

VACUUM CIRCUIT BREAKER INDOOR



VSSE1 Indoor



VSSE2 Indoor



VSSE3 Indoor



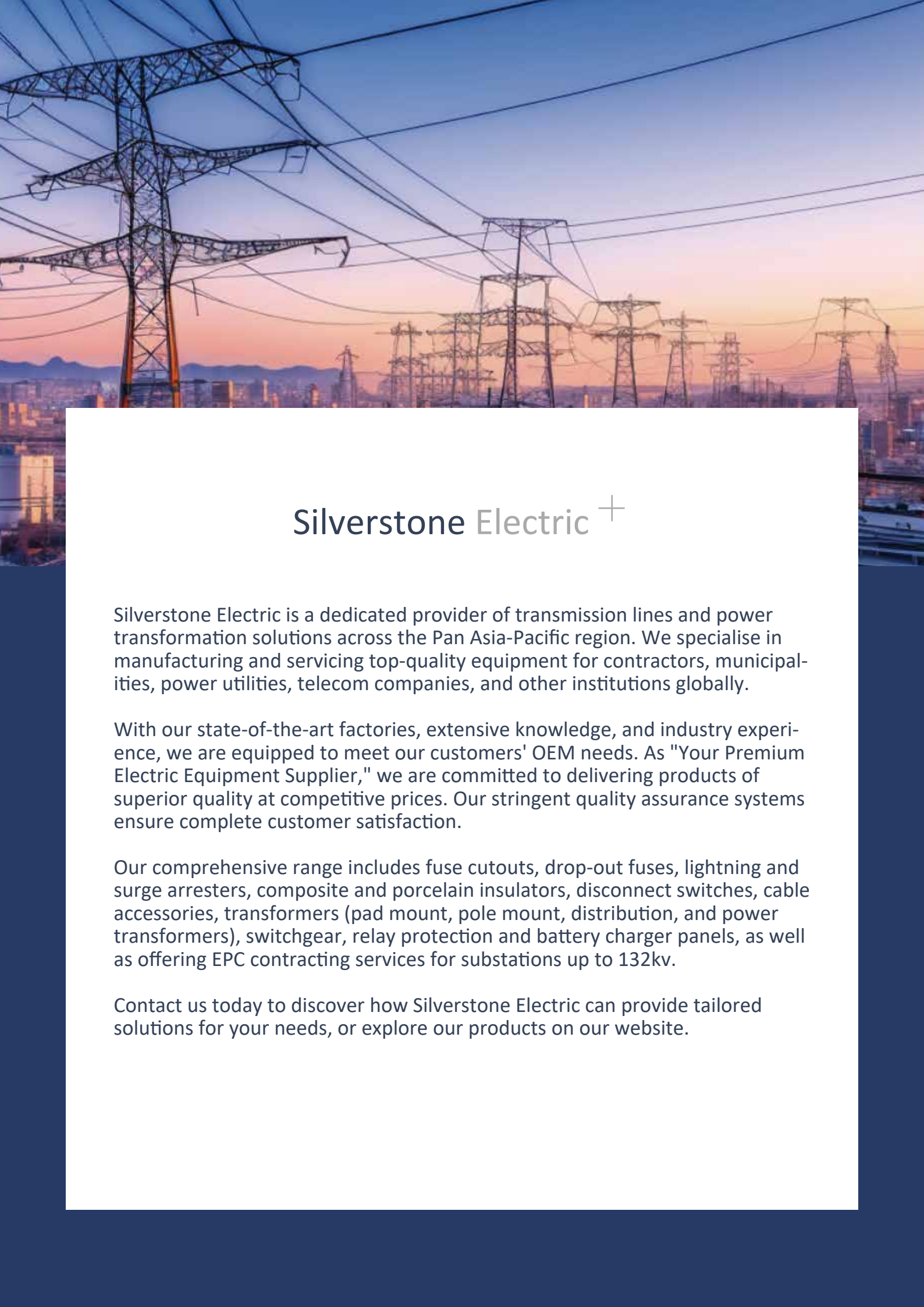
VSSE4 Indoor



VSSE5 Indoor



VS1 Indoor



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VSSE1 : General

TECHNICAL STANDARD :

VSSE1 serious indoor breaker completely satisfy the Standards of GB1984 AC High voltage Breaker, GB/T 11022 -1999 Common Specifications for High-Voltage Switchgear and Controlgear Standards, China Power Sector Standards DL403. VSSE1 also meet the requirements of IEC62271-100, IEC56 and other main industrialized countries' similar standards.

TESTING :

VSSE1 series circuit breaker has passed following test : Type tests : Power frequency withstand voltage tests, lightning impulse withstand voltage tests, temperature-rise tests, short-time withstand current tests, peak withstand current tests, short-circuit current breaking capacity tests, mechanical endurance, etc.

Routine test before out of factory

: Mechanical performance test : Mechanical characteristics tests, power frequency withstand voltage tests on main circuit, dielectric tests on auxiliary and control circuits, measurement of the resistance of the main circuit, interlock operation tests, mechanical operation tests, electric operation tests etc.

SCOPE OF APPLICATION :

It is universally used in power plant, electric network, metallurgy industry, petrochemical industry and infrastructures such as airport, subway, building. When the VSSE1 circuit breaker is used in distribution system, can be applied to control and protect cable, trolley wire, transformer, generator and capacitor bank.

SAFETY :

VSSE1 circuit breaker possesses perfect mechanical and electric interlock equipment, meanwhile, its high reliable operating performance and mechanical life, coordinated with matched switchgear cabinet, to ensure normal power distribution, operator and equipment's safety.



Drive Mechanism

VSSE1 :
SPRING OPERATION MECHANISM



Drive Mechanism (Cont...)



CIRCUIT PANEL

The modularized secondary controlling circuit panel adopts auto-fastening connection-peg, which is convenient for replacing and also ensure the reliability of the electric connection.



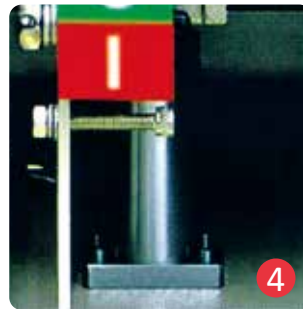
MAKING MODULE

The making module has characteristic of brief structure and reliable operating principle, thoroughly avoid some faults, such as can't keep making, can't break and so on, meanwhile, reduce release power during opening state



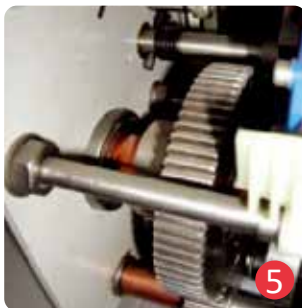
MAKING/BREAKING COIL

The coil is whole sealing designed, keeping the coil out of moisture



BREAKING BUFFER

High powered breaking buffer will reduce moving-contact overswing or rebounding extent when circuit breaker is in process of breaking, thus reduced the rate of re-arcing when breaking, assured the vacuum interrupter bellows' mechanical endurance.



SUPERFICIAL TREATMENT

80% mechanical parts apply Ni-P alloy treatment, greatly improved spare parts's anti-septic power, assure machine's stable quality all the time.



WHOLE MECHANISM'S ADVANTAGE

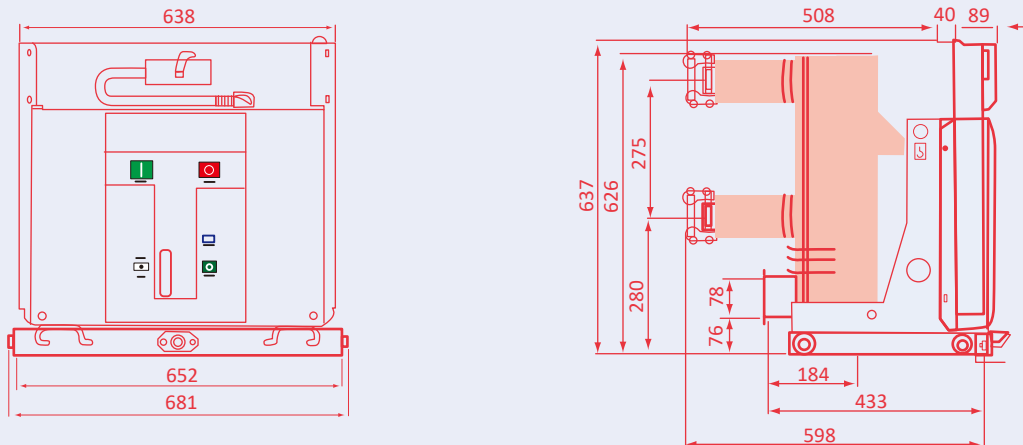
Operating mechanism's structure is simple, and operation is reliable, it goes with strong commonality, can be used in different specifications. Because it is our independent developed products, so we can specialed do it according to customers's requirements.



VSSE1 : Every detail of VSSE1, we try to be the best.

External Dimensions

OVERALL DIMENSION FOR VSSE1 WITHDRAWABLE CIRCUIT-BREAKER (POLE DISTANCE IS 210MM)

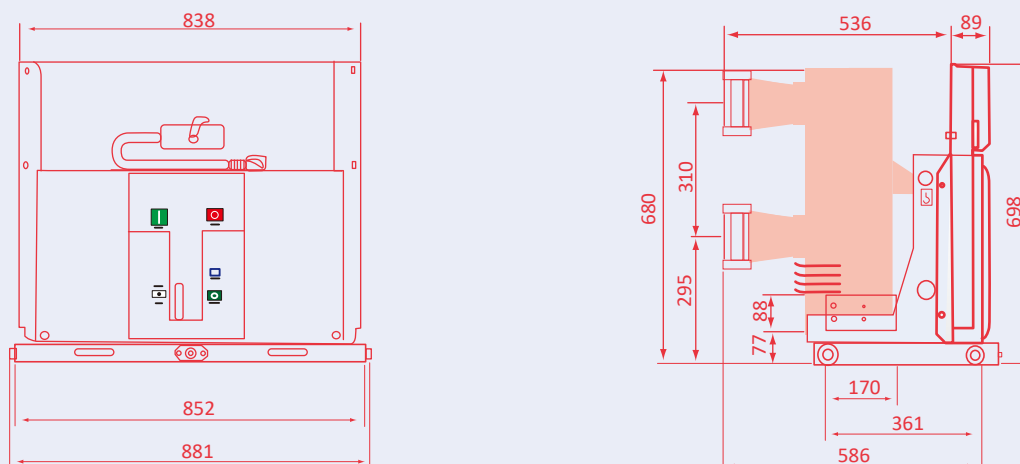


PRIMARY POLE DISTANCE IS 210MM:

RATED CURRENT (A)	RATED SHORT CIRCUIT BREAKING CURRENT (kA)	FITTED FIXED CONTACT'S SIZE (mm)
630	...25	Ø 35
1250	...40	Ø 49
1600	...40	Ø 55

WE CAN PRODUCE VSSE1 HANDCART (HIGH-ALTITUDE TYPE) CIRCUIT-BREAKER WHICH THE POLE DISTANCE IS 275MM AS PER THE DEMAND OF USERS.

OVERALL DIMENSION FOR VSSE1 WITHDRAWABLE CIRCUIT-BREAKER : (POLE DISTANCE IS 275MM)

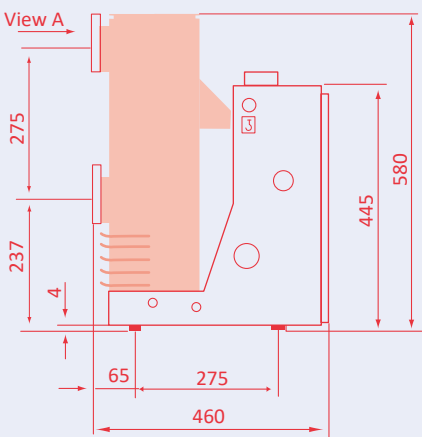
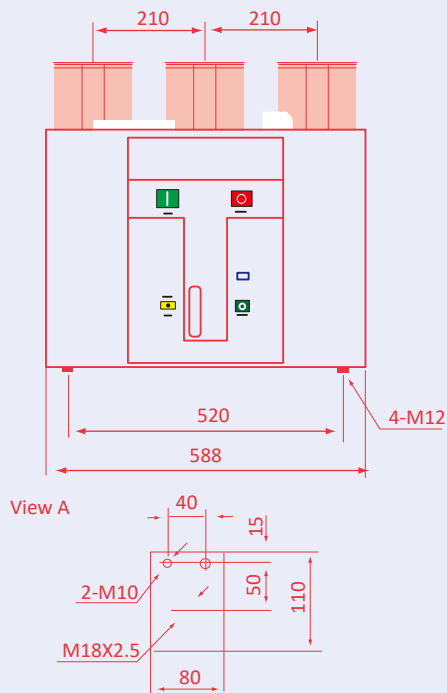


PRIMARY POLE DISTANCE IS 275MM:

RATED CURRENT (A)	RATED SHORT CIRCUIT BREAKING CURRENT (kA)	FITTED FIXED CONTACT'S SIZE (mm)
1600	...40	Ø 55
1600-2000	...40	Ø 79
2500/3150	...40	Ø 109
4000	40	Ø 109

External Dimensions (Cont...)

OVERALL DIMENSION FOR VSSE1 FIXED CIRCUIT-BREAKER
(POLE DISTANCE IS 210MM)

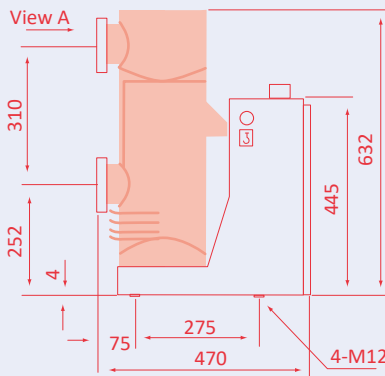
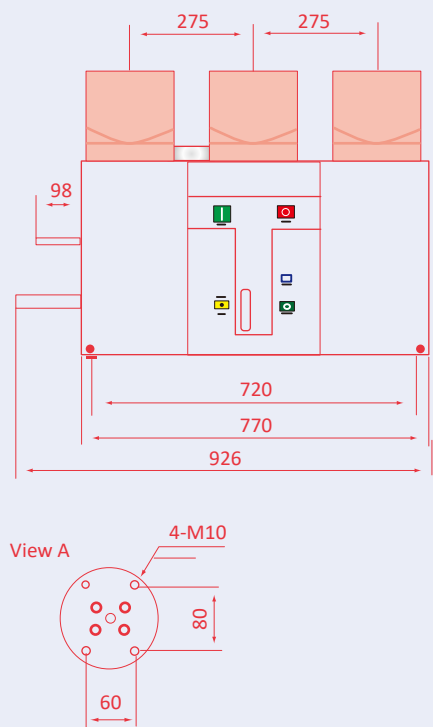


PRIMARY POLE DISTANCE IS 210MM:

RATED CURRENT (A)	RATED SHORT CIRCUIT BREAKING CURRENT (kA)
630	...31.5
1250	...40
1600	...40

WE CAN PRODUCE VSSE1 FIXED CIRCUIT-BREAKER WHICH THE PHASE CLEARANCE IS 230, 250 AND 275MM AS PER THE DEMAND OF USERS

OVERALL DIMENSION FOR VSSE1 FIXED CIRCUIT-BREAKER
(POLE DISTANCE IS 275MM)



PRIMARY POLE DISTANCE IS 275MM:

RATED CURRENT (A)	RATED SHORT-CIRCUIT BREAKING CURRENT (kA)
1600	...31.5 40
2000	
2500	
3150	40
4000	

Technical Parameter

NO.	ITEM		UNIT	TECHNICAL DATE			
1	Rated voltage		kV	12			
2	Rated insulating level	Rated short time power frequency withstand voltage (1min)		42			
		Rated lightning impulse withstand voltage (peak value)		75			
3	Rated frequency		Hz	50			
4	Rated current		A	630	630	1250	1250
				1250	1250	1600	1600
						2000	2000
						2500	2500
						3150	3150
				4000	4000		
5	Rated short circuit breaking current		kA	20	25	31.5	40
6	Rated short time withstand current			20	25	31.5	40
7	Rated peak withstand current			50	63	80	100
8	Rated short-circuit making current (peak value)			50	63	80	100
9	4S Rated short time withstand current			20	25	31.5	40
10	Rated peak value of current			50	63	80	100
11	Rated making surge current of capacitor bank			12.5 (The frequency is less than 1000Hz)			
12	Rated breaking current of single/summetrical capacitor bank		630/400 (The value should be 800/400 while the current is 40kA)				
13	Mechanical endurance		Time	10000, 30000, 60000 10000, 30000			
14	Duration of rated short-circuit current		S	4			
15	Power frequency withstand voltage of secondary circuit		V	2000			
16	Rated operatinal voltage	Making coil		AC110/220, DC110/220			
		Breaking coil		AC110/220, DC110/220			
		Energy-storage motor		AC110/220, DC110/220			
17	Making time (under Rated voltage)		m/s	35~70			
18	Breaking time (under Rated voltage)			20~50			
19	Permitted abrasion thickness of moving and fixed contact		mm	3			
20	Energy storage times		s	≤15			
21	Clearance		mm	9±1			
22	Travel			3~4			
23	Bounce time (making)		ms	≤2			
24	Three pole making/breaking non-simultaneity			≤2			
25	Average breaking speed			0.9~1.3			
26	Average making speed			0.4~0.8			
27	Contact pumping (breaking)		mm	≤3			
28	Conductance circuit resistance		μ Ω	≤50 (630A)			
				≤45 (1250A)			
				≤35 (1600A-2000A)			
				≤25 (More than 2500A)			
29	The contacting pressure of contactor during making		N	2000±200(20kA)			
				2400±200(25kA)			
				3100±200(31.5kA)			
				4750±250(40kA)			
30	Rated operating order			O-θ-CO-180s-CO			

- » The average breaking speed is that of contactor's first 6mm.
- » The average making speed refers to the average speed of total Contactor space.
- » While the rated short circuit breaking current is less than 40kA, θ is equal to 0.3S, While the short circuit breaking current is more than or equal to 40kA, θ is equal to 180S.

Technical Parameter (Cont...)

THE TECHNICAL PARAMETER OF ENERGY-STORAGE MOTOR

MODEL	RATED VOLTAGE	RATED INPUT POWER	SCOPE OF WORK VOLTAGE	ENERGY STORAGE TIMES (UNDER RATED VOLTAGE)
ZYJ55-1	DC110V	50, 75	85%–110% of the rated voltage	≤10
	DC220V			

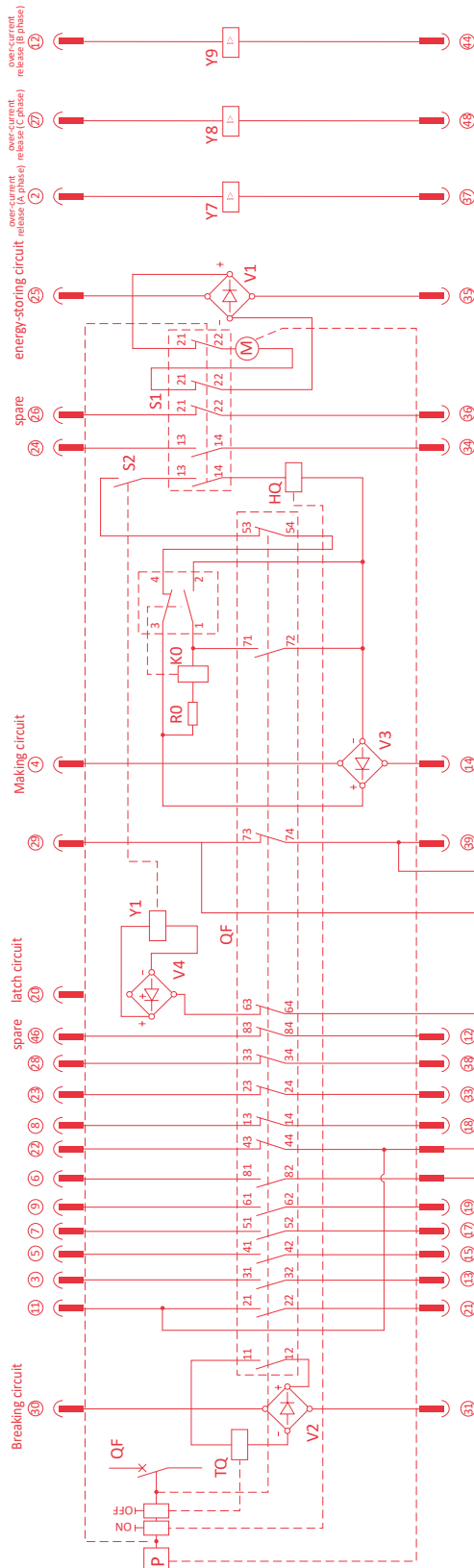
THE TECHNICAL PARAMETER OF MAKING/BREAKING COIL AND CORRELATIVE ELECTRIC ELEMENTS

ITEMS	MAKING COIL		BREAKING COIL		LATCH COIL		ANTI-PUMPING RELAY	
The rated work voltage	DC220	DC110	DC220	DC110	DC220	DC110	DC220	DC110
Rated working current	1.1	2.2	1.1	2.2	25mA		9.1mA	
Rated power	242	242	242	242	2.7		1	
Scope of working voltage	85%–110% of the rated voltage		65%–120% of the rated work voltage. The breaker can't opening if less than 30% of the rated work voltage.					

SECONDARY CONTROLLING CIRCUIT SCHEME

CONTROLLING VOLTAGE	LATCH SCHEME	ANTI-PUMPING SCHEME	UNDER VOLTAGE RELEASE SCHEME	OVER-CURRENT RELEASE SCHEME		
AC220V	with latch	with anti-pumping relay	with under voltage release	with over-current release	Quantity of over-current release	The value of moving current
DC220V					Two sets or Three sets	3.5/5/7.5/10
AC110V	without latch	without anti-pumping relay	without under voltage release	without over-current release		
DC110V						

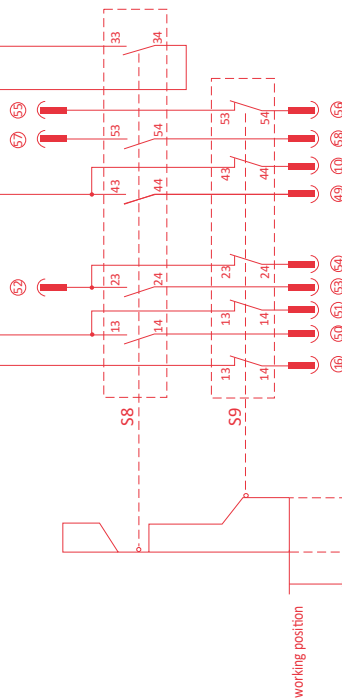
Schematic Diagram



VSSE1

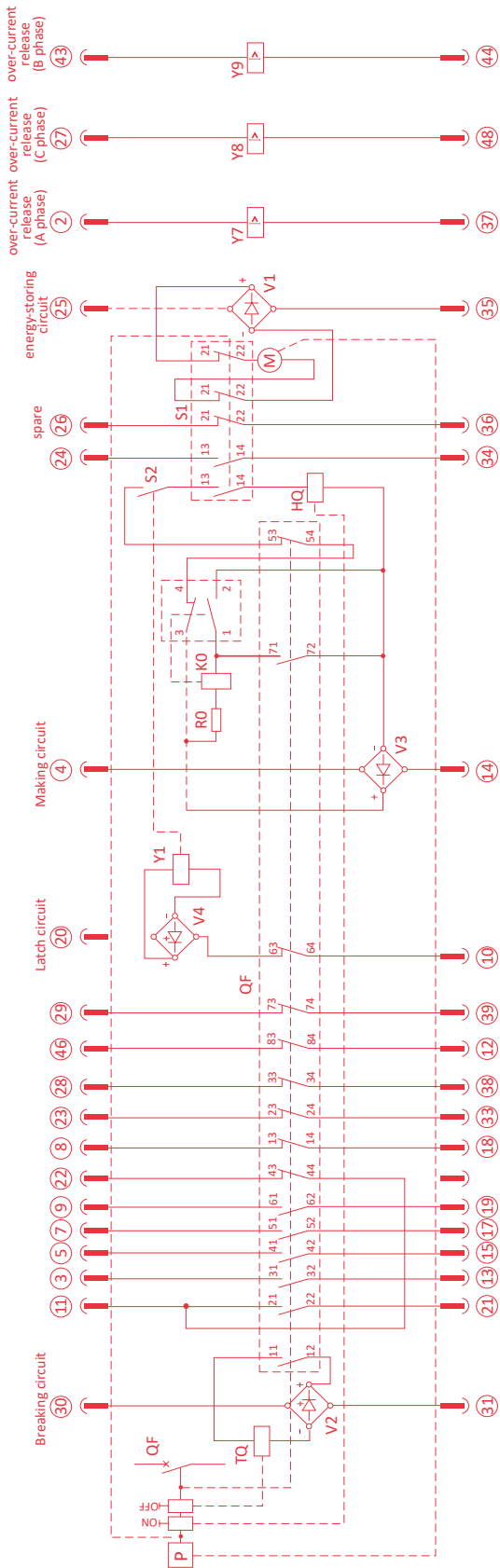
ELEMENTARY DIAGRAM FOR VSSE1 WITHDRAWABLE TYPE VACUUM CIRCUIT BREAKER
(INCLUDING ANTI-PUMPING, LATCH, OVER-CURRENT SCHEME)

CODE NAME	COMPONENTS NAME
Y1	Latch coil (optional)
TQ	Breaking release
HQ	Making release
P	Manual energy storage
Y7-Y9	Indirectness over-current releaser (optional)
S1	Motor exclusive micro switch
S2	Micro switch of latch coil (optional)
QF	Auxiliary switch of main axis
S8	Auxiliary switch which used for testing position
S9	Auxiliary switch which used for working position
M	Energy-storage motor
K0	Anti-pumping relay within mechanism
R0	Series resistance
V1-V4	Rectifying element



- » While the AC voltage entry bridge rectifier circuit, the bridge rectifier circuit must be installed, otherwise the bridge rectifier circuit should be cancel while the DC voltage entry.
- » Over-current release (Y7-Y9) : Y8 and Y9 circuit is cancel while adopt Y7 over-current release (adopt Central current transformer). Y9 circuit is cancel while adopt Y7 and Y8 over-current release. Y7, Y8 and Y9 is cancel while without over-current release.

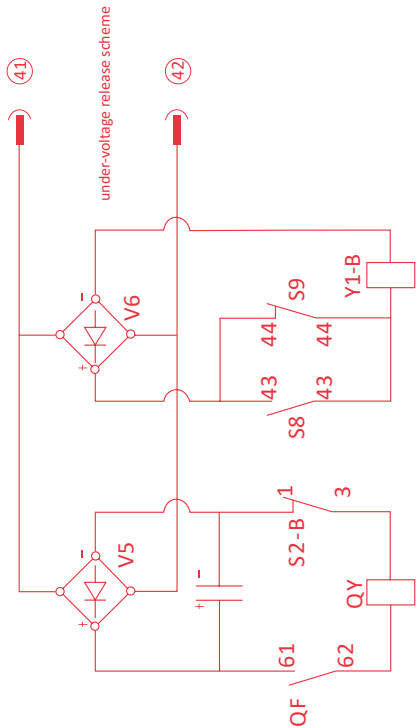
Schematic Diagram (Cont...)



VSSE1

ELEMENTARY DIAGRAM FOR VSSE1 FIXED TYPE VACCUUM CIRCUIT BREAKER
(THE BREAKER IS IN OPENING STATE AND NON-STORED ENERGY)

CODE NAME	COMPONENTS NAME
Y1	Latch coil (optional)
TQ	Breaking release
HQ	Making release
P	Manual energy storage
Y7-Y9	Indirectness over-current releaser (optional)
S1	Motor exclusive micro switch
S2	Micro switch of latch coil (optional)
QF	Auxiliary switch of main axis
M	Energy-storage motor
K0	Anti-pumping relay within mechanism
R0	Series resistance
V1-V6	Rectifying element
QY	Under voltage coil (optional)
Y1-B	Under voltage exclusive latch coil (optional)
S2-B	Auxiliary switch of under voltage exclusive latch coil



VSSE2 : General

TECHNICAL STANDARD :

VSSE2 completely satisfy the Standards Of GB1984 AC High voltage Breaker, GB11022 -1999 Common Specifications For High-Voltage Switchgear And Controlgear Standards, China Power Sector Standards DL403.

And also meet the requirements of IEC62271-100, IEC56 and other main industrialized countries' similar standards.

TESTING :

VSSE2 series circuit breaker has passed following test : Type tests : power frequency withstand voltage tests, lightning impulse withstand voltage tests, temperaturerise tests, short-time withstand current tests, peak withstand current tests, short-circuit current breaking capacity tests, mechenlcel endurance etc.

Routine test before out of factory

: Mechanical performance test, mechanical characteristics tests. Power frequency withstand voltage tests on main circuit, dielectric tests on auxiliary and control circuits, measurement of the resistance of the main circuit, interlock operation tests, mechanical operation tests, electric operation tests etc.

SCOPE OF APPLICATION :

It is universally used In power plant, electric network, metallurgy Industry, petrochemical Industry and Infrastructures, such as airport, subway, building.

When the VSSE2 circuit breaker used In distribution system, It can be applied to control and protect cable, trolley wire, transformer, generator and capacitor bank.

SAFETY :

VSSE2 circuit breaker possesses perfect mechanical and electric interlock equipment, meanwhile, its high reliable operating performance and mechanical endurance, coordinated with matched switchgear cabinet, to ensure normal power distribution, operator and equipment's safety.



Embedded Poles

THE MAIN FEATURES OF EMBEDDED POLE :



» High Reliability and Stability

Comparing with assembly pole, embedded pole use much lesser parts of conductor faying surfaces and jointing fastening piece, so that simplify the conductance circuit's assembly links, lower the circuit's resistance and improve galvanic circle's reliability and stability.

» Stable Insulating Ability

Vacuum interrupter embedded with epoxide resin solid material, to guarantee the minimized affection from external environment, and its external insulating ability will avoid the influence from dust, moisture, small animal, condensation and filthy, fully satisfy requirements of GB/DL standards of secondary filthy area.

» Firm Struction

It will give more sufficient protection for vacuum interrupter, free of mechanical collision in process of assembly and transportation.

» Miniaturization

Taking epoxide resin as insulating media to shorten the distance between poles and reduce the volume of VCB as well as the matched switchgear.

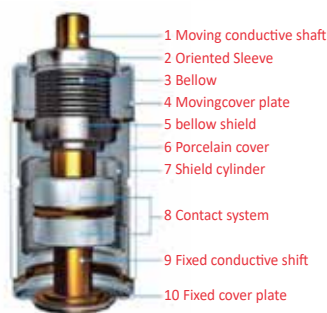
» Free Maintenance

Pouring the pole as a whole, vacuum interrupter gets fully protection and also the VCB benefit from its maintenance free.

» More Environment Protection

Replacing SF6 as insulation, embedded pole circuit breaker is more environment protection in a certain extent.

THE CORE COMPONENT OF VSSE2 VACUUM CIRCUIT BREAKER IS VACUUM INTERRUPTER, THE INTERRUPTER WE USED IS NEW STYLE, WITH FOLLOWING FEATURES :



» Unique R contact design:

Currently, mainly vacuum Interrupter of Chinese manufacturer are apply cup-shape vertical magnetic struction.

VSSE2 Vacuum circuit breaker apply unique vertical-magnetic-struction R contact which possess proprietary intellectual property rights, the vacuum interrupter with R contact, have much advantage as below:

» Vertical electromagnetic field formed by breaking short circuit current is strong, heat capacity is good, therefore the ability of breaking short circuit current is powerful, restrick rate is low, reliability is high, it will meet the breaking requirement of 100% rated short circuit current.

» R contact is integration manufacture, with high strength of struction, and won't be out of shape when making and breaking, reliable short circuit breaking ability.

» R contact goes with beautiful design, high level of with standing voltage

» Low line loop resistance: under rated contact pressure $I_n=1250A$ hour, $R=9\pm1\mu\Omega$; $I_n=2500A$ hour, $R=7\pm1\mu\Omega$

» With high reliable inclusive load and inductive load breaking ability.

» With high reliable ground fault current breaking ability.

» Under normal work, it goes with pretty low X ray radiation level, satisfy the environmental protection requires.

- Completely one-time embedded technics.
- High-stable-quality ceramic metallized technics.
- Stainless steel braze welding technics.

Embedded Poles (Cont...)

VSSE2 : SPRING DRIVE MECHANISM



CIRCUIT PANEL



The modularized secondary controlling circuit panel adopts a auto-fastening connectionpeg, which is convenient for replacing and also ensure the reliability of the electric connection

MAKING MODULE



The making module has characteristic of brief structure and reliable operating principle, thoroughly avoid some faults. such as can't keep making, can't break and so on, meanwhile, reduce release power during opening slate.

MAKING/BREAKING COIL



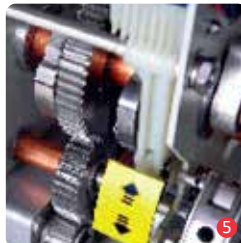
The coil is whole sealing designed, keeping the coil out of moisture.

BREAKING BUFFER



High powered breaking buffer will reduce moving-contact overswing or rebounding extent when circuit breaker is in process of breaking, thus reduced the rate of re-arcing when breaking, assured the vacuum interrupter bellows' mechanical endurance.

SUPERFICIAL TREATMENT



80% mechanical parts apply Ni-P alloy treatment, greatly improved spareparts's anti-septic powe, assure machine's stable quality all the time.

WHOLE MECHANISM'S ADVANTAGE



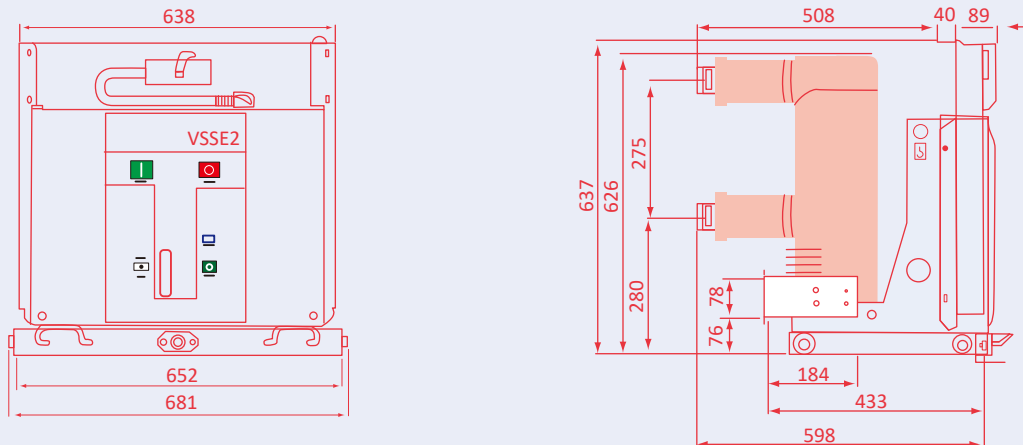
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VSSE2 : Every detail of VSSE2, we try to be the best.

External Dimensions

OVERALL DIMENSION FOR VSSE2 WITHDRAWABLE CIRCUIT-BREAKER (POLE DISTANCE IS 210MM)

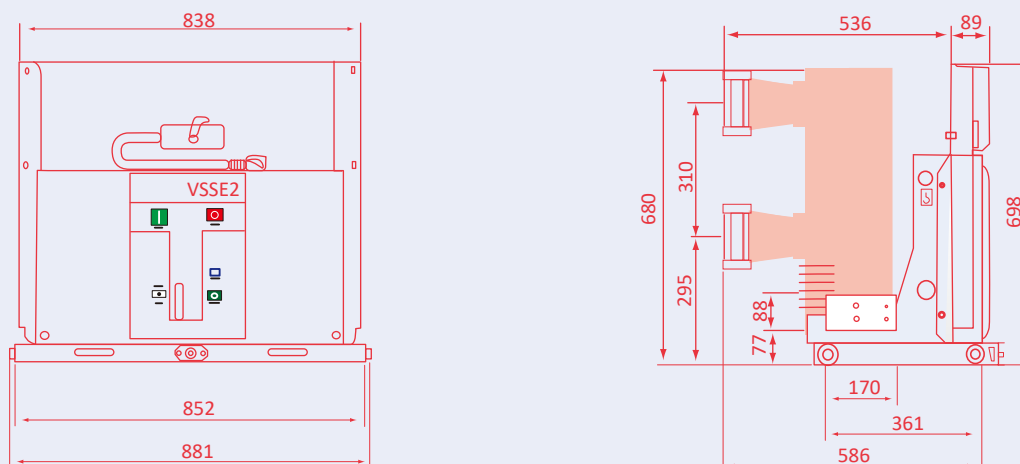


PRIMARY POLE DISTANCE IS 210MM:

RATED CURRENT (A)	RATED SHORT CIRCUIT BREAKING CURRENT (kA)	FITTED FIXED CONTACT'S SIZE (mm)
630	...25	Ø 35
1250	...40	Ø 49
1600	...40	Ø 55

WE CAN PRODUCE VSSE2 HANDCART (HIGH-ALTITUDE TYPE) CIRCUIT-BREAKER WHICH THE POLE DISTANCE IS 275MM AS PER THE DEMAND OF USERS.

OVERALL DIMENSION FOR VSSE2 WITHDRAWABLE CIRCUIT-BREAKER : (POLE DISTANCE IS 275MM)

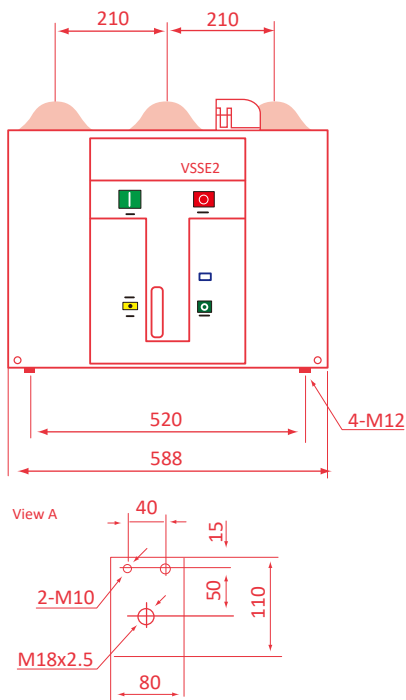


PRIMARY POLE DISTANCE IS 275MM:

RATED CURRENT (A)	RATED SHORT CIRCUIT BREAKING CURRENT (kA)	FITTED FIXED CONTACT'S SIZE (mm)
1600	...40	Ø 55
1600/2000	...40	Ø 79
2500/3150	...40	Ø 109
4000	40	Ø 109

External Dimensions (Cont...)

OVERALL DIMENSION FOR VSSE2 FIXED CIRCUIT-BREAKER (POLE DISTANCE IS 210MM)

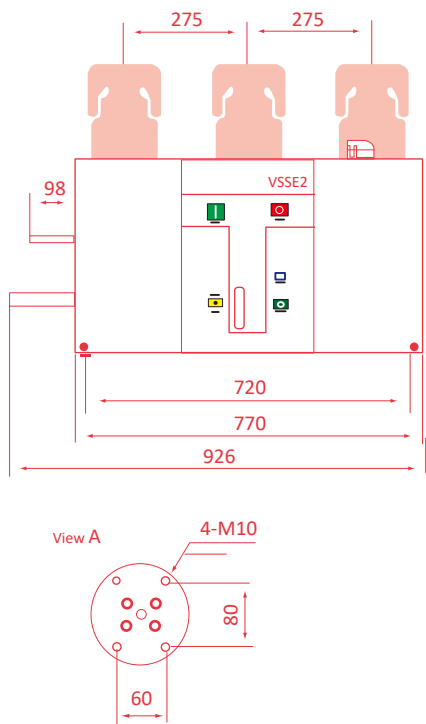


PRIMARY POLE DISTANCE IS 210MM:

RATED CURRENT (A)	RATED SHORT CIRCUIT BREAKING CURRENT (kA)
630	...31.5
1250	...40
1600	...40

WE CAN PRODUCE VSSE2 FIXED CIRCUIT-BREAKER WHICH THE PHASE CLEARANCE IS 230, 250 AND 275MM AS PER THE DEMAND OF USERS.

OVERALL DIMENSION FOR VSSE2 FIXED CIRCUIT-BREAKER (POLE DISTANCE IS 275MM)



PRIMARY POLE DISTANCE IS 275MM:

RATED CURRENT (A)	RATED SHORT-CIRCUIT BREAKING CURRENT (kA)
1600	...31.5 40
2000	
2500	
3150	40
4000	

Technical Parameter

NO.	ITEM		UNIT	TECHNICAL DATE			
1	Rated voltage		kV	12			
2	Rated insulating level	Rated short time power frequency withstand voltage (1min)		42			
		Rated lightning impulse withstand voltage (peak value)		75			
3	Rated frequency		Hz	50			
4	Rated current		A	630	630	1250	1250
				1250	1250	1600	1600
						2000	2000
						2500	2500
						3150	3150
						4000	4000
5	Rated short circuit breaking current		kA	20	25	31.5	40
6	Rated short time withstand current			20	25	31.5	40
7	Rated peak withstand current			50	63	80	100
8	Rated short-circuit making current (peak value)			50	63	80	100
9	4s Rated short time withstand current			20	25	31.5	40
10	Rated peak value of current			50	63	80	100
11	Rated making surge current of capacitor bank			12.5 (The frequency is less than 1000Hz)			
12	Rated breaking current of single/summetrical capacitor bank			630/400 (The value should be 800/400 while the current is 40kA)			
13	Mechanical endurance		Time	10000, 30000, 60000 10000, 30000			
14	Duration of rated short-circuit current		S	4			
15	Power frequency withstand voltage of secondary circuit			2000			
16	Rated operatinal voltage	Making coil	V	AC110/220, DC110/220			
		Breaking coil		AC110/220, DC110/220			
		Energy-storage motor		AC110/220, DC110/220			
17	Making time (under Rated voltage)		m/s	35~70			
18	Breaking time (under Rated voltage)			20~50			
19	Permitted abrasion thickness of moving and fixed contexts		mm	3			
20	Energy storage times		s	≤15			
21	Clearance		mm	9±1			
22	Travel			3~4			
23	Bounce time (making)		ms	≤2			
24	Three pole making/breaking non-somultaneity			≤2			
25	Average breaking speed			0.9~1.3			
26	Average making speed			0.4~0.8			
27	Contact pumping (breaking)		mm	≤3			
28	Conductance circuit resistance		μ Ω	≤50 (630A)			
				≤45 (1250A)			
				≤35 (1600A-2000A)			
				≤25 (More than 2500A)			
29	The contacting pressure of contactor during making		N	2000±200(20kA)			
				2400±200(25kA)			
				3100±200(31.5kA)			
				4750±250(40kA)			
30	Rated operating order			O-θ-CO-180s-CO			

- » The average breaking speed is that of contactor's first 6mm.
- » The average making speed refers to the average speed of total Contactor space.
- » While the rated short circuit breaking current is less than 40kA, θ is equal to 0.3S, While the short circuit breaking current is more than or equal to 40kA, θ is equal to 180S.

Technical Parameter (Cont...)

THE TECHNICAL PARAMETER OF ENERGY-STORAGE MOTOR

MODEL	RATED VOLTAGE	RATED INPUT POWER	SCOPE OF WORK VOLTAGE	ENERGY STORAGE TIMES (UNDER RATED VOLTAGE)
ZYJ55-1	DC110V	50, 75	85%–110% of the rated voltage	≤10
	DC220V			

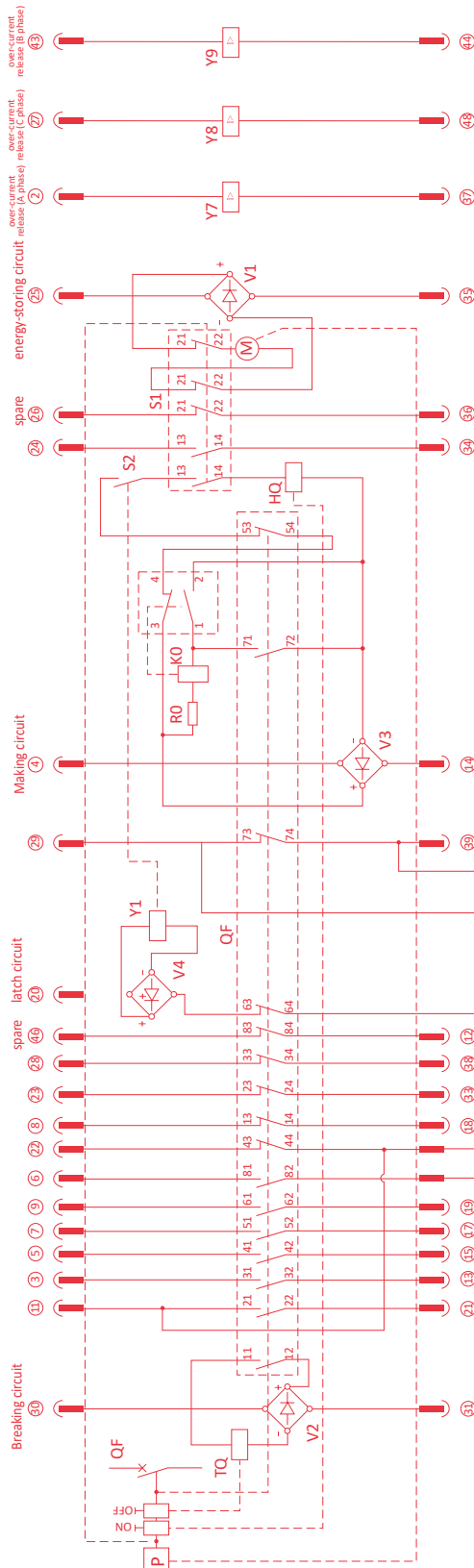
THE TECHNICAL PARAMETER OF MAKING/BREAKING COIL AND CORRELATIVE ELECTRIC ELEMENTS

ITEMS	MAKING COIL		BREAKING COIL		LATCH COIL		ANTI-PUMPING RELAY	
The rated work voltage	DC220	DC110	DC220	DC110	DC220	DC110	DC220	DC110
Rated working current	1.1	2.2	1.1	2.2	25mA		9.1mA	
Rated power	242	242	242	242	2.7		1	
Scope of working voltage	85%–110% of the rated voltage		65%–120% of the rated work voltage. The breaker can't opening if less than 30% of the rated work voltage.					

SECONDARY CONTROLLING CIRCUIT SCHEME

CONTROLLING VOLTAGE	LATCH SCHEME	ANTI-PUMPING SCHEME	UNDER VOLTAGE RELEASE SCHEME	OVER-CURRENT RELEASE SCHEME		
AC220V	with latch	with anti-pumping relay	with under voltage release	with over-current release	Quantity of over-current release	The value of moving current
DC220V					Two sets or Three sets	3.5/5/7.5/10
AC110V	without latch	without anti-pumping relay	without under voltage release	without over-current release		
DC110V						

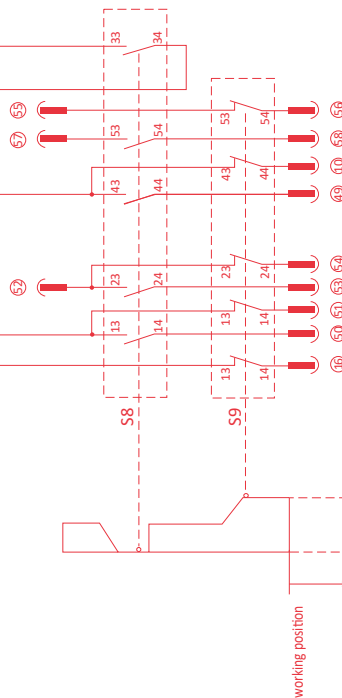
Schematic Diagram



VSSE2

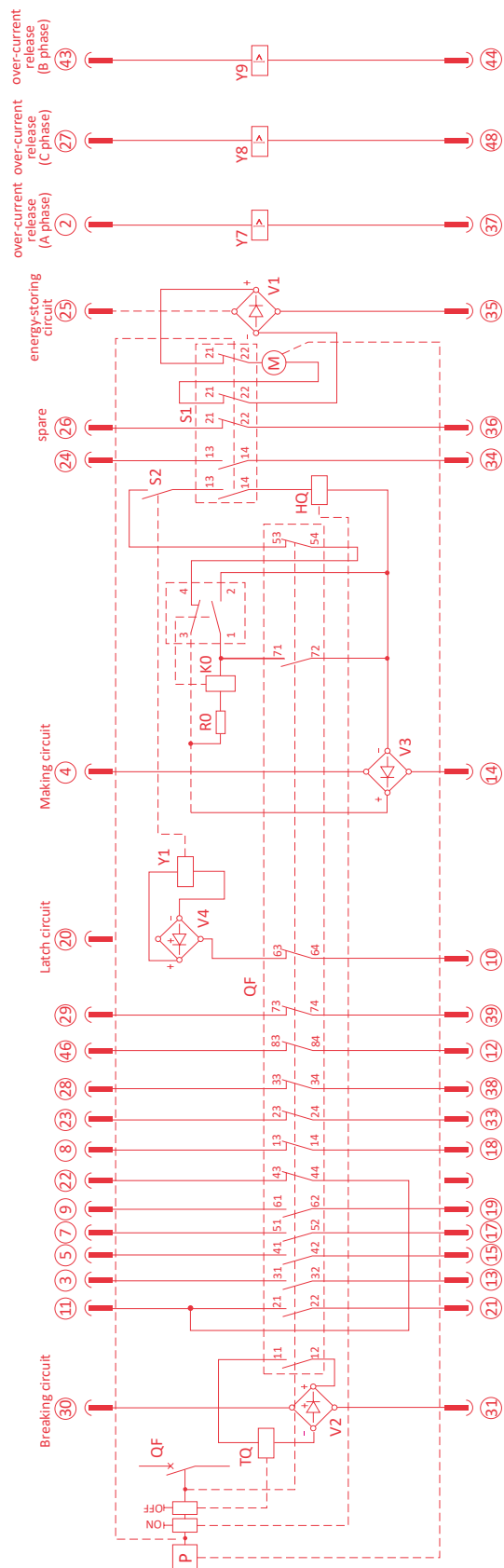
ELEMENTARY DIAGRAM FOR VSSE2 WITHDRAWABLE TYPE VACUUM CIRCUIT BREAKER
(INCLUDING ANTI-PUMPING, LATCH, OVER-CURRENT SCHEME)

CODE NAME	COMPONENTS NAME
Y1	Latch coil (optional)
TQ	Breaking release
HQ	Making release
P	Manual energy storage
Y7-Y9	Indirectness over-current releaser (optional)
S1	Motor exclusive micro switch
S2	Micro switch of latch coil (optional)
QF	Auxiliary switch of main axis
S8	Auxiliary switch which used for testing position
S9	Auxiliary switch which used for working position
M	Energy-storage motor
K0	Anti-pumping relay within mechanism
R0	Series resistance
V1-V4	Rectifying element



- » While the AC voltage entry bridge rectifier circuit, the bridge rectifier circuit must be installed, otherwise the bridge rectifier circuit should be cancel while the DC voltage entry.
- » Over-current release (Y7-Y9) : Y8 and Y9 circuit is cancel while adopt Y7 over-current release (adopt Central current transformer). Y9 circuit is cancel while adopt Y7 and Y8 over-current release. Y7, Y8 and Y9 is cancel while without over-current release.

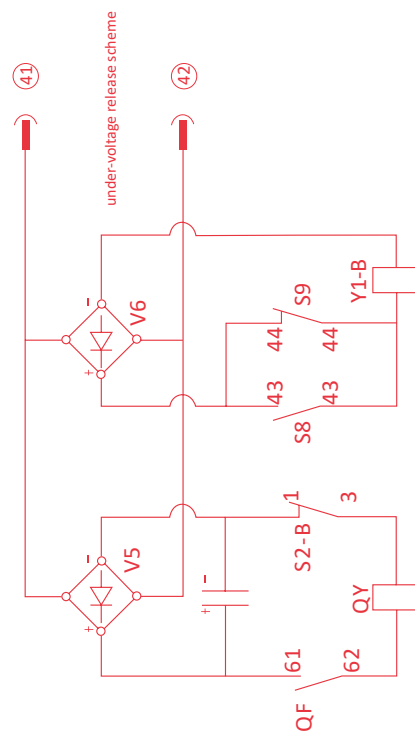
Schematic Diagram (Cont...)



VSSE2

ELEMENTARY DIAGRAM FOR VSSE2 FIXED TYPE VACUUM CIRCUIT BREAKER
(THE BREAKER IS IN OPENING STATE AND NON-STORED ENERGY)

CODE NAME	COMPONENTS NAME
Y1	Latch coil (optional)
TQ	Breaking release
HQ	Making release
P	Manual energy storage
Y7-Y9	Indirectness over-current releaser (optional)
S1	Motor exclusive micro switch
S2	Micro switch of latch coil (optional)
QF	Auxiliary switch of main axis
M	Energy-storage motor
K0	Anti-pumping relay within mechanism
R0	Series resistance
V1-V6	Rectifying element
QY	Under voltage coil (optional)
Y1-B	Under voltage exclusive latch coil (optional)
S2-B	Auxiliary switch of under voltage exclusive latch coil



VSSE3 : General

TECHNICAL STANDARD :

All the technical parameters of the circuit breaker completely satisfy the standards of GB1984 AC High Voltage Breaker, GB/T11022 Common Specifications For High Voltage Switchgear And Control gear Standards, China Power Sector Standards DL403.

Also meet the requirements of IEC62271-100 and other main industrialized countries' similar standards.

TESTING :

VSSE3 series vacuum circuit breaker has passed following test, to ensure the products' safe operation.

Type tests : Power frequency withstand voltage type tests, lightning impulse withstand voltage tests, temperature rise tests, short time withstand current tests, peak withstand current tests, short time current breaking capacity tests, mechanical endurance etc.

Routing test before out of factory : Mechanical performance test, power frequency withstand voltage tests on main circuit, insulating performance tests on auxiliary and control circuits, resistance measurement of the main circuit, interlock operation tests, mechanical operation tests, electric operation tests etc.

SCOPE OF APPLICATION :

It is universally used in power plant, electric network, metallurgy industry, petrochemical industry and infrastructures such as airport, subway, and building.

When the VSSE3 circuit breaker is used in distribution system, it can be applied to control and protect cable, trolley wire, transformer, generator and capacitor bank.

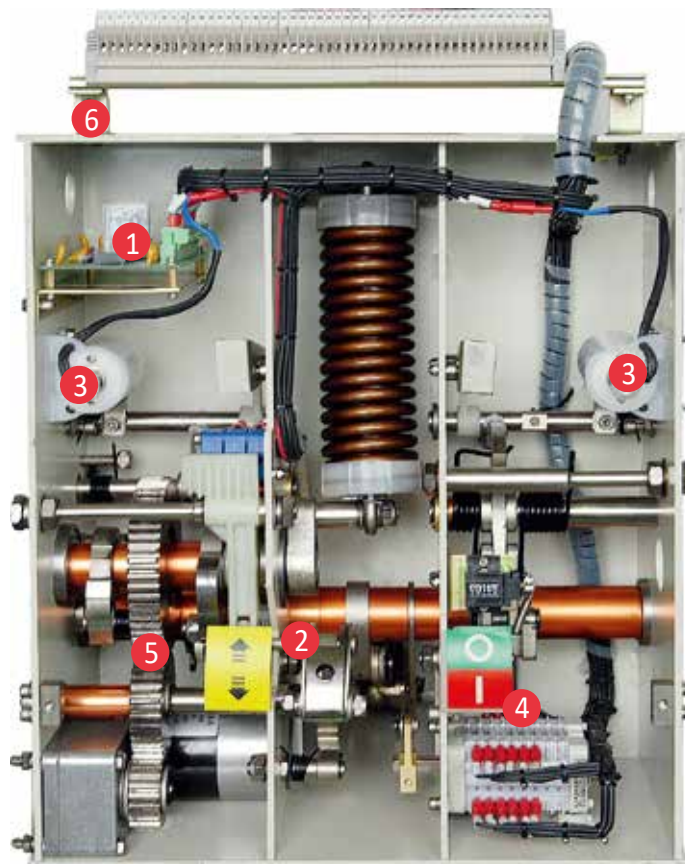
SAFETY :

VSSE3 side-mounted fixed style vacuum circuit breaker possesses perfect mechanical and electric interlock device, meanwhile, its high reliable operating performance and mechanical life, coordinated with matched switchgear cabinet, guaranteed normal power distribution, operator and equipments' safety.



Drive Mechanism

VSSE3 : SPRING OPERATION MECHANISM



EMBEDDED POLE



ASSEMBLY POLE-1



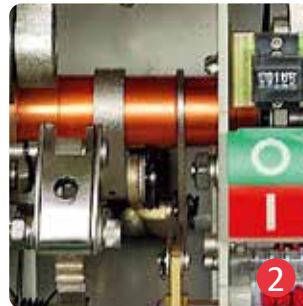
ASSEMBLY POLE-2

Drive Mechanism (Cont...)



CIRCUIT PANEL

The modularized secondary controlling circuit panel adopts auto-fastening connection-peg, which is convenient for replacing and also ensure the reliability of the electric connection.



MAKING MODULE

The making module has characteristic of brief structure and reliable operating principle, thoroughly avoid some faults, such as can't keep making, can't break and so on, meanwhile, reduce release power during opening state.



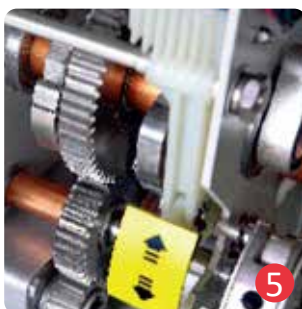
MAKING/BREAKING COIL

The coil is whole sealing designed, keeping the coil out of moisture.



BREAKING BUFFER

High powered breaking buffer will reduce moving-contact overswing or rebounding extent when circuit breaker is in process of breaking, thus reduced the rate of re-arcing when breaking, assured the vacuum interrupter bellows' mechanical endurance.



SUPERFICIAL TREATMENT

80% mechanical parts apply Ni-P alloy treatment, greatly improved spare parts's anti-septic power, assure machine's stable quality all the time.



WHOLE MECHANISM'S ADVANTAGE

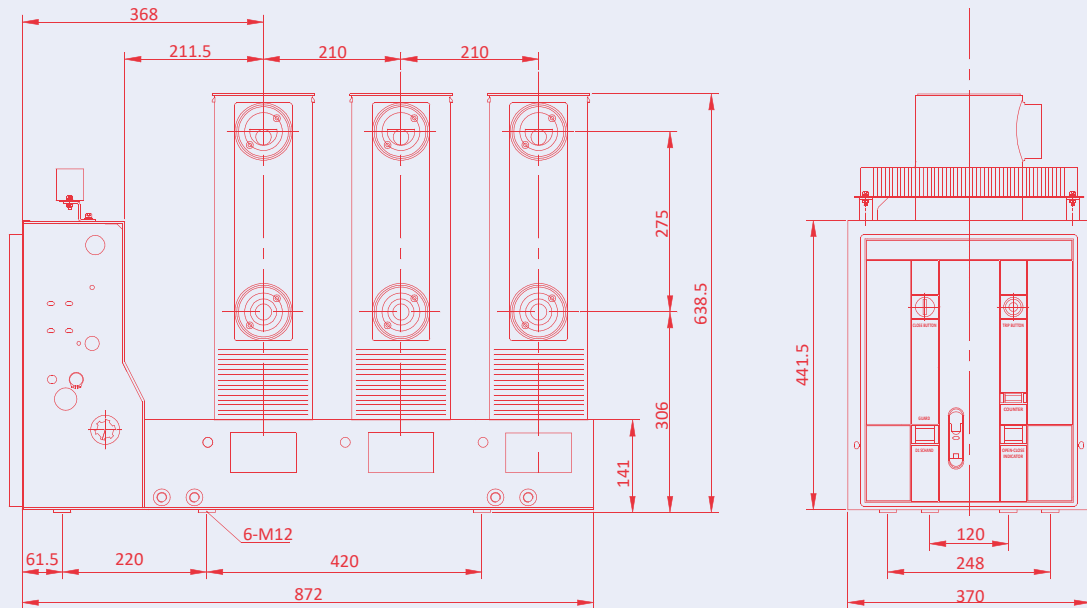
Operating mechanism's structure is simple, and operation is reliable, it goes with strong commonality, can be used in different specifications. Because it is our independent developed products, so we can specialed do it according to customers's requirements.



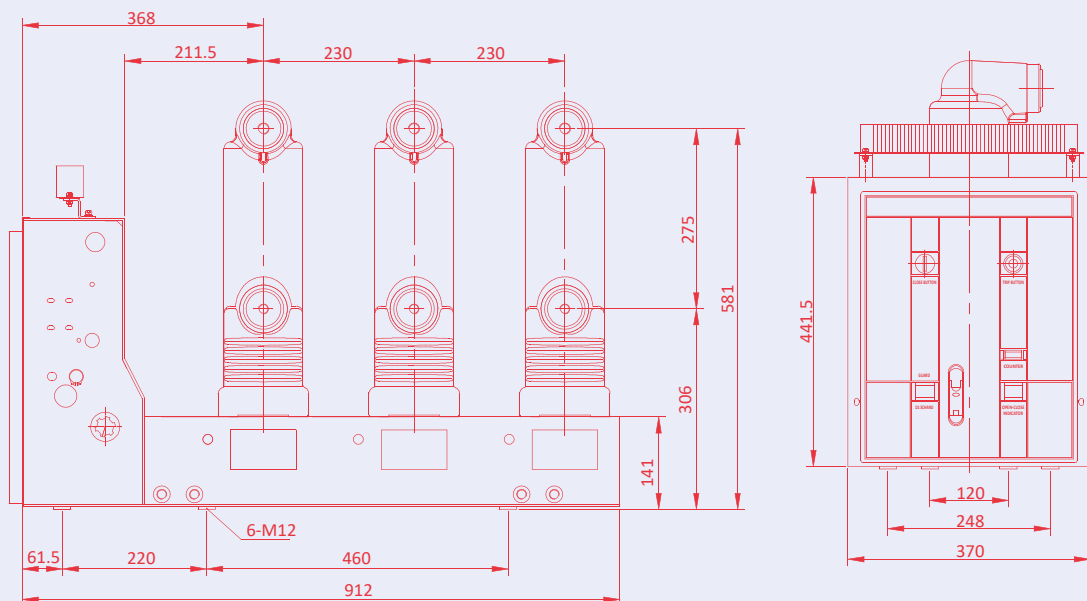
VSSE3: Every detail of VSSE3, we try to be the best.

External Dimensions

OVERALL DIMENSION FOR VSSE3-12kV CIRCUIT-BREAKER (POLE DISTANCE IS 210MM)

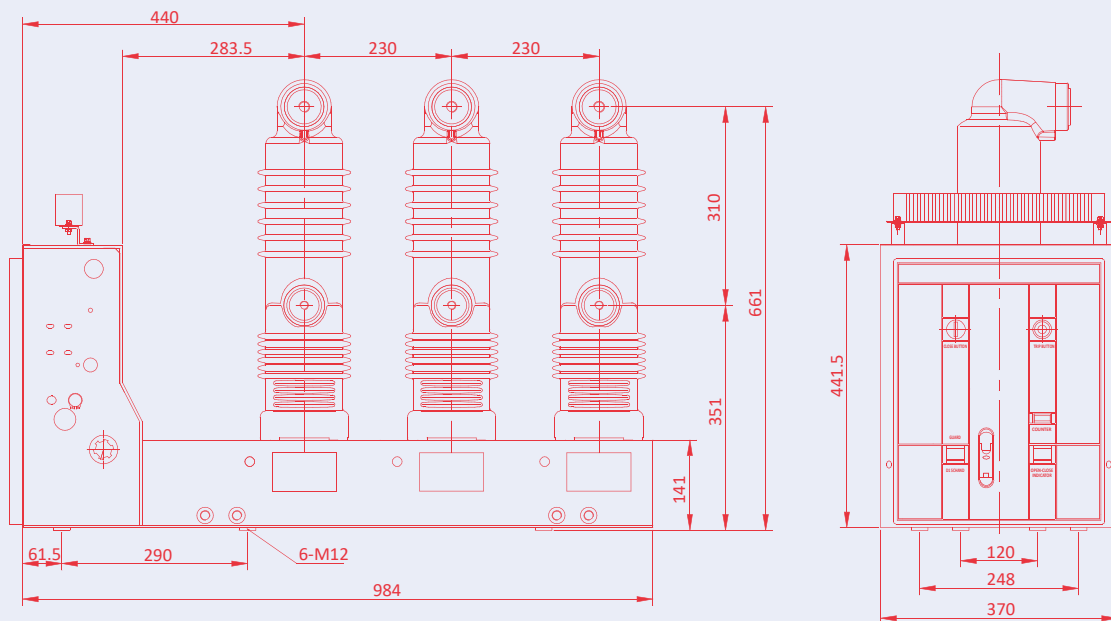


OVERALL DIMENSION FOR VSSE3-12kV CIRCUIT-BREAKER : (POLE DISTANCE IS 230MM)

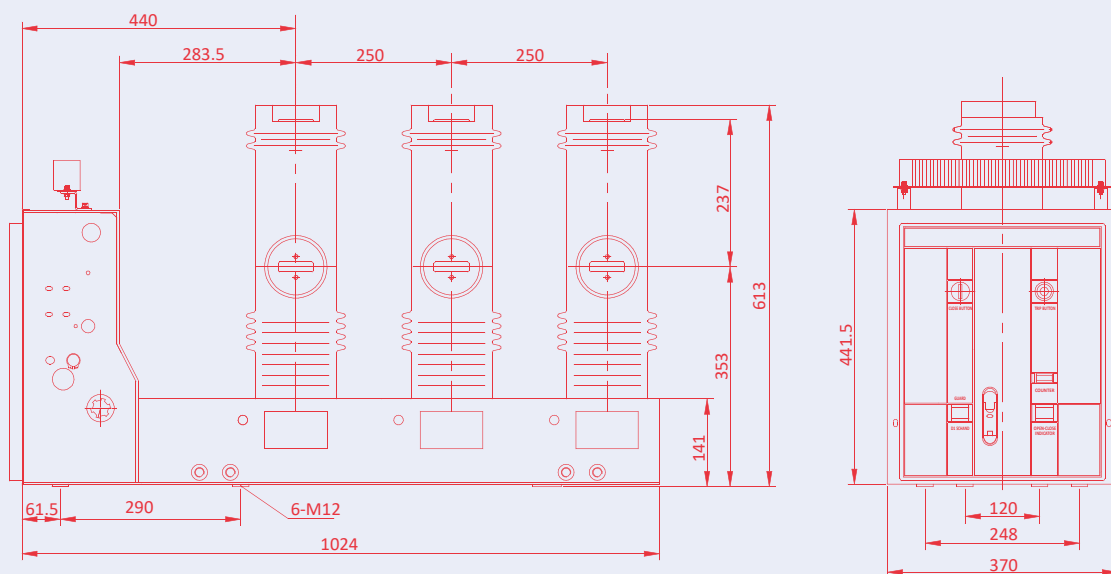


External Dimensions (Cont...)

OVERALL DIMENSION FOR VSSE3-24kV CIRCUIT-BREAKER (POLE DISTANCE IS 230MM)



OVERALL DIMENSION FOR VSSE3-24kV CIRCUIT-BREAKER (POLE DISTANCE IS 250MM)



Technical Parameter

NO.	ITEM		UNIT	TECHNICAL DATE			
1	Rated voltage		kV	12/24			
2	Rated insulating level	Rated short time power frequency withstand voltage (1min)		42/65			
		Rated lightning impulse withstand voltage (peak value)		75/125			
3	Rated frequency		Hz	50			
4	Rated current		A	630	1250	630	1250
				1250	1600	1250	1600
					2000		2000
					2500		2500
5	Rated short circuit breaking current		kA	20	25	31.5	
6	Rated short time withstand current			20	25	31.5	
7	Rated peak withstand current			50	63	80	
8	Rated short-circuit making current (peak value)			50	63	80	
9	4S Rated short time withstand current			20	25	31.5	
10	Rated peak value of current			50	63	80	
11	Rated making surge current of capacitor bank			12.5 (The frequency is less than 1000Hz)			
12	Rated breaking current of single/summetrical capacitor bank		630/400 (The value should be 800/400 while the current is 40kA)				
13	Mechanical endurance		Time	10000, 30000, 60000		10000, 30000	
14	Duration of rated short-circuit current		S	4			
15	Power frequency withstand voltage of secondary circuit		V	2000			
16	Rated operational voltage	Making coil		AC110/220, DC110/220			
		Breaking coil		AC110/220, DC110/220			
		Energy-storage motor		AC110/220, DC110/220			
17	Making time (under Rated voltage)		m/s	35~70 / ≤60			
18	Breaking time (under Rated voltage)			20~50 / ≤45			
19	Permitted abrasion thickness of moving and fixed contacts		mm	3			
20	Energy storage times		s	≤15			
21	Clearance		mm	9±1 / 13±1			
22	Travel			3~4 / 4±1			
23	Bounce time (making)		ms	≤2			
24	Three pole making/breaking non-simultaneity			≤2			
25	Average breaking speed			0.9~1.3 / 1.1~1.7			
26	Average making speed			0.4~0.8 / 0.6~1.1			
27	Contact pumping (breaking)		mm	≤3			
28	Conductance circuit resistance		μ Ω	≤45 (630A~1250A)			
				≤35 (1600A~2000A)			
				≤25 (More than 2500A)			
29	Rated operating order			O-θ-CO-180s-CO			

Technical Parameter (Cont...)

THE TECHNICAL PARAMETER OF ENERGY-STORAGE MOTOR

MODEL	RATED VOLTAGE	RATED INPUT POWER	SCOPE OF WORK VOLTAGE	ENERGY STORAGE TIMES (UNDER RATED VOLTAGE)
ZYJ55-1	DC110V	50, 75	85%–110% of the rated voltage	≤10
	DC220V			

THE TECHNICAL PARAMETER OF MAKING/BREAKING COIL AND CORRELATIVE ELECTRIC ELEMENTS

ITEMS	MAKING COIL		BREAKING COIL		LATCH COIL		ANTI-PUMPING RELAY	
The rated work voltage	DC220	DC110	DC220	DC110	DC220	DC110	DC220	DC110
Rated working current	1.1	2.2	1.1	2.2	25mA		9.1mA	
Rated power	242	242	242	242	2.7		1	
Scope of working voltage	85%–110% of the rated voltage		65%–120% of the rated work voltage. The breaker can't opening if less than 30% of the rated work voltage.					

SECONDARY CONTROLLING CIRCUIT SCHEME

CONTROLLING VOLTAGE	LATCH SCHEME	ANTI-PUMPING SCHEME	UNDER VOLTAGE RELEASE SCHEME	OVER-CURRENT RELEASE SCHEME		
AC220V	with latch	with anti-pumping relay	with under voltage release	with over-current release	Quantity of over-current release	The value of moving current
DC220V					Two sets or Three sets	3.5/5/7.5/10
AC110V	without latch	without anti-pumping relay	without under voltage release	without over-current release		
DC110V						

Technical Parameter (Cont...)

REMARK :

The breaker is in testing Position, Opening state, no energy stored

S1 : Auxiliary switch (switchover after closing spring stored)

HK : Auxiliary switch (switchover when opening/closing operating)

DL : Connecting terminal

V1-V3 : Bridge rectifier (cancel when current kind is AC)

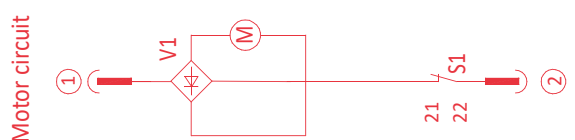
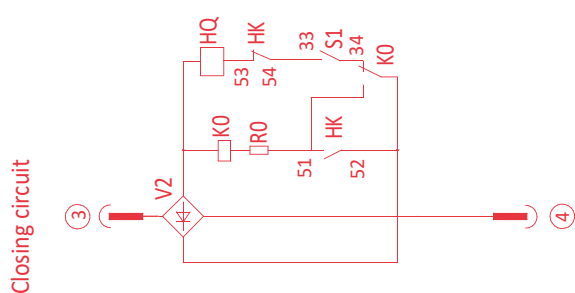
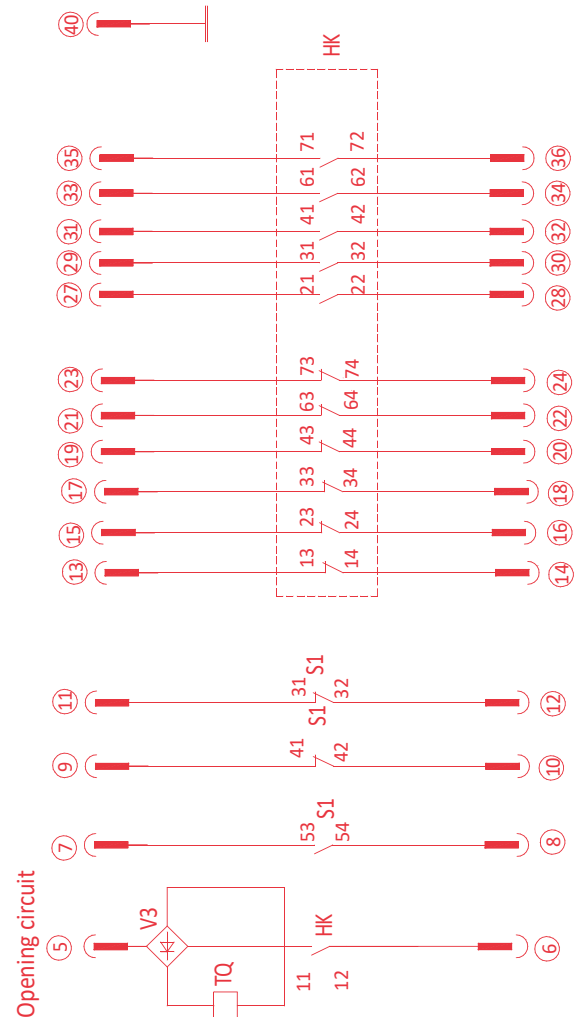
S2 : Auxiliary switch

HQ : Closing coil

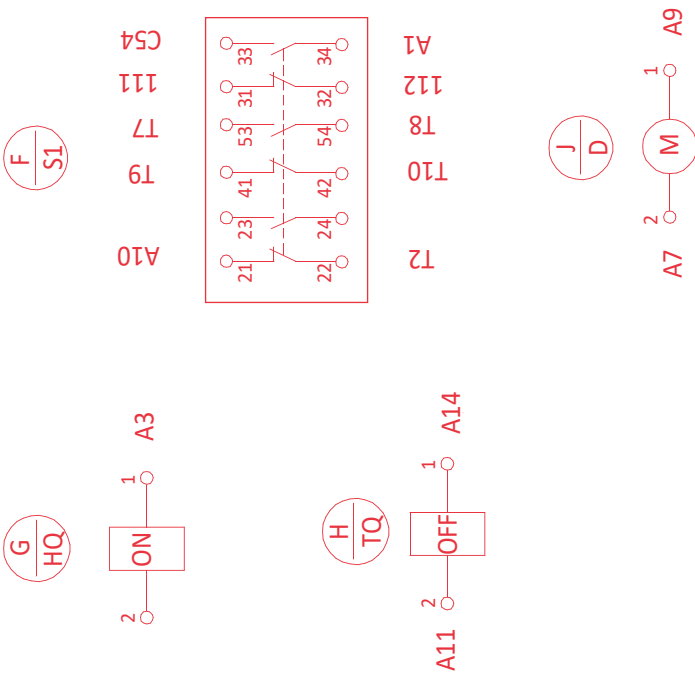
TQ : Opening coil

M : Energy-storage motor

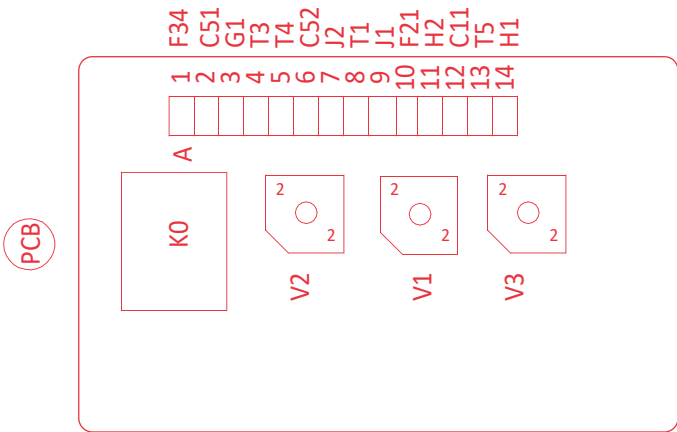
KO : Anti-pumping relay



Technical Parameter (Cont...)



DL			DL		
			C41	31	
			C32	30	
			C31	29	
			C22	28	
			C21	27	
				26	
				25	
			C74	24	
			C73	23	
			C64	22	
			C63	21	
			C44	20	
			C43	19	
			C34	18	
			C33	17	
			C24	16	
			C23	15	
			C14	14	
			C13	13	
			F32	12	
			F31	11	
			F42	10	
			F41	9	
			F54	8	
			F53	7	
			C12	6	
C72	36		A13	5	
C71	35		A5	4	
C62	34		A4	3	
C61	33		F22	2	
C42	32		A8	1	



REMARK :

- The breaker is in testing Position, Opening state, no energy stored
- S1 : Auxiliary switch (switchover after closing spring stored)
 - HK : Auxiliary switch (switchover when opening/closing operating)
 - DL : Connecting terminal
 - V1-V3 : Bridge rectifier (cancel when current kind is AC)
 - S2 : Auxiliary switch
 - HQ : Closing coil
 - TQ : Opening coil
 - M : Energy-storage motor
 - KO : Anti-pumping relay

VSSE4 : General

CIRCUIT BREAKER'S OVERALL STRUCTURE :

Spring drive mechanism and circuit breaker principle parts adopt integration design, primary conductance circuit and mechanism adopt front and rear layout, conductance circuit locates behind of circuit break, driving mechanism is front of circuit breaker, handcart pushing mechanism is under circuit breaker, and possess compact construction and small size.

CONDUCTANCE CIRCUIT ADOPTS ASSEMBLY POLE OR EMBEDDED POLE STRUCTURE :

According to different requirements, there are two types of conductance circuit in VSSE4 series indoor vacuum circuit breaker, namely assembly type and embedded type.

Assembly Structure : Circuit breaker's vacuum interrupter is fixed in insulating tube, whose material is epoxide resin, with reliable electrical performance, and introduce advanced APG technics. All of this, getting insulating tube as a support force when installation, and with alternating, opposite insulating function. The design of this insulating tube gives full consideration on national standard and rigorous working conditions, prevent from any external environment affects on vacuum interrupter, without dust and foreign bodies into leading circuit, but also will assure high-impedence state to voltage affection even under muggy and serious nasty environment.

Embedded Structure : Circuit breaker's primary conductance circuit adopts embedded pole, with advanced automatic pressure gel APG technic, directly casting vacuum interrupter and primary conductance circuit's other parts in special epoxide resin, taking a shape of leading circuit module. Embedded pole's installing end carry out double skirt design, this embedded pole equipped with following features: large leakage distance, high mechanical intensity, high component precision, less components, needn't secondary adjustments etc. Pole pillar's electrical field is well- distributed, avoid the destruction to organic insulating from part electric field concentration. Meanwhile, this kind design will simplify primary conductance's assembly, completely avoid the problem that conductance circuit's connecting bolt will loose when operating, which guaranteed conductance circuit's reliability, realized the possibilty of free-maintenance in first conductive circuit.

RELIABLE INTEGRATING SPRING DRIVE MECHANISM :

VSSE4 series indoor VCB's spring drive mechanism is plane layout, holding manual energy storing and motor energy storing function, compact outside size, good overall rigidity, reliable operation.

HIGH COMPATIBILITY AND WIDELY APPLICATION :

The dimension of VSSE4 serious indoor breaker is same as foreign famous breaker, such as ABB VD4, so it be a excellent alternative of foreign famous breaker.

Widely applicable scope, It not only can be match Chinese KYN28-24 switchgear, but also can be match all kinds of foreign Switchgear.

FLEXIBLE INSTALLING METHOD :

VSSE4 series circuit breaker have two type : Fixed and withdrawable type, both will conveniently realized Five-Protecting Interlock. It can be installed in all kinds of fixed switchgear, also in all kinds of withdrawable switchgear's chassis.



Embedded Poles

THE MAIN FEATURES OF EMBEDDED POLE :



» High Reliability and Stability

Comparing with assembly pole, embedded pole use much less parts of conductor faying surfaces and jointing fastening piece, so that simplify the conductance circuit's assembly links, lower the circuit's resistance and improve galvanic circle's reliability and stability.

» Stable Insulating Ability

Vacuum interrupter embedded with epoxide resin solid material, to guarantee the minimized affection from external environment, and its external insulating ability will avoid the influence from dust, moisture, small animal, condensation and filthy, fully satisfy requirements of GB/DL standards of secondary filthy area.

» Firm Struction

It will give more sufficient protection for vacuum interrupter, free of mechanical collision in process of assembly and transportation.

» Miniaturization

Taking epoxide resin as insulating media to shorten the distance between poles and reduce the volume of VCB as well as the matched switchgear.

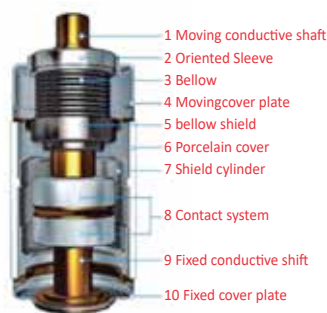
» Free Maintenance

Pouring the pole as a whole, vacuum interrupter gets fully protection and also the VCB benefit from its maintenance free.

» More Environment Protection

Replacing SF6 as insulation, embedded pole circuit breaker is more environment protection in a certain extent.

THE CORE COMPONENT OF VSSE4 VACUUM CIRCUIT BREAKER IS VACUUM INTERRUPTER, THE INTERRUPTER WE USED IS NEW STYLE, WITH FOLLOWING FEATURES :



» Unique R contact design:

Currently, mainly vacuum Interrupter of Chinese manufacturer are apply cup-shape vertical magnetic struction.

VSSE4 Vacuum circuit breaker apply unique vertical-magnetic-struction R contact which possess proprietary intellectual property rights, the vacuum interrupter with R contact, have much advantage as below:

» Vertical electromagnetic field formed by breaking short circuit current is strong, heat capacity is good, therefore the ability of breaking short circuit current is powerful, restrict rate is low, reliability is high, it will meet the breaking requirement of 100% rated short circuit current.

» R contact is integration manufacture, with high strength of struction, and won't be out of shape when making and breaking, reliable short circuit breaking ability.

» R contact goes with beautiful design, high level of withstanding voltage.

» Low line loop resistance: under rated contact pressure $I_n=1250A$ hour, $R=9\pm1\mu\Omega$; $I_n=2500A$ hour, $R=7\pm1\mu\Omega$

» With high reliable inclusive load and inductive load breaking ability.

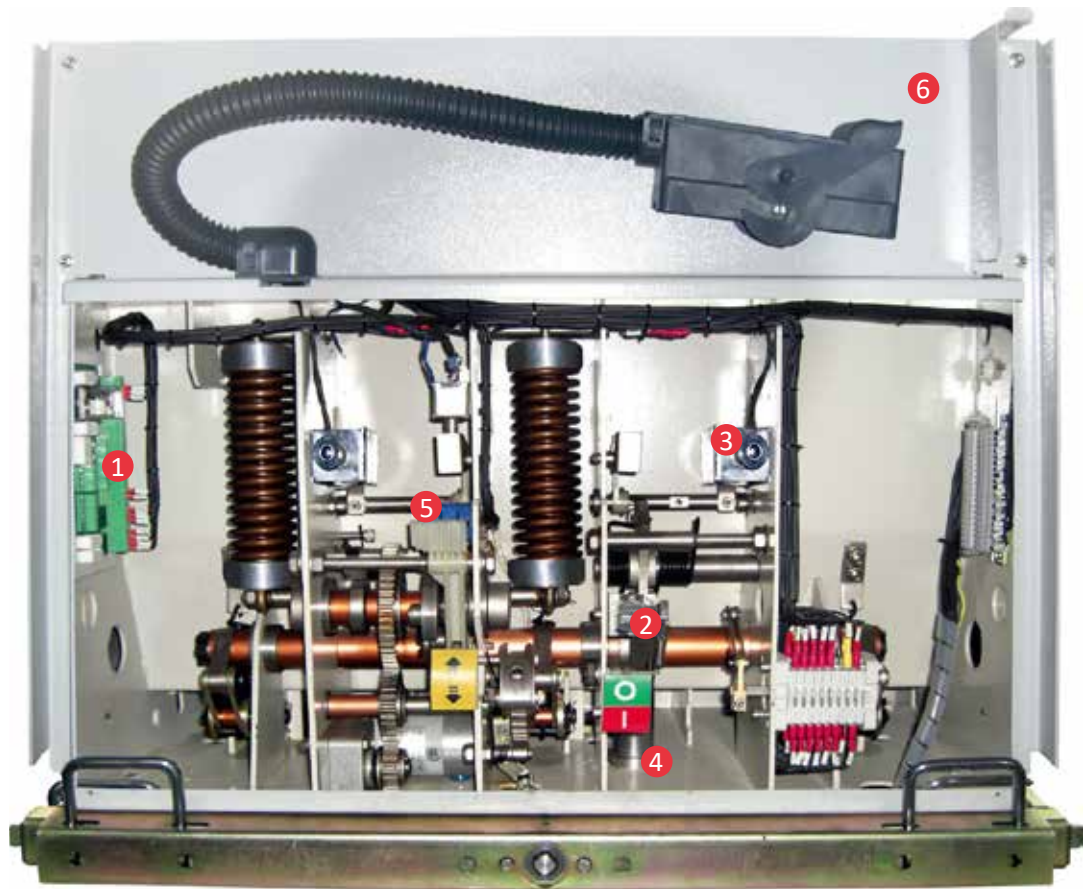
» With high reliable ground fault current breaking ability.

» Under normal work, it goes with pretty low X ray radiation level, satisfy the environmental protection requires.

- Completely one-time embedded technics.
- High-stable-quality ceramic metallized technics.
- Stainless steel braze welding technics.

Drive Mechanism

VSSE4 :
SPRING OPERATION MECHANISM



Drive Mechanism (Cont...)



CIRCUIT PANEL

The modularized secondary controlling circuit panel adopts auto-fastening connection-peg, which is convenient for replacing and also ensure the reliability of the electric connection.



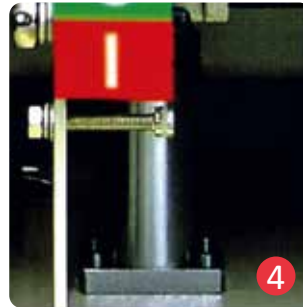
MAKING MODULE

The making module has characteristic of brief structure and reliable operating principle, thoroughly avoid some faults, such as can't keep making, can't break and so on, meanwhile, reduce release power during opening state.



MAKING/BREAKING COIL

The coil is whole sealing designed, keeping the coil out of moisture.



BREAKING BUFFER

High powered breaking buffer will reduce moving-contact overswing or rebounding extent when circuit breaker is in process of breaking, thus reduced the rate of re-arcing when breaking, assured the vacuum interrupter bellows' mechanical endurance.



SUPERFICIAL TREATMENT

80% mechanical parts apply Ni-P alloy treatment, greatly improved spare parts's anti-septic power, assure machine's stable quality all the time.



WHOLE MECHANISM'S ADVANTAGE

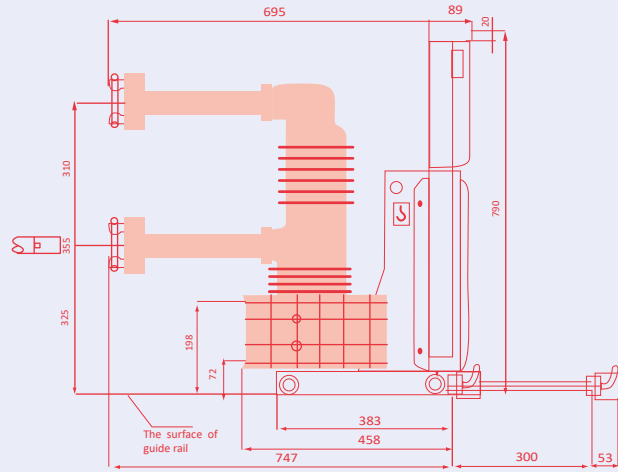
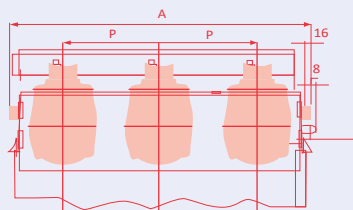
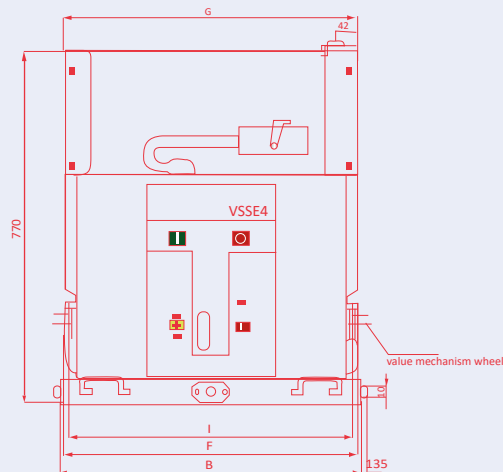
Operating mechanism's structure is simple, and operation is reliable, it goes with strong commonality, can be used in different specifications. Because it is our independent developed products, so we can specialed do it according to customers's requirements.



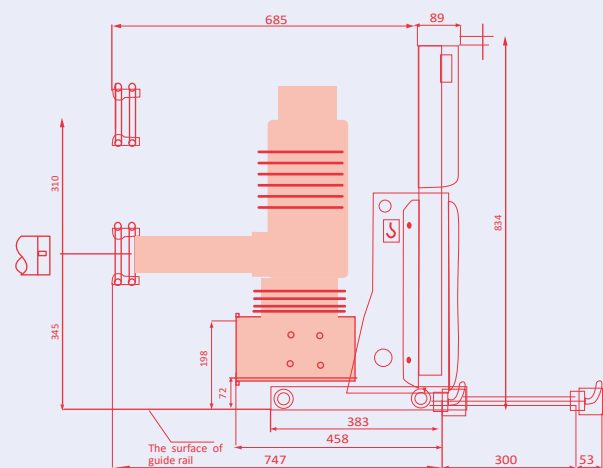
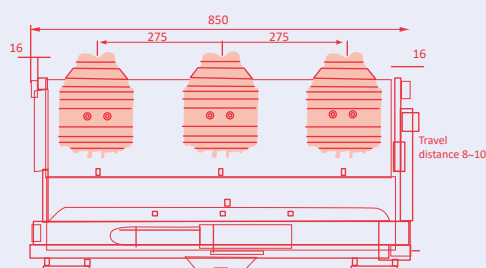
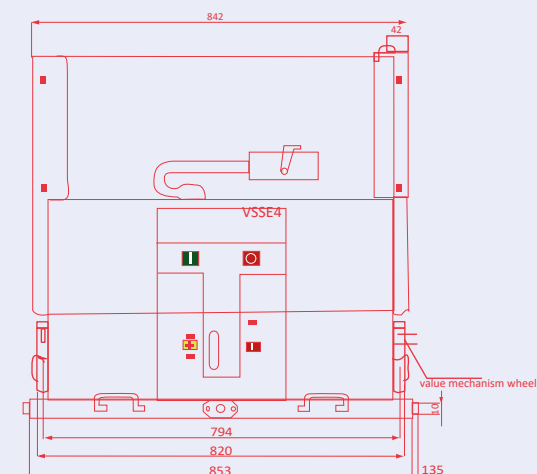
VSSE4: Every detail of VSSE4, we try to be the best.

External Dimensions

OVERALL DIMENSION FOR VSSE4 EMBEDDED POLE WITHDRAWABLE TYPE CIRCUIT-BREAKER



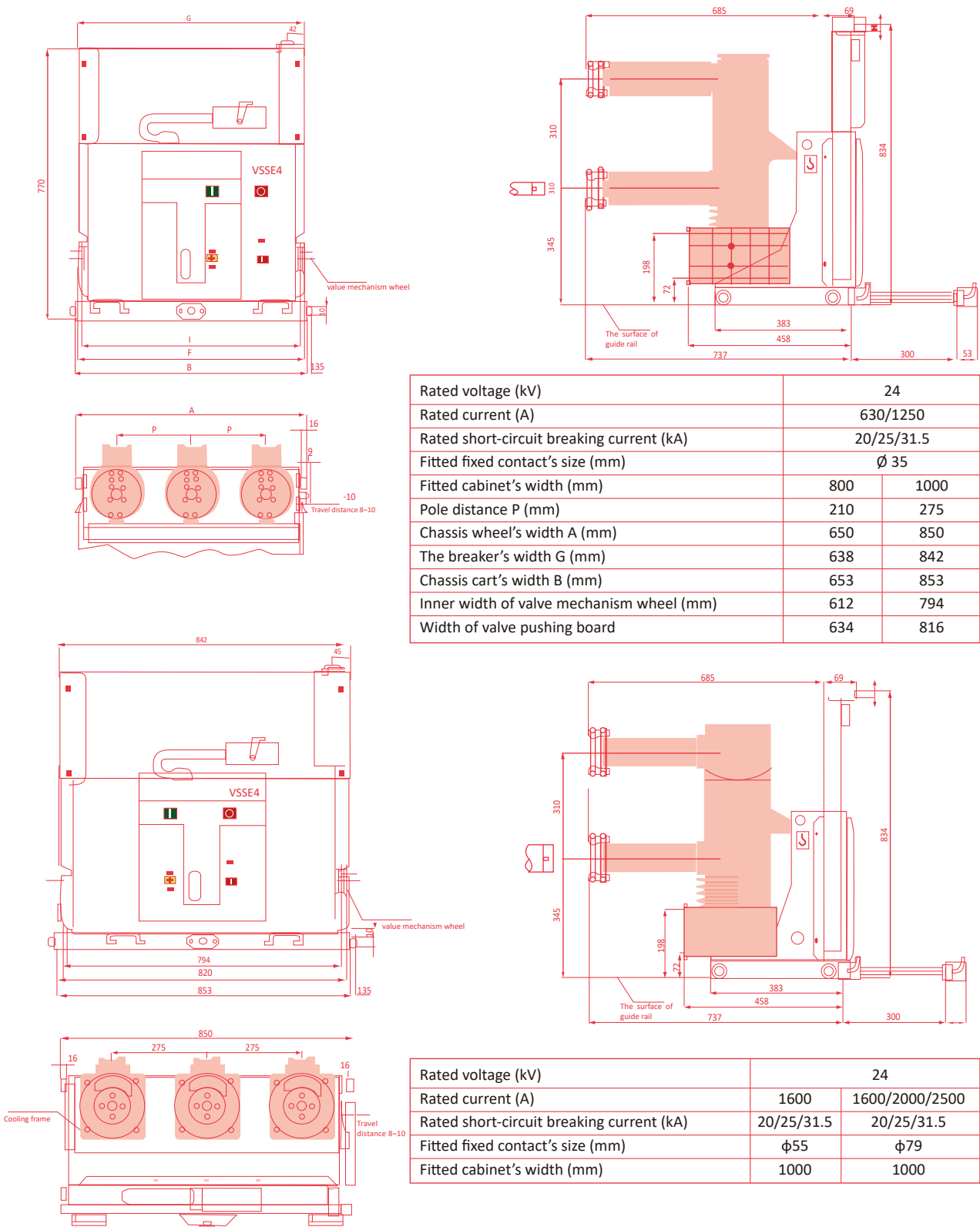
Rated voltage (kV)	24	
Rated current (A)	630/1250	
Rated short-circuit breaking current	20/25/31.5	
Fitted fixed contact's size	Ø 35	
Fitted cabinet's width (mm)	800	1000
Pole distance (mm)	210	275
Chassis wheel's width A (mm)	650	850
The breaker's width G (mm)	638	842
Chassis cart's width B (mm)	653	853
Inner width of valve mechanism wheel (mm)	612	794
Width of valve pushing board	634	816



Rated voltage (kV)	24	
Rated current (A)	1600	1600/2000/2500
Rated short-circuit breaking current (kA)	20/25/31.5	20/25/31.5
Fitted fixed contact's size (mm)	Ø55	Ø79
Fitted cabinet's width (mm)	1000	1000

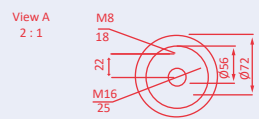
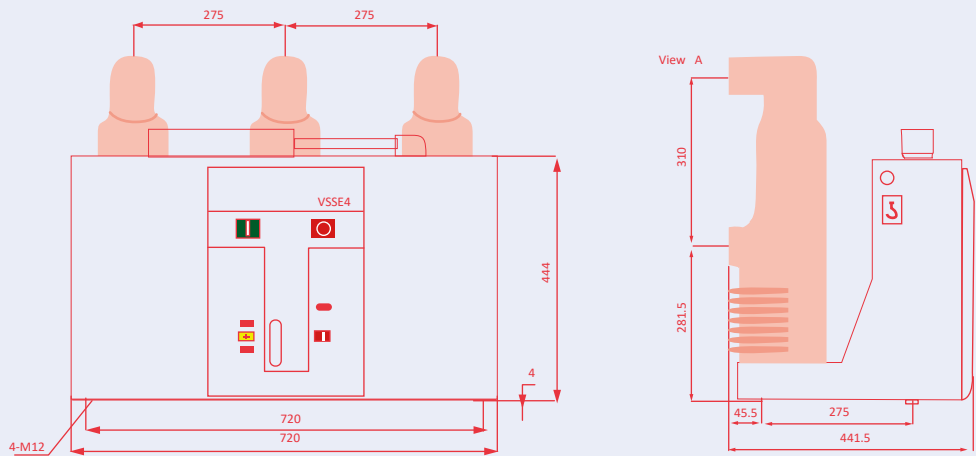
External Dimensions (Cont...)

OVERALL DIMENSION FOR VSSE4 ASSEMBLY POLE WITHDRAWABLE TYPE CIRCUIT-BREAKER

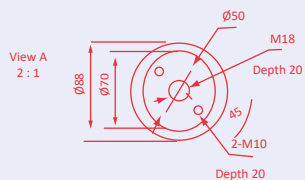
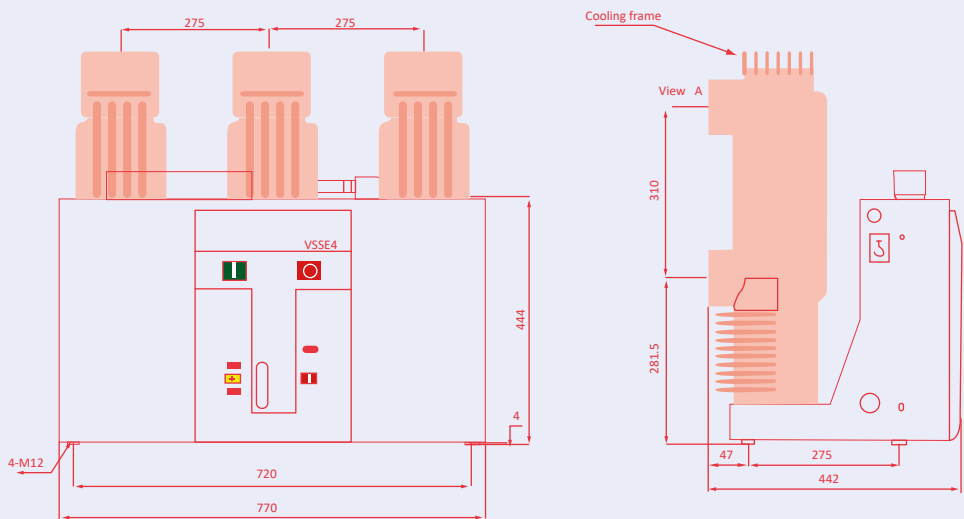


External Dimensions (Cont...)

OVERALL DIMENSION FOR VSSE4 EMBEDDED POLE FIXED TYPE CIRCUIT-BREAKER



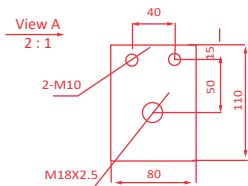
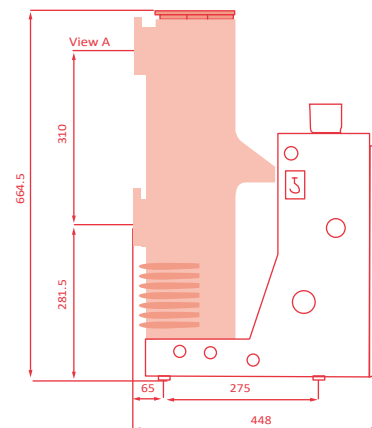
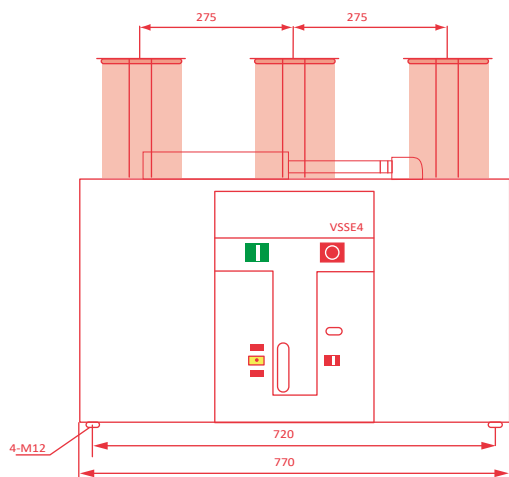
Rated voltage (kV)	24
Rated current (A)	630/1250
Rated short-circuit breaking current (kA)	20/25/31.5



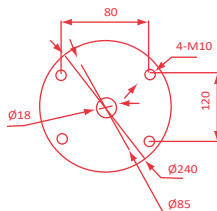
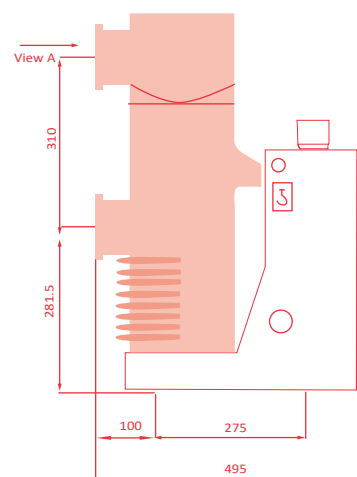
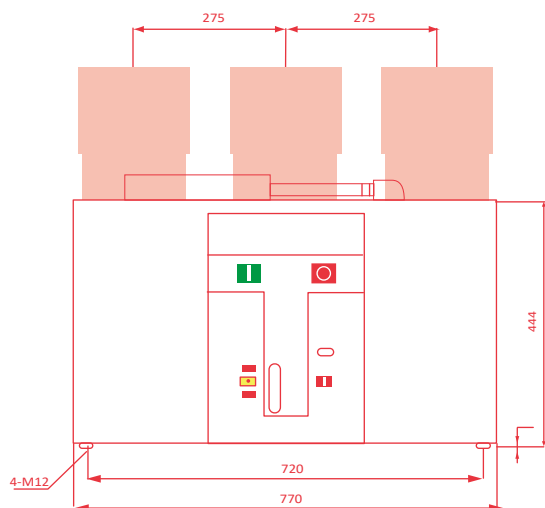
Rated voltage (kV)	24
Rated current (A)	1600/2000/2500
Rated short-circuit breaking current (kA)	20/25/31.5

External Dimensions (Cont...)

OVERALL DIMENSION FOR VSSE4 ASSEMBLY POLE FIXED TYPE CIRCUIT-BREAKER



Rated voltage (kV)	24
Rated current (A)	630/1250
Rated short-circuit breaking current (kA)	20/25/31.5



Rated voltage (kV)	24
Rated current (A)	1600/2000/2500
Rated short-circuit breaking current (kA)	20/25/31.5

Technical Parameter

NO.	ITEM	UNIT	PAREMETERS DATA		
1	Rated voltage	kV	24		
2	Rated short time power frequency withstand voltage (1min)		65		
	Rated lightning impulse withstand voltage (peak value)		125		
3	Rated frequency	Hz	50		
4	Rated current	A	630	630	1250
			1250	1250	1600
					2000
					2500
5	Rated short circuit breaking current		20	25	31.5
6	Rated short time withstand current	kA	20	25	31.5
7	Rated peak withstand current		50	63	80
8	4S Rated short circuit making current		20	25	31.5
9	Rated peak value of current		50	63	80
10	Rated short circuit making current (peak value)		50	63	40
11	Duration of rated short-circuit current	S	4		
12	Mechanical endurance	times	10000, 30000, 60000		
13	Rated making surge current of capacitor bank	kA	12.5 (The frequency is less than 100Hz)		
14	Rated breaking current of single/symmetrical capacitor bank	A	630, 400		
15	Breaking times at rated short-circuit current	times	274 (E2)		
16	Power frequency withstand voltage of secondary circuit	V	2000		
17	Rated operating voltage		AC110/220		DC110/220
18	Rated operating order		O-0.3s-CO-180s-CO		
19	Energy storage times	S	≤5		
20	Clearance	mm	13±1		
21	Travel		4±1		
22	Pole distance		210±1.5/275±1.5		
23	Bounce time (making)	ms	≤2		
24	Three pole making /breaking non-simultaneity		≤2		
25	Average breaking speed	m/s	1.1~1.7		
26	Average making speed		0.6~1.1		
27	Making time	ms	≤60		
28	Breaking time		≤45		
29	Contact pumping (breaking)	mm	≤3		
30	Permitted abrasion thickness of moving and fixed contacts		3		
31	Conductance circuit resistance	μΩ	Withdrawable type		Rated current
			≤45		630~1250A
			≤35		1600~2000A
			≤25		More than 2500A

» The average breaking speed refers to the average speed of contactor's first 8mm, and the average.

» Making speed is that of contactor's last 8mm.

Technical Parameter (Cont...)

THE TECHNICAL PARAMETER OF ENERGY-STORAGE MOTOR

MODEL	RATED VOLTAGE	RATED INPUT POWER	SCOPE OF WORK VOLTAGE	ENERGY STORAGE TIMES (UNDER RATED VOLTAGE)
ZYJ55-1	DC110V	50, 75	85%–110% of the rated voltage	≤10
	DC220V			

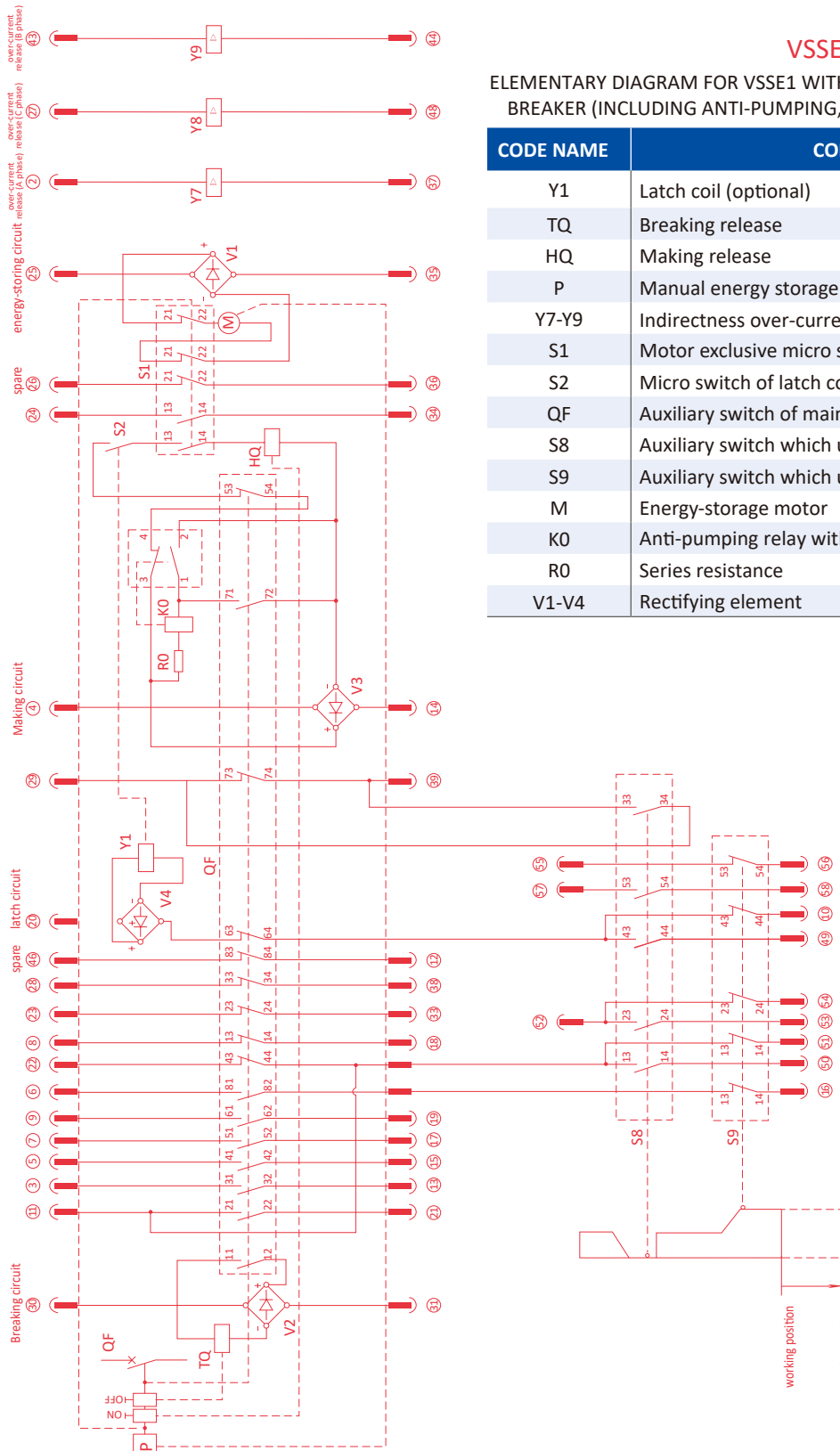
THE TECHNICAL PARAMETER OF MAKING/BREAKING COIL AND CORRELATIVE ELECTRIC ELEMENTS

ITEMS	MAKING COIL		BREAKING COIL		LATCH COIL		ANTI-PUMPING RELAY	
The rated work voltage	DC220	DC110	DC220	DC110	DC220	DC110	DC220	DC110
Rated working current	1.1	2.2	1.1	2.2	25mA		9.1mA	
Rated power	242	242	242	242	2.7		1	
Scope of working voltage	85%–110% of the rated voltage		65%–120% of the rated work voltage. The breaker can't opening if less than 30% of the rated work voltage.					

SECONDARY CONTROLLING CIRCUIT SCHEME

CONTROLLING VOLTAGE	LATCH SCHEME	ANTI-PUMPING SCHEME	UNDER VOLTAGE RELEASE SCHEME	OVER-CURRENT RELEASE SCHEME		
AC220V	with latch	with anti-pumping relay	with under voltage release	with over-current release	Quantity of over-current release	The value of moving current
DC220V					Two sets or Three sets	3.5/5/7.5/10
AC110V	without latch	without anti-pumping relay	without under voltage release	without over-current release		
DC110V						

Schematic Diagram



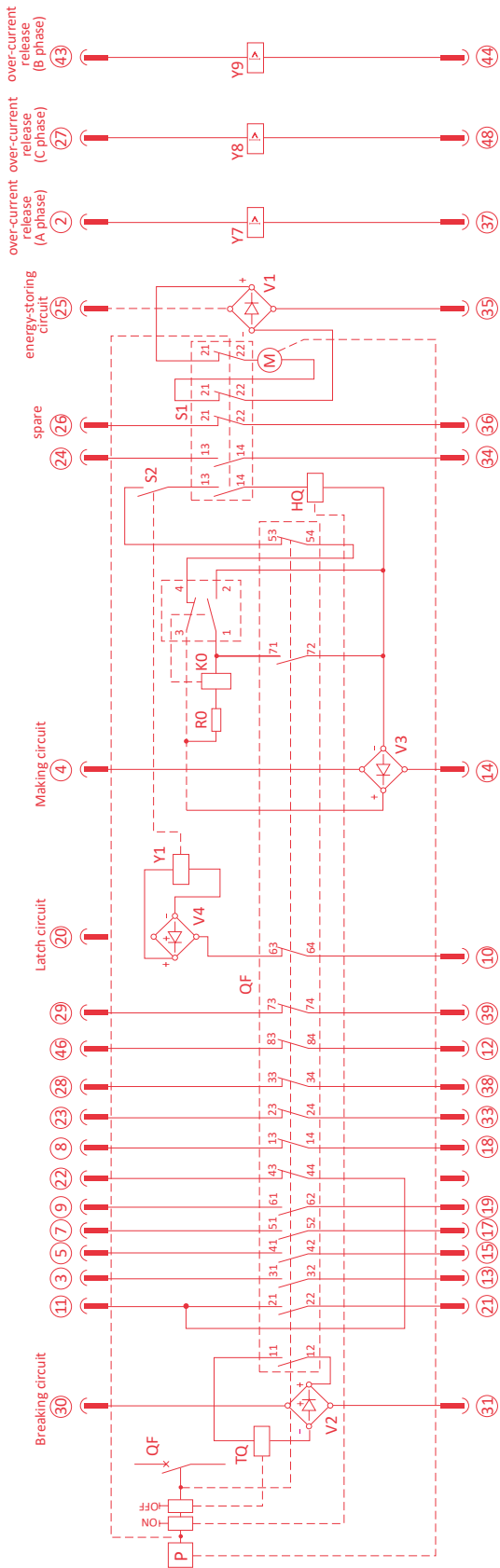
VSSE4

ELEMENTARY DIAGRAM FOR VSSE1 WITHDRAWABLE TYPE VACUUM CIRCUIT BREAKER (INCLUDING ANTI-PUMPING, LATCH, OVER-CURRENT SCHEME)

CODE NAME	COMPONENTS NAME
Y1	Latch coil (optional)
TQ	Breaking release
HQ	Making release
P	Manual energy storage
Y7-Y9	Indirectness over-current releaser (optional)
S1	Motor exclusive micro switch
S2	Micro switch of latch coil (optional)
QF	Auxiliary switch of main axis
S8	Auxiliary switch which used for testing position
S9	Auxiliary switch which used for working position
M	Energy-storage motor
K0	Anti-pumping relay within mechanism
R0	Series resistance
V1-V4	Rectifying element

- » While the AC voltage entry bridge rectifier circuit, the bridge rectifier circuit must be installed, otherwise the bridge rectifier circuit should be cancel while the DC voltage entry.
- » Over-current release (Y7-Y9) : Y8 and Y9 circuit is cancel while adopt Y7 over-current release (adopt Central current transformer). Y9 circuit is cancel while adopt Y7 and Y8 over-current release. Y7, Y8 and Y9 is cancel while without over-current release.

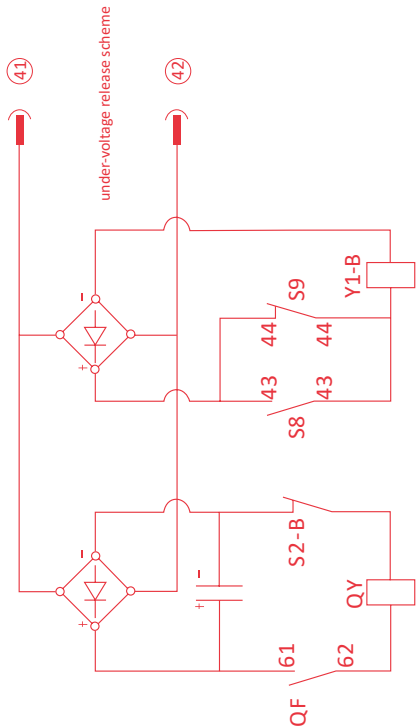
Schematic Diagram (Cont...)



VSSE4

ELEMENTARY DIAGRAM FOR VSSE4 FIXED TYPE VACUUM CIRCUIT BREAKER
(THE BREAKER IS IN OPENING STATE AND NON-STORED ENERGY)

CODE NAME	COMPONENTS NAME
Y1	Latch coil (optional)
TQ	Breaking release
HQ	Making release
P	Manual energy storage
Y7-Y9	Indirectness over-current releaser (optional)
S1	Motor exclusive micro switch
S2	Micro switch of latch coil (optional)
QF	Auxiliary switch of main axis
M	Energy-storage motor
K0	Anti-pumping relay within mechanism
R0	Series resistance
V1-V6	Rectifying element
QY	Under voltage coil (optional)
Y1-B	Under voltage exclusive latch coil (optional)
S2-B	Auxiliary switch of under voltage exclusive latch coil



VSSE5 : General

TECHNICAL STANDARD :

VSSE5 completely satisfy the Standards Of GB1984 AC High voltage Breaker, GB/T 11022-1999 Common Specifications For High-Voltage Switchgear And Controlgear Standards, China Power Sector Standards DL403.

Also meet the requirements of IEC62271-100, IEC56 and other main industrialized countries' similar standards.

TESTING :

VSSE5 series circuit breaker has passed following test.

Type tests : Power frequency withstand voltage tests, lightning impulse withstand voltage tests, temperature-rise tests, short time withstand current tests, peak withstand current tests, short-circuit current breaking capacity tests, mechanical endurance etc.

Routine test before out of factory : Mechanical performance test, mechanical characteristics tests, power frequency withstand voltage tests on main circuit, dielectric tests on auxiliary and control circuits, measurement of the resistance of the main circuit, interlock operation tests.

SCOPE OF APPLICATION :

It is universally used in power plant, electric network, metallurgy industry, petrochemical industry and infrastructures, such as airport, subway, building.

When the VSSE5 circuit breaker is in distribution system, it can be applied to control and protect cable, trolley wire, transformer, generator and capacitor bank.

SAFETY :

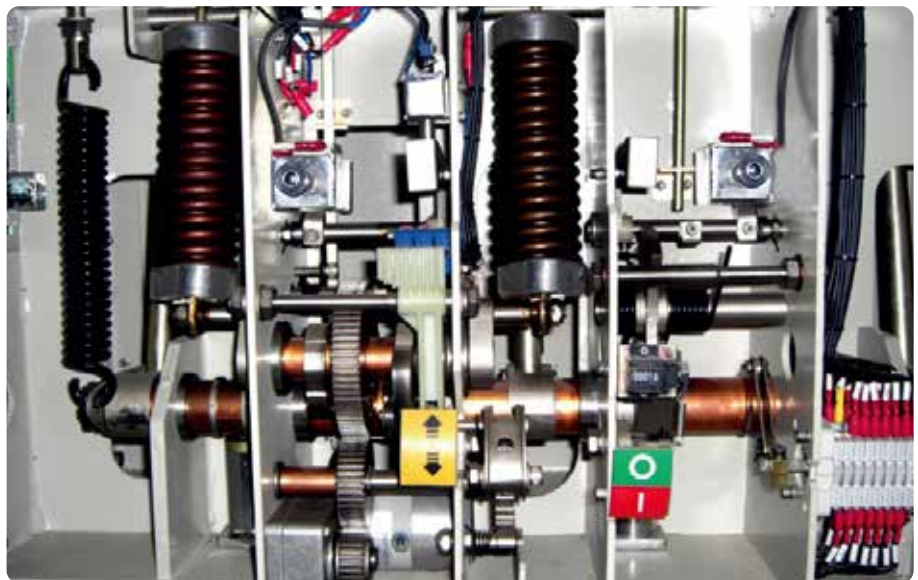
VSSE5 circuit breaker possesses perfect mechanical and electric interlock equipment, meanwhile, its high reliable operating performance and mechanical endurance, coordinated with matched switchgear cabinet, to ensure normal power distribution, operator and equipment's safety.



Technical Characteristic

INTEGRATION STRUCTURE :

The spring operation mechanism and breaker is designed integration structure that mechanism and primary conductance circuit are located are front-to-back layout. The detail of distribution as follows: conductance circuit is locate in back of breaker, mechanism is in front of breaker, handcart parts is under side of breaker. Whole structure is featured by compact construction, reasonable distribution and small-volume.



RELIABLE INTEGRATING SPRING DRIVE MECHANISM :

The mechanism is plane layout, holding manual energy storing and motor energy storing function, compact outside size, good overall rigidity, reliable operation.

Technical Characteristic (Cont...)

FLEXIBLE INSTALLING METHOD :

The breaker have two type : Middle-positioned and roll-on-floor type, both will conveniently realized Five-Protecting Interlock. It can be installed in all kinds of switchgear both Chinese and foreign.

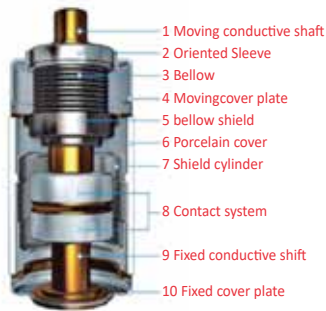


CONDUCTANCE CIRCUIT ADOPTS ASSEMBLY POLE OR EMBEDDED POLE STRUCTURE :

According to different requirement, there are two type of conductance circuit in VSSE5 series indoor vacuum circuit breaker, namely assembly type and embedded type.

ASSEMBLY STRUCTURE : Circuit breaker's vacuum interrupter is fixed in insulating tube, whose material is epoxide resin, with reliable electrical performance, and introduce advanced APG technics. All of this, getting insulating tube as a support force when installation, and with alternating, opposite insulating function. The design of this insulating tube gives full consideration on national standard and regorous working conditions, prevent from any external environment affects on vacuum interrupter, without dust and foreign bodies into leading circuit, but also will assure high-inpedence state to voltage affection even under muggy and serious nasty environment.

Technical Characteristic (Cont...)

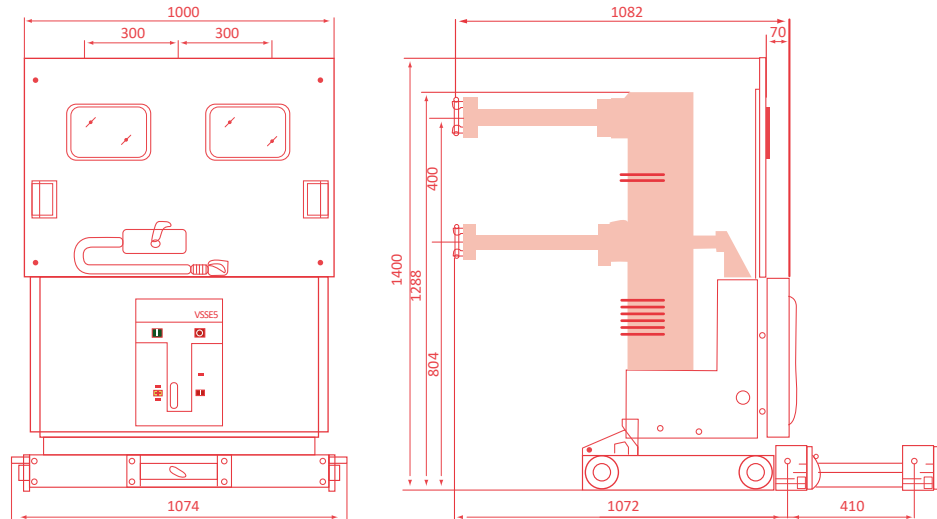


EMBEDDED STRUCTURE : Circuit breaker's primary conductance circuit adopts embedded pole, with advanced automatic pressure gel APG technic, directly casting vacuum interrupter and primary conductance circuit's other parts in special epoxide resin, taking a shape of leading circuit module. Embedded pole's installing end carry out double skirt design, this embedded pole equipped with following features: large leakage distance, high mechanical intensity, high component precision, less components, needn't secondary adjustments etc. Pole pillar's electrical field is well- distributed, avoid the destruction to organic insulating from part electric field concentration. Meanwhile, this kind design will simplify primary conductance's assembly, completely avoid the problem that conductance circuit's connecting bolt will loose when operating, which guaranteed conductance circuit's reliability, realized the possibitly of free-maintenance in first conductive circuit.



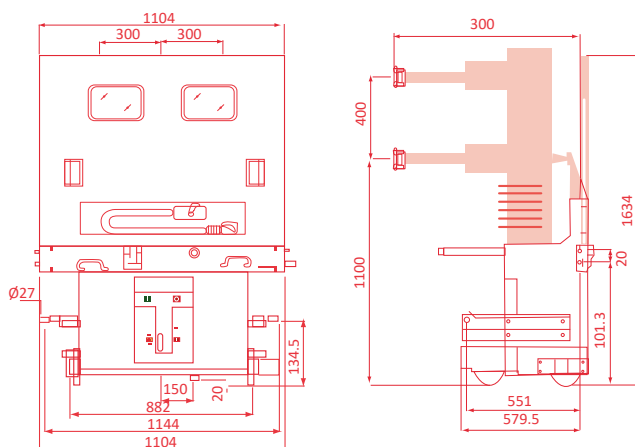
Technical Characteristic (Cont...)

OVERALL DIMENSION FOR VSSE5A-40.5 MIDDLE-POSITIONED WITHDRAWABLE CIRCUIT-BREAKER

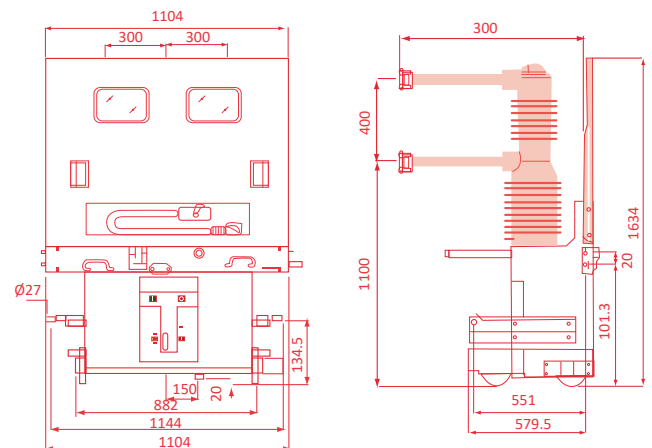


RATED CURRENT (A)	RATED SHORT-CIRCUIT BREAKING CURRENT (KA)	CONTACT (MM)	FITTED FIXED CONTACT 'S SIZE (MM)	FITTED CABINET'S WIDTH (MM)
630	20/25/31.5	Φ 49	CT-30	1400
1250		Φ 49	CT-30	
1600	31.5	Φ 49	CT-36	
2000		Φ 49	CT-48	

OVERALL DIMENSION FOR VMD5BT-40.5 ASSEMBLY POLE TYPE ROLL-ON-FLOOR CIRCUIT-BREAKER



OVERALL DIMENSION FOR VMD5BG-40.5 EMBEDDED POLE TYPE ROLL-ON-FLOOR CIRCUIT-BREAKER



RATED CURRENT (A)	RATED SHORT-CIRCUIT BREAKING CURRENT (KA)	CONTACT (MM)	FITTED FIXED CONTACT 'S SIZE (MM)	FITTED CABINET'S WIDTH (MM)
630	20/25/31.5	Φ 49	CT-30	1400
1250		Φ 49	CT-30	
1600	31.5	Φ 55	CT-36	
2000		Φ 79	CT-48	
2500		Φ 109	CT-64	

Technical Parameter

NO.	ITEM	UNIT	PAREMETERS DATA		
1	Rated voltage	kV	40.5		
2	Rated short time power frequency withstand voltage (1min)		95		
	Rated lightning impulse withstand voltage (peak value)		185		
3	Rated frequency	Hz	50/60		
4	Rated current	A	630	630	1250
			1250	1250	1600
					2000
					2500
5	Rated short circuit breaking current		20	25	31.5
6	Rated short time withstand current	kA	20	25	31.5
7	Rated peak withstand current		50	63	80
8	4S Rated short circuit making current		20	25	31.5
9	Rated peak value of current		50	63	80
10	Rated short circuit making current (peak value)		50	63	80
11	Duration of rated short-circuit current	S	4		
12	Mechanical endurance	times	10000, 30000, 60000		
13	Rated making surge current of capacitor bank	kA	12.5 (The frequency is less than 100Hz)		
14	Rated breaking current of single/symmetrical capacitor bank	A	630, 400		
15	Breaking times at rated short-circuit curre t	times	20		
16	Power frequency withstand voltage of secondary circuit	V	2000		
17	Rated operating voltage		AC110/220	DC110/220	
18	Rated operating order		O–0.3s–CO–180s–CO		
19	Energy storage times	S	≤5		
20	Clearance	mm	20±2		
21	Travel		6±1		
22	Pole distance		300±1.5		
23	Bounce time (making)	ms	≤3		
24	Three pole making /breaking non-simultaneity		≤2		
25	Average breaking speed	m/s	1.5~1.9		
26	Average making speed		0.6~1.3		
27	Making time	ms	30~80		
28	Breaking time		20~45		
29	Contact pumping (breaking)	mm	≤3		
30	Permitted abrasion thickness of moving and fixed contacts		3		
31	Conductance circuit resistance	μ Ω	Withdrawable type		Rated current
			≤45		More than 1250A
			≤35		1600~2000A
			≤25		Less than 2500A

» The average breaking speed refers to the average speed of contactor's first 8mm, and the average.

» Making speed is that of contactor's last 8mm.

Technical Parameter (Cont...)

THE TECHNICAL PARAMETER OF ENERGY-STORAGE MOTOR

MODEL	RATED VOLTAGE	RATED INPUT POWER	SCOPE OF WORK VOLTAGE	ENERGY STORAGE TIMES (UNDER RATED VOLTAGE)
ZYJ55-1	DC110V	50, 75	85%–110% of the rated voltage	≤10
	DC220V			

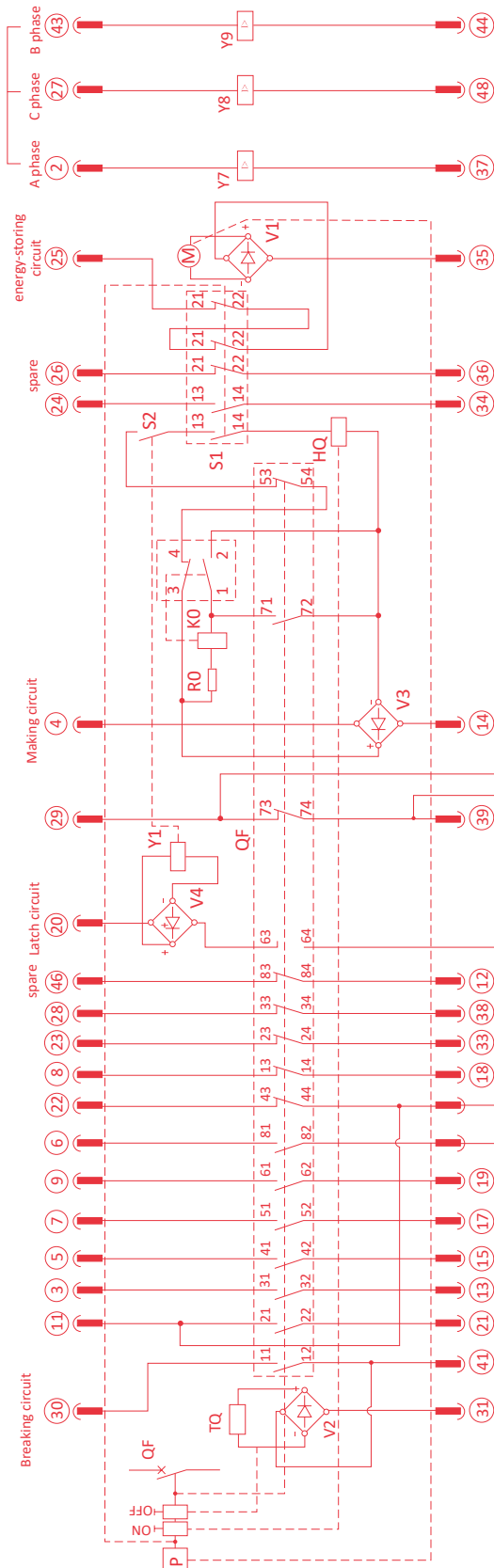
THE TECHNICAL PARAMETER OF MAKING/BREAKING COIL AND CORRELATIVE ELECTRIC ELEMENTS

ITEMS	MAKING COIL		BREAKING COIL		LATCH COIL		ANTI-PUMPING RELAY	
The rated work voltage	DC220	DC110	DC220	DC110	DC220	DC110	DC220	DC110
Rated working current	1.1	2.2	1.1	2.2	25mA		9.1mA	
Rated power	242	242	242	242	2.7		1	
Scope of working voltage	85%–110% of the rated voltage		65%–120% of the rated work voltage. The breaker can't opening if less than 30% of the rated work voltage.					

SECONDARY CONTROLLING CIRCUIT SCHEME

CONTROLLING VOLTAGE	LATCH SCHEME	ANTI-PUMPING SCHEME	UNDER VOLTAGE RELEASE SCHEME	OVER-CURRENT RELEASE SCHEME		
AC220V	with latch	with anti-pumping relay	with under voltage release	with over-current release	Quantity of over-current release	The value of moving current
DC220V					Two sets or Three sets	3.5/5/7.5/10
AC110V	without latch	without anti-pumping relay	without under voltage release	without over-current release		
DC110V						

Schematic Diagram

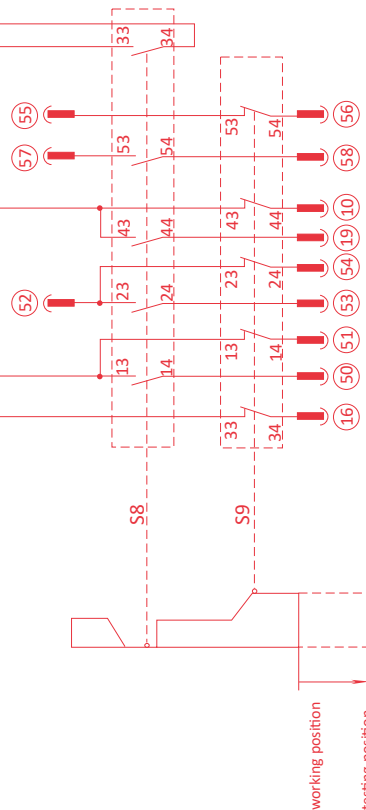


VSSE5A-40.5

ELEMENTARY DIAGRAM FOR VSSE5A-40.5 WITHDRAWABLE TYPE VACUUM CIRCUIT BREAKER

(INCLUDING ANTI-PUMPING, LATCH, OVER-CURRENT SCHEME)

CODE NAME	COMPONENTS NAME
Y1	Latch coil (optional)
TQ	Breaking release
HQ	Making release
P	Manual energy storage
Y7-Y9	Indirectness over-current releaser (optional)
S1	Motor exclusive micro switch
S2	Micro switch of latch coil (optional)
QF	Auxiliary switch of main axis
S8	Auxiliary switch which used for testing position
S9	Auxiliary switch which used for working position
M	Energy-storage motor
K0	Anti-pumping relay within mechanism
R0	Series resistance
V1-V4	Rectifying element

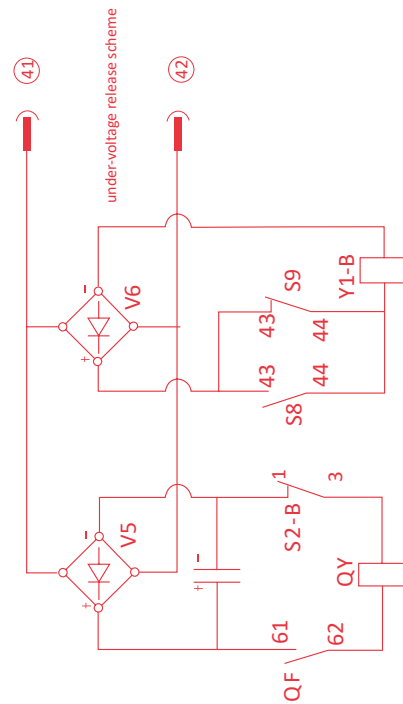
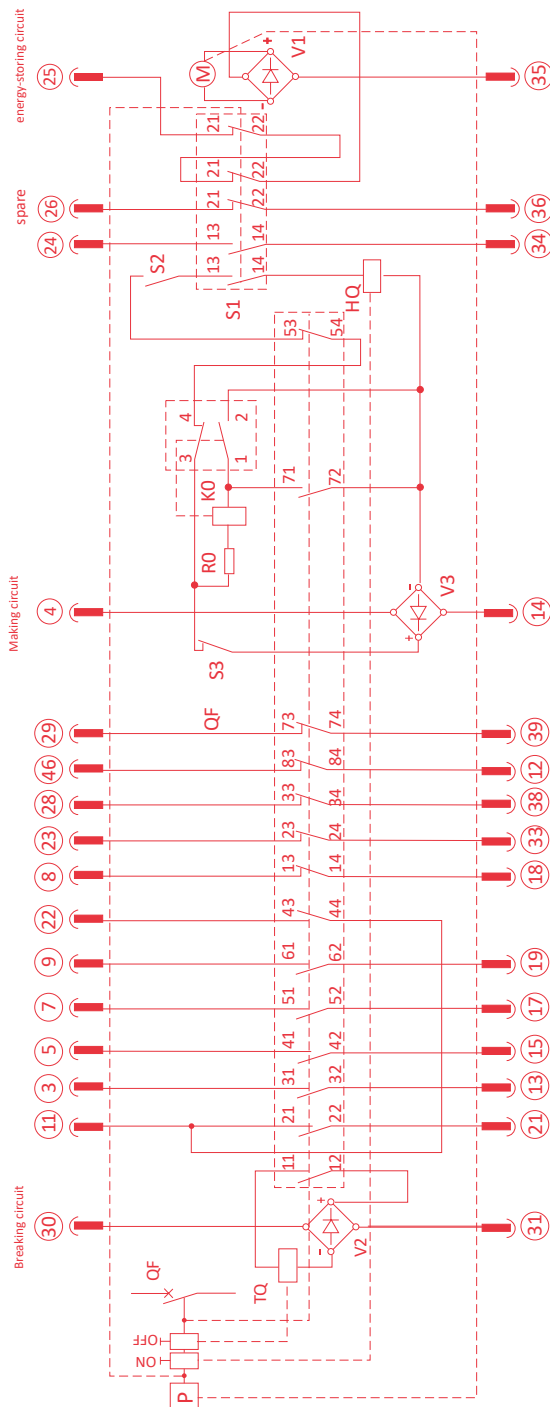


- » While the AC voltage entry bridge rectifier circuit, the bridge rectifier circuit must be installed, otherwise the bridge rectifier circuit should be cancel while the DC voltage entry.
- » Over-current release (Y7-Y9) : Y8 and Y9 circuit is cancel while adopt Y7 over-current release (adopt Central current transformer). Y9 circuit is cancel while adopt Y7 and Y8 over-current release. Y7, Y8 and Y9 is cancel while without over-current release.

Schematic Diagram (Cont...)

VSSE5B-40.5

ELEMENTARY DIAGRAM FOR VSSE5B-40.5 WITHDRAWABLE TYPE VACUUM CIRCUIT BREAKER



THE BREAKER IS IN OPENING STATE AND NON-STORED ENERGY

CODE NAME	COMPONENTS NAME
TQ	Breaking release
HQ	Making release
P	Manual energy storage
S1	Motor exclusive micro switch
S3	Mechanism push position switch
QF	Auxiliary switch of main axis
M	Energy-storage motor
K0	Anti-pumping relay within mechanism
R0	Series resistance
V1-V6	Rectifying element
QY	Under voltage coil (optional)
Y1-B	Under voltage exclusive latch coil (optional)
S2-B	Auxiliary switch of under voltage exclusive latch coil

VS1 : General

GENERAL PROVISIONS :

VS1(ZN63–12) Series vacuum circuit breaker, indoor switch equipment of 12kV rated voltage, three phase current 50Hz, can be power equipment and protect unit of power system and other especial industry. Due to its special superiority, it is available to the places with frequent operations of rated working current or of frequent breaking short circuit current.

It applies overall layout structure, with spring operating mechanism are of quite experience, simple structure, reliable performances. Since the outside box adopts reasonable division structure, making each performance unit very clear and convenient to maintenance.

TECHNICAL STANDARDS :

VS1 vacuum circuit breaker meets the standards of GB1984–2003, DL/T403–2000, JB3855–1996 etc.

MAIN FEATURES :

Adopting overall spring operating mechanism, with characteristics of simple structure, be reliable and experienced. Using matured APG technology to do assembly poles, primary circuit employ assembly type structure, can be make sure conducting circuit's reliability and convenient assembly.

Be equip with all-completed anti-wrong-operation interlock, can be make sure operator and equipment's safety.

APPLICABLE SCOPE :

VS1 vacuum circuit breaker have two types, namely fixed type and withdrawable type. Withdrawable type circuit breaker is matched middle-positioned switchgear GZS1-12(KYN28-12) (width 650mm, 800mm, 1000mm, fixed type circuit breaker is matched in XGN-12, GG1A-12 and cubical type substation.

TESTING :

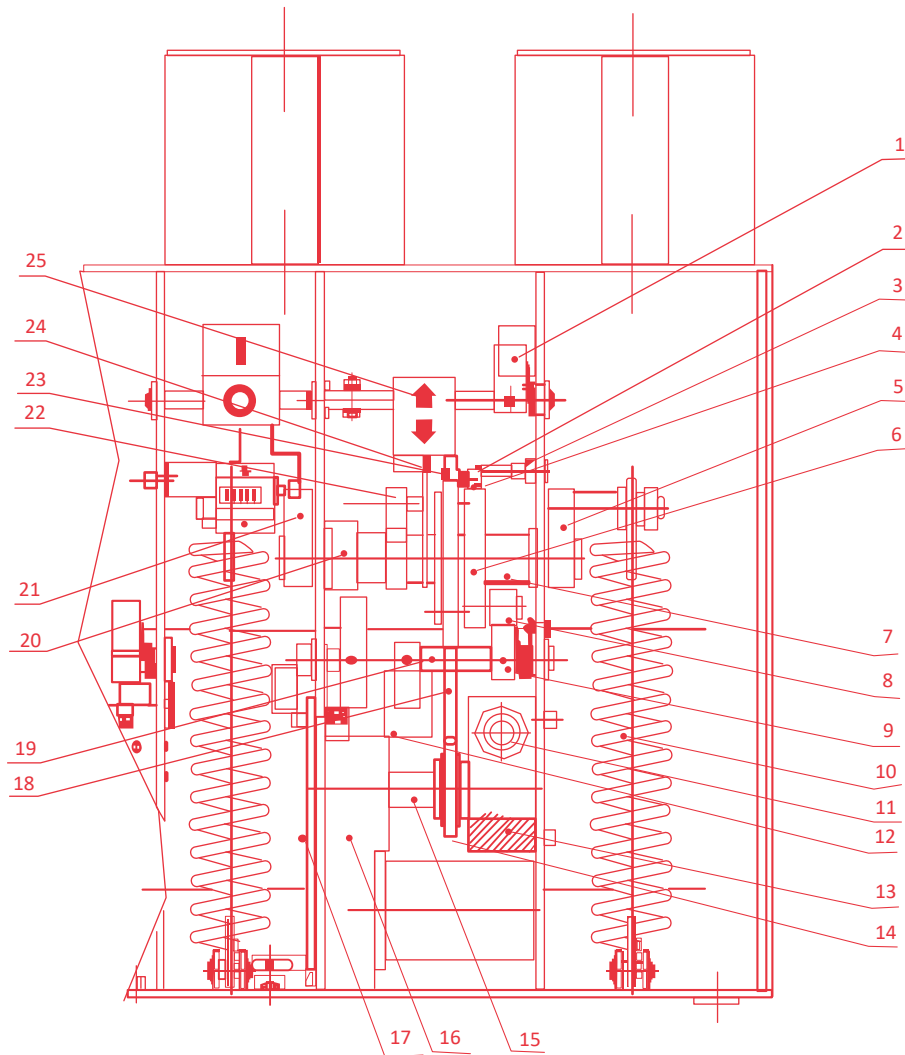
National lab type test : 60000 times mechanical life test, 50 times electrical test.

Routine Test : Mechanical performance test, main circuit power frequency withstand voltage test, insulating test on auxiliary and control circuits, main circuit resistance test, interlock operating test, mechanical and electrical operating test.



Operating Mechanism (Refer to Picture-1)

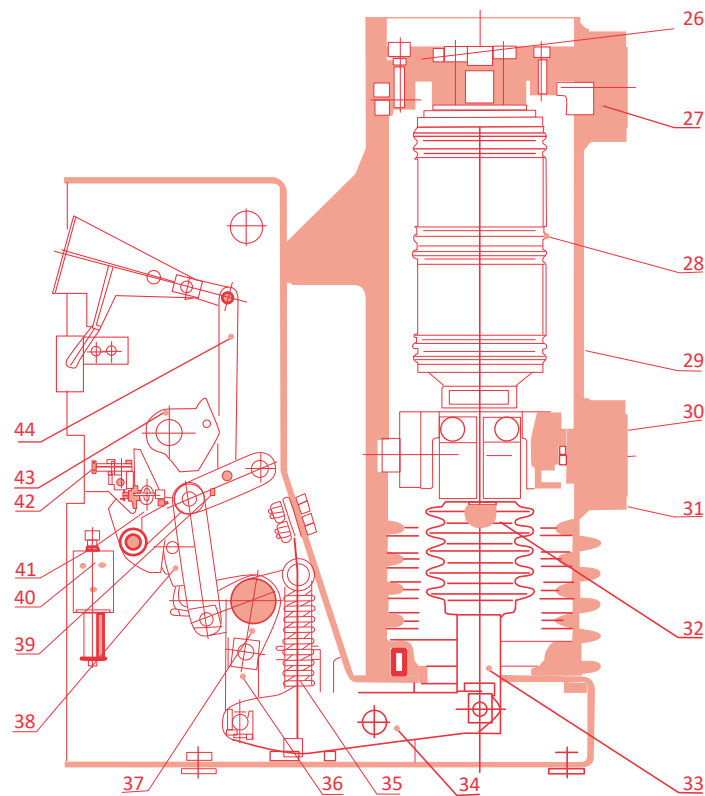
PICTURE-1



- | | | | |
|--------------------------------------|------------------------------|---------------------------|--------------------------|
| 1. Microswitch | 2. Pin | 3. Limit level | 4. Slider |
| 5. Cramkarm | 6. Storage driving wheel | 7. Storage shaft | 8. Roller |
| 9. Storage keeping pawl | 10. Closing spring | 11. Manually storage worm | 12. Close coil |
| 13. Manually storage driving turbine | 14. Motor driving chainwheel | 15. Motor output shaft | 16. Energy storing motor |
| 17. Interlock driving bend plate | 18. Driving chain | 19. Storage keeping shaft | 20. Latch coil |
| 21. Cramkarm | 22. Cam | 23. Chainwheel | 24. Connecting plate |
| 25. Storage indicator drop | | | |

Operating Mechanism (Refer to Picture-2)

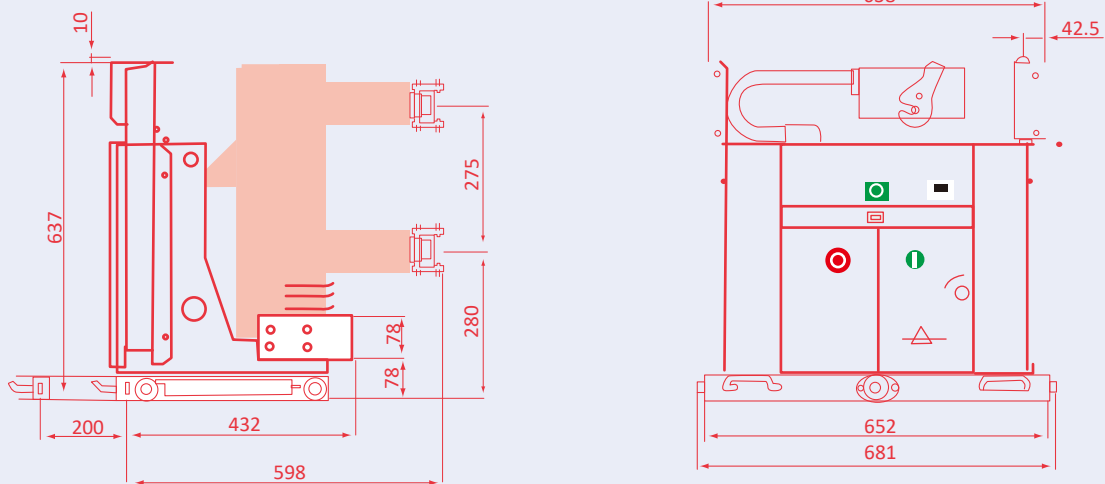
PICTURE-2



- | | | | |
|-------------------------------|----------------------|---|-------------------------------------|
| 26. Upper bracket | 27. Upper terminal | 28. Vacuum interrupter | 29. Insulating tube |
| 30. Lower bracket | 31. Lower terminal | 32. Disc spring | 33. Insulating draw bar |
| 34. Driving crankarm | 35. Breaking spring | 36. Driving connecting plate | 37. Principal axis driving crankarm |
| 38. Close keeping pawl | 39. Connecting plate | 40. Open coil | 41. Semiaxis |
| 42. Manually breaking mandril | 43. Cam | 44. Close/open indicator connecting plate | |

VS1 Fixed Type Overall Dimension

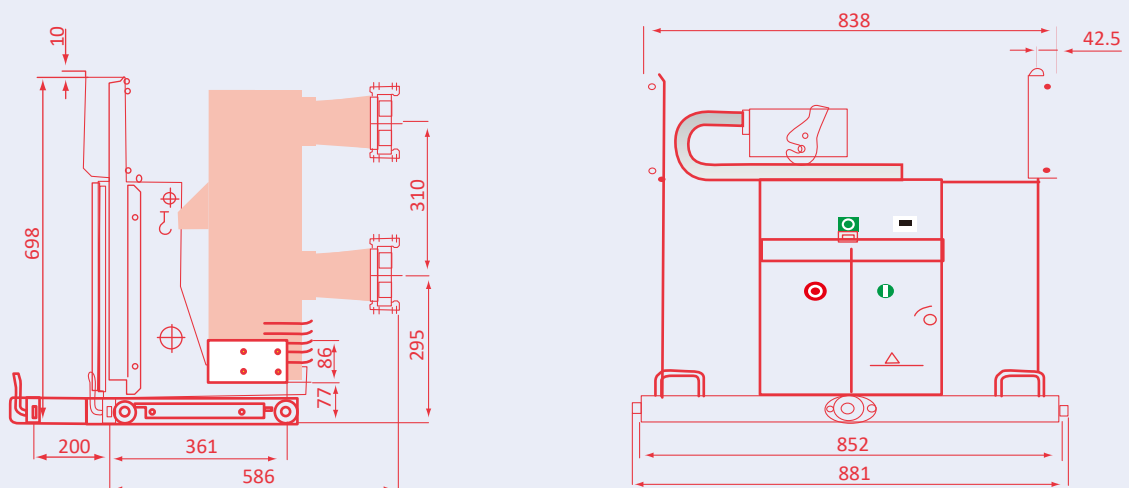
VS1 WITHDRAWABLE TYPE OVERALL DIMENSIONS : (POLE DISTANCE 210MM)



PRIMARY POLE DISTANCE 210MM:

RATED CURRENT (A)	RATED SHORT CIRCUIT BREAKING CURRENT (kA)	FITTED FIXED CONTACT'S SIZE (mm)
630	...25	Ø 35
1250	...20-31.5	Ø 49
1600	...20-31.5	Ø 55

VS1 WITHDRAWABLE TYPE OVERALL DIMENSIONS : (POLE DISTANCE 275MM)

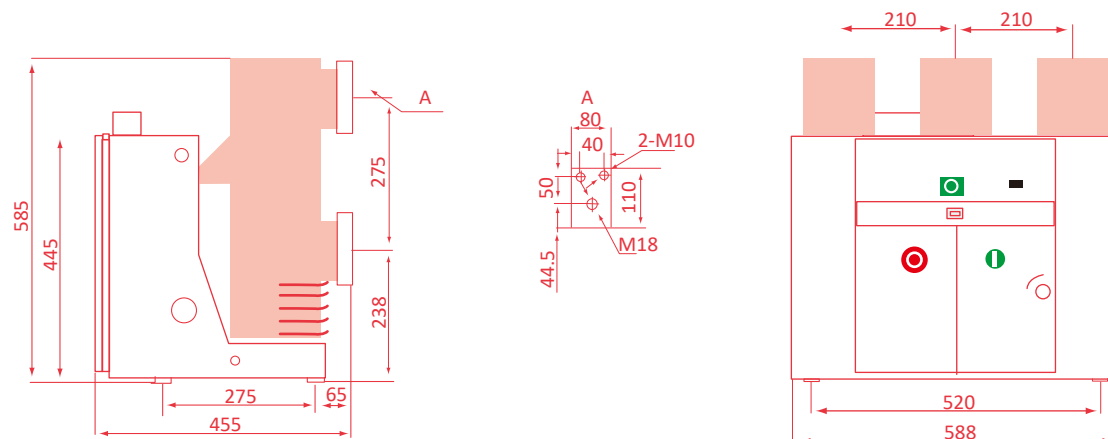


PRIMARY POLE DISTANCE 275MM:

RATED CURRENT (A)	RATED SHORT CIRCUIT BREAKING CURRENT (kA)	FITTED FIXED CONTACT'S SIZE (mm)
1600-2000	31.5-40	Ø 79
2500-4000	31.5-40	Ø 109

VS1 Fixed Type Overall Dimension (Cont...)

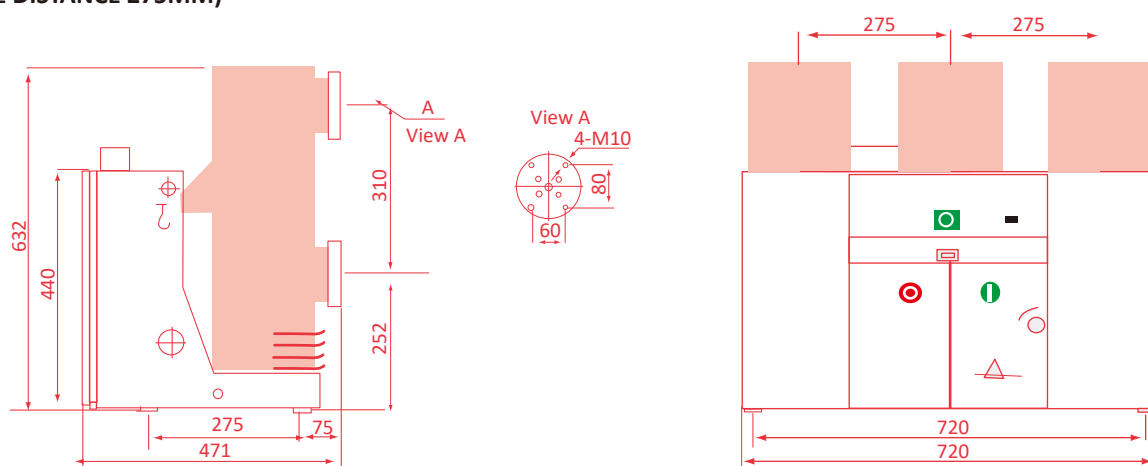
VS1 FIXED TYPE OVERALL DIMENSIONS :
(POLE DISTANCE 210MM)



POLE DISTANCE 210MM:

RATED CURRENT (A)	RATED SHORT CIRCUIT BREAKING CURRENT (kA)
630	...25
1250	...20–31.5
1600	...20–31.5

VS1 FIXED TYPE OVERALL DIMENSIONS :
(POLE DISTANCE 275MM)



POLE DISTANCE 275MM:

RATED CURRENT (A)	RATED SHORT CIRCUIT BREAKING CURRENT (kA)
1600–2000	...31.5–40
2500–4000	...31.5–40

Technical Parameter

VS1 MAIN SPECIFICATIONS AND TECHNICAL PARAMETERS :

NO.	ITEM	UNIT	PAREMETER DATA							
1	Rated voltage	kV	12							
2	Rated short time power frequency withstand voltage (1min)		42							
3	Rated lightning impulse withstand voltage (peak value)		75							
4	Rated frequency	Hz	50							
5	Rated current	A	630	630	630	1250	1250	1600	1600	2000
			1250	1250	1600	2000	2000	2500	2500	3150
					2500	3150	3150	4000*	4000*	
6	Rated short circuit breaking current	kA	20	25	31.5		40		50	
7	Rated short time withstand current		20	25	31.5		40		50	
8	Duration of rated short circuit	s	4							
9	Rated peak withstand current	kA	50	63	80		100		125	
10	Rated short circuit making current		50	63	80		100		125	
11	Rated breaking current of single/symmetrical capacitor bank	A	630/400 (40kA is 800/400)							
12	Rated making surge current of capacitor bank	kA	12.5 (frequency not over 1000Hz)							
13	Breaking time (rated voltage)	ms	20~50							
14	Closing time (rated voltage)		35~70							
15	Mechanical life	Time	10000, 30000, 60000							
16	Rated short circuit breaking times		50 (40kA is 30)							
17	Rated operating voltage	V	AC110/220, DC110/220							
18	Energy storing motor's rated power	W	80							
19	Average breaking speed	m/s	0.9~1.2							
20	Average closing speed		0.5~0.8							
21	Rated operating sequence		0-θ-CO-180s-CO							

- * PIS NOTE :**
1. When rated current up to 4000A, switchgear need forced cooling.
 2. When the rated short circuit breaking current is less than 40kA, θ is 0.3s, when the short circuit breaking current is more or equal to 40kA, θ is 180s.

Technical Parameter (Cont...)

THE TECHNICAL PARAMETER OF ENERGY STORING MOTOR

MODEL	RATED VOLTAGE	RATED INPUT POWER	SCOPE OF WORK VOLTAGE	ENERGY STORAGE TIMES (UNDER RATED VOLTAGE)
ZYJ55-1	DC110V	50, 75	85%–110% of the rated voltage	≤10
	DC220V			

THE TECHNICAL PARAMETERS OF CLOSE/OPEN COIL AND CORRELATIVE ELECTRIC ELEMENTS

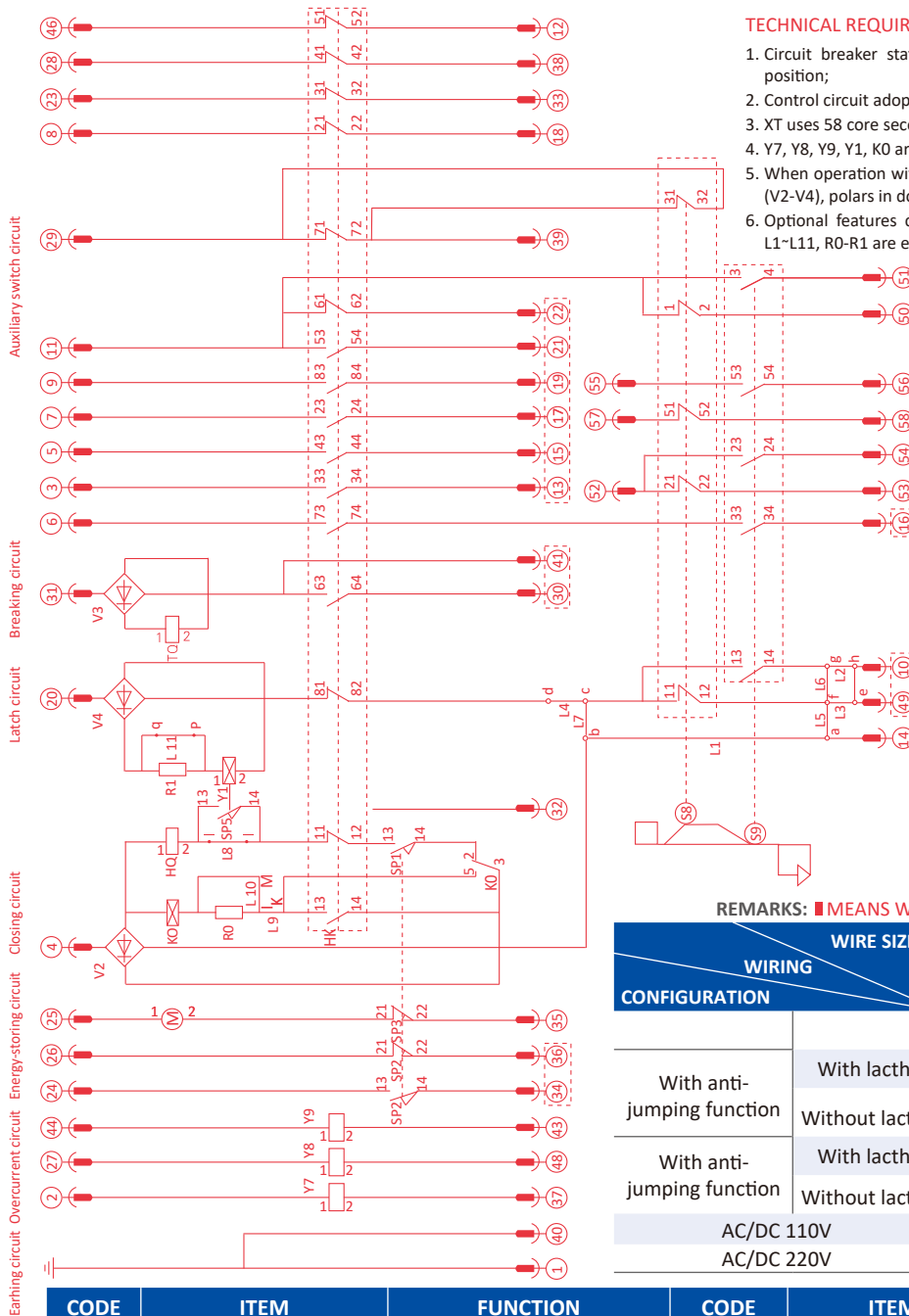
ITEMS	CLOSE COIL		OPEN COIL		LATCH COIL		ANTI-JUMPING RELAY	
The rated work voltage	DC220	DC110	DC220	DC110	DC220	DC110	DC220	DC110
Rated working current	1.1	2.2	1.1	2.2	25mA		9.1mA	
Rated power	242	242	242	242	2.7		1	
Scope of working voltage	85%–110% of the rated voltage		65%–120% of the rated work voltage. The breaker can't open if less than 30% of the rated work voltage.					

SECONDARY CONTROLLING CIRCUIT SCHEME

CONTROLLING VOLTAGE	LATCH SCHEME	ANTI-JUMPING SCHEME	UNDER VOLTAGE RELEASE SCHEME	OVER-CURRENT RELEASE SCHEME		
AC220V	with latch	with anti-jumping relay	with under voltage release	with over-current release	Quantity of over-current release	The value of moving current
DC220V					One set/Two sets/ Three sets	3.5/5/7.5/10A
AC110V	without latch	without anti-jumping relay	without under voltage release	without over-current release		
DC110V						

Schematic Diagram

PICTURE-1 : VS1 WITHDRAWABLE TYPE VACUUM CIRCUIT BREAKER ELECTRICAL CONTROLLING SCHEMATIC DIAGRAM



TECHNICAL REQUIREMENTS:

1. Circuit breaker state is not stored energy, open, position testing position;
2. Control circuit adopts 1mm² wire; earthing wire adopts 2.5mm²;
3. XT uses 58 core secondary socket plug;
4. Y7, Y8, Y9, Y1, K0 are optional parts;
5. When operation with direct voltage, cancel bridge rectifier elements (V2-V4), polars in dotted line frame should be same;
6. Optional features configuration refer to chart (remark: K0, V2-V4, L1~L11, R0-R1 are elements on circuit board).

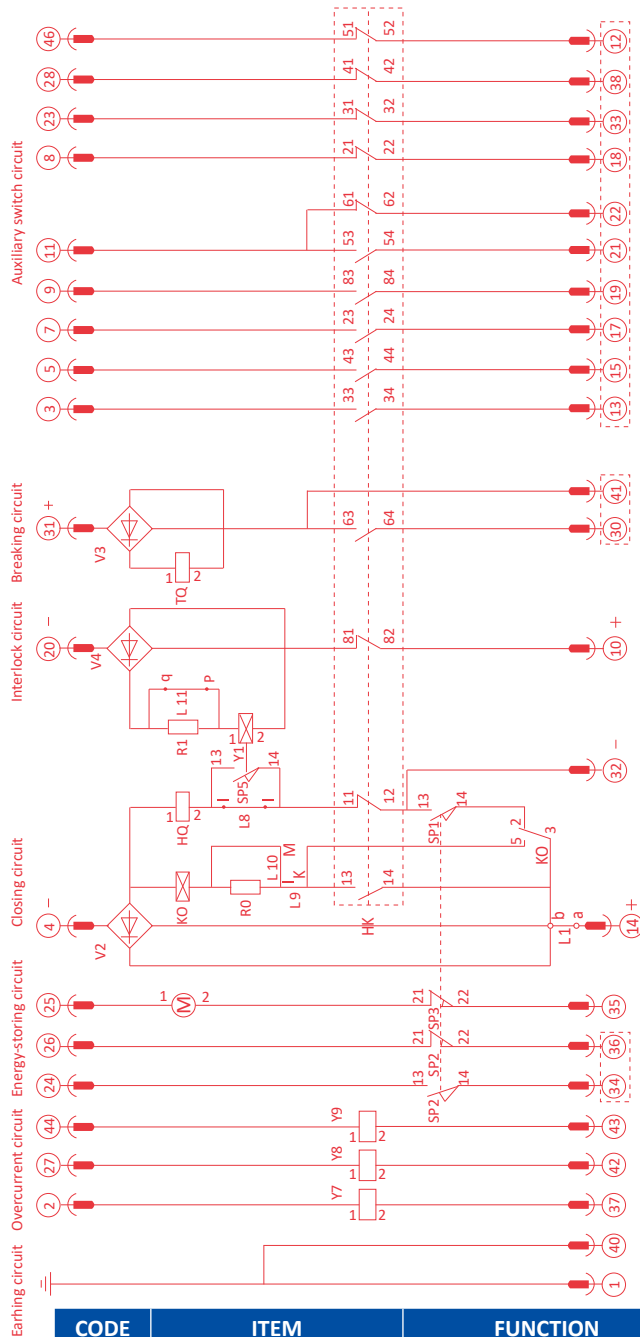
REMARKS: ■ MEANS WIRING, BLANK SPACE MEAN BREAK

WIRING CONFIGURATION		WIRE SIZE										
		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11
With anti-jumping function	With lath	■	■	■	■					■		
	Without lath					■	■	■	■			
With anti-jumping function	With lath	■	■	■	■							
	Without lath					■	■	■	■			
AC/DC 110V											■	■
AC/DC 220V												

CODE	ITEM	FUNCTION	CODE	ITEM	FUNCTION
HQ	Close coil	Control switch close	SP1 ~ SP3	Microswitch	To cut after closing spring stored energy
TQ	Open coil	Control switch open	SP5	Limit switch	To realize latch function
M	Energy storing motor	To store energy when switch is closed	S8	Chassis auxiliary switch	To cut when in testing position
HK	Auxiliary switch	To cut when close/open operation	S9	Chassis auxiliary switch	To cut when in working position
V2-V4	Rectifier elements	To rectify the circuit	Y1	Latch coil	To close latch circuit
XT	Secondary socket plug	Control lines summary	R0-R1	Resistance	Partial pressure resistance
LXΦ	Connecting terminal	To connect chassis wiring	Y7 ~ Y3	Overcurrent release	Overcurrent protection
KO	Anti-jump relay	To avoid switch to jump	L1 ~ L11	Connecting wire	To realize functional shift

Schematic Diagram (Cont...)

PICTURE-2 : VS1 FIXED TYPE VACUUM CIRCUIT BREAKER ELECTRICAL CONTROLLING SCHEMATIC DIAGRAM



TECHNICAL REQUIREMENTS:

1. Breaker state is not stored energy, open, position;
2. Control circuit adopts 1mm² wire; earthing wire adopts 2.5mm²;
3. XT uses 46 core secondary socket plug or terminal board;
4. Y7, Y8, Y9, Y1, K0 are optional parts;
5. When operation with direct voltage, cancel bridge rectifier elements (V2-V4), polars in dotted line frame should be same;
6. Optional features configuration refer to chart (remark: K0, V2-V4, L1~L11, R0-R1 are elements on circuit board).

REMARKS: ■ MEANS WIRING, BLANK SPACE MEAN BREAK

WIRING CONFIGURATION		WIRE SIZE										
		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11
With anti-jumping function	With lach	■								■		
	Without lach	■		■					■	■		
With anti-jumping function	With lach	■										
	Without lach	■							■			
AC/DC 110V											■	■
AC/DC 220V												

CODE	ITEM	FUNCTION	CODE	ITEM	FUNCTION
HQ	Close coil	Control switch's close	SP1 ~ SP3	Microswitch	To cut after closing spring stored energy
TQ	Open coil	Control switch's open	SP5	Limit switch	To realize latch function
M	Energy storing motor	To store energy when switch is closed	Y1	Latch coil	To close latch circuit
HK	Auxiliary switch	To cut when close/open operation	R0-R1	Resistance	Partial pressure resistance
V2-V4	Rectifier elements	To rectify the circuit	Y7 ~ Y9	Overcurrent release	Overcurrent protection
XT	Secondary socket plug	Control lines summary	L1 ~ L11	Connecting wire	To realize functional shift
LXΦ	Connecting terminal	To connect chassis wiring			
KO	Anti-jump relay	To avoid switch to jump			

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