

VBC-12 系列环保固封式真空断路器

Series eco-friendly solid vacuum circuit breaker

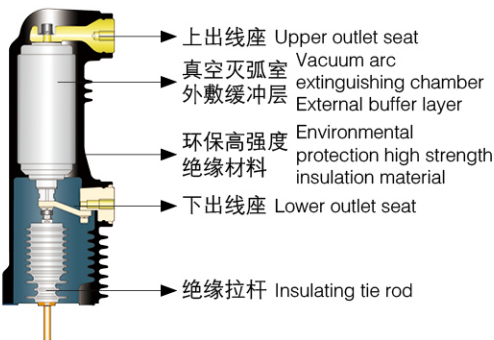


ZGBC

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固封真空断路器
Solid vacuum circuit breaker



固封极柱立体透视
Solid poles perspective

概述 Outline

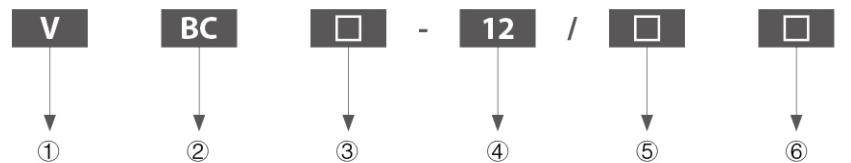
VBC-12 系列环保固封式真空断路器（以下简称断路器）是三相交流 50Hz，额定电压为 12kV 的户内开关设备，可供工矿企业、发电厂及变电站作电气设施的控制和保护之用，并适用于频繁操作的场所。

- 符合 GB1984-2003《交流高压断路器》
- 符合 JB3855-1996《3.6-40.5kV 户内交流高压真空断路器》
- 符合 DL403-91《10-35kV 户内交流高压断路器订货技术条件》标准要求
- 符合 IEC62271-100 的相关要求
- 断路器采用操动机构与断路器本体一体式设计，既可做为固定安装单元，也可配有专用推进机构，组成手车单元使用

VBC-12 series eco-friendly solid vacuum circuit breaker (hereinafter referred to as circuit breaker) is a three-phase indoor switchgear of AC50Hz and rated voltage of 12 kV, used to control and protect the electric devices in industrial and mining enterprises, power plants, transformer substations, meanwhile, it can be used for the locations where requires frequent operation.

- Accordance with GB1984-2003 < High-voltage alternating current circuit-breakers >
- Accordance with JB3855-1996 < Indoor high-voltage alternating-current vacuum circuit breaker of 3.6-40.5kV >
- Accordance with DL403-91<Specification for indoor high-voltage alternating-current circuit breaker of 10-35kV>
- Conformity with relevant requirements of IEC62271-100
- Due to its integrated design of operating mechanism and body of circuit breaker, this circuit breaker not only can be used as a fixed installation unit, but also can be equipped with a driving mechanism and form into handcart unit for using

断路器型号、名称及含义 Circuit breaker type description



- | | |
|------------------|--|
| ① 环保固封式真空断路器 | ① Eco-friendly solid vacuum circuit breaker |
| ② 江苏北辰电气设备有限公司 | ② JIANGSU BEICHEN ELECTRIC EQUIPMENT CO.,LTD |
| ③ R- 固定式；无 - 手车式 | ③ R-Fixed type; No-Handcart type |
| ④ 额定电压 (kV) | ④ Rated voltage (kV) |
| ⑤ 额定电流 (A) | ⑤ Rated current (A) |
| ⑥ 额定短路开断电流 (kA) | ⑥ Rated short-circuit breaking current (kA) |



产品特点 Features

- ◎ VBC-12 采用成熟的弹簧操作机构，性能稳定、可靠、寿命长、操作简单、优秀的防腐能力，寿命期内只需极少维护
- ◎ VBC-12 固封极柱采用环保高强度绝缘材料，海拔高度可达 2000 米，独特的触头材料和一次梅花触头应用，使 VBC-12 固封真空断路器适用于中压系统的各种场合
- ◎ 所有产品出厂前经过数百次机械操作磨合试验，确保了产品性能处于最稳定的阶段
- ◎ 外形尺寸和配柜联锁方式与国内主流中压开关柜 KYN28 柜完全兼容，通用性高，大大降低设计费用
- ◎ 采用先进的进口测试设备，真实记录每一台产品的空载机械特性，并向用户提供这些特性曲线，确保产品质量的可靠性
- ◎ 按 GB1984-2003 中延长的电寿命 E2 级、延长的机械寿命 M2 级及容性电流开合具有非常低的重击穿概率 C2 级型式试验
- ◎ 产品装配采用工装保证尺寸的一致性，所有产品在出厂前均进行过标准柜的推柜试验，保证了产品的可互换性和通用性
- ◎ VBC-12 uses a mature spring operating mechanism, stable, reliable, long life, simple operation, excellent corrosion resistance, life expectancy is only minimal maintenance
- ◎ VBC-12 solid sealing pole of the use of environmentally friendly high strength insulation material, with an altitude of 2000 meters above sea level, a unique contact material and a plum blossom contact application, so that the VBC-12 sealed vacuum circuit breaker is suitable for medium pressure system of various occasions
- ◎ All products have been tested in hundreds of times before the factory, to ensure the performance of the product is in the most stable stage
- ◎ The shape size and the type of the interlocking system are fully compatible with the domestic mainstream medium voltage switchgear KYN28 cabinet, and the design cost is greatly reduced
- ◎ The use of advanced imported test equipment, the real record of the no-load mechanical characteristics of each product, and to provide users with these characteristics curve, to ensure the reliability of product quality
- ◎ According to extend the GB1984-2003 electrical life of E2 level and prolong the life of machine m2 and volume of current switching has very low restrike probability C2 type test
- ◎ Product assembly use fixture ensure size consistency, all products in the factory have been standard cabinet push test cabinet, to ensure the product interchangeability and versatility





应用领域 Application field

- | | |
|---|-----------------------------|
| ○ 化工工业 | ○ 汽车工业 |
| ○ 石油工业 | ○ 发电厂 |
| ○ 管道工业 | ○ 纺织及食品工业 |
| ○ 海上工业 | ○ 冶金工业 |
| ○ 造船工业 | ○ 造纸工业 |
| ○ 变电所、变电站 | ○ 露天煤矿 |
| ○ 水泥工业 | |
| ○ Chemical Industry | ○ Auto industry |
| ○ Petroleum Industry | ○ Power plant |
| ○ Pipeline Industry | ○ Textile and food industry |
| ○ Maritime Industry | ○ Metallurgical Industry |
| ○ Shipbuilding Industry | ○ Paper Industry |
| ○ Substation and transformer substation | ○ Opencut coal mine |
| ○ Cement Industry | |

使用环境条件 Environmental conditions

- 环境温度：不高于 +40 °C，不低于 -15 °C (允许在 -30°C时储运) ；
- 海拔高度可达 2000 米；
- 空气相对湿度：日平均值不大于 95%，月平均值不大于 90%；
- 饱和蒸汽压：日平均值不大于 2.2×10^{-3} MPa，月平均值不大于 1.8×10^{-3} MPa；
- 地震烈度不超过 8 级；
- 无火灾、爆炸、严重污秽、化学腐蚀以及剧烈震动的场所。
- Environmental temperature: -15 °C ~ +40 °C (warehousing and transportation at -30 °C is permissible) ；
- Altitude $\geq 2000\text{m}$;
- Air relative humidity: daily average $\leq 95\%$, monthly average $\leq 90\%$;
- Saturated vapor pressure: daily average $\leq 2.2 \times 10^{-3}$ MPa, monthly average $\leq 1.8 \times 10^{-3}$ MPa;
- Seismic intensity ≤ 8 level;
- Installation places without fire, explosion, serious filthy, chemical corrosion and violent vibration.

可选配件 Optional accessories



储能手柄
Energy storage handle



小车摇手柄
Car shake handle



升车
Lift car



中压供电系统中控制与保护的最好选择

Optimal selection of control and protection for medium voltage power supply and distribution system

- ◎ 环保固封式真空断路器所配操作机构是性能优异的弹簧储能机构，采用一体化设计，使机构主件分布更优化、机构更简单、性能更稳定。机构部分组装维护非常简单，而储能机构由链轮结构、传动装置及合闸弹簧组成，机构紧凑、小巧。操作机构通常都配有手动储能装置与电动储能装置，可实现自动重合闸功能。
- ◎ 手动储能操作机构的断路器通常设有手动分合操作按钮，断路器位置指示及弹簧机构储能状态指示器，开关操作次数计数器，分励脱扣，辅助开关，位置和故障信号等装置。
- ◎ 电动储能操作机构的断路器：增设储能电机，分励脱扣器，防跳继电器，储能电机脱扣器的辅助开关。
- ◎ 还可以根据具体要求提供以下附件：欠压脱扣器、过流继电器等。
- ◎ Eco-friendly solid vacuum circuit breaker with the operating mechanism is the outstanding performance of the spring energy storage mechanism, the use of integrated design, so that the distribution of the main parts of the mechanism more optimized, more simple, more stable performance. Part of the body assembly and maintenance is very simple. And the energy storage mechanism is composed of a chain wheel structure, transmission device and closing spring, compact structure, small. The operating mechanism is usually equipped with a manual energy storage device and an electric energy storage device, which can realize the function of automatic coincidence gate.
- ◎ Manual storage to the operating mechanism of the circuit breaker is usually equipped with manual operation button, the storage of breaker position indicator and a spring mechanism can status indicator, switching frequency counter, shunt release, auxiliary switch, location and fault signal device.
- ◎ Operating mechanism of the circuit breaker: additional energy storage motor shunt tripping device, anti jump relay, energy storage motor circuit breaker auxiliary switch of electric energy storage.
- ◎ Can also provide the following attachments according to specific requirements: undervoltage tripping device, overcurrent relay etc.

主要技术参数 The main technical parameters

◎ 主要规格及技术参数 Main specifications and technical parameters

序号 No.	项目 Item		单位 Unit	数值 Data			
1	额定电压 Rated voltage		kV	12			
2	额定绝缘水平 Rated insulation level	额定雷电冲击耐受电压峰值 Rated lightning impulse withstand voltage (peak)		75			
		1 min 工频耐压 1 min power frequency withstand voltage		42			
3	额定短路开断电流 Rated short-circuit breaking current		kA	20	25	31.5	40
4	额定电流 Rated current		A	630、1250		630、1250 1600、2000 2500、3150	1250、1600 2000、2500 3150、4000
5	额定热稳定电流（有效值） Rated short-time withstand current (effective value)		kA	20	25	31.5	40
6	额定动稳电流（峰值） Rated peak withstand current (peak)			50	63	80	100
7	额定短路关合电流（峰值） Rated short-circuit making current (peak)			50	63	80	100
8	额定短路开断电流开断次数 Rated short-circuit breaking current breaking times		次 times	80		50	30
9	二次回路工频耐受电流（1min） Power frequency withstand voltage of secondary circuit (1 min)		V	2000			
10	额定操作顺序 Rated operation sequence			分 -0.3s- 合分 -180s- 合分 O-0.3S-CO-180S-CO 分 -180s- 合分 -180s- 合分（40kA） O-180S-CO-180S-CO (40kA)			
11	额定热稳定时间 Rated thermal stability time		s	4			
12	额定单个 / 背对背电容器组开断电流 Rated breaking current of single/back-to-back capacitor bank		A	630/400			800/400
13	机械寿命 Mechanical life		次 times	20000			10000

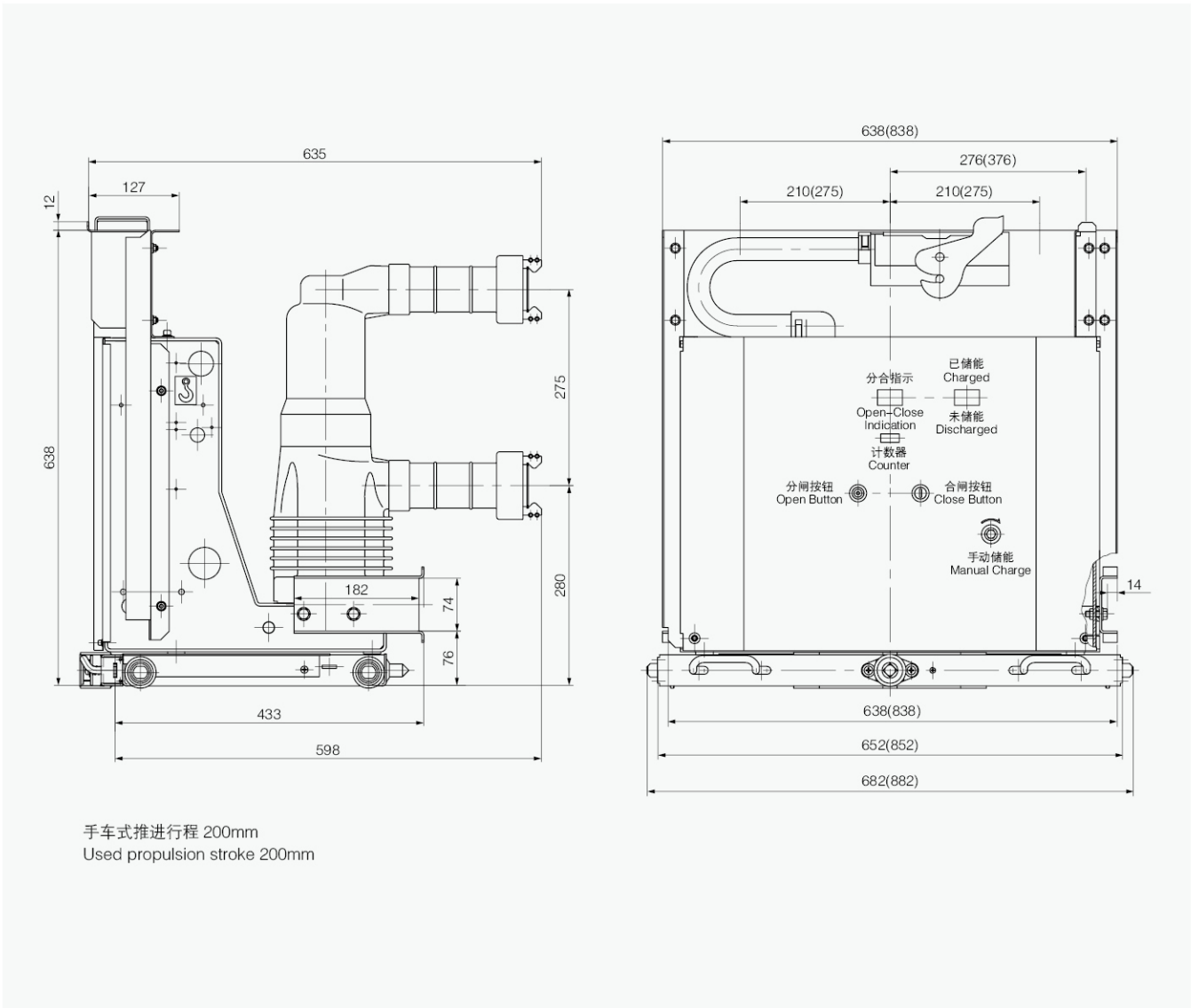
◎ 断路器装配调整后机械特性参数 Mechanical property parameters of circuit breaker assembly and regulation

序号 No.	项目 Item	单位 Unit	数值数值 Data	
1	触头开距 Clearance between open contacts	mm	9 ± 1	
2	接触行程 Contacting travel		3.5 ± 0.5	
3	平均合闸速度 (6mm~ 触头闭合) Average closing speed (6mm~contacts close)	m/s	0.6 ± 0.2	
4	平均分闸速度 (触头分开 ~6mm) Average opening speed (contacts open~6mm)		1.1 ± 0.2	
5	分闸时间 (额定电压) Opening time (rated voltage)	m/s	20~50	
6	合闸时间 (额定电压) Closing time (rated voltage)		35~70	
7	触头合闸弹跳时间 Contact closing bounce time	ms	≤ 2	≤ 3 (40kA)
8	三相分闸不同期性 Three-phase opening asynchrony		≤ 2	
9	动、静触头允许磨损累积厚度 Permissible war thickness of moving and static contacts	mm	3	
10	主导电回路电阻 Resistance of main conductive circuit	μ Ω	≤ 50 (630A) 、 ≤ 45 (1250A) ≤ 35 (1600~2000A) 、 ≤ 25 (2500A 以上)	
11	合闸触头接触压力 Contacting pressure of closing contact	N	2000 ± 200 (20kA) 、 2400 ± 200 (25kA) 3100 ± 200 (31.5kA) 、 4500 ± 250 (40kA)	

◎ 分合闸线圈参数 Parameters of opening and closing coils

序号 No.	项目 Item	合闸线圈 Closing coil	分闸线圈 Opening coil	备注 Remark
1	额定操作电压 (V) Rated operating voltage (V)	AC110/220 DC110/220	AC110/220 DC110/220	分闸线圈在小于 30% 额定操作电压时, 不得分闸 Opening coli should not open when it is lower than 30% of rated operating voltage.
2	线圈功率 (W) Coil power (W)	245	245	
3	正常工作电压范围 Range of mornal working voltage	85%~110% 额定电压 85%~110% of rated voltage	65%~120% 额定电压 65%~120% of rated voltage	

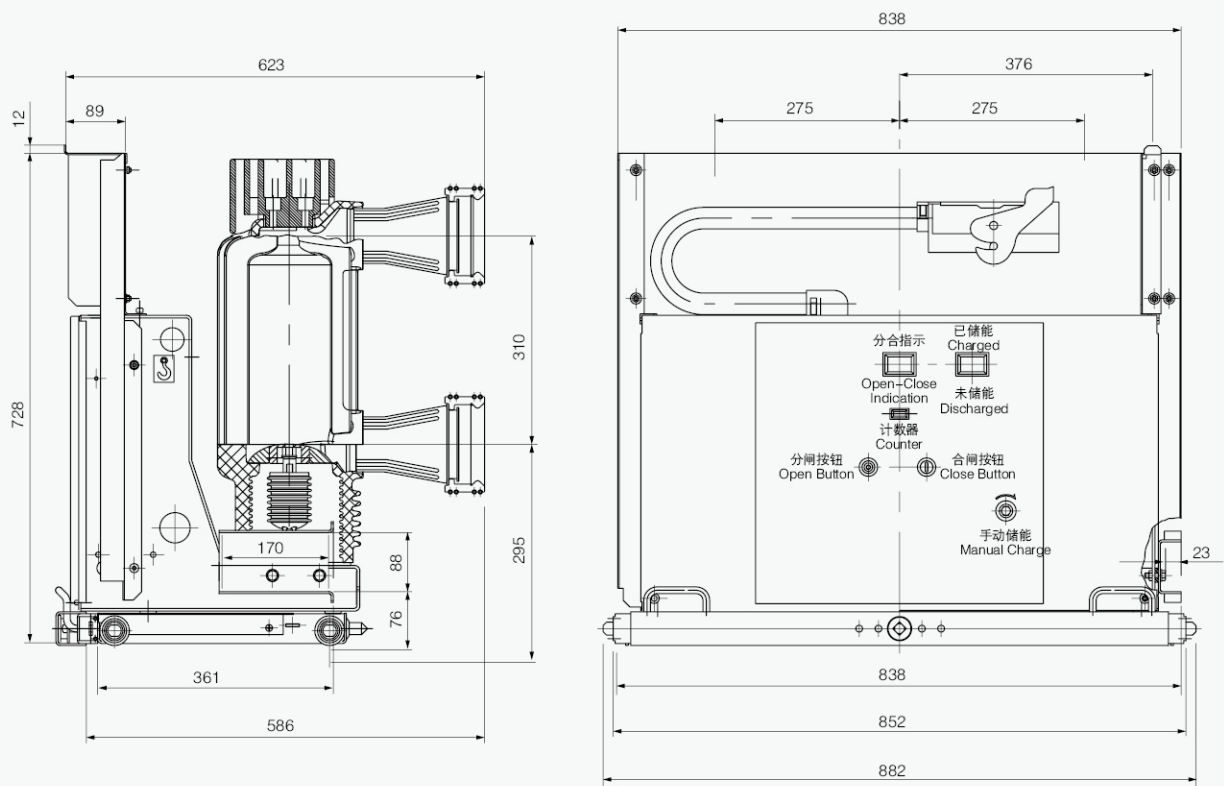
产品外形尺寸图 (手车式) (mm)
Product outline dimension (handcart type) (mm)



VBC-12 手车式固封真空断路器 800 宽外形尺寸图
VBC-12 handcart solid vacuum circuit breaker 800 W dimensions

序号 No.	项目 Item	数值 Data		
1	额定电流 (A) Rated current (A)	630	1250	1600
2	额定短路开断电流 (kA) Rated short-circuit breaking current (kA)	20、25、31.5	25、31.5、40	31.5、40
3	配合静触头尺寸 (mm) Dimension for matching static contact (mm)	φ 35	φ 49	φ 55
4	相间距离 (mm) Phase-to-phase distance (mm)	210 ± 1.5		

注：尺寸为相距 275mm 的配小电流 1000 宽柜子的图
Note: Dimensions in brackets with a small distance of 275mm wide cabinets current 1000 figure

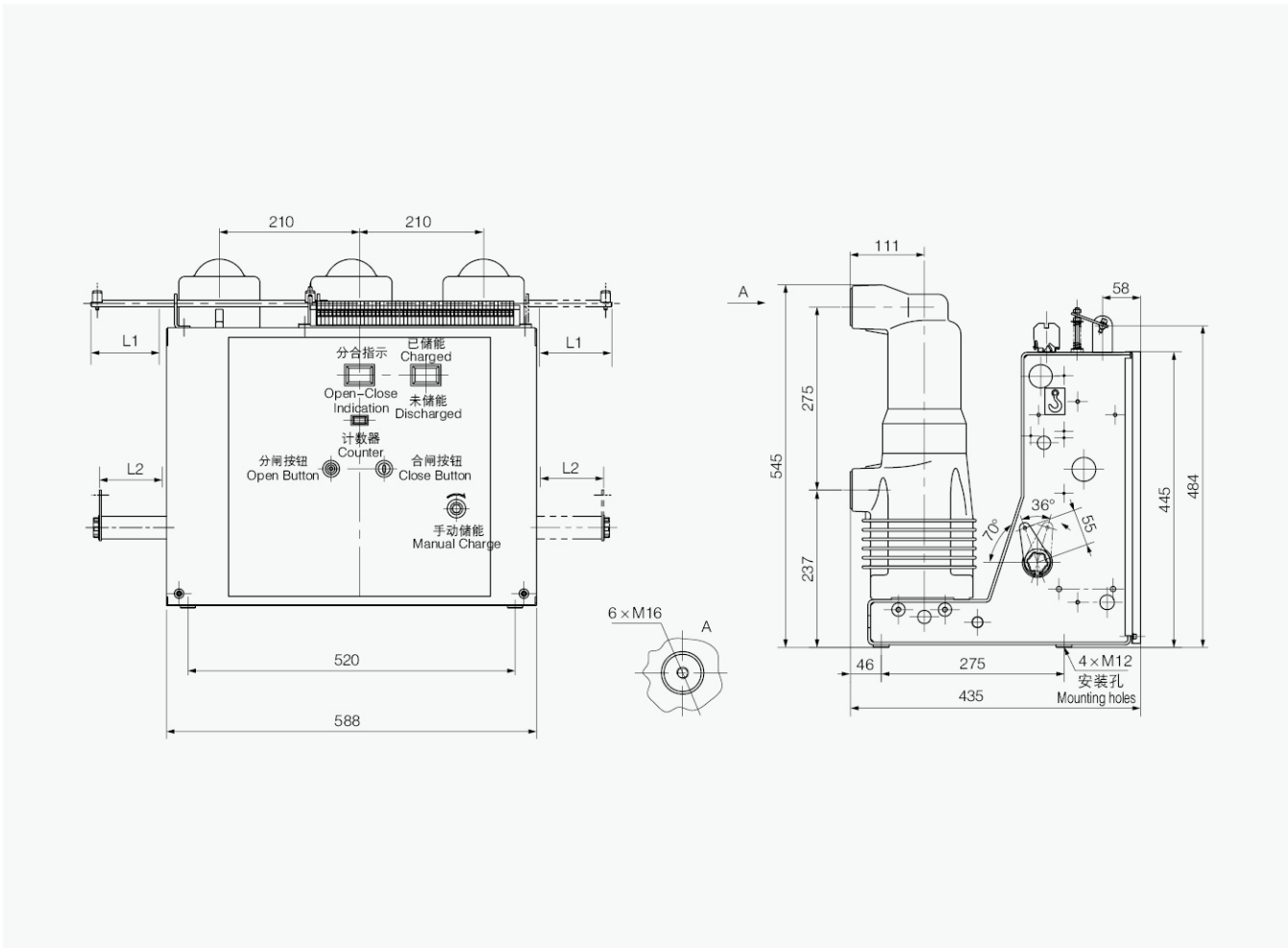


手车式推进行程 200mm
Used propulsion stroke 200mm

VBC-12 手车式固封真空断路器 1000 宽外形尺寸图
VBC-12 handcart solid vacuum circuit breaker 1000 W dimensions

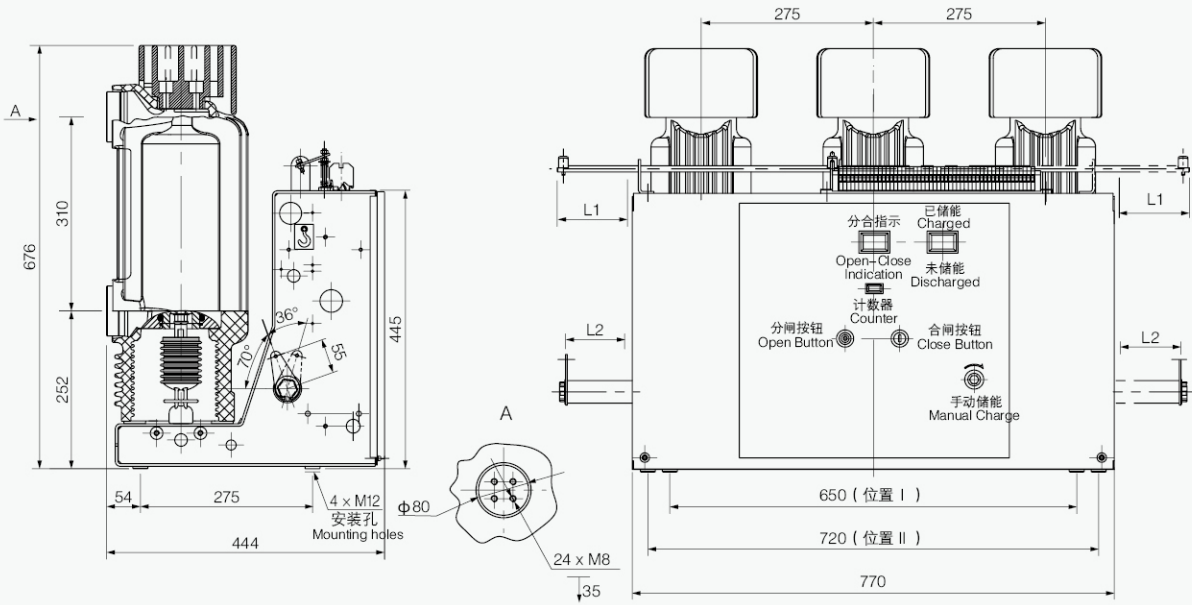
序号 No.	项目 Item	数值 Data				
1	额定电流 (A) Rated current (A)	1600	2000	2500	3150	4000
2	额定短路开断电流 (kA) Rated short-circuit breaking current (kA)	31.5、40		31.5、40		40
3	配合静触头尺寸 (mm) Dimension for matching static contact (mm)	φ 79		φ 109		
4	相间距离 (mm) Phase-to-phase distance (mm)	275 ± 1.5				

产品外形尺寸图 (固定式) (mm)
Product outline dimension (fixed type) (mm)



VBC-12 固定式固封真空断路器 800 W 外形尺寸图
VBC-12 fixed solid vacuum circuit breaker 800 W dimensions

序号 No.	项目 Item	数值 Data		
1	额定电流 (A) Rated current (A)	630	1250	1600
2	额定短路开断电流 (kA) Rated short-circuit breaking current (kA)	20、25、31.5	25、31.5、40	31.5、40
3	相间距离 (mm) Phase-to-phase distance (mm)	210±1.5		
4	机构顶部联锁 L1 (mm) Top interlock mechanism L1 (mm)	50、120、150、200 (联锁分左或右伸出, 长度可按客户要求定制) (Interlocking points left or right out, length can be customized according to customer requirements)		
5	机构主轴联锁 L2 (mm) Spindle inerlock mechanism L2 (mm)	36、106、136、186 (联锁分左或右伸出, 长度可按客户要求定制) (Interlocking points left or right out, length can be customized according to customer requirements)		

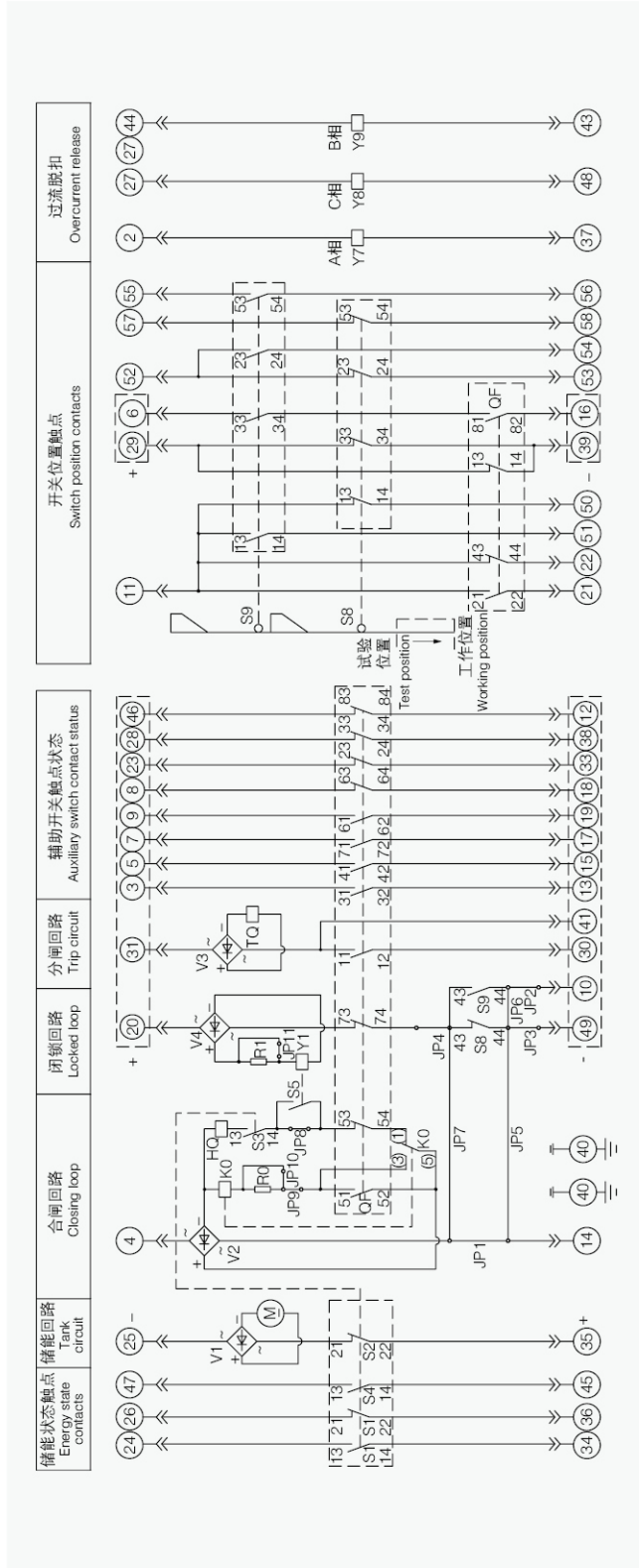


VBC-12 固定式固封真空断路器 1000 宽外形尺寸图
VBC-12 fixed solid vacuum circuit breaker 1000 W dimensions

序号 No.	项目 Item	数值 Data				
1	额定电流 (A) Rated current (A)	1600	2000	2500	3150	4000
2	额定短路开断电流 (kA) Rated short-circuit breaking current (kA)	31.5、40				40
3	相间距离 (mm) Phase-to-phase distance (mm)	275 ± 1.5				
4	机构顶部联锁 L1 (mm) Top interlock mechanism L1 (mm)	50、120、150、200 (联锁分左或右伸出，长度可按客户要求定制) (Interlocking points left or right out, length can be customized according to customer requirements)				
5	机构主轴联锁 L2 (mm) Spindle inerlock mechanism L2 (mm)	36、108、136、186 (联锁分左或右伸出，长度可按客户要求定制) (Interlocking points left or right out, length can be customized according to customer requirements)				

VBC-12 系列环保固封式真空断路器二次控制接线图 (手车式)

VBC-12 series eco-friendly solid vacuum circuit breaker secondary control wiring diagram (handcart type)



可选件接线图:
Optional wiring deployment:

可选项接线适配: Optional wiring deployment:										操作电源选择: Operating power selection:				1-m	q-p			
跳线状态 State of jumper wire		跳线 Jumper wire		a-b	h-g	e-f	c-d	a-f	a-g	b-c	i-j	l-k	跳线状态 State of jumper wire		跳线 Jumper wire	JP10	JP11	
配置 Configuration				JP1	JP2	JP3	JP4	JP5	JP6	JP7	JP8	JP9	配置 Configuration					
带防锁 With anti-trip				带闭锁 With locking	✓	✓	✓	/	/	/	/	✓	AC/DC220V				/	/
				无闭锁 without locking	/	/	/	✓	✓	✓	✓	✓					✓	✓
无防锁 Without anti-trip				带闭锁 With locking	✓	✓	✓	/	/	/	/	/	AC/DC110V				✓	✓
				无闭锁 without locking	/	/	/	✓	✓	✓	✓	✓					✓	✓

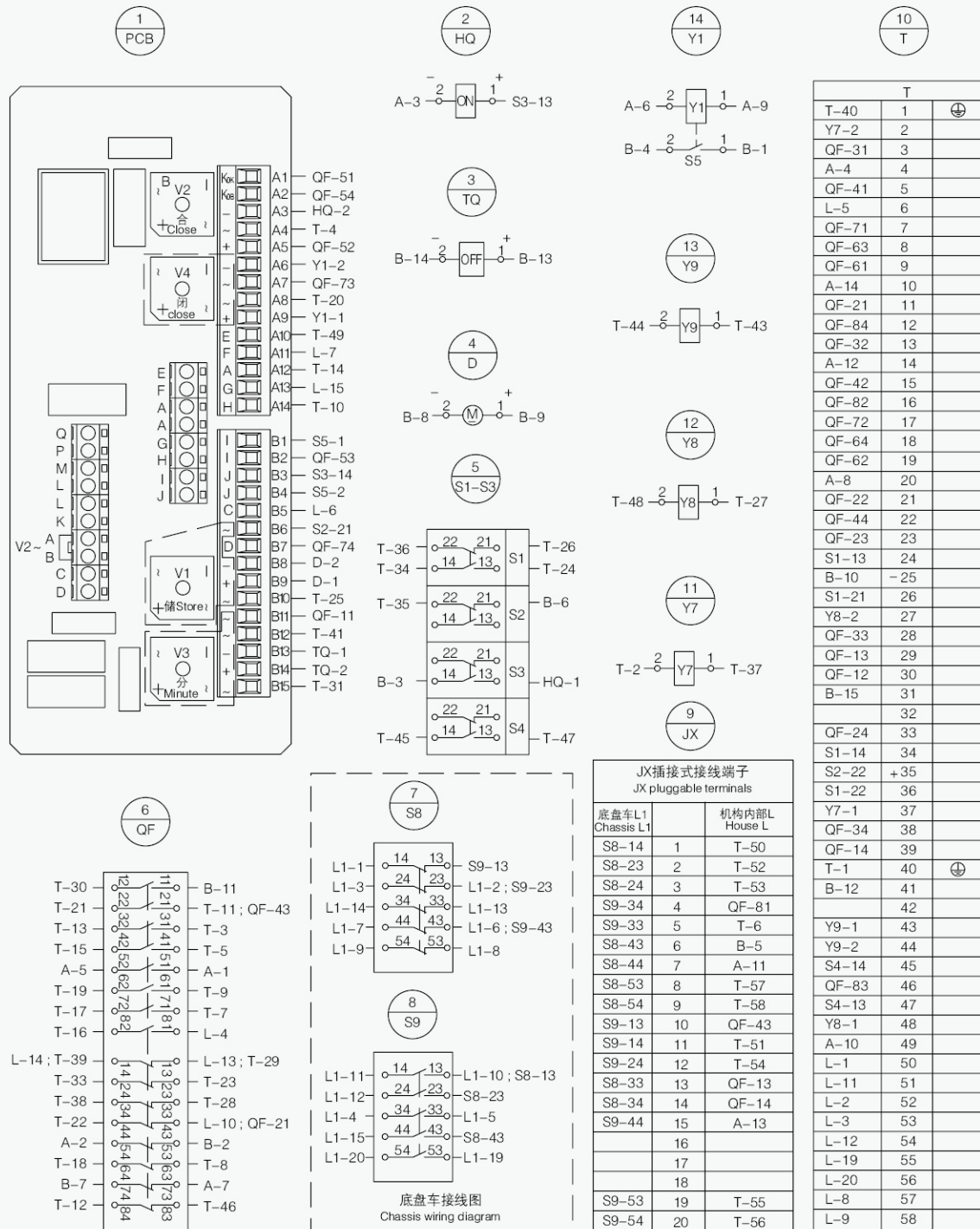
注: "1" 表示断开, "√" 表示连接 Note: "1" means breaking, "√" means making

T (1-58) 58 芯航空插头 58 core plug
Y7-Y9 过流脱扣线圈 (可选) Overcurrent tripping coil (optional)
K0 内部防跳继电器 (可选) Internal anti-tripping relay (optional)
V1-V4 整流器 Rectifier
Y1 储能电机 Energy-storage motor
R0-R1 电阻 Resistor
HQ 合闸脱扣线圈 Closing trip coil

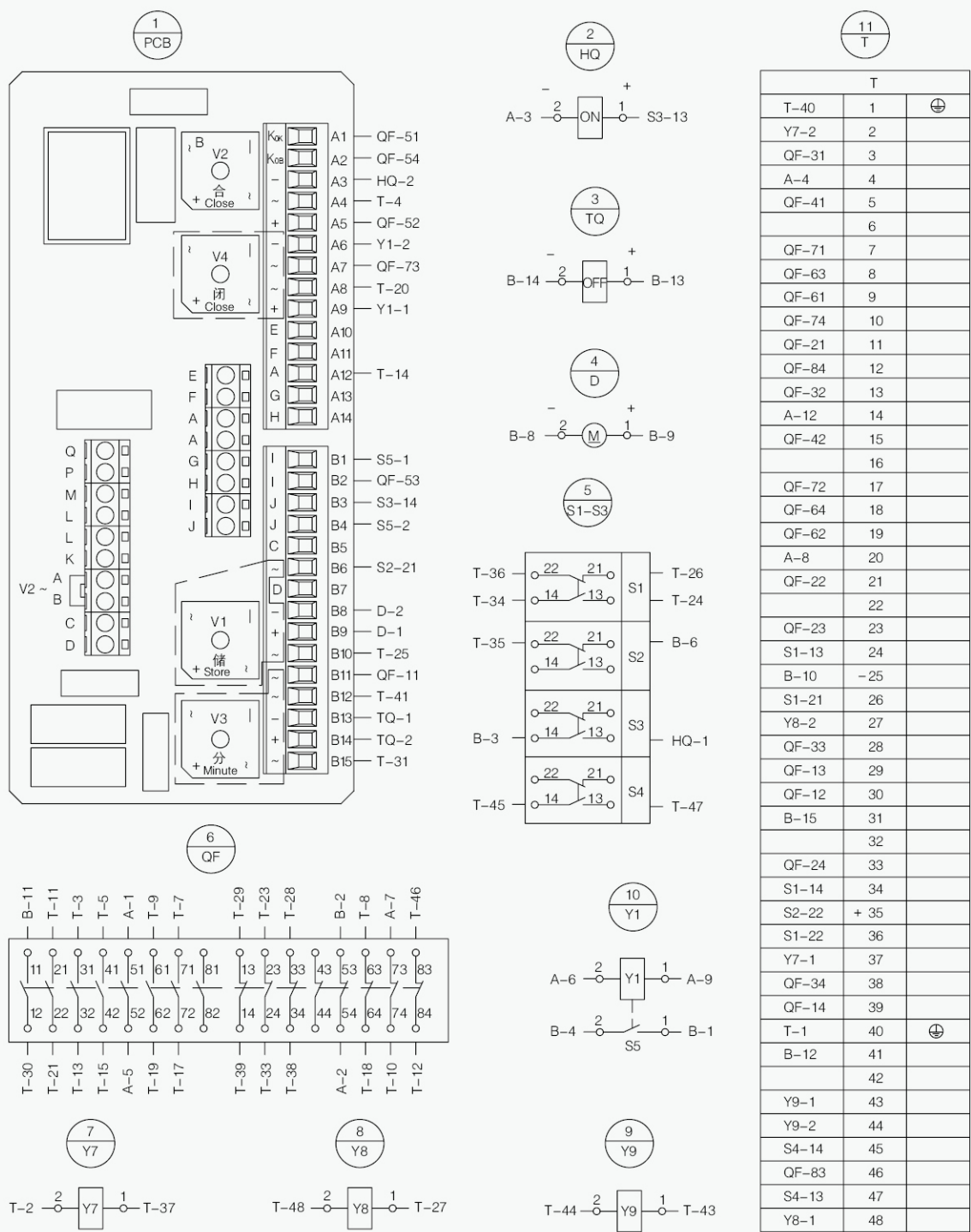
TQ 分闸脱扣线圈 Tripping trip coil
S9 辅助开关 (工作位置切换) Auxiliary switch (working position switch)
S8 辅助开关 (试验位置切换) Auxiliary switch (test position switch)
JP1-JP11 跳线 Jumper
S5 闭锁电磁铁驱动开关 (可选) Latching solenoid micro switch (optional)
S1-S4 行程开关 (合闸弹簧储能后切换) Limit switch (switch after closing springs charged)
QF 辅助开关 8 开 8 闭 (分合闸时切换) Auxiliary switch 8 ON 8 closed (open and close when the switch)

注: 1. 断路器处于试验位置, 分闸且未储能状态。
2. 当为直流电源操作时虚线框中的极性应相同, 电机应按图示极性接线。
Note: 1.Circuit breaker in the test position opening and no energy state.
2.When is the DC power operation dashed box should be the same polarity, the polarity of the motor wiring should be shown.

VBC-12 手车式内部电气原理图
VBC-12 Internal electric circuit diagram of handcart type

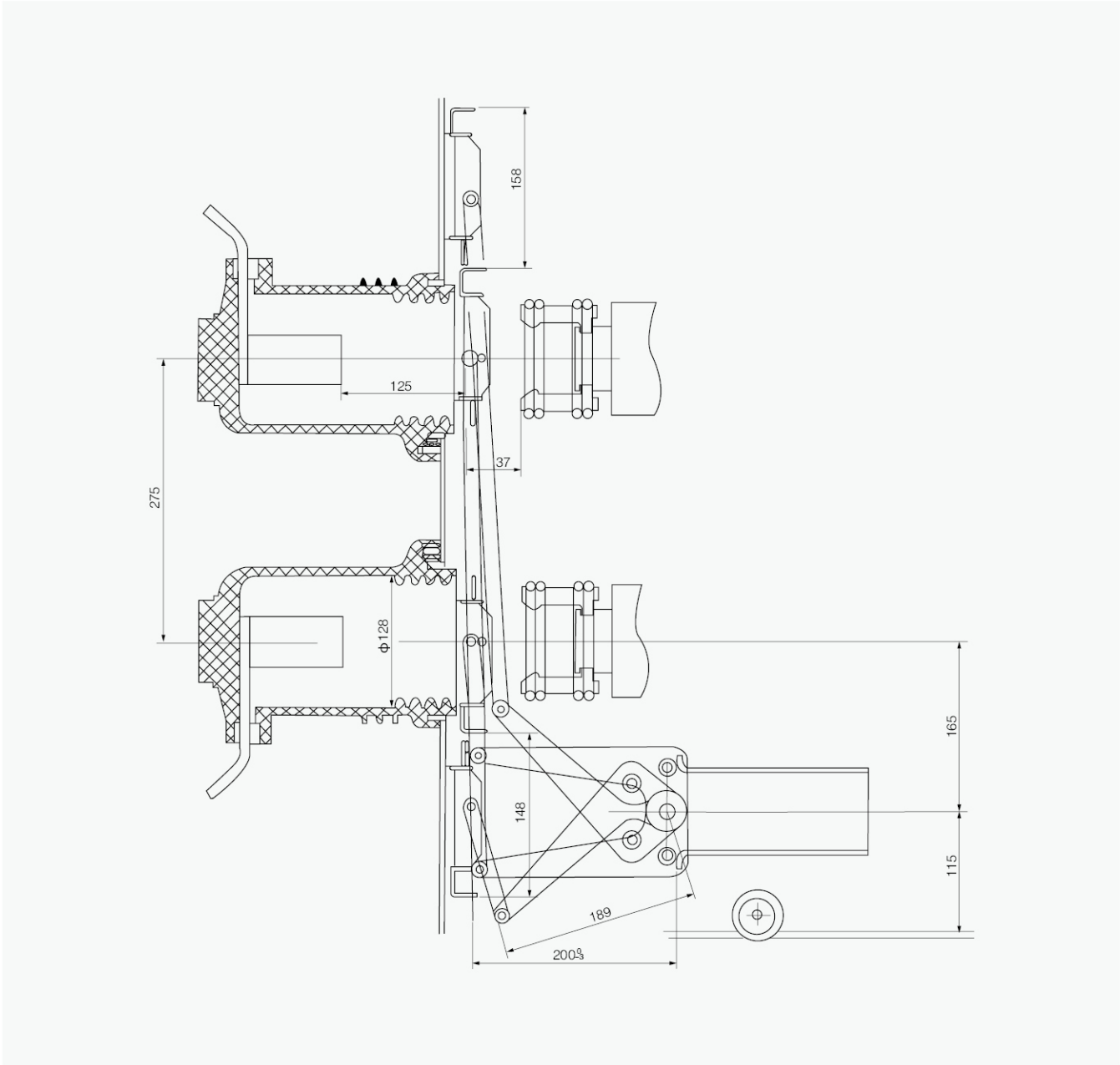






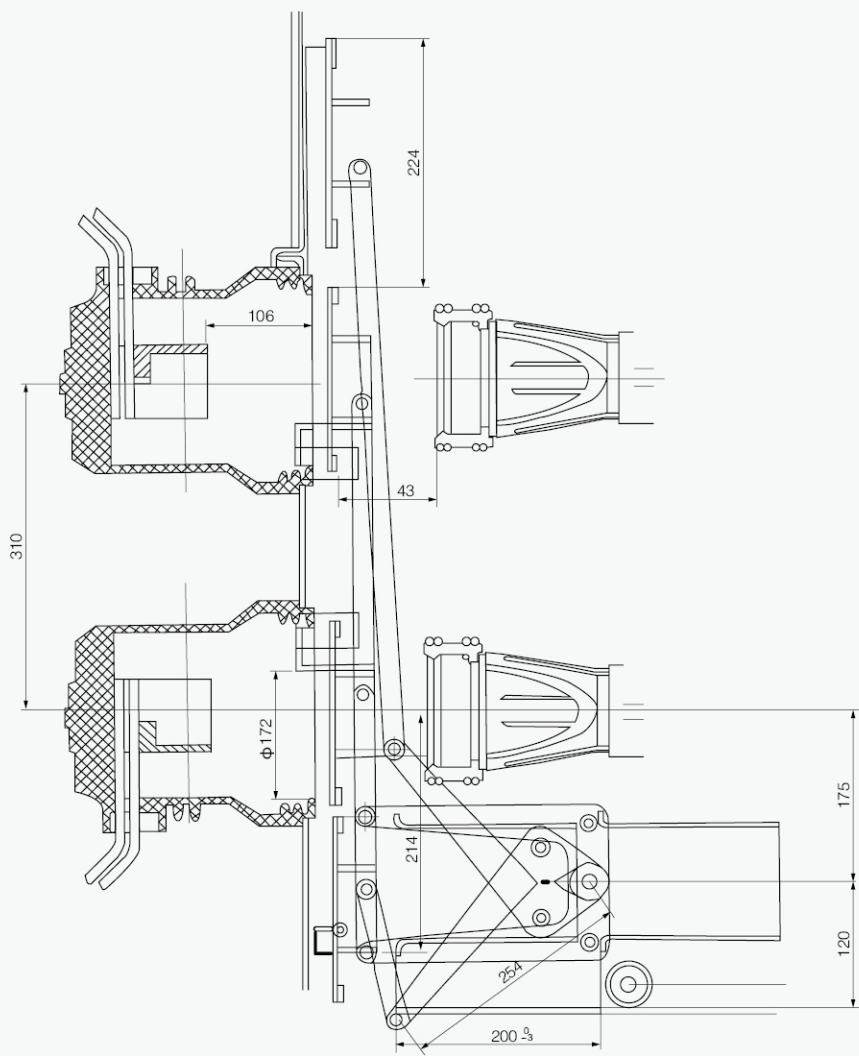
VBC-12 固定式接线图
VBC-12 Wiring diagram of fixed type

VBC-12 系列环保固封式真空断路器宽柜体推荐配合尺寸 (mm)
VBC-12 series eco-friendly solid vacuum circuit breaker cabinet width Recommended fits size (mm)



VBC-12 固封真空断路器 800 宽柜体推荐配合尺寸图
VBC-12 solid vacuum circuit breaker cabinet with 800 wide size map

序号 No.	项目 Item	数值 Data		
1	额定电流 (A) Rated current (A)	630	1250	1600
2	额定短路开断电流 (kA) Rated short-circuit breaking current (kA)	20、25、31.5	25、31.5、40	31.5、40
3	配合静触头尺寸 (mm) Dimension for matching static contact (mm)	Φ35	Φ49	Φ55

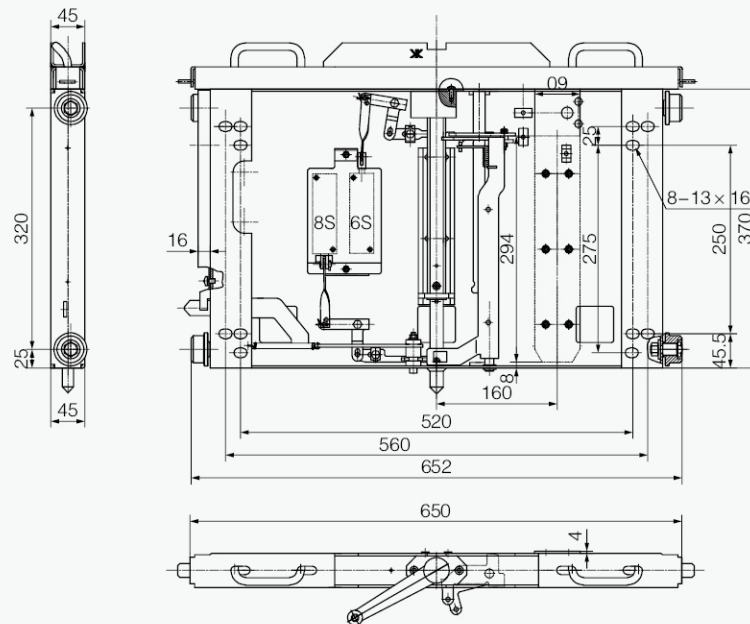


VBC-12 固封真空断路器 1000 宽柜体推荐配合尺寸图
VBC-12 solid vacuum circuit breaker cabinet with 1000 wide size map

序号 No.	项目 Item	数值 Data				
1	额定电流 (A) Rated current (A)	1600	2000	2500	3150	4000
2	额定短路开断电流 (kA) Rated short-circuit breaking current (kA)	31.5、40	31.5、40	31.5、40	31.5、40	40
3	配合静触头尺寸 (mm) Dimension for matching static contact (mm)	Φ 79		Φ 109		

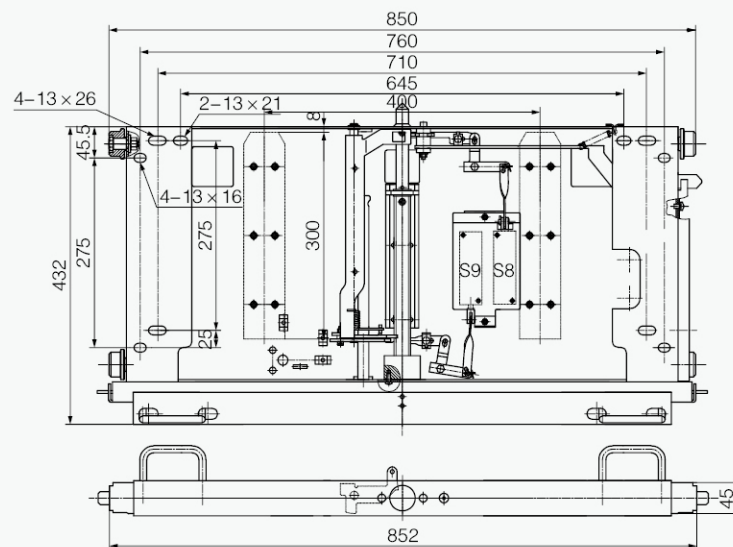
接地装置装配尺寸图 (mm)

Assembly dimension diagram of earthing device (mm)



VBC-12 固封真空断路器 800 接地装置装配尺寸图

VBC-12 solid vacuum circuit breaker 800 grounding device assembly size chart



VBC-12 固封真空断路器 1000 接地装置装配尺寸图

VBC-12 solid vacuum circuit breaker 1000 grounding device assembly size chart

VBC-12 系列环保固封式真空断路器选型表

VBC-12 series eco-friendly solid vacuum circuit breaker selection table

断路器型号 Circuit breaker type

☐ VBC-12 (手车式 handcart type) ☐ VBC-12R (固定式 fixed type)

VBC-12 系列环保固封式真空断路器参数 VBC-12 series eco-friendly solid vacuum circuit breaker parameters

柜体宽度（mm）Cabinet width (mm)	800			1000	
相间距 (mm) Phase space (mm)	210			275	
额定短路开断电流 (kA) Rated short-circuit breaking current (kA)	25	31.5	40	31.5	40
额定工作电流（kA） Rated working current（kA）	☐ 630	☐ 630	☐ 1250	☐ 1600	☐ 1600
	☐ 1250	☐ 1250	☐ 1600	☐ 2000	☐ 2000
		☐ 1600			☐ 2000
					☐ 3150
					☐ 4000

弹簧操作机构技术参数 Technical parameters of spring operating mechanism

储能回路 Energy storage circuit	☐ AC/DC 220V	☐ AC/DC 110V
合闸 / 分闸回路 Closing / opening loop	☐ DC 220V	☐ DC 110V
	☐ AC 220V	☐ AC 110V
合闸闭锁回路 Closing and locking loop	☐ DC 220V	☐ DC 110V
	☐ AC 220V	☐ AC 110V
防跳功能 Anti jump function	☐ 有 Have	☐ 无 no

可选配置 Optional configuration

过流保护 Over current protection	☐ 2 个 5A	☐ 2 个 3.5A	
	☐ 3 个 5A	☐ 3 个 3.5A	
切电容断路器 Cut capacitor circuit breaker	☐ 老练式 Sophisticated type	☐ C2 级 C2 Class	
欠失压保护 (选此项时只能选 2 个过流保护) Under voltage protection (selected 2 over current protection)	☐ 欠失压保护 Under voltage protection	☐ DC 220V ☐ AC 220V	☐ DC 110V ☐ AC 110V
	☐ 带闭锁 With locking ☐ 无闭锁 without locking	☐ DC 220V ☐ AC 220V	☐ DC 110V ☐ AC 110V

固定式技术要求 Fixed technical requirements

联锁 Interlock	左出 Left out _____ mm	右出 Right out _____ mm	
主轴 Spindle	☐ 不伸出框架 Not extending frame	左伸出框架 _____ mm Left frame	右伸出框架 _____ mm Right out frame