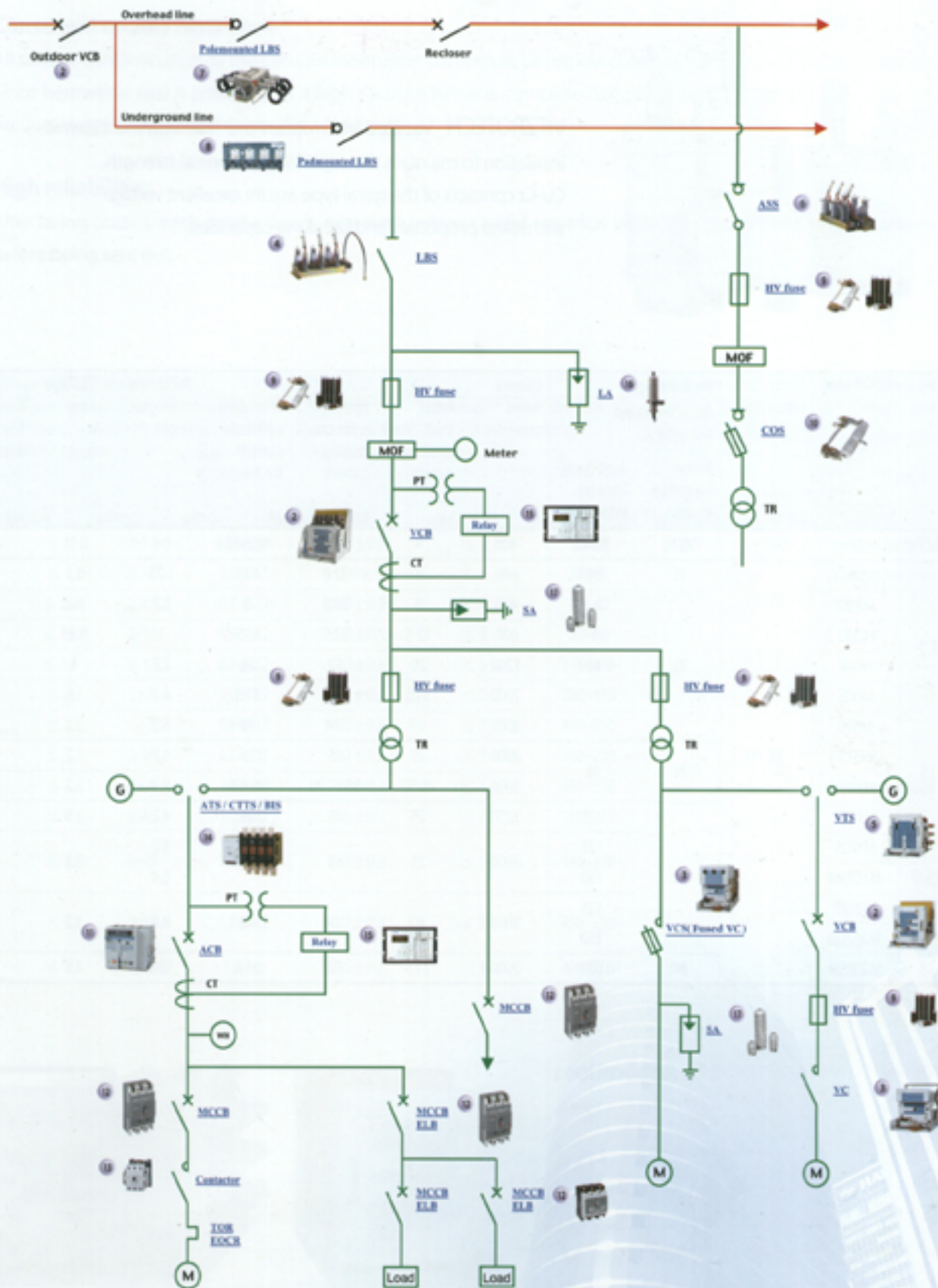


# Low and Medium Voltage Equipments



Circuit breakers, Load break switches  
Transfer switches, Power fuses, Contactors and Insulators





# Vacuum Interrupters



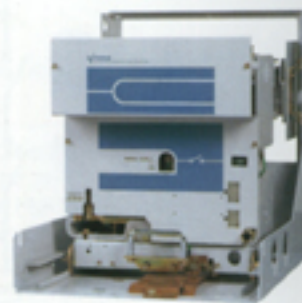
**VITZROTECH** Vacuum Interrupters use fine-alumina ceramic insulation to maintain the superior mechanical strength. Cu-Cr contacts of the spiral type assure excellent voltage withstand properties and breaking capacities.

Rated voltage kV	Interrupter type	Rated frequency Hz	Insulation level		Current				Mechanical specifications			
			Rated withstand test voltage	Power frequency kVrms	Rated current A	Rated short-circuit breaking current kA	Rated short-circuit making current kA	Short-time withstand current for 3sec kA	Interrupter weight kg	Moving side weight kg	Bellows free contact force (atm) kgf	
3.6/7.2	SF	50, 60	10/16	30/45	400	4	10	4(2sec)	0.6	0.15	7	
7.2	OK		35	85	600	4	32.8	13.1	1.05	0.3	7	
	M10Q		22	60	400	8	20.8	8	0.7	0.2	7	
	M20Q				600	12.5	32.5	12.5	1	0.35	7	
	M30R				1200	20	52	20	2.2	1	16	
	M40S				2000	31.5	82	31.5	4.1	1.6	16	
	M50S				3000	40	104	40	5.5	2.2	27	
15	M51S		36	95	2000	25	65	25	4.2	1.2	16	
	M101S		3000	40/50	104/130	40/50	7.2	3.3	27			
25.8	M102R		60	125	125	1250	25	65	25	4.2	1.5	20
	M102S				2000	25	65	25	5.2	2.3	27	
	M102SM				150	3000	40	104	40	9.5	3.2	27
	M202T				125	3000	40	104	40	9.5	3.2	27
	M202TM				150	3000	40	104	40	9.5	3.2	27
38	M203SM	80	200	2000	31.5	82	31.5	10.9	4.5	27		

## Applications



Vacuum circuit breakers up to 38kV class



Vacuum contactors 7.2kV 400A

### Consistent quality assurance

All surface contamination of the vacuum interrupter parts must be removed before being assembled in a clean room. Since hermetical seal is produced in a high vacuum furnace, complete degassing treatment is possible. Thus a high vacuum degree can be maintained for a long time.

### High reliability

After being brazed, each production is repeatedly given careful electrical tests and vacuum integrity measurement before being sent out.

Mechanical requirements							Service life		Applications		
Contact stroke	Maximum contact erosion	Wipe length	Closing speed average (0 to 1/3 stroke)	Opening speed average (0 to 3/4 stroke)	Maximum contact bounce duration	Total contact force, F	Electrical life	Mechanical life			
mm	mm	mm	m/s	m/s	ms	kgf	× 1000 operations	× 1000 operations			
4±0.3	≤ 1	≥ 1.5	0.35±0.1	0.5±0.1	≤ 7	10~18	250	500	Vacuum contactors		
8±0.5	≤ 1	≥ 1.5	0.6±0.1	0.8	≤ 4	50~65			Vacuum switches		
8±1	≤ 1.5	≥ 1.5	0.7±0.2	0.9±0.2	≤ 4	25~40					
8±1	≤ 1.5	≥ 1.5	0.7±0.2	1.2±0.3	≤ 5	50~60					
8±1	≤ 1.5	≥ 1.5	0.7±0.2	1.2±0.3	≤ 5	115~156					
8±1	≤ 2	≥ 2	0.7±0.2	1.2±0.3	≤ 5	280~335					
8±1	≤ 2	≥ 3	0.8±0.2	1.5±0.2	≤ 3	450~550					
12±1	≤ 3	≥ 3.5	1.2±0.2	1.7±0.2	≤ 3	180~220			10	10	Vacuum breakers
12±1	≤ 3	≥ 4	1.0±0.2	1.8±0.2	≤ 3	450~550					
16±1	≤ 3	≥ 4.5	1.0±0.2	1.5±0.2	≤ 5	180~220					
16±1	≤ 3	≥ 4.5	1.0±0.2	1.5±0.2	≤ 5	180~220					
16±1	≤ 3	≥ 4.5	1.1±0.2	1.7±0.2	≤ 5	450~550					
24±1	≤ 3	≥ 4.5	1±0.2	1.5±0.2	≤ 5	400~500					



Vacuum Transfer Switches  
7.2kV 400A



Load Break Switches  
12/15kV 630A



# Vacuum Circuit Breakers



## Compact and high reliable design!

1. Broad range up to 38kV 40kA
2. Worldwide application  
Type tested according to IEC60056 and ANSI C37  
CESI and KEMA certified, ISO9001 certified
3. Self-made Vacuum Interrupter
4. Easy maintenance and convenient inspection
5. Compact design and light weight
6. Long service life

## Control and operation

1. Closing system  
Breaker types 1084S and 6613S : Solenoid system  
The other types : Motor spring stored energy system
2. Tripping system - All breaker types by shunt trip
3. Supply voltage - DC 110V or 125V

## Installation versions / Type suffix codes

KVA□ - xxxxM, KMV□ - xxxxx

- N** : Fixed breaker
- E** : Draw-out breaker with E type cradle  
- without safety shutters
- F** : Draw-out breaker with F type cradle  
- with non-metal shutters
- H** : Draw-out breaker with H(G) type cradle  
- with metal shutters and bushings
- X** : Outdoor use breaker

## Optional accessories

1. Condenser trip devic, CTD
2. Vacuum checker
3. Position indicator

Rated voltage kV	Breaker type	Breaking capacity MVA	Rated frequency Hz	Insulation level Rated withstand test voltage	
				Power frequency kVrms	1.2x50µsec impulse kVcrest
7.2	KMV□-1084S	100	60	20	60
	KVA□-6613S	160	60	20	60
	KVA□-6408M	100	60	20	60
	KVA□-6613M	160	60	20	60
	KVA□-6620M	250	60	20	60
	KVA□-6120M				
	KVA□-6625M	320	60	20	60
	KVA□-6125M				
	KVA□-6225M				
	KVA□-6131M	390	60	20	60
	KVA□-6231M				
	KVA□-6140M	500	60	20	60
KVA□-6240M					
KVA□-6340M					
12/15	KVA□-1625M	650	50/60	36(42)	95
	KVA□-1125M				
	KVA□-1225M				
	KVA□-1631M	820	50/60	36(42)	95
	KVA□-1131M				
	KVA□-1231M				
	KVA□-1140M	1050/1300	50/60	36	95
KVA□-1240M					
KVA□-1340M					
24	KVA□-2613M	520	60	50	125
	KVA□-2113M				
	KVA□-2625M	1040	60	50	125
	KVA□-2125M				
	KVA□-2225M				
	KVA□-2131M	1310	60	50	125
KVA□-2231M					
KVA□-2331M					
25.8	KMV□-2256M	1120	60	60	125
	KMV□-2251M				
	KMV□-2252M				
	KVA□-2140M	1800	60	60	125
	KVA□-2240M				
KVA□-2340M					
36/38	KVA□-3131M	2100	60	80	170
	KVA□-3231M				
	KVA□-3140M	2630	60	80	170
	KVA□-3240M				
25.8 Outdoor use	KVAX-2625M	1120	60	60	150
	KVAX-2125M				
	KVAX-2225M				
	KVAX-2640M	1800	60	60	150
	KVAX-2140M				
	KVAX-2240M				
KVAX-2340M					



Current				Operation time			Operating duty	Auxiliary switches	Weights Breaker (With out cradle)	Application standrad
Rated current	Rated short-circuit breaking current	Rated short-circuit making current	Short-time withstand current for 1sec	Opening time	Interrupting time	Closing time				
A	kA	kA	kA	Sec.	Cycles	Sec.	contacts	kg		
400	8	20.8	8	0.05	5	0.15	CO-15s-CO	4NO+4NC	54	IEC60056
630	12.5	32.5	12.5	0.05	5	0.15	CO-15s-CO	4NO+4NC	57	
400	8	20.8	8 (2sec)	0.05	3	0.1	O-0.3s-CO	4NO+4NC	54	
630	12.5	32.5	12.5 (2sec)	0.05	3	0.1	-3m-CO	4NO+4NC	57	
630	20	52	20	0.05	5	0.1	CO-15s-CO	4NO+4NC	90	
630									94	
1250	25	65	25	0.05	5	0.1	CO-15s-CO	4NO+4NC	98	
2000									102	
1250	31.5	82	31.5 (2sec)	0.05	5	0.1	CO-15s-CO	4NO+4NC	112	
2000									105	
1250	40	104	40 (2sec)	0.05	5	0.1	CO-15s-CO	6NO+6NC	114	
2000									270	
3150									285	
									310	
630	25	65	25 (3 sec)	0.05	3	0.1	O-0.3s-CO -3m-CO	4NO+4NC	115	IEC60056 ANSI C37
1250									129	
2000									138	
630	31.5	82	31.5 (4 sec)	0.05	3	0.1	O-0.3s-CO -3m-CO	4NO+4NC	115	
1250									129	
2000									138	
1250	40/50	104/130	40/50 (3sec)	0.05	5	0.1	O-0.3s-CO -3m-CO	4NO+4NC	350	IEC60056
2000									370	
3150									390	
630	12.5	32.5	12.5	0.05	5	0.1	O-0.3s-CO -3m-CO, CO-15s-CO	6NO+6NC	105	IEC60056
1250									110	
630	25	65	25	0.05	5	0.1		6NO+6NC	210	
1250								220		
2000								240		
1250	31.5	82	31.5	0.06	5	0.1		8NO+8NC	350	
2000									370	
3150									370	
600	25	65	25	0.05	5	0.1	O-0.3s-CO -3m-CO, CO-15s-CO	8NO+8NC	280	IEC60056
1200									280	
2000									290	
1200	40	104	40	0.06	5	0.1	8NO+8NC	350		
2000								370	ANSI C37	
3000								370		
1200	31.5	82	31.5 (3 sec)	0.06	5	0.1	O-0.3s-CO -3m-CO, CO-15s-CO	8NO+8NC	550	IEC60056
2000								550		
1250	40	104	40	0.06	5	0.1		8NO+8NC	530	IEC60056
2000								550		
600	25	65	25	0.05	5	0.1	O-0.3s-CO -3m-CO, CO-15s-CO	10NO+10NC	1000	IEC60056
1200									1020	
2000									1060	
600	40	104	40	0.05	5	0.1		1750		
1200								1800		
2000								1900		
3000								2000		

**Note:** Control and operation

1. Closing system

Breaker types 1084S and 6613S : Solenoid system

The other types : Motor spring stored energy system

2. Tripping system

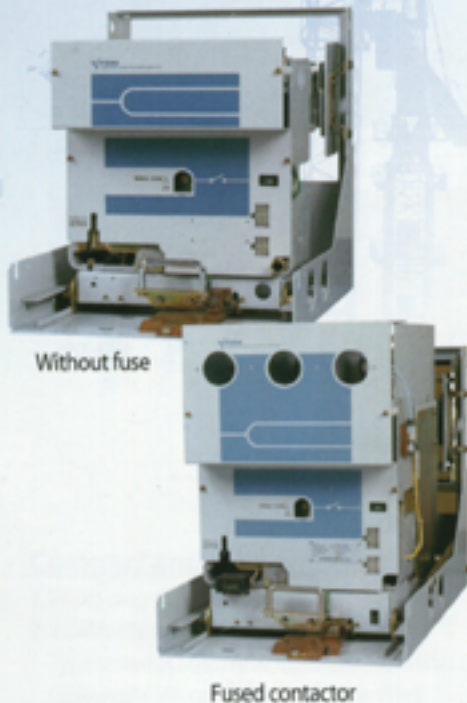
All breakers are tripped by shunt trip systems

3. Control & operating voltage

DC 110V or 125V



# Vacuum Contactors



**VITZROTECH** Vacuum Contactors are widely used in medium voltage circuit of industrial project as primary switching unit of motors, transformers and capacitors. Combination contactors are designed to protect circuit from fault current with attaching power fuses to vacuum contactors.

## Features

- **Excellent interrupting performance**  
Whole circuit interruption occurs within 5 cycles since arc diffuse in vacuum at very high speed and most of them extinguish at the first current zero.
- **Long service life**  
VITZRO guarantee that mechanical life is 2.5 million operation cycles of normally energized type (standard type - KVP) and 0.25 million operation cycles for closing latching type(KVS type).
- **Compact design and light weight**  
The vacuum high insulation construction realize reduction in gap and operating force, enabling a compact and lightweight contactor never before attainable by the conventional medium voltage contactors.
- **Safety**  
Requiring no oil for run, the contacts are enclosed in a vacuum switch bulb to confine arc within the unit. These and other safety considerations combine to create a system that is free from fire and explosion hazards.

Rated voltage	Contactor type		Current				Rated frequency	Insulation level		Service life		Auxiliary switches
	Version	Type	Rated current	Rated short-circuit breaking current	Short-time withstand current			Rated withstand test voltage	Mechanical	Electrical		
kV			A	kA	2sec	0.5 cycle	Hz	Normal frequency	1.2x50µ sec impulse	mil. operations	mil. operations	contacts
3.6	Fixed	KVP-322E	200	4	4	40	50, 60	10	45	* 2.5	0.25	2NO+2NC
		KVP-342E	400									
	Drawout	KVPD-322E	200									
		KVPD-342E	400									
7.2	Fixed	KVP-625E	200	4	4	40	50, 60	20	60	* 2.5	0.25	2NO+2NC
		KVP-645E	400									
	Drawout	KVPD-625E	200									
		KVPD-645E	400									

\* : case of mechanical closing latching type the service life is 0.25 mil operations.

Control voltage : DC : 24, 48/50, 100/110, 115/125, 200/220, 230/250 AC : 100/110, 200/220

## Type numbering system

KV  -

3.6kV 200A : 322E  
3.6kV 400A : 342E  
7.2kV 200A : 625E  
7.2kV 400A : 645E

- P : Fixed contactor
- PD : Drawout contactor
- S : Fixed contactor with a mechanical closing latch
- SD : Drawout contactor with a mechanical closing latch
- N : Combination contactor ( fuse unit assembled )
- R : Combination contactor with a mechanical closing latch
- PM : Fixed contactor with a mechanical interlock
- SM : Fixed contactor with a mechanical interlock and a mechanical closing latch



# Load Break Switches



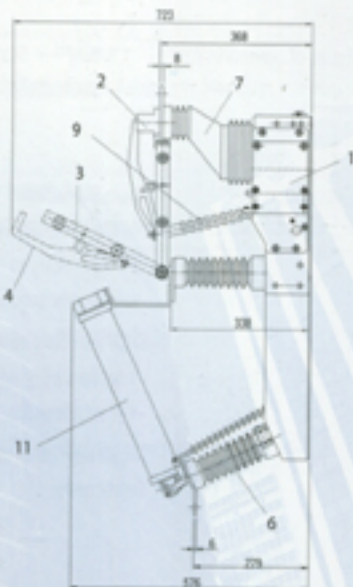
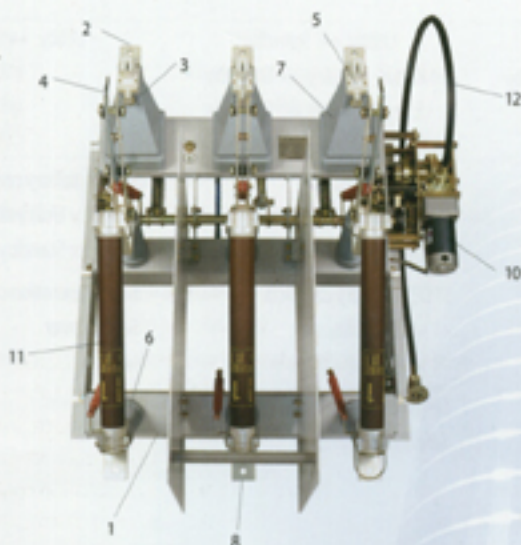
**VITZROTECH** Load Break Switches are available in medium voltage switching and protection to your distribution system with power fuses.

The switches are specially designed to handle all three phase live switching duties including full load and associated transformer magnetizing and cable charging currents including fault closing operations. They are fully type tested in KERI ( Korea Electrotechnology Research Institute ) under qualified system.

Rated voltage	12 / 15kV		24kV	
LBS type	12KML-M	12KMLF-M	KML-M	KML-A
Number of poles	3		3	
Rated current	630A		630A	
Rated frequency	AC50/60Hz		AC50/60Hz	
Power frequency withstand voltage	32kV		50kV	
Impulse withstand voltage(1.2x50µsec)	85kV		125kV	
Short time withstand current, 1sec	20kA		20kA	
Short-circuit making current	52kA		52kA	
Load breaking current	630A		630A	
Close loop current	630A		630A	
Charging current	31.5A		31.5A	
Opening time	<60ms		<60ms	
Operation method	Manual	Motor	Manual	Motor
Control voltage	AC/DC24, 110V		AC/DC24, 110V	
Control current(at DC 110V)	5A		5A	
Weight( Non-fused LBS )	62.5kg	76kg	64kg	68kg
Manual operating cable length	1.5m ( other options : 1 / 1.2 / 1.8 / 2m )			
Fuse ampere ratings	10, 16, 20, 25, 30, 40, 50, 63, 80, 100, 125, 160, 200A			

## Configuration of 24kV Fused type LBS

1. Base Frame
2. Arc Chamber
3. Main Blade
4. Arcing Blade
5. Fixed Contact
6. Support Insulator
7. Support Insulator with Puffer
8. Terminal
9. Operating Rod
10. Geared Motor
11. Fuse Holder
12. Manual Operating Cable



## Accessories

Auxiliary relay, Motor operator, Shunt trip, Fuse trip device, Power fuse link, Fuse holder



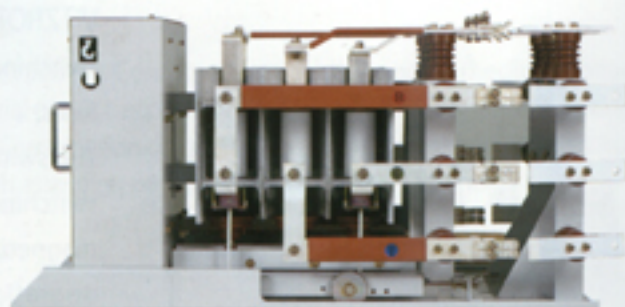
# Transfer Switches

## Low voltage

- Automatic Transfer Switches, ATS upto 3000A
- Closed Transition Transfer Switches, CTTS upto 3000A
- Bypass Isolation Transfer Switches, BIS upto 400A

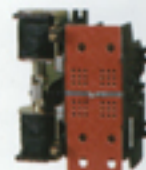
## Medium voltage

- 7.2kV Vacuum Transfer Switches, VTS 400/600A



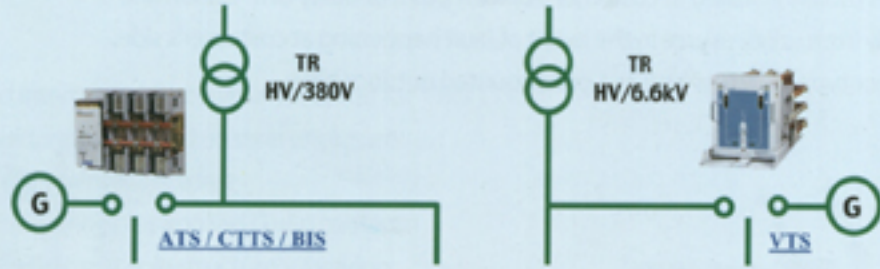
VTS

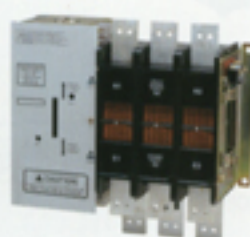


### Automatic Transfer Switches



Type	Standard WN	Economic WP	Economic W	Mini HS
Rated voltage	AC600V DC125V	AC600V DC125V	AC600V DC125V	AC250V -
Rated current	100, 200, 400, 600 800, 1000, 1200 1600, 2000, 3000A	100, 200, 400A	100, 200, 400A	100, 200A
Poles	2,3,4	2,3,4	2,3,4	2
Connection	Front (to 1600A) Rear	Front Rear	Front Rear	Front
Types of operation	Utility ↔ Standby Utility ↔ Neutral(trip) ↔ Standby	Utility ↔ Standby Utility → Delay → Standby Utility ← Delay ← Standby (Time delay : 3-30sec.)	Utility ↔ Standby	Utility ↔ Standby
Description	<b>Neutral position</b> - to trip to isolation or - for time delay to reduce switchover problems <b>SPDT Auxiliary contacts</b> - 1 set for Utility side - 1 set for Standby side <b>Single operation coil</b> <b>Safety cover</b>	<b>Time delay neutral</b> - 3-30 sec. to reduce switchover problems <b>SPDT Auxiliary contacts</b> - 1 set for Utility side - 1 set for Standby side <b>Single operation coil</b> <b>Safety cover</b>	<b>SPDT Auxiliary contacts</b> - 1 set for Utility side - 1 set for Standby side <b>Single operation coil</b> <b>Safety cover</b>	<b>Compact design</b> - for 2 pole purpose - for use upto 200A
Standard	IEC 60947-6-1, JEM 1038			

# SF6 Gas Insulated Load Break Switch



Closed Transition Transfer Switches	Bypass Isolation Transfer Switches	7.2kV Vacuum Transfer Switches
		
<p>CTTS CT</p>	<p>BIS BIS</p>	<p>VTS VTS-6N</p>
<p>AC600V DC125V</p>	<p>AC600V DC125V</p>	<p>7.2kV</p>
<p>100, 200, 400, 600 800, 1000, 1200 1600, 2000, 3000A</p>	<p>100, 200, 400A</p>	<p>400, 600A</p>
<p>2,3,4 Front( to 1600A) Rear Utility ↔ Standby</p>	<p>2,3,4 Drawout Utility ↔ Standby</p>	<p>3 Fixed Drawout Utility ↔ Standby</p>
<p>Utility ↔ Neutral(trip) ↔ Standby Utility → Synchronizing → Standby Utility ← Synchronizing ← Standby</p>	<p>Utility ↔ Standby Utility ↔ Neutral(trip) ↔ Standby Bypass</p>	<p>Utility ↔ Standby Utility ↔ Neutral(trip) ↔ Standby</p>
<p><b>Synchronizing</b> - to eliminate momentary loss of power during transfer.</p> <p><b>Neutral position</b> - to trip to isolation or - for time delay to reduce switchover problems</p> <p><b>SPDT Auxiliary contacts</b> - 1 set for Utility side - 1 set for Standby side</p> <p><b>Double operation coil</b> <b>Safety cover</b></p>	<p><b>Bypass Isolation</b> - for the inspection and maintenance ATS without the need for power interruption.</p> <p><b>Neutral position</b> - to trip to isolation or - for time delay to reduce switchover problems</p> <p><b>SPDT Auxiliary contacts</b> - 1 set for Utility side - 1 set for Standby side</p>	<p><b>Vacuum Interrupters</b> - provide high reliable switching and long service life</p> <p><b>Interlocking</b> - electrically and mechanically for safety</p> <p><b>Neutral position</b> - to trip to isolation or - for time delay to reduce switchover problems</p>
<p>IEC 60947-6-1, JEM 1038</p>		<p>JIS C4605</p>



# Auto Section Switches

Auto section switch is usually installed at customer's branch point of utility distribution line to isolate automatically from utility source in the event of fault happening at customer's side. Vitzro provide an indoor type switch as well as a polemounted outdoor type.



## Indoor type

- Air insulated
- Adoption of air puffer structure for arc extinguishing
- Insulator type CTs used for easier installation.
- Light weight and compact



## Outdoor type

- Liquid filled
- On-Off indicator visible from the ground
- Operation counter
- Mechanism part separated from liquid filled contact part for comfortable maintenance

Type of mounting	Indoor use		Outdoor use(polemounted)	
Type of insulation	Air		Liquid	
Rated Voltage	25.8kV		25.8kV	
Type	KAS-A-A1	KAS-A-M1	VAS-O-A22	VAS-O-M22
Operation method	Motor	Manual	Motor	Manual
Rated current	200A		200A	
Rated frequency	60 HZ		60 HZ	
Rated short-time current ( 1 sec )	10kA		10kA	
instant, asym	15kA		15kA	
1 sec. sym	10kA		10kA	
10 sec. sym	3.5kA		3.5kA	
Rated short circuit current	900A		900A	
Rated short circuit making current(peak)	15kA		15kA	
Power frequency withstand voltage, kV				
terminal to earth	50kV, 1min		Dry : 60kV/1min, Wet : 50kV/10sec	
terminal to terminal	60kV, 1min		Dry : 60kV/1min, Wet : 50kV/10sec	
terminal to other phase terminal	50kV, 1min		Dry : 60kV/1min, Wet : 50kV/10sec	
Impulse withstand voltage (kV)				
terminal to ground	125kV		150kV	
terminal to terminal	125kV		150kV	
terminal to other phase terminal	125kV		150kV	
terminal to control terminal	6kV		6kV	
SWC	2.5kV		2.5kV	
Pick-up current, A				
phase			10, 20, 30, 50, 70, 100, 140, 200, Block	
ground			5, 10, 15, 25, 35, 50, 70, 100, Bypass	
Max. lock current			800A	
Inrush restraint			0.5, 1 sec.	
Control voltage			24V DC ( 220V AC for battery recharge )	
Weight	90 kg	85 kg	200 kg	190 kg



# SF6 Gas Insulated Load Break Switches

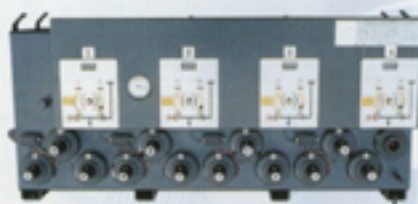
## Features

1. SF6-insulated and interrupted (vacuum interrupted for 12kV)
2. Hermetically-sealed, welded, stainless steel enclosure
3. Easy installation and maintenance free
4. Puffer arc quenching principles applied (Tulip contacts)
5. Compact design with the simple structure supplying excellent insulation and arc extinction
6. Pollution resistance with Moldcone
7. High rust-proof performance
8. Motor operation available



Type of mounting	Pole mounted						
Rated Voltage	25.8kV				12kV		
Type	VPS-M24	VPS-A24	VPS-M26	VPS-A26	VPS-M16V	VPS-A16V	VPS-M10
Operation method	Manual	Remote	Manual	Remote	Manual	Remote	Remote
Rated current(A)	400A		630A		630A		
Rated frequency	50 / 60 HZ				50 HZ		50 / 60 HZ
Type of interruption	Puffer tube (SF6 gas)				Vacuum interrupter		Puffer tube (SF6 gas)
Rated short-time current ( 1 sec )	12.5(kA)				16kA/4sec		
Rated making current	32.5(kAp)				40(kAp)		
Mainly active load current	400A		630A		630A		
Closed loop current	400A		630A		630A		
Transformer off-load current	14A		21A		21A		
Cable charging current	25A		25A		10A		
Mechanical endurance	5,000 operations				10,000 operations		
Power frequency withstand voltage, kV							
terminal to earth	60				42		
terminal to terminal	60				42		
terminal to other phase terminal	60				48		
Impulse withstand voltage (kV)							
terminal to ground	150				75		
terminal to terminal	150				75		
terminal to other phase terminal	150				85		
Pressure of SF6 gas	1.5 kg/ cft. G				0.2 kg/ cft. G		1.5 kg/ cft. G
Weight	135kg	170kg	155kg	190kg	135kg	155kg	160kg
standards	PS-151-170 ~ 180, IEC 60265-1, ANSI C37.71				GB3804.1-xx, IEC60265-1, ANSI C 37.71, ANSI C37.63		

Padmounted type for under ground lines is available at 25.8kV 600A





# HV fuses



HV fuse-links are suitable for reliable protection of medium voltage equipments such as transformers, motors, capacitors and cables. They protect those equipments against the thermal and dynamic effects of short-circuits. In addition to the HV fuse-links VITZRO also provides fuse-holders, load break switches and vacuum contactors for switch-fuse combination.

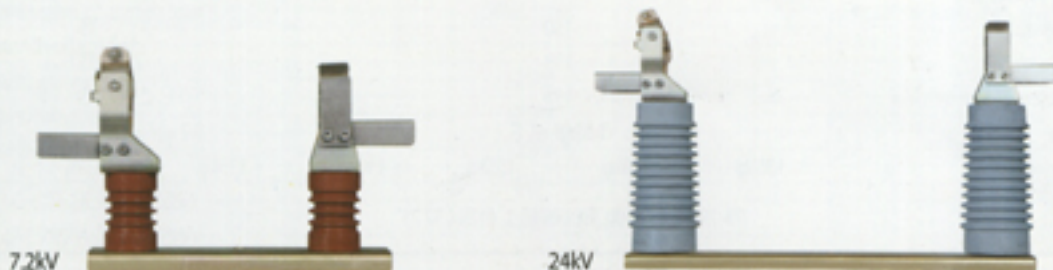
VITZRO HV fuse-links offer following features.

- High breaking capacity
- High current limitation
- Low switching voltage
- Quick breaking
- Non-ageing
- Standard : IEC 60 282-1 / VDE 0670 T4

## 7.2kV Fuse-links

Rated voltage [kV]	Type order no.	Rated current I <sub>n</sub> [A]	Rated breaking current		Dimensions		Weight [kg]
			maximum [kA]	minimum [A]	e [mm]	d [mm]	
7.2	VTHF07010	10	50	4I <sub>n</sub>	192	56	1.1
	VTHF07020	20					
	VTHF07032	31.5					
	VTHF07040	40					
	VTHF07050	50				65	1.4
	VTHF07063	63					
	VTHF07080	80					
	VTHF07100	100				88	2.4
	VTHF07125	125					
	VTHF07160	160					
VTHF07200	200						

## Fuse-holders (Fuse-bases), Indoor



Rated voltage	Type order no. with suffix code □	Rated current	BIL	Suffix code φ : diameter of fuse-link (dimension d in the above table)	
7.2kV	VTHFB07AS □	200A	60kV	5: φ 56	6: φ 65
24kV	VTHFB24AS □	200A	125kV	7: φ 78	8: φ 88



## 24 / 25.8kV Fuse-links

Rated voltage [kV]	Type order no.	Rated current In [A]	Rated breaking current		Dimensions		Weight [kg]
			maximum [kA]	minimum [A]	e [mm]	d [mm]	
24	VTHF24001	1	40	5xIn	442	56	23
	VTHF24010	10					
	VTHF24016	16					
	VTHF24020	20					
	VTHF24025	25					
	VTHF24032	31.5				65	
	VTHF24040	40					
	VTHF24050	50					
	VTHF24063	63					
	VTHF24080	80					
25.8	VTHF25100	100	31.5			78	4.1
24	VTHF24125	125				88	5.9
	VTHF24160	160					
	VTHF24200	200					

## Applications



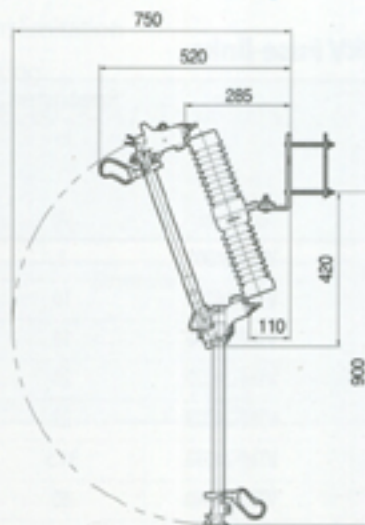


# Power Fuses



**VITZROTECH** Power Fuses are installed on the primary side of the transformer and other main equipments for the protection from the fault current and overload of transformers, cables and capacitor banks in the ambient air temperature and altitude not exceeding 40°C and 1000m, respectively.

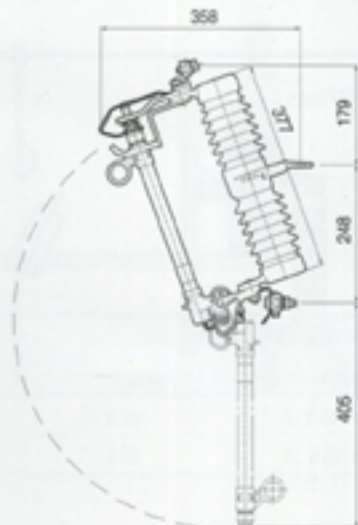
Rated voltage	25.8kV	
Frame size	200AF	
Fuse unit ampere ratings	3, 6, 8, 10, 12, 15, 20, 25, 30	
... K type	40, 50, 65, 80, 100, 140, 200	
Rated breaking capacity	Sym	12.5kA
	Asym	20kA
Power frequency withstand voltage		
terminal to ground	Dry	70kV ( 1min.)
	Wet	60kV ( 10sec.)
pole to pole	77kV ( 1min.)	
Impulse withstand voltage(1.2x50µ sec)		
terminal to ground	150kV	
pole to pole	165kV	
Applicable standard	ANSI C37.41-46	



# Cut Out Switch

- Compact design and easy installation.
- Convenient replacement of a fuse unit and outstanding performance.
- Excellent operation regardless of fault current level.
- Long service life with corrosion resistant and water proof properties.

Rated voltage	25.8kV	
Rated maximum voltage	27kV	
Frame size	100AF	
Rated breaking capacity	Sym	7.1kA
	Asym	10kA
Power frequency withstand voltage		
	Dry	42kV ( 1min.)
	Wet	36kV ( 10sec.)
Impulse withstand voltage(1.2x50µsec)	125kV	
Weight	10kg	
Applicable standard	ANSI C37.41-42	



# Lightning Arresters & Surge Absorbers

Lightning arresters and surge absorbers are used to provide overvoltage protection for electric equipments in the distribution system by limiting the overvoltage due to lightning and switching surges.

## Lightning Arresters

Gapless  
ZnO



Type	KMZ-18	KMX-18
Housing material	Porcelain	EPDM Polymer
Rated voltage	18kV	18kV
Nominal discharge current	2.5kA	5kA
Maximum residual voltage (8x20µsec)	65kV	65kV
Discharge withstand current (4x10µsec)	25kA	65kA
Weight	3.7kg	2.4kg

## Surge Absorbers

Polymer concrete  
Gapless  
ZnO



Type	KMSA-3.6	KMSA-7.2	KMSA-18
Housing material	POLYSIL	POLYSIL	POLYSIL
Rated voltage	3.3kV	6.6kV	18kV
Nominal discharge current	5kA	5kA	5kA
Maximum residual voltage (8x20µsec)	13kV	26kV	65kV
Discharge withstand current (4x10µsec)	40kA	40kA	40kA
Weight	0.41kg	0.6kg	2.15kg



# Air Circuit Breakers



## Optional accessories

- UVT, Under voltage trip  
Instant trip type  $\leq 0.5$  sec  
Delayed trip type  $\geq 1$  sec
- CTD, Condenser trip device  
To trip circuit breakers in the event of power failure Or to get DC power from AC input as a rectifier
- SST, Safety shutter
- OCA, Alarm contact  
To give a trip signal from protection relays
- OCC, Trip cause contacts  
To give a trip signal by trip cause from protection relays
- KIT, Key interlock  
LOCK IN OPEN type, LOCK IN CLOSED type

Frame size	1600AF				
Breaker type	VAB-16				
Number of poles	3, 4				
Electrical characteristics as per IEC 60947-2					
Rated insulation voltage, $U_i$	1000V				
Impulse withstand voltage, $U_{imp}$ 8kV	8kV				
Rated operational voltage, $U_e$	690V				
Rated current, $I_n$	600A	800A	1000A	1250A	1600A
(Sensor/CT) current, $I_{ct} = I_n$					
Base current (to be set at the protection relay), $I_b$	0.6-0.8-1.0 $\times I_n$				
Rating of 4th pole % $I_n$	100%				
Rated breaking capacity ACS0/60Hz					
Ultimate, $I_{cu}$					50kA
					50kA
					50kA
Service, $I_{cs}$ % $I_{cu}$	100%				
Rated short-time withstand current, $I_{cw}$	50kA				
Rated making capacity, $I_{cm}$ kA peak	105kA				
Breaking time ms	$< 35$				
Closing time ms	$< 50$				
Installation and maintenance					
Service life	x1000 operations				
Mechanical	w/ maintenance				20
	w/o maintenance				10
Electrical					5
Connection	Drawout				Rear
	Fixed				Rear
Dimensions & weight	mm, kg		H $\times$ W $\times$ D		
	Drawout	3P	390 $\times$ 300 $\times$ 510mm, 70kg		
		4P	390 $\times$ 385 $\times$ 510mm, 90kg		
	Fixed	3P	390 $\times$ 300 $\times$ 390mm, 50kg		
		4P	390 $\times$ 385 $\times$ 390mm, 60kg		

Note : Control voltage for Motor and protection relays, OCR/OCGR : DC 110V, AC110V, AC220V



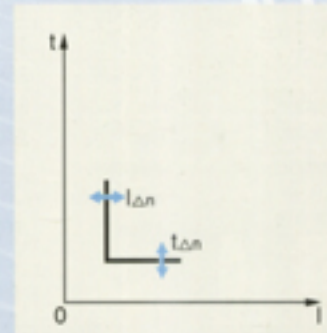
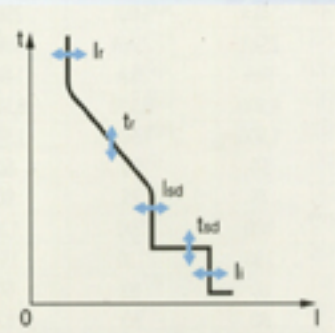


Protection relays - OCR and OCGR



3200AF			4000AF
VAB-32			VAB-40
3,4			3,4
1000V			1000V
8kV			
690V			690V
2000A	2500A	3200A	4000A
0.6-0.8-1.0 × In			0.6-0.8-1.0 × In
50%			50%
65kA			85kA
65kA			85kA
65kA			85kA
100%			100%
65kA			85kA
143kA			187kA
< 35			< 35
< 50			< 50
20			20
10			10
5			5
Rear			Rear
Rear			Rear
H × W × D			H × W × D
390 × 435 × 510mm, 105/119kg			440 × 555 × 569mm, 170kg
390 × 520 × 510mm, 120/132kg			440 × 640 × 569mm, 190kg
390 × 435 × 390mm, 73/83kg			406 × 525 × 390mm, 95kg
390 × 520 × 390mm, 83/94kg			406 × 610 × 390mm, 110kg


● Base current	OCR/OCGR	
current setting, $I_0$	$I_0 = I_n \times$	0.6 - 0.8 - 1.0 (3 steps)
● Long time, LT	OCR/OCGR	
current setting, $I_1$	$I_1 = I_0 \times$	0.7 - 0.8 - 0.9 - 1.0 (4 steps)
(LTP)	tripping current	between 1.05 and 1.20 × $I_1$
	accuracy	± 10%
time delay, $t_1$	$t_1$ at 6 × $I_1$	5 - 10 - 20 - 30 sec. (4 steps)
(LTD)	accuracy	± 20%
● Short time, ST	OCR/OCGR	
pick-up current setting, $I_2$	$I_2 = I_0 \times$	4 - 6 - 8 - 10 (4 steps)
(STP)	accuracy	± 10%
time delay		0.1 - 0.2 - 0.4 - 0.8 sec. (4 steps)
(STD)	accuracy	± 20%
● Instantaneous, I	OCR/OCGR	
pick-up current setting, $I_3$	$I_3 = I_0 \times$	4 - 8 - 12 - 16 (4 steps)
(INST)	accuracy	± 10%
● Ground fault protection (available at OCGR only)	OCGR	
pick-up current setting, $I_4$	$I_4 = I_n \times$	0.1 - 0.2 - 0.3 - 0.5 (4 steps)
(GFP)	accuracy	± 20%
time delay		0.2 - 0.4 - 0.6 - 0.8 sec. (4 steps)
(GFD)	accuracy	± 20%
● Reset button	OCR/OCGR	
RESET	press to reset indicators	
● LED indicators	OCR/OCGR	
O.L	Overload status pre-alarm	
LTD	Tripped by long time pick-up/overload	
STD	Tripped by short time pick-up	
INST	Tripped by instant pick-up	
GFT	Tripped by ground fault	
● Test terminal	OCR/OCGR	
TEST	Terminals to test the relay by an exclusive test kit	







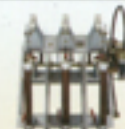
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# Molded Case Circuit Breakers

## Economic type MCCB

### VBE series

Frame size

30 to 800AF

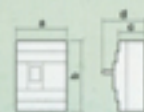
Breaking capacity

2.5 to 35kA

2, 3 and 4 pole version



Frame size		30AF	50AF	60AF	100AF	225AF	400AF	600AF	800AF
Type	2-pole	VBE 32	VBE 52	VBE 62	VBE 102	VBE 202	VBE 402	VBE 602	VBE 802
	3-pole	VBE 33	VBE 53	VBE 63	VBE 103	VBE 203	VBE 403	VBE 603	VBE 803
	4-pole	-	VBE 54	VBE 64	VBE 104	VBE 204	VBE 404	VBE 604	VBE 804
Rated current at 40°...	A	5, 10, 15, (16), 20, 30, (32)	6, 10, 15, (16), 20, 30, (32), 40, 50	60, (63)	60, (63), 75, (80), 100	125, 150, (160), 175, (180), 200, 225	250, 300, (315), 350, 400	500, 600, (630)	700, 800
	Rated insulation voltage AC	460V	690V	690V	690V	690V	690V	690V	690V
Rated breaking capacity, Icu	AC 600V	-	2.5kA	2.5kA	7.5kA	7.5kA	18kA	22kA	22kA
	AC 500V	-	5kA	5kA	10kA	10kA	18kA	25kA	25kA
	AC 460V	2.5kA	10kA	10kA	14kA	18kA	25kA	35kA	35kA
	AC 400V	2.5kA	10kA	10kA	14kA	18kA	25kA	35kA	35kA
	AC 220V	5kA	18kA	18kA	25kA	35kA	35kA	50kA	50kA
	DC 250V	-	2.5kA	2.5kA	5kA	10kA	10kA	20kA	20kA
IEC60947-2 Ics=0.5Icu	AC 220V	5kA	18kA	18kA	25kA	35kA	35kA	50kA	50kA
	DC 250V	-	2.5kA	2.5kA	5kA	10kA	10kA	20kA	20kA
Endurance (operations)	Mechanical	8,500	8,500	8,500	8,500	7,000	4,000	4,000	4,000
	Electrical	1,500	1,500	1,500	1,500	1,000	1,000	1,000	1,000
Dimensions, mm	a(2-pole)	50	50	50	50	105	140	210	210
	a(3-pole)	75	75	75	75	105	140	210	210
	a(4-pole)	-	100	100	100	140	185	280	280
	b	96	130	130	130	165	257	275	275
	c	60	60	60	60	60	109	107	107
	d	80	80	80	80	84	145	155	155



## Standard type MCCB

### VBS series

Frame size

30 to 800AF

Breaking capacity

10 to 50kA

2, 3 and 4 pole version



Frame size		30AF	50AF	60AF	100AF	225AF	400AF	600AF	800AF
Type	2-pole	VBS 32	VBS 52	VBS 62	VBS 102	VBS 202	VBS 402	VBS 602	VBS 802
	3-pole	VBS 33	VBS 53	VBS 63	VBS 103	VBS 203	VBS 403	VBS 603	VBS 803
	4-pole	VBS 34	VBS 54	VBS 64	VBS 104	VBS 204	VBS 404	VBS 604	VBS 804
Rated current at 40°...	A	6, 10, 15, (16), 20, 30, (32)	6, 10, 15, (16), 20, 30, (32), 40, 50	60, (63)	10, 15, (16), 20, 30, (32), 40, 50, 60, (63), 75, 80, 100	125, 150, (160), 175, (180), 200, 225	250, 300, (315), 350, 400	500, 600, (630)	700, 800
	Rated insulation voltage AC	690V	690V	690V	690V	690V	690V	690V	690V
Rated breaking capacity, Icu	AC 600V	2.5kA	5kA	5kA	10kA	10kA	22kA	35kA	35kA
	AC 500V	5kA	7.5kA	7.5kA	14kA	14kA	25kA	45kA	45kA
	AC 460V	10kA	14kA	14kA	25kA	25kA	35kA	50kA	50kA
	AC 400V	10kA	14kA	14kA	25kA	25kA	35kA	50kA	50kA
	AC 220V	18kA	25kA	25kA	50kA	50kA	50kA	100kA	100kA
	DC 250V	2.5kA	5kA	5kA	14kA	14kA	20kA	40kA	40kA
IEC60947-2 Ics=0.5Icu	AC 220V	18kA	25kA	25kA	50kA	50kA	50kA	100kA	100kA
	DC 250V	2.5kA	5kA	5kA	14kA	14kA	20kA	40kA	40kA
Endurance (operations)	Mechanical	8,500	8,500	8,500	8,500	7,000	4,000	4,000	4,000
	Electrical	1,500	1,500	1,500	1,500	1,000	1,000	1,000	1,000
Dimensions, mm	a(2-pole)	50	50	50	60	105	140	210	210
	a(3-pole)	75	75	75	90	105	140	210	210
	a(4-pole)	100	100	100	120	140	185	280	280
	b	130	130	130	155	165	257	275	275
	c	60	60	60	60	60	109	107	107
	d	80	80	80	82	84	145	155	155



Note: The values in ( ) are available on request



## High interrupting capacity type

### VBH series

Frame size

**30 to 400AF**

Breaking capacity

**14 to 50kA**

2, 3 and 4 pole version



Frame size		30AF	50AF	60AF	100AF	225AF	400AF
Type	2-pole	VBH 32	VBH 52	VBH 62	VBH 102	VBH 202	VBH 402
	3-pole	VBH 33	VBH 53	VBH 63	VBH 103	VBH 203	VBH 403
	4-pole	VBH 34	VBH 54	VBH 64	VBH 104	VBH 204	VBH 404
Rated current at 40°...	A	6, 10, 15, (16), 20, 30, (32)	10, 15, (16), 20, 30, (32), 40, 50	60, (63)	15, (16), 20, 30, (32), 40, 50, 60, (63), 75, (80), 100	125, 150, (160), 175, (180), 200, 225	250, 300, (315), 350, 400
Rated insulation voltage	AC	690V	690V	690V	690V	690V	690V
Rated breaking capacity, Icu	AC 600V	5kA	10kA	10kA	18kA	18kA	30kA
	AC 500V	7.5kA	14kA	14kA	25kA	25kA	35kA
	AC 460V	14kA	25kA	25kA	35kA	35kA	50kA
	AC 400V	14kA	25kA	25kA	35kA	35kA	50kA
	AC 220V	25kA	50kA	50kA	65kA	65kA	85kA
	DC 250V	5kA	14kA	14kA	18kA	18kA	40
IEC60947-2 Ics=0.5xIcu							
Endurance (operations)	Mechanical	8,500	8,500	8,500	8,500	7,000	4,000
	Electrical	1,500	1,500	1,500	1,500	1,000	1,000
Dimensions, mm	a(2-pole)	50	60	60	60	105	140
	a(3-pole)	75	90	90	90	105	140
	a(4-pole)	100	120	120	120	140	185
	b	130	155	155	155	165	257
	c	60	60	60	60	60	109
	d	80	82	82	82	84	145



## Current limiting type MCCB

### VBL series

Frame size

**50 to 800AF**

Breaking capacity

**65kA**

2, 3 and 4 pole version



Frame size		50AF	100AF	225AF	400AF	600AF	800AF
Type	2-pole	VBL 52	VBL 102	VBL 202	VBL 402	VBL 602	VBL 802
	3-pole	VBL 53	VBL 103	VBL 203	VBL 403	VBL 603	VBL 803
	4-pole	-	-	-	VBL 404	VBL 604	VBL 804
Rated current at 40°...	A	10, 15, (16), 20, 30 (32), 40, 50	10, 15, (16), 20, 30, (32), 40, 50, 60, (63), 75, (80), 100	125, 150, (160), 175 (180), 200, 225	250, 300, (315), 250, 400	500, 600, (630)	700, 800
Rated insulation voltage	AC	690V	690V	690V	690V	690V	690V
Rated breaking capacity, Icu	AC 600V	35kA	35kA	35kA	35kA	42kA	42kA
	AC 500V	42kA	42kA	42kA	50kA	50kA	50kA
	AC 460V	65kA	65kA	65kA	65kA	65kA	65kA
	AC 400V	65kA	65kA	65kA	65kA	65kA	65kA
	AC 220V	100kA	100kA	125kA	125kA	125kA	125kA
	DC 250V	40kA	40kA	40kA	40kA	40kA	40kA
IEC60947-2 Ics=0.5xIcu							
Endurance (operations)	Mechanical	8,500	8,500	7,000	4,000	4,000	4,000
	Electrical	1,500	1,500	1,000	1,000	1,000	1,000
Dimensions, mm	a(2-pole)	74	74	105	140	210	210
	a(3-pole)	105	105	105	140	210	210
	a(4-pole)	140	140	140	185	280	280
	b	156	156	165	257	275	275
	c	82	82	99	109	107	107
	d	104	104	122	145	155	155



Note: The values in ( ) are available on request



# Contactors and Overload Relays



## Contactors

Ratings up to 200kW 400A  
 3-pole main contact  
 Finger proof design (upto 85A)  
 DIN rail or screw mountable (upto 85A)  
 Front/side mountable contact blocks  
 CE marked by IEC 60947-4



## Overload Relays

- Thermal(bimetallic) style
  - Setting range up to 150A
  - Direct mountable to contactors
  - 1NO+1NC trip contacts
  - Trip class 10A according to IEC60947-4-1
  - Ambient compensated -5 to 40 °C
  - Manual/Automatic reset convertible
- Electronic style
  - Setting range up to 40A
  - Direct mountable to contactors
  - Separate mounting types available upto 60A
  - Changeover(1NO+NC) trip contacts
  - Definite / Inverse time trip curves

Frame size	Contactor spec.				
	Contactor types		AC3 ratings (IEC60947-4)		
	AC operated	DC operated	220~240V	380~440V	500~550V
9A	TMC-9	TMD-9	2.5kW 11A	4kW 9A	4kW 7A
12A	TMC-12	TMD-12	3.5kW 13A	5.5kW 12A	7.5kW 12A
18A	TMC-18	TMD-18	4.5kW 18A	7.5kW 18A	7.5kW 13A
22A	TMC-22	TMD-22	5.5kW 22A	11kW 22A	15kW 22A
	TMC-22S		5.5kW 22A	11kW 22A	15kW 22A
32A	TMC-32S		7.5kW 32A	15kW 32A	18.5kW 28A
	TMC-32	TMD-32	7.5kW 32A	15kW 32A	18.5kW 28A
40A	TMC-40S		11kW 40A	18.5kW 40A	22kW 32A
	TMC-40	TMD-40	11kW 40A	18.5kW 40A	22kW 32A
50A	TMC-50	TMD-50	15kW 55A	22kW 50A	30kW 43A
65A	TMC-65	TMD-65	18.5kW 65A	30kW 65A	37kW 60A
75A	TMC-75	TMD-75	22kW 75A	37kW 75A	45kW 64A
85A	TMC-85	TMD-85	25kW 85A	45kW 85A	45kW 75A
105A	TMC-100		30kW 105A	55kW 105A	55kW 85A
120A	TMC-125		37kW 125A	60kW 120A	60kW 90A
150A	TMC-150		45kW 150A	75kW 150A	90kW 140A
180A	TMC-180		55kW 180A	90kW 180A	110kW 180A
250A	TMC-220		75kW 250A	132kW 250A	132kW 200A
300A	TMC-300		90kW 300A	160kW 300A	160kW 250A
400A	TMC-400		125kW 400A	200kW 400A	225kW 350A

### 1. Coil voltage

TMC-9 to 40 (~40A)

AC 50Hz 24, 48~50, 100, 110~120, 200, 220~240, 346~380, 380~415, 415~440, 500V

AC 60Hz 24, 48~50, 100~110, 115~120, 200~220, 230~240, 380, 400~440, 460~480, 500~550V

### 2. Rating of auxiliary contact

Ith=16A, 3A at AC 220V inductive load, 3A at DC24V inductive load, 8A at AC 220V resistive load



					Overload relay spec.			
690V	AC1 (Ith)	Auxiliary contact		Dimensions (AC operated type) W x H x D, mm	Thermal (Bimetallic) style			Electronic style with inverse curves direct mount to contactor
		standard	additional (option)		Differential type	Non-differential type		
					3-heater	3-heate	2-heater	
4kW 5A	20A	1NO (or 1NC)	1NO+1NC (side mount)	44 x 80 x 86.8	STK-22	STH-22/3	STH-22	PSOCR-SP-12I - 1 - 12A
7.5kW 9A	20A	1NO (or 1NC)	2-pole unit (front mount)		Setting ranges, A			
7.5kW 9A	25A	2NO+2NC	2, 4-pole units (front mount)	63 x 80 x 86.8	0.1-0.16	1-1.6	6-9	PSOCR-SP-22I - 2 - 22A
15kW 18A	32A	2NO+2NC			0.16-0.25	1.6-2.5	7-10	
15kW 18A	32A		1NO+1NC (side mount)	44 x 82 x 92.5	0.25-0.4	2.5-4	9-13	
18.5kW 21A	50A		2, 4-pole units (front mount)		STK-40	STH-40/3	STH-40	
18.5kW 21A	50A	2NO+2NC	2, 4-pole units (front mount)	78 x 88.9 x 94.5	Setting ranges, A			PSOCR-SP-40I - 6 - 44A
22kW 25A	60A		1NO+1NC 2, 4-pole units		4-6	12-18		
22kW 25A	60A			5-8	16-22			
30kW 33A	80A			6-9	18-26			
37kW 42A	100A	2NO+2NC	2, 4-pole units (front mount)	91 x 110.5 x 115.3	7-10	24-36	45-65	
45kW 47A	110A				9-13	28-40	54-75	
45kW 52A	135A			12-18	28-40	63-85		
55kW 65A	150A			16-22	34-50			
60kW 70A	150A			STK-85	STH-85/3	STH-85		
90kW 100A	200A		Side mount unit	120 x 165 x 157	Setting ranges, A			
110kW 120A	230A	2NO+2NC	1NO+1NC or		34-50	65-100		
132kW 150A	260A		2NO+2NC (on both sides)	43-65	85-125			
200kW 220A	350A			54-80	100-150			
250kW 300A	420A			163 x 243 x 198				



TMC-50 to 400 ( 50-400A )

AC 50Hz 100-127, 200-240, 260-350, 380-440, 460-550V

AC 60Hz 100-127, 200-240, 260-350, 380-440, 460-550V

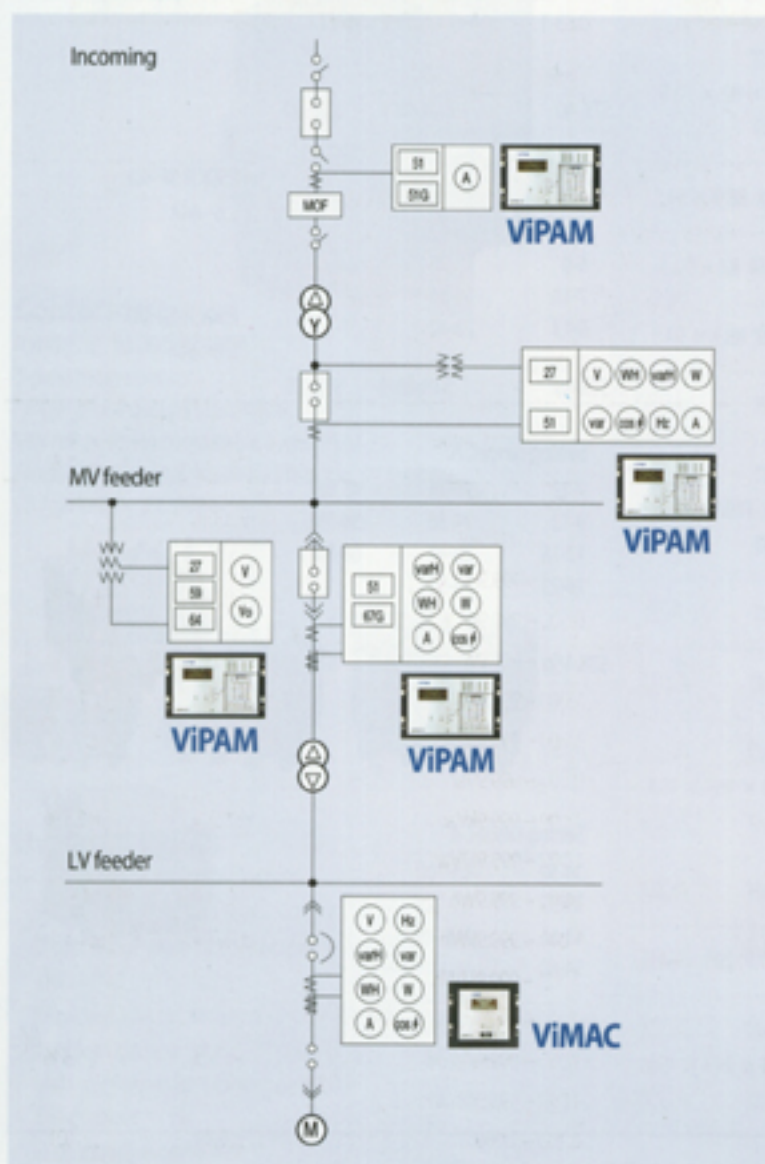
# ViPAM, Digital Integrated Protection & Monitoring Equipment

## ViMAC, Digital Integrated Measuring & Control Equipment

**ViPAM** is a microprocessor-based protection and monitoring equipment suitable for use in low and medium voltage distribution networks to protect equipments and lines with high reliability and safety.

It provides user-friendly front panel configuration and data communication with a host computer.

**ViMAC** is a multifunction, microprocessor-based equipment to meter, control and monitor electric system status.



Protection	ViPAM
● Functions	
OCR, 50/51	UVR, 27
OCGR, 50/51N	OVGR, 64G
OVR, 59	SGR, 67G

- IEC curves provided
  - IEC curve A - Inverse time delay
  - IEC curve B - Very inverse time delay
  - IEC curve C - Extremely inverse time delay
  - IEC curve - Short inverse time delay

Metering and Monitoring
● Metering items
Volt, Amperre, Watt, VAR, Watthour
VARH, Power factor, Frequency

- Status display via VFD (Vacuum Fluorescent Display) and LEDs

Control
Closing and opening of a Circuit Breaker

Communication	
● Data communication by RS232 or RS485	
1) Maximum baud rate : 38.4kbps	
2) Connection :	RS232 : Point to Point
	RS485 : 4 wires Multidrop
3) Protocol : Modbus, DNP3.0	

- Data Communication concentrator is optional



### ViPAM



### ViMAC



- |                    |                             |                    |
|--------------------|-----------------------------|--------------------|
| 1. VFD display     | 7. Circuit breaker ON key   | 13. CPU reset key  |
| 2. Up key          | 8. Circuit breaker OFF key  | 14. Setting key    |
| 3. Down key        | 9. Lock key                 | 15. Drawout handle |
| 4. ESC key         | 10. CB Remote operation key |                    |
| 5. Fault reset key | 11. CB Local operation key  |                    |
| 6. Enter key       | 12. LEDs                    |                    |

Metering menu	Metering value	Displayed range	Accuracy	
			ViMAC	ViPAM
Voltage, V	RMS value	0.000 ~ 999.9V 0.000 ~ 999.9kV	±0.5%	±0.5%
Current, A	RMS value	0.000 ~ 999.9A 0.000 ~ 999.9kA	±0.5%	±1.0%
Power	Real, Watt	Average value 0.000 ~ 999.9W 1.000 ~ 999.9kW 1.000 ~ 999.9MW	±1.0%	±1.5%
	Reactive, Vars	Average value 0.000 ~ 999.9Var 1.000 ~ 999.9kVar 1.000 ~ 999.9MVar	±1.0%	±1.5%
Energy	Real, Wh	Accumulated value 0.000 ~ 999.9Wh 1.000 ~ 999.9kWh 1.000 ~ 999.9MWh	±1.0%	±1.5%
	Reactive, Varh	Accumulated value 0.000 ~ 999.9VarH 1.000 ~ 999.9kVarH 1.000 ~ 999.9MVarH	±1.0%	±1.5%
Power factor, PF	Average value	0.200 ~ 1.000	±0.01	±0.01
Frequency, F	Average value	55-65(Hz)	±0.02Hz	±0.02Hz

# Cable terminations

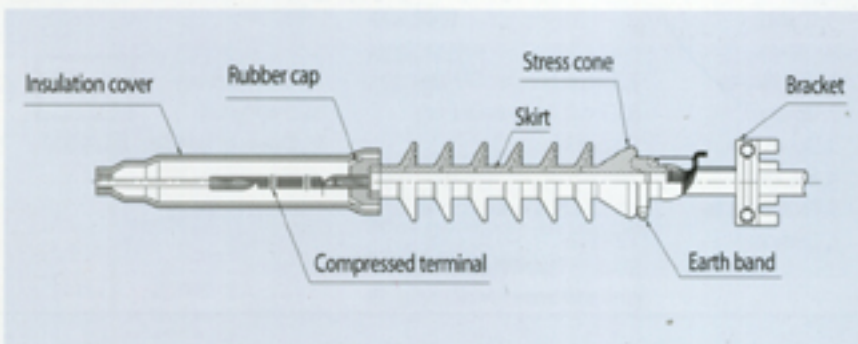
## Feature

- 23kV cable terminations for indoor or outdoor use
- Excellent tracking resistance
- Excellent hydrophobicity
- Light weight and compact



Rated voltage	23kV		
Conductor size	60mm <sup>2</sup>	200mm <sup>2</sup>	325mm <sup>2</sup>
Withstand voltage			
AC	65kV, 1min, Dry		
DC	105kV, 15min		
BIL and full wave	240kV		
Partial discharge voltage	25.8kV / 5pC		

## Structure



# Insulators

## Materials

- POLYSIL
- Epoxy
- E.P.D.M rubber

## Applications

- Bushings, Supporting insulators, Barrier





# Main circuit breakers & Inverter high speed circuit breakers

MCB, main circuit breaker, is used together with AC and DC source section which loaded in electric train that services in Seoul subway and capital region electric railway.

IHVB, inverter high speed circuit breaker, is used for the circuit of vehicle driving motor main source.

The MCB and IHVB are designed and manufactured by Vitzro own technology. They are specially designed and manufactured to operate accurately in severe vibration.

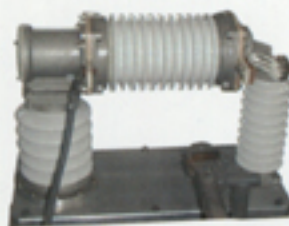
The type test result in accordance with railway standard at KERI(Korea Electrotechnology Research Institute) proves the quality and performance of our MCB and IHVB.

## Feature

- Accurate motion : pneumatic operation system adopted
- High reliability
- Antiseismic property : long service life



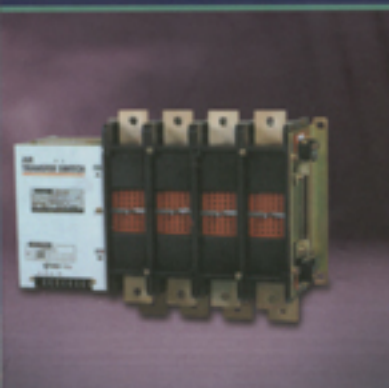
AC1000/DC1200A MCB



1000A MCB

	MCB	MCB	IHVB
Rated voltage	27.5kV	27.5kV	DC 1.5kV
Rated current			
AC	1000A	1000A	-
DC	1200A	-	300A
Rated Breaking current			
AC	4kA	20kA	DC 30kA

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