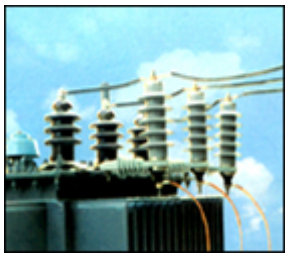
HIGH VOLTAGE SURGE ARRESTER SPECIFICATION

Applications:

(Polymer housed MOA for 110kv)



(The polymer housed MOA for 10kv)

(Porcelain housed MOA for 220kv)

(35kv MOA without gaps for middle phase)

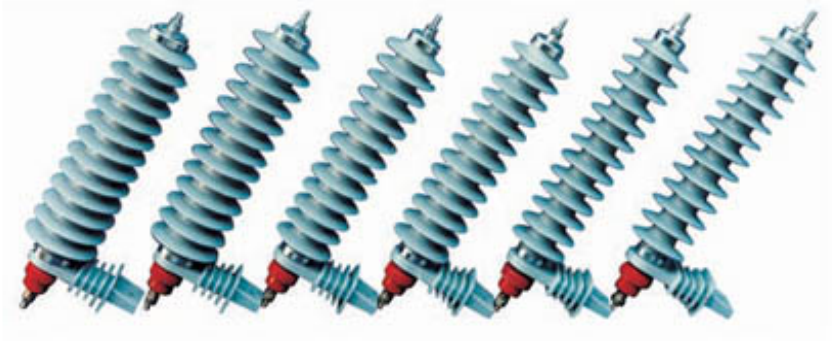
(110kv MOA without gaps for suspension tower)

(110kv MOA with gap for dead-end tower)

Pictures:

(0.22KV-10KV Surge Arrester with Polymer housing)

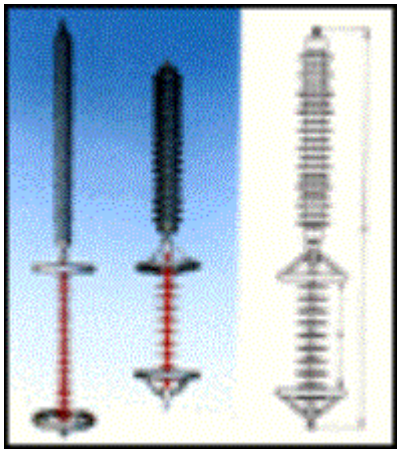
6KV-10KV Surge Arrester with porcelain housing



6-36KV Surge Arrester with polymer housing, disconnector and bracket

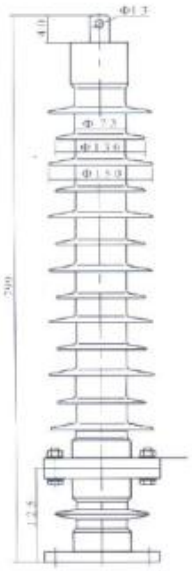
(Base mounting Type, 35KV)

(Base mounting Type, 110KV)

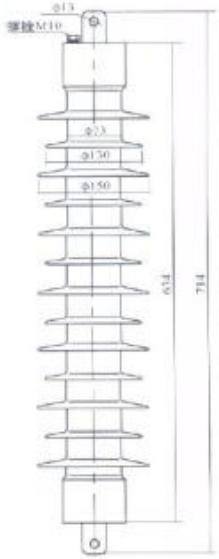


(110KV-220KV)

Transmission line MOA for 10~220Kv



Base mounting
station type MOA
for
YH10WZ-54/160
YH10WZ-60/176
YH10WZ-72/200



Suspension mounting
station type MOA
for
YH10WZ-54/160
YH10WZ-60/176
YH10WZ-72/200

Surge Arrester Core

General Description

Metal oxide surge arrester of rated voltage 3.8-750kV are protective apparatus used for protecting AC transmission and transformation equipment against damage from atmospheric overvoltage and switching overvoltage. The products are manufactured according to manufacturing technology transferred from HITACHI Ltd. of Japan. Compared with silicon carbide surge arrester, metal oxide surge arrester has superior protective characteristics, good reliability, high discharge capacity, and simple construction etc. thus, assuring the best overall protection for transmission and transformation equipment.

Usually, the arrester is connected between system and ground in parallel with protected equipment. At continuous operating voltage, zinc oxide resistors appear to be an extremely high resistance, the resistive current through the arrester is of the order of microamperes. In appearance of a lightning stroke or switching surge on the system, the residual voltage across the terminals of the surge arrester will be limited to a certain permissible value because of the excellent non-linearity of resistors, and high surge energy of the line will be absorbed, thus the insulation of electrical equipment is protected.

The zinc oxide surge arrester can be used in the following conditions: ambient temperature -40℃ to +40℃; altitude above sea level up to 1000m; withstanding 8º earthquake intensity (horizontal acceleration 0.2g).

Anti-vibration type, anti-pollution type and plateau type arrester are available for special application. Anti-vibration type arresters are adaptable for using in an area with 9º earthquake intensity (horizontal acceleration 0.4g); anti-pollution type arresters for light or heavy polluted condition; and plateau type arresters for relative high altitude area.

Performance

The zinc oxide surge arrester show an excellent protective performance, high capability to withstand lightning and switching surge, good response characteristics to steep lightning impulse and superior anti-pollution property. The performance of the arresters meets the requirement of IEC 60099-4(2000), IEEEC62.11 and JEC (Japan standard),and other standards are available.

Superior protective characteristics

Owing to the high non-linearity and excellent steep response characteristics of zinc oxide resistors, both the steep wave front residual voltage and switching residual voltage of the zinc oxide surge arrester have been reduced. Thus the corresponding protective margins have been increased, and the protective margins for steep wave front surge, standard lightning and switching surge are approximately the same. Therefore, the best overall protection for electrical apparatus is provided.

The zinc oxide arresters are especially suitable for application to low surge impedance system, such as multiple lines, capacitor banks or cable, where conventional SiC arresters can hardly be applied satisfactorily.

Perfect overvoltage energy absorption capability

The non-linearity coefficient of zinc oxide resistors is about 30-50. In fact no following current can be observed during lightning surge operating duty test. Hence the energy absorbed by the arrester is very small. Capability against multiple lightning is greatly improved.

High overvoltage energy absorption capability

The zinc oxide arresters can absorb all kinds of energy of lightning and switching surge. The overvoltage energy absorption capability of our zinc oxide surge arrester is as follows:

Nominal system voltage (kV)	110-220	330	500
Discharge capacity 2ms, rectangular wave (A)	800	1000	1500
Long duration discharge class (IEC standard)	Class2	Class3	Class5
Energy absorption capability (kJ/kV)	3	5	8
Energy absorption capability limit (kJ/kV)	9.2	11.2	15

Both nominal current operating duty test for 20 times and combined operating duty stability test have been passed successfully according to standard IEC.

High temporary overvoltage withstanding capability

Temporary power frequency overvoltage may be caused by single line-to-ground faults, capacitive charging effects for long transmission line and load rejection effect, etc. After an initial energy of 3kJ/kV rating, 5kJ/kV rating and 8kJ/kV rating has been respectively injected into the arresters of 110-220kV, 330kV and 500kV, the zinc oxide surge arresters still possess capability to withstand a temporary power frequency overvoltage $1.1U_R \geq 10s$, $1.15U_R \geq 2.5s$, as shown in Figure 1.

Reliable long term operating stability

Since the zinc oxide surge arresters have no gaps, the zinc oxide resistors are exposed to a long-term load of normal operating voltage and all kinds of overvoltage. Therefore operating stability is of critical importance for zinc oxide arresters. Zinc oxide resistors of different size have passed accelerated aging test under 115℃ for 1000 hours according to IEC standard. A service life of more than 100 years may be expected at an ambient temperature of 40℃.

Excellent anti-pollution performance

Because the zinc oxide arresters have no series gaps, the influence of contaminants on porcelain surface upon the performance of arresters is greatly reduced, eliminating all the problems caused by series gaps, such as the reduction of spark-over voltage and degradation of the performance of interrupting following current.

About Disconnector

The polymer housed MOA with disconnector for 3-10kV

The polymer housed MOA with disconnector for 3-10kV is equipped with the insulation base and bracked. The top bolt of disconnector is directly connected with the bottom of MOA. The below bolt is connected with ground lead.Fig7 shows the product's full assemblage.

The disconnector shall operate at the power frequency short circuit while MOA's failure under the abnormal conditions. As the dotted line showed in Fig2,the grounding end of the disconnector breaks away automatically, and the failed MOA is separated from the system, that means the MOA needs to be replaced. To do so, the disconnector should has the rapidly operation characteristic, withstand current impulse and operating duty without working.

----------The polymer housed MOA with disconnector for 3-10kV----------

1:Time versus current operation characteristic of disconnector

The disconnector must operate at the fault current. Disconnector operation test has been performanced on high power test centre of Electrical Power Research lnstitute, P.R.China for values of current 800A,200A,20A,5A according to IEC Standard.Result of test is given in the right table

Current	800A					200A				
Sample NO.	1	2	3	4	5	6	7	8	9	10
Operation time(s)	0.016	0.012	0.018	0.012	0.019	0.026	0.076	0.018	0.068	0.066
Current	20A					5A&				
Sample NO.	11	12	13	14	15	16	17	18	19	20
Operation time(s)	50	35	2	1.5	24	46	529	595	98	316

2:The disconnector's ability for the current impulse and operating duty without working

The disconnector is in series with the MOA. The disconnector shall has no operating

while MOA is under the normal conditions, to guarantee the MOA can show its fine functions. The disconnctor shall withstand the following item according to GB11032:
(1):Long duration current impulse test without operating.

(2):Operating duty test without operating.

(3):Type test made by Power lndustry Ministry Electric Power Appearance

Quality lnspection & Test Centre, shows the superior performance of withstanding

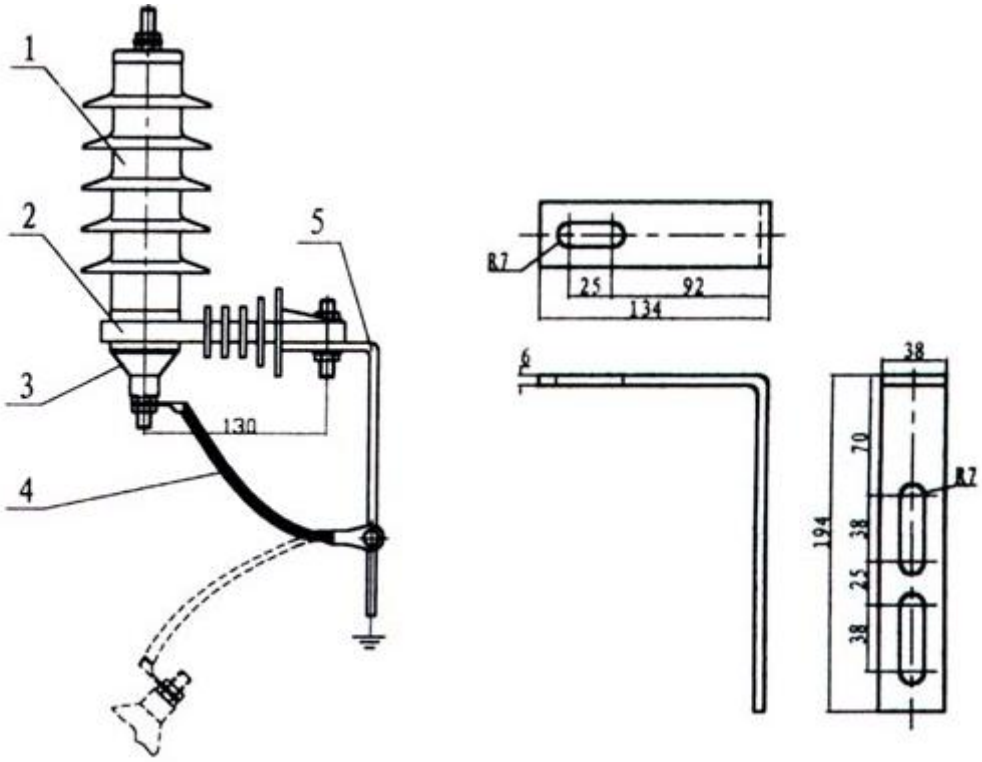
2ms 150A,and operating duty with 4/10 μs 65kA.

3:The installation of MOA with disconnector

The bellow shows the connection of polymer housed MOA with disconnector for 3-10kV.dotted line shows the situation of the grounding part's disconnection while the disconnector operation.
Note :Distribution MOA, station MOA and MOA for capacitors is connected directly

with disconnector by insulation base

DISCONNECTOR INSTALLATION



1. MOA
2. INSULATION BASE
3. DISCNNECTOR
4. 30CM SOFT GROUNDING
5. INSTALATION BRACKET

THE PARAMETERS OF SURGE ARRESTORS

Type Parameters			HY5W-9/25.5	HY5W-12/34	HY5W-15/42.5	HY5W-18/51	HY5W-24/68
1	Max. Continuous operating voltage, U_{MCOV}, kVr.m.s.		7.2	9.6	12	14.4	19.2
2	Rated voltage, U_R, kVr.m.s.		9	12	15	18	24
3	Rated discharge current, kA peak value		5	5	5	5	5
4	Min. D.C. reference voltage, $U_{1mA,}$ kV		13	17.2	21.5	25.8	34.4
5	Max. residual voltage at steep impulse 1/10μs, kV		29.3	39.1	48.9	58.7	78.2
6	Max. residual voltage at lighting impulse 8/20μs, kV		25.5	34	42.5	14.4	19.2
7	Max. residual voltage at switching impulse 30/60 μs, kV		/	/	/	/	/
8	Withstand capability at current impulse 2ms, A		75	75	75	75	75
9	Withstand capability at current impulse 4/10μs, kA		65	65	65	65	65
10	Housing insulation level at lighting impulse, kV		60	75	75	105	125
11	Housing insulation level at power frequency in wet 1 min., kV		23	30	30	40	50
12	Mechanical strength, torsional/ cantilever (N.m / N)		35/250	35/250	35/250	35/250	35/250
13	Creepage distance, mm		227	291	351	419	540
14	Dimension	Diameter of sheds, mm	88	88	88	88	88
		Number of sheds, pcs	3	4	5	6	8
		Height of arrestors, mm	205	235	265	295	355
		Weight of arrestors, kg	0.87	1.06	1.25	1.43	1.80

THE PARAMETERS OF SURGE ARRESTORS

TypeParameters			HY10W-15/42.5	HY10W-24/68	HY10W-30/85	HY10W-33/93.5	HY10W-36/102
1	Max. Continuous operating voltage, U_{MCOV}, kVr.m.s.		12	19.2	24	26.4	28.8
2	Rated voltage, U_R, kVr.m.s.		15	24	30	33	36
3	Rated discharge current, kA $_{peak\ value}$		10	10	10	10	10
4	Min. D.C. reference voltage, $U_{1mA,}$ kV		21.5	34.4	43	47.3	51.6
5	Max. residual voltage at steep impulse 1/10μs, kV		48.9	78.2	97.8	107.5	117.3
6	Max. residual voltage at lighting impulse 8/20μs, kV		42.5	68	85	93.5	102
7	Max. residual voltage at switching impulse 30/60 μs, kV		36	57.8	72.2	79.5	86.7
8	Withstand capability at current impulse 2ms, A		250～400	250～400	250～400	250～400	250～400
9	Withstand capability at current impulse 4/10μs, kA		100	100	100	100	100
10	Housing insulation level at lighting impulse, kV		75	125	145	145	170
11	Housing insulation level at power frequency in wet 1 min., kV		30	50	60	60	70
12	Mechanical strength, torsional/ cantilever (N.m / N)		60/250	60/250	60/250	60/250	60/250
13	Creepage distance, mm		355	545	675	675	740
14	Dimension	Diameter of sheds, mm	103	103	103	103	103
		Number of sheds, pcs	5	8	10	10	11
		Height of arrestors, mm	240	330	390	390	420
		Weight of arrestors, kg	1.69	2.58	3.16	3.25	3.55

THE PARAMETERS OF SURGE ARRESTORS

TypeParameters			HY10W-42/119	HY10W-60/170
1	Max. Continuous operating voltage, U_{MCOV}, kVr.m.s.		33.6	48
2	Rated voltage, U_R, kVr.m.s.		42	60
3	Rated discharge current, kA peak value		10	10
4	Min. D.C. reference voltage, $U_{1mA,}$ kV		60.2	86
5	Max. residual voltage at steep impulse 1/10μs, kV		136.8	195.5
6	Max. residual voltage at lighting impulse 8/20μs, kV		119	170
7	Max. residual voltage at switching impulse 30/60 μs, kV		101.2	144.5
8	Withstand capability at current impulse 2ms, A		250～400	250～400
9	Withstand capability at current impulse 4/10μs, kA		100	100
10	Housing insulation level at lighting impulse, kV		185	221
11	Housing insulation level at power frequency in wet 1 min., kV		80	110
12	Mechanical strength, torsional/ cantilever (N.m / N)		60/250	60/250
13	Creepage distance, mm		875	1250
14	Dimension	Diameter of sheds, mm	103	103
		Number of sheds, pcs	13	18
		Height of arrestors, mm	480	630
		Weight of arrestors, kg	4.12	5.66

THE PARAMETERS OF SURGE ARRESTORS

Type Parameters			HY10W-90/232	HY10W-72/201	HY10W-90/240
1	Max. Continuous operating voltage, U_{MCOV}, kVr.m.s.		72.5	57	70
2	Rated voltage, U_R, kVr.m.s.		90	72	90
3	Rated discharge current, kA peak value		10	10	10
4	Min. D.C. reference voltage, U_{1mA}, kV		130	103	132
5	Max. residual voltage at steep impulse 1/10μs, kV		271	231	276
6	Max. residual voltage at lighting impulse 8/20μs, kV		232	201	240
7	Max. residual voltage at switching impulse 30/60 μs, kV		190	173	207
8	Withstand capability at current impulse 2ms, A		600	600	600
9	Withstand capability at current impulse 4/10μs, kA		100	100	100
10	Housing insulation level at lighting impulse, kV		450	310	450
11	Housing insulation level at power frequency in wet 1 min., kV		185	132	185
12	Mechanical strengthcantilever ,(N)		1412	780	1412
13	Creepage distance, mm		2055	1860	3100
14	Dimension	Diameter of sheds, big/small, mm	146/126	146/126	210/170
		Number of sheds, pcs	11/10	10/9	14/13
		Height of arrestors, mm	1010	915	1370
		Total weight, kg	20	19	42

THE PARAMETERS OF SURGE ARRESTORS

Type Parameters			HY10W-120/325	HY10W-138/375	Y10W-120/325 Porcelain
1	Max. Continuous operating voltage, U_{MCOV}, kVr.m.s.		96	111	96
2	Rated voltage, U_R, kVr.m.s.		120	138	120
3	Rated discharge current, kA $_{peak\ value}$		10	10	10
4	Min. D.C. reference voltage, $U_{1mA,}$ kV		175	202	175
5	Max. residual voltage at steep impulse 1/10μs, kV		356	450	356
6	Max. residual voltage at lighting impulse 8/20μs, kV		325	375	325
7	Max. residual voltage at switching impulse 30/60 μs, kV		267	335	267
8	Withstand capability at current impulse 2ms, A		600	600	600
9	Withstand capability at current impulse 4/10μs, kA		100	100	100
10	Housing insulation level at lighting impulse, kV		450	520	450
11	Housing insulation level at power frequency in wet 1 min., kV		185	210	185
12	Mechanical strengthcantilever ,(N)		1412	1412	3120
13	Creepage distance, mm		3100	3540	3200
14	Dimension	Diameter of sheds, big/small, mm	210/170	210/170	302/272
		Number of sheds, pcs	14/13	16/15	12/11
		Height of arrestors, mm	1370	1474	1734
		Total weight, kg	42	47	182