

ZW32-12系列户外交流高压真空断路器

ZW32-12 Series Outdoor AC HV Vacuum Circuit Breaker



ZW32-12系列户外柱上交流高压真空断路器(以下简称断路器) 是最高额定电压为12kV, 三相交流50Hz的户外配电设备。主要用于开断、关合电力系统中的负荷电流、过载电流及短路电流。适用于变电站及工矿企业配电系统中作保护和控制之用, 及农村电网频繁操作的场所。也可作为电网的分段开关, 加装控制器后, 可实现配网自动化。

The ZW32-12 series outdoor on-post AC HV vacuum circuit breaker (hereinafter referred to as circuit breaker) is an outdoor distribution equipment in maximum rated voltage of 12kV, and three-phase AC 50Hz. It is mainly used for breaking and switching the load current, overload current and short-circuit current in the power system; and suitable for protection and control of power distribution system in substations and industrial and mining enterprises, and places with frequent operation in the rural power grids. It can also be used as grid sectionalizing switches, and can realize distribution grid automation upon being installed with the controller.

质量稳定, 性能优越

结构特点及工作原理

结构特点

断路器采用三相支柱式结构，具有开断性能稳定可靠，无燃烧和爆炸危险、安全、免维护、体积小、重量轻和使用寿命长等特点。

断路器采用全封闭结构，密封性能好，有防潮、防凝露性能，特别适应于严寒或高温潮湿地区使用。

三相支柱及电流互感器采用进口户外环氧树脂固体绝缘，具有耐高低温、耐紫外线、耐老化的特点。支柱套筒也可根据客户需求使用硅橡胶与户内环氧树脂复合绝缘。

操作机构采用小型化弹簧操动机构，分合闸能耗低；机构传动采用直动传输方式，分合闸部件少，可靠性高。操作机构置于密封的断路器机构箱中，解决了机构锈蚀的问题，提高了机构的可靠性。

断路器的分、合闸可手动或电动操作及远方操作(远方操作须配用相应的带通讯功能的控制器)，可与控制器配套实现配网自动化，也可以与重合控制器配合组成重合器。

断路器可以装设二相或三相CT，可通过箱体内专用复合控制器实现过电流自动脱扣保护使用，也可将二次线引出箱体进行微机控制保护。

加装户外隔离开关和断路器形成一体化，断路器与隔离开关具有可靠的机械联锁装置。

可以与电力负荷监控系统配合使用。

加装外置电子PT，电子PT从互感器中取得电流转换为电压，并具备保护控制的功能，使断路器自具操作电源。

Structural Characteristics and Working Principle

Structural Characteristics

Circuit breaker is used with three-phase pillar structure, and has advantages of stable and reliable breaking performance, no fire or explosion hazard, safety, maintenance-free, compact size, light weight and long service life.

The circuit breaker features totally enclosed structure, excellent sealing, moisture-proof, and anti-condensation, especially suitable for use in cold or hot and humid regions.

Three-phase pillar and current transformer are insulated with imported outdoor epoxy resin solid insulation, having advantages of high and low temperature resistant, UV resistant, and anti-aging. The pillar bushings can also be made of silicone rubber and indoors epoxy-resin composite insulation upon request of the customer.

The operating mechanism is a miniature spring-operated mechanism, featuring low energy consumption for opening and closing; the mechanism drive is in mode of direct drive, featuring fewer opening/closing parts and high reliability. The operating mechanism is placed in a sealed box for circuit-breaker mechanism, thereby solving the problem of corrosion to mechanism, and improving the reliability of mechanism.

The opening and closing of circuit breaker can be manually or electrically operated and remotely operated (the remote operation shall be equipped with the appropriate controller w/ function of communication). The circuit breaker can be used to form complete set with the controller in realizing automation of distribution network, or alternatively used in combination with the reclosing controller to form into recloser.

The circuit breaker can be equipped with two-phase or three-phase CT to realize overcurrent automatic tripping protection through dedicated multiplex controller in the cabinets, and can also lead out the secondary line from the cabinet for computer control protection.

The outdoor switch disconnectors are installed to form integration with circuit breakers, and the circuit breaker and the switch disconnector are provided with reliable mechanical interlock device.

The circuit breaker can be used in combination with the power load monitoring system.

The circuit breaker is externally installed with electronic PT. The electronic PT obtains current from the transformer and then converts the current to voltage, and provides protection and control functions. In such way, the circuit breaker is self-contained with functions of operating power.

操动机构及其动作原理

操动机构分为手动操作和电动操作两种，手动机构只能手动操作，电动机构为手动和电动两用操作。

储能操作：拉动储能手柄，或电动机转动，在传动齿轮的带动下使凸轮转动，合闸弹簧被逐渐拉长，当弹簧过中后，凸轮由定位件保持不再转动，开关处准备合闸状态，同时凸轮与传动轴脱离，使机构不能再次储能。

合闸操作：储能完毕后，拉动手动合闸手柄，或给合闸线圈施加电压，使合闸半轴转动，合闸拐臂与合闸半轴解扣，合闸弹簧释放能量，带动传动轴使开关合闸，同时分闸弹簧被储能。

分闸及过流脱扣过程：断路器合闸后，拉动手柄或给分闸线圈施加电压或当线路电流超过消涌流装置的设定值时过流线圈被驱动，都使得分闸半轴转动，分闸拐臂与分闸半轴解扣，分闸弹簧释放能量，带动传动杆使开关分闸。

隔离开关特点

本隔离开关与断路器联为一体，通过机械联锁进行防误操作。

Actuator and its Working Principle

The actuator has two operation modes: manual operation and electric operation, of which the manual mechanism enables only manual operation, and electric mechanism enables both manual and electric operation.

Energy storage operation: Pull the energy storage lever, or rotate the motor, so that the cam rotates driven by the driving gear. The closing spring is gradually stretched, when the spring passes over the center, the cam no longer rotates due to being retained by the positioning member, and the switch is readily in the closing state, and meanwhile the cam is disengaged from the drive shaft so that the mechanism no longer stores any energy.

Closing operation: Upon completion of the energy storage, pull the manual closing lever or apply voltage to the closing coil so that the closing semi-axis rotates, the closing crank arm and closing semi-axis are released, and the closing spring releases energy to drive the drive shaft to open/close the switch. Meanwhile, the opening spring is stored energy.

Opening and overcurrent tripping: After the circuit breaker is closed, pull the opening lever or apply voltage to the opening coil or when the line current exceeds the set value of the inrush current suppression device, the overcurrent coil is driven, and the closing semi-axis rotates. The closing crank arm and closing semi-axis are released, the closing spring releases energy and the transmission lever is driven to open/close the switch.

Features of Switch Isolator

This switch isolator and the circuit breaker are connected into one, and prevent misuse through mechanical interlock.



使用环境条件

- ▶ 海拔高度：不超过2000米；
- ▶ 污秽等级：IV级；
- ▶ 周围空气温度：-40℃~+40℃；
- ▶ 日温差：日变化25℃；
- ▶ 风速不大于35m/s；
- ▶ 地震强度不超过8级；
- ▶ 无易燃、易爆炸危险、化学腐蚀的场所。

Environmental Conditions for Use

- ▶ Altitude: not greater than 2000m;
- ▶ Contamination Level: Level IV;
- ▶ Ambient air temperature: -40 °C ~ + 40 °C;
- ▶ Daily temperature difference: daily variation of 25 °C;
- ▶ Wind speed not greater than 35m/s;
- ▶ Earthquake intensity of not greater than M8;
- ▶ Places without flammable, explosive hazards, and chemical corrosion.

主要规格及技术参数 Main Specifications and Technical Parameters

断路器性能参数

Performance parameter of circuit breaker

序号 No.	名称 Description	单位 Unit	参数 Parameters
1	额定电压 Rated voltage	kV	12
2	额定频率 Rated frequency	Hz	50
3	额定电流 Rated current	A	630 1250
4	额定短路开断电流 Rated short-circuit breaking current	kA	20
5	额定峰值耐受电流(峰值) Rated peak withstand current (peak)	kA	50
6	额定短时耐受电流/持续时间 Rated short-time withstand current / duration	kA/S	20/4
7	额定短路关合电流(峰值) Rated short-circuit making current (peak)	kA	50
8	机械寿命 Mechanical life	次 Number of cycles	10000
9	额定短路开断电流开断次数 Breaking operations of rated short-circuit breaking current	次 Number of cycles	30
10	工频耐压(1min): (湿)(干)相间、对地/断口 Power frequency withstand voltage (1min): (wet) (dry) phase-to-phase, phase-to-ground / fracture	kV	34/42/48
11	雷电冲击耐受电压 Lightning impulse withstand voltage	kV	75
12	二次回路1min工频耐压 Secondary circuit 1min power frequency withstand voltage	KV	2

机械特性参数
Mechanical characteristic parameters

序号 No.	名称 Description	单位 Unit	参数 Parameters
1	触头开距 Contacts spacing	mm	9 ± 1
2	触头超行程 Contact over-travel	mm	2 ± 0.5
3	分闸速度 Opening speed	m/s	1.2 ± 0.2
4	合闸速度 Closing speed	m/s	0.8 ± 0.2
5	触头合闸弹跳时间 Bouncing time of contactor closed	ms	≤ 2
6	相间中心距离 Center distance between phases	mm	340 ± 1.5
7	三相分合闸不同期性 Time interval between opening of first and last phase of three phase circuit-breaker	ms	≤ 2
8	各相导电回路电阻 Phase-wise conductive loop resistance	μ Ω	< 80
9	合闸时间 Closing time	ms	25~60
10	分闸时间 Opening time	ms	18~45
11	储能电动机额定功率 Rated power of energy storage motor	W	40

隔离开关参数
Switch isolator parameters

序号 No.	名称 Description	单位 Unit	参数 Parameters
1	额定电压 Rated voltage	kV	12
2	额定电流 Rated current	A	630
3	热稳定电流(有效值) Thermal stability current (effective value)	kA	20
4	动稳定电流(峰值) Dynamic stable current (peak)	kA	50
5	1min工频耐压 1min power frequency withstand voltage	kV	48
6	每相回路电阻 Each phase loop resistance	μ Ω	< 60
7	触刀刚合不同期 Non-synchronism at the instant of closing contact knife	mm	< 2