge current
Is 16kA	Short-circuit current withstand
IEC 60099-4	Standard reference
48-62Hz	Rated frequency
PRECISE	Manufacturing's trademark
TIS 2366-2551	TIS's trademark

REMARK		APPROVE. ^{RFP} <i>[Signature]</i> 28/11/16	DESCRIPTION: SURGE ARRESTER RATED 30kV 5kA TYPE LAZ-P30
		ENG. APPR. ^{PTC} <i>[Signature]</i> 11/11/16	
STANDARD PRODUCT FOR LOCAL MARKET SUPPORT STANDARD IEC 60099-4	DIVISION PEM101	CHECKED ^{PTC} <i>[Signature]</i>	CODE NO. HS-F-99-0301
		DRAWN ^{IRS} <i>[Signature]</i> 8/11/16	SURFACE TREATMENT: N/A
		SIGNATURE <i>[Signature]</i> DATE	MATERIAL: SILICONE RUBBER (HOUSING)
		STANDARD REFERENCE UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS TOLERANCES COMPLY WITH ± 10 % 	R1. EDIT HRIGHT AS "340" R2. CHANGE POSITION MARKING AND DESIGN REVISION DETAIL