



SHTW1系列智能型万能式低压断路器 WATSC702、WATSC802自动电源转换系统

SHTW1 Series Intelligent Air Circuit Breaker

WATSC702、WATSC802 Automatic Power Transfer Switching System



上海华通低压开关有限公司(原上海华通开关厂低空部)
SHANGHAI HUATONG LV ELECTRIC APPARATUS CO. LTD.
(SHANGHAI HUATONG SWITCHGEAR WORKS LV-DIVISION)



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企业简介

上海华通，历史悠久。

上海华通低压开关有限公司的前身是上海华通开关厂低压空气开关制造部（曾名塑壳车间），经上级公司上海电气集团总公司批准于2001年8月整体转制后成立为股份制公司。

自1919年创立“华通电机厂”——解放后国有化的“上海华通开关厂”——2001年转制后的“上海华通低压开关有限公司”已经走过了百年的风雨旅程。

低压电器制造方面经历了从无到有、从小到大、从一般到高科技的不断发展过程。

上世纪50年代的第一代仿苏产品A3塑料外壳式断路器在我厂诞生，壳架等级达600A。60—70年代自力更生研发并大规模生产DZ10系列塑料外壳式断路器，产品畅销全国各地，并源源不断出口到中、西亚，及非洲地区。80年代从美国西屋公司引进了H系列塑料外壳式断路器及专有制造技术，最大壳架等级达3000A，为国内外之最。90年代先后开发完善了SHTW1(DW45)系列低压智能型万能式断路器、S(H)系列高性能塑料外壳式断路器等几大系列低压产品，以及SHTQ1、SHTQ3系列双电源自动转换开关电器，S(H)L系列剩余电流断路器，S(H)Z系列智能型塑料外壳式断路器。2013年成功开发SHTW3系列低压智能型万能式断路器，2019年又成功开发了SHTM3系列及S(H)系列（升级版）塑料外壳式断路器以及WATSC702/802自动电源转换系统。同时与有关科研单位、企业集团及其他相关行业开展了全方位的合作，使我公司在产品的设计开发、工艺制造、生产管理等方面迅速适应市场经济的发展需要，成为我国低压电器主要生产基地之一。目前除了仍延续生产原有几大系列产品外，还开发了智能化产品及SHTB系列微型断路器等新产品。

公司已获得了ISO9001:2000质量体系认证，全部产品均获得国家强制性产品认证(CCC)证书。公司坚持不断发展，开拓创新，服务至上，争创品牌的理念，严格按照ISO9001国际质量体系进行质量管理。公司产品现已被广泛用于电力、煤炭、石油、化工、冶金、交通、通讯、建筑及城市基础设施等领域。

我公司以通过体制改革为契机，激活内部机制，更新观念，不断开发新产品，延续华通精湛的制造技术，以先进的工艺、优异的产品质量和周到的售后服务回报广大用户的支持和信赖。我们将一如既往地，秉承百年“华通”的优良传统，以最新的技术、最快的速度、最优的质量为用户提供最佳的服务。

Enterprise introduction

Shanghai huatong has a long history.

Shanghai huatong LV electric apparatus CO., LTD., formerly known as Shanghai huatong switchgear works LV electric apparatus manufacturing department (formerly known as plastic shell workshop), was established as a new company in August 2001 after the approval of the parent company Shanghai electric group company.

Since the establishment of "WHA TUNG ELEC & GEN.ENG WORKS" in 1919 -- "Shanghai huatong switchinggear works" nationalized after liberation -- "Shanghai huatong LV electric apparatus CO., LTD." after the transformation in 2001, "Shanghai huatong LV electric apparatus CO., LTD." has gone through the wind and rain journey for a hundred years.

The manufacture of low voltage electrical appliances has experienced the continuous development process from scratch, from small to large, from general to high-tech. The manufacture of low voltage apparatus has experienced the continuous development process from scratch, from small to large, from general to high-tech.

In the 1950s, the first generation of imitation product A3 moulded case circuit breaker was born in our factory, with a frame size of 600A. During the 1960s and 1970s, self-reliant R&D and mass production of DZ10 series moulded case circuit breakers have sold well all over the country and exported continuously to central, western Asia and Africa. In the 1980s, we introduced the H-series moulded case circuit breaker and proprietary manufacturing technology from Westinghouse company, with the maximum frame size up to 3000A, the highest at home and abroad. In the 1990s, successively developed and improved SHTW1(DW45) series low-voltage intelligent air-operated circuit breaker, S(H) series high performance moulded case circuit breaker and other series of low-voltage products, as well as SHTQ1 and SHTQ3 series double power source auto-switch apparatus, S(H)L series residual current circuit breaker, S(H)Z series intelligent type breaker. In 2013, SHTW3 series of low-voltage intelligent air-operated circuit breakers were successfully developed, and in 2019, SHTM3 series, S(H) series (upgraded version) moulded case circuit breakers and WATSC702, WATSC802 Automatic power transfer switching system were successfully developed.

At the same time with the relevant scientific research units, enterprise groups and other related industries to carry out all-round cooperation, so that our company in product design and development, technology manufacturing, production management and other aspects quickly adapt to the needs of the development of the market economy, become one of the main production bases of China's low-voltage apparatus. At present, in addition to continuing to produce the original several series of products, we have also developed intelligent products and new products such as SHTB series miniature circuit breakers.

The company has obtained ISO9001:2000 quality system certification, all the products have obtained the national compulsory product certification (CCC) certificate. The company adheres to the concept of continuous development, pioneering and innovation, service first and striving for a brand, and carries out quality management in strict accordance with ISO9001 international quality system. The company's products have been widely used in power, coal, petroleum, chemical, metallurgy, transportation, communications, construction and urban infrastructure and other fields.

Our company takes the opportunity through the system reform, activates the internal mechanism, updates the concept, develops the new product unceasingly, continues huatong exquisite manufacture technology, with the advanced craft, the outstanding product quality and the thoughtful after-sale service returns the general user's support and the trust. Our company will, as always, uphold the hundred years of "huatong" fine tradition, with the latest technology, the fastest speed, the best quality to provide users with the best service.

概述

Essentials

概述

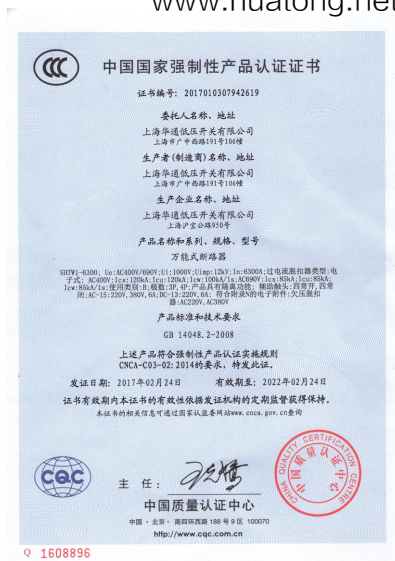
SHTW1 系列智能型万能式断路器 (以下简称断路器), 额定电流为 630A ~ 6300A, 适用于交流 50Hz、400V、690V, 主要在配电网中用来分配电能和保护线路, 防止电源设备遭受过载、欠电压、短路、单相接地等故障的危害, 该断路器具有多种智能保护功能。可做到选择性保护, 并且动作精确, 可避免不必要的停电, 提高供电可靠性。

Essentials

SHTW 1 Series Intelligent Air Circuit Breakers (hereinafter referred to as the Breaker) with rated current of 630A–6300A are suitably used in AC50Hz, 400V and 690V systems mainly in distribution network for power distribution, circuit protection, and prevention of power supply apparatus from damage due to overload, undervoltage, short circuit, single phase earthing etc.. With various intelligent protective functions, the Breaker has a kind of selective and accurate operating protections, avoiding unnecessary down time and promoting power supply reliability consequently.

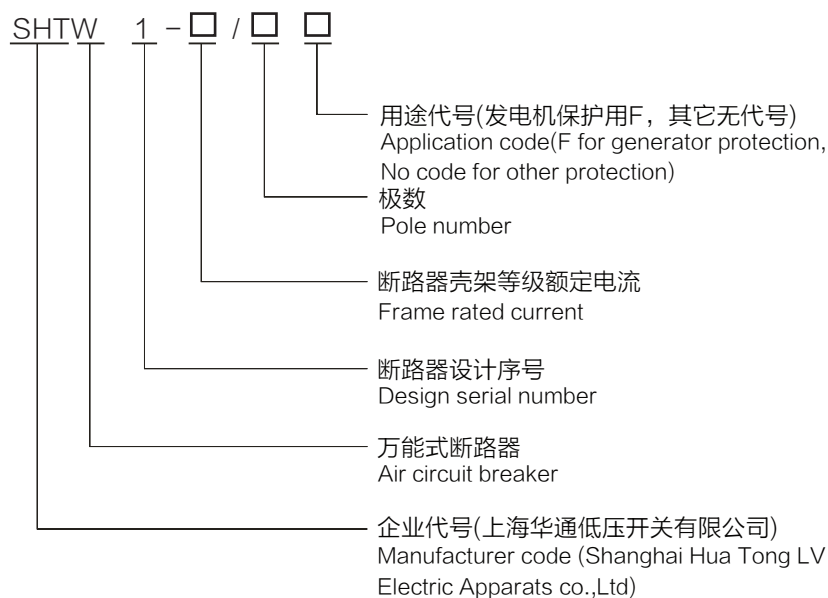


www.huatong.net.cn



● 断路器型号及意义

● Type and its designation



● 正常工作条件

- 周围空气温度为 $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$, 且24h的平均值不超过 $+35^{\circ}\text{C}$ (特殊订货的除外);
- 安装地点的海拔不超过2000m;

● Normal operation conditions

- Ambient temperature: $-5^{\circ}\text{C} \sim +4^{\circ}\text{C}$, and average temperature in 24 hours below $+35^{\circ}\text{C}$ (except for special orders);
- Elevation of installation site: $\leq 2000\text{m}$.

结构简介

Essentials of structure

B

- 安装地点的空气相对湿度在最高温度为 + 40℃ 时不超过50%。在较低温度下可以有较高的相对湿度，最湿月的月平均最低温度不超过 + 25℃，该月的月平均最大相对湿度不超过90%，并考虑因温度变化发生在产品表面上的凝露；
- 污染等级为3级；
- 断路器主电路及欠电压脱扣器线圈、电源变压器初级线圈的安装类别为Ⅳ，其余辅助电路、控制电路安装类别为Ⅲ；

● 正常安装条件

- 断路器应按本说明书安装要求安装。断路器的垂直倾斜度不超过5°；
- 断路器安装在柜体小室内，且加装门框，防护等级达IP40；加透明罩，防护等级达IP54。

● 符合标准

IEC60947-2
GB/T 14048.2
《低压开关设备和控制设备 第2部分：断路器》

● 型 式

安装方式：

固定式、抽屉式；

连接方式：

水平连接、垂直前连接、垂直后连接；

储能方式：

手动储能、电动储能；

极 数：

三极、四极；

脱扣器种类：

智能型脱扣器、欠电压脱扣器(瞬时和延时两种)、分励脱扣器。

结构简介

断路器为立体布置形式，具有结构紧凑、体积小的结构特点。触头系统封闭在绝缘底板内，且每相触头也都用绝缘板隔开，形成一个个小室，而智能型控制器、手动操作机构、电动操作机构依次在其前面形成各自独立的单元，如其中某一单元坏了，可将其整个拆下换上新的。

- Relative humidity: not exceeding 50% at the maximum ambient temperature of +40℃. With lower temperature, higher humidity would be permitted, but the lowest average temperature in a month not exceeding +25℃ during the most moist month, and the maximum monthly average relative humidity not exceeding 90% in that month, and giving consideration to the dews on the goods surface, which would appear due to temperature change.

- Pollution protection: 3 grade.

- Installing category: Ⅳ for breakers main circuits, coils of under voltage release and primary circuit of transformers; Ⅲ for other auxiliary circuits and control circuit.

● Normal installation conditions

- The installation of breakers should be done as the relative article of this instruction. The vertical gradient is less than 5°.

- Breaker could be fixed in cabinet of panel's body, the protection grade is IP40 (with door frame) and IP54 (with transparent cover).

● Standards applicable

IEC60947-2
GB/T 14048.2
《Low-voltage switchgear and controlgear—Part 2: Circuit-breakers》

● Type

In terms of assembly:

Fixed type and With draw out type;

In light of connection:

Horizontal Rear, Vertical Front, Vertical Rear connection;

In accordance with energy storing:

Manual and Motor-driven;

Pole number:

Three-pole and Four-pole;

According to the classification of trips equipped:

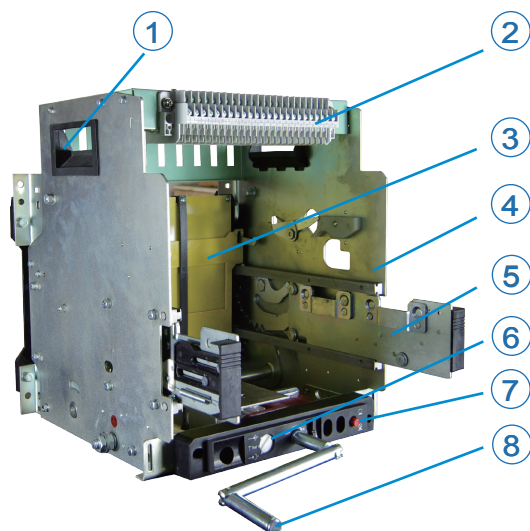
Intelligent trip, Undervoltage trip (instantaneous and time-delay respectively), Shunt trip.

Essentials of structure

As a three dimensional arrangement, the Breaker features compact in structure and small in volume. The contact system is enclosed in the insulating bottom plate, of which each phase contact is separated with an insulating partition from each other to form several small cabinets, whereas the intelligent controller, manual operating mechanism, motor-driven operating mechanism are situated in front orderly, forming independent units. In case one unit is out of order, just replace it with a new one as a whole.

结构简介 Essentials of structure

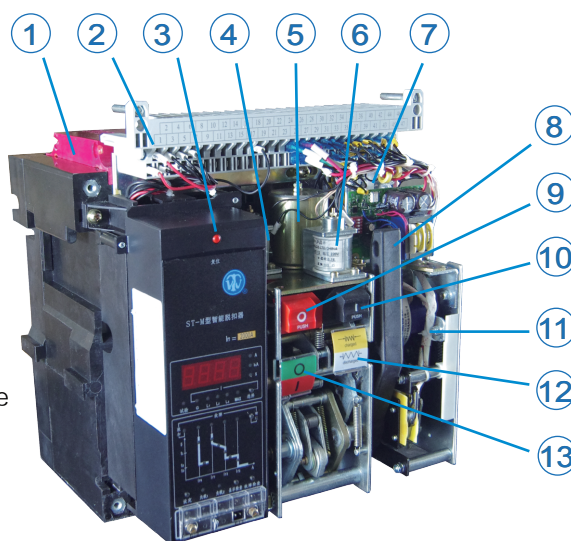
SHTW1万能式断路器



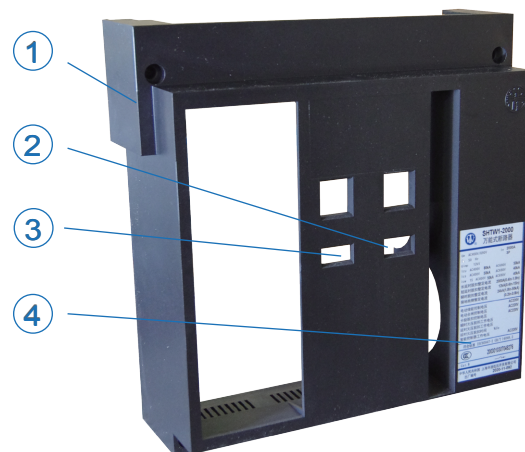
- | | |
|------------|--------------------------------|
| 1 把手 | Handle |
| 2 二次回路接线端子 | Terminals of secondary circuit |
| 3 隔离挡板 | Isolating partition |
| 4 侧板 | Side plate |
| 5 抽出手柄 | Withdrawout handle |
| 6 位置显示 | Position indicator |
| 7 三位置锁定装置 | Three-position locking device |
| 8 摇手柄 | Rotating handle |

B

- | | |
|-------------|---------------------------------------|
| 1 灭弧室 | Arc chamber |
| 2 二次回路接线端子 | Terminals of secondary circuit |
| 3 智能型控制器 | Intelligent controller |
| 4 分励脱扣器 | Shunt trip |
| 5 欠压脱扣器 | Undervoltage trip |
| 6 闭合电磁铁 | Closing solenoid |
| 7 辅助触头 | Auxiliary contacts |
| 8 储能手柄 | Energy storing handle |
| 9 分闸按钮 | Opening pushbutton |
| 10 合闸按钮 | Closing pushbutton |
| 11 电动机储能机构 | Motor-driven energy storing mechanism |
| 12 机构储能状态显示 | Indication of energy storing state |
| 13 主触头位置显示 | Position indication of main contact |



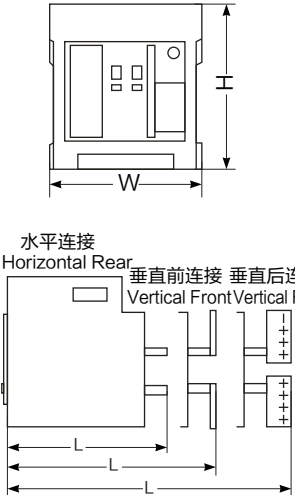
- | | |
|-------------|--|
| 1 面罩 | Panel cover |
| 2 机构储能状态显示窗 | Position indication window of main contact |
| 3 主触头位置显示窗 | Indication window of energy storing state |
| 4 铭牌 | Nameplate |

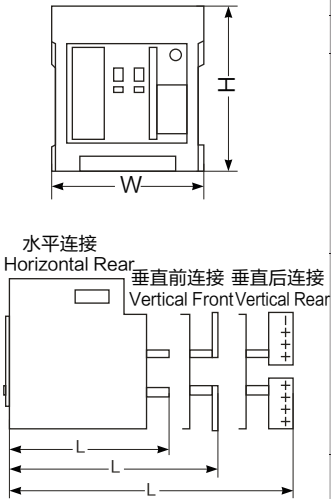


主要技术数据
Main technical parameters

主要技术数据

Main technical parameters

型号		Type	SHTW1-2000									
壳架等级额定电流Inm(A)		Frame Rated Current Inm(A)	2000									
额定电流In(A)		Rated Current In(A)	630		800		1000		1250			
额定工作电压Ue(V)		Rated Working Voltage Ue(V)										
额定绝缘电压Ui(V)		Rated Insulation Voltage Ui(V)										
额定冲击耐受电压Uimp(kV)		Rated Impulse Withstand able Voltage Uimp(kV)										
工频耐受电压U		Working Frequency Withstand able Voltage U										
极数		Quantity of poles	3、4		3、4		3、4		3、4			
N极额定电流IN(A)		Rated Current of N-pole In(A)	630		800		1000		1250			
短路分断等级		Circuit breaking capacity	N	H	N	H	N	H	N	H		
额定极限短路分断能力Icu(kA)(有效值) Limited Short-circuit Breaking Capacity Icu(kA)(effective value)		AC400V	80	80	80	80	80	80	80	80		
		AC690V	50	50	50	50	50	50	50	50		
额定运行短路分断能力Ics(kA)(有效值) Operation Short-circuit Breaking Capacity Ics(kA)(effective value)		AC400V	50	80	50	80	50	80	50	80		
		AC690V	40	40	40	40	40	40	40	40		
额定短路接通能力Icm(kA)(峰值) Rated Making Capacity Short Circuit Icm(kA)(peak)		AC400V	176	176	176	176	176	176	176	176		
		AC690V	105	105	105	105	105	105	105	105		
额定短路耐受电流(Is)Icw(kA)(有效值) Rated Stand Current For Short-time(Is)Icw(kA)(effective value)		AC400V	50	80	50	80	50	80	50	80		
		AC690V	40	40	40	40	40	40	40	40		
全分断时间(无附加延时)(ms) Full Disconnection Time (without additional time-delay)(ms)												
闭合时间(ms) Closing Time(ms)												
智能型控制器 Intelligent Controller		电子型(L) Electronic Type(L)	●		●		●		●			
		标准型(M) Normal Type(M)	●		●		●		●			
		通讯型(H) Communicative Type(H)	●		●		●		●			
操作性能 Operation Performance		电气寿命 Electric Life	AC400V	15000		15000		15000		10000		
			AC690V	10000		10000		10000		6500		
		机械寿命 Mechanical Life	免维护 Non-maintainance	15000		15000		15000		15000		
			有维护 Maintainance	30000		30000		30000		30000		
安装 Installation 		联接方式 Connection Pattern	水平连接Horizontal Rear	●		●		●		●		
			垂直前连接 Vertical Front	●		●		●		●		
			垂直后连接Vertical Rear	●		●		●		●		
		外形尺寸H×W×LOverall dimensions(mm)										
		抽屉式 Draw-out	3P	水平连接 Horizontal Rear	439×375×421							
				垂直前连接 Vertical Front	439×375×427							
				垂直后连接Vertical Rear	439×375×431							
			4P	水平连接 Horizontal Rear	439×470×421							
				垂直前连接Vertical Front	439×470×427							
				垂直后连接Vertical Rear	439×470×431							
		固定式 Fixed	3P	水平连接 Horizontal Rear	397×362×322							
				垂直前连接Vertical Front	397×362×340							
				垂直后连接Vertical Rear	397×362×379							
			4P	水平连接 Horizontal Rear	397×457×322							
				垂直前连接Vertical Front	397×457×340							
				垂直后连接Vertical Rear	397×457×379							
		重量 Weight	抽屉式 Draw-out	3P/4P	75 / 95							
			固定式 Fixed	3P/4P	45 / 58							



主要技术数据

Main technical parameters

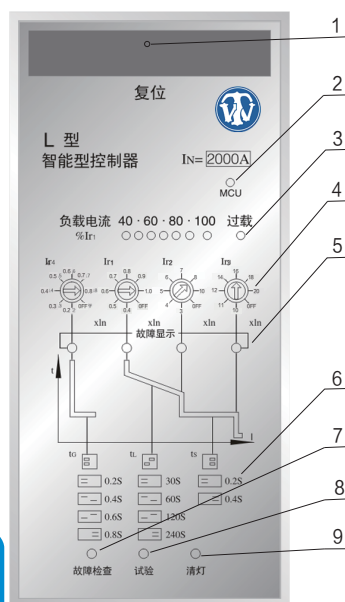
				SHTW1-3200				SHTW1-4000		SHTW1-5000	SHTW1-6300	
				3200				4000		5000	6300	
1600		2000		2000	2500	2900	3200	3200	3600	4000	5000	6300
AC400V , AC690V 50Hz/60Hz												
AC1000V 50Hz/60Hz												
12												
AC3000V 1min 50Hz/60Hz												
3、4		3、4		3、4	3、4	3、4	3、4	3、4		3、4	3、4	
1600		2000		2000	2500	2900	3200	3200	3600	4000	5000	6300
N	H	N	H	—	—	—	—	—		—	—	
80	80	80	80	100	100	100	100	100		120	120	
50	50	50	50	65	65	65	65	65		65	85	
50	80	50	80	65	65	65	65	65		100	120	
40	40	40	40	50	50	50	50	50		65	85	
176	176	176	176	220	220	220	220	220		220	220	
105	105	105	105	143	143	143	143	143		143	187	
50	80	50	80	65	65	65	65	65		100	100	
40	40	40	40	50	50	50	50	50		65	85	
●		●		●	●	●	●	●		●	●	
●		●		●	●	●	●	●		●	●	
●		●		●	●	●	●	●		●	●	
10000		8000		8000	8000	6000	6000	6000		6000	3000	
6500		5000		3000	3000	2500	2500	1500		1000	500	
15000		15000		10000	10000	10000	10000	10000(3P)5000(4P)		10000	10000	
30000		30000		20000	20000	20000	20000	20000(3P)10000(4P)		8000	6000	
●		●		●	●	●	●	●		●	●	
●		●		●	●	●	—	—		—	—	
●		●		●	●	●	—	—		—	—	
439×375×421		439×375×421		439×435×466		439×435×466		439×550×491		439×813×540	439×928×504	
439×375×432		439×375×437		439×435×437		439×435×447		—		—	—	
439×375×431		439×375×431		439×435×467		439×435×467		—		—	—	
439×470×421		439×470×421		439×550×466		439×550×466		439×813×491		439×928×504	439×1043×504	
439×470×432		439×470×437		439×550×437		439×550×447		—		—	—	
439×470×431		439×470×431		439×550×467		439×550×467		—		—	—	
397×362×322		397×362×322		397×422×322		397×422×322		397×537×335		—	—	
397×362×345		397×362×350		397×422×347		397×422×357		—		—	—	
397×362×379		397×362×379		397×422×374		397×422×374		—		—	—	
397×457×322		397×457×322		397×537×322		397×537×322		397×800×335				
397×457×345		397×457×350		397×537×347		397×537×357		—		—	—	
397×457×379		397×457×379		397×537×374		397×537×374		—		—	—	
				90 / 120				130 / 150		180 / 210	210 / 210	
				60 / 77				80 / 100		—	—	



智能型控制器 Intelligent controller

L 型智能型控制器

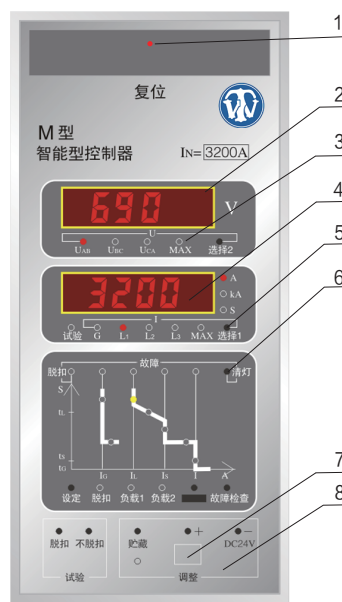
L Type Intelligent controller



- 1-故障脱扣复位按钮
1-Reset pushbutton for fault tripping
- 2-MCU运行监视
2-MCU supervision of operation
- 3-负荷电流光柱指示
3-Light column indication for load current
- 4-电流整定
4-Current setting
- 5-故障状态指示
5-Indication of fault state
- 6-时间整定
6-Time setting
- 7-故障检查键
7-Fault inspect button
- 8-试验按键
8-Test button
- 9-清灯键
9-Reset button

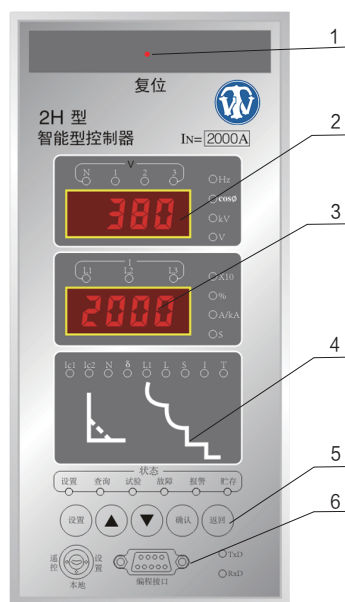
M 型智能型控制器

M Type Intelligent controller



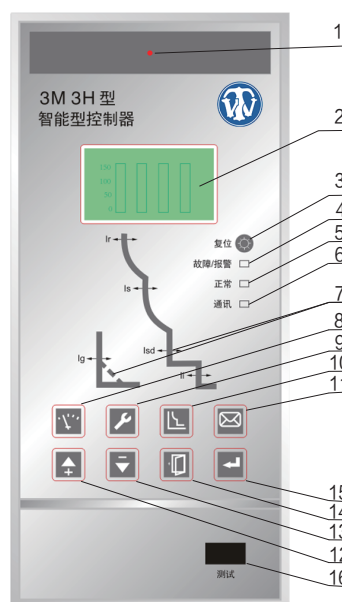
- 1-故障脱扣复位按钮
1-Reset pushbutton for fault tripping
- 2-电压表显示
2-Voltage indication
- 3-发光二极管指示
3-LED indication
- 4-电流表显示
4-Current indication
- 5-按钮
5-Pushbutton
- 6-“清灯”键
6-Clear key
- 7-测试电源插孔
7-Test power supply socket
- 8-防护罩
8-Protective cover

2M、2H型智能型控制器 2M、2H Type Intelligent controller



- 1-故障脱扣复位按钮
1-Reset pushbutton for fault tripping
- 2-功能表窗口显示
2-Function indication
- 3-电流表显示
3-Current indication
- 4-参数设定、故障指示灯
4-Parameters setting, fault indicate lamps.
- 5-设置、确认、返回键
5-Setting confirm, back button
- 6-编程接口
6-Program interface

3M、3H型智能型控制器 3M、3H Type Intelligent controller



- 1-故障和报警复位按钮
1-Reset button for fault and alarm
- 2-LCD界面显示
2-LCD Interface indication
- 3-复位按钮
3-Reset button
- 4-故障/报警LED
4-Fault/alarm LED
- 5-正常LED
5-Normal LED
- 6-通讯LED(3M型无)
6-Communication LED(except for 3M type)
- 7-曲线显示LED
7-Curves indication LED
- 8-测量功能键
8-Test fuction button
- 9-设定功能键
9-Setting fuction button
- 10-保护功能键
10-Protect fuction button
- 11-信息功能键
11-Information fuction button
- 12-向上整定键
12-Up setting button
- 13-向下整定键
13-Down setting button
- 14-退出键
14-Quit button
- 15-选择键
15-Selection button
- 16-测试端口
16-Test port

智能型控制器 Intelligent controller

参数 Technical data 特性 Characteristic	型式 Type	经济型 Economic Type			标准型 Standard Type		通讯型 Communication Type
		L2	L3	L4	M	2M	2H
长延时保护 Long time delay protection		反时限动作 For inverse time $T_r = t_r \cdot (1.5 I_r / I)^2$ Tr动作时间 Operating time I— 实际电流 Actual current				由六种过载保护特性曲线表达式（详见《使用说明书》） There are six characteristic curves for Long time overload protection (see the user ' s manual)	
整定电流Ir (A) Setting current		(0.4~1)In+OFF		(0.4~1)In (级差≤2% Step≤2%)		(0.4~1)In+OFF (级差≤2A Step≤2A)	
设定时间 tr (s) Setting time		30、60、120、240 (在1.5Ir时) At 1.5 Ir		15、30、60、120、240、480 OFF (在1.5Ir时) At 1.5 Ir		由六种过载保护特性曲线整定值 Setting values for six characteristic curves for Longtime overload protection	
短延时保护 Short time delay protection			定时限动作 Definite time	方式a：Pattern a： $I \geq 1.1 I_{sd}, I < 8 I_r$ $T_s = t_{sd} \cdot (8 I_r / I)^2$ $I \geq 8 I_r$ 为定时限 (Definite time) Tsd-动作时间 (Operating time) 方式b：Pattern b： 定时限 (Definite time)		1.定时限动作 2.反时限动作+定时限动作 1.Definite time 2.Inverse time+Definite time 定时限动作 ($I \geq 8 I_r$) / 反时限动作 ($I \geq 1.1 I_{sd}, I < 8 I_r$) Definite time ($I \geq 8 I_r$) / Inverse time ($I \geq 1.1 I_{sd}, I < 8 I_r$) 注：曲线6时同M型；曲线1~5时，反时限动作电流和定时限动作电流可分别整定（详见《使用说明书》） Note:for curve 6,is the same as Type M;for curve 1~5,the rated current can be setting according to the user ' s manual	
整定电流 Ir2A Setting current			(3~10)In+OFF	(0.4~15)In+OFF (级差≤4% Step≤4%)		曲线6时：(0.4~15)In+OFF For cure 6 curve:(0.4~15) In+OFF 曲线1~5时：(1.5~15) In+OFF For cure 1~5 curve: (1.5~15) In+OFF (级差≤2A)Step≤2A	
设定时间 ts (s) Setting time			0.2、0.4、	0.1、0.2、0.3、0.4、		定时限时：0.1~1.0（级差Step0.1） For definite time 0.1~1.0,Step 0.1 反时限时：曲线1~5时比长延时的相应速度快10倍 For inverse inverst time,Curve 1 ~ 5 T=0.1TL	
瞬时保护 Instantaneous protection		动作时间<30ms operating<30ms					
整定电流 Ir3 (A) Setting current		(3~10)In+OFF	(10~20)In+OFF Inm≥3200A：(7~14)In+OFF	In~50kA/75kA/100kA+OFF (级差≤2A Step≤2A)		In~50kA/75kA/100kA+OFF (级差≤2A Step≤2A)	
接地保护 Earth fault protection			In+OFF	定时限动作 Definite time		定时限或反时限动作（详见《使用说明书》） Definite time or Inverse time	
整定电流 Ir4 (A) /If (A) Setting current			(0.2~0.8)In+OFF	(0.2~0.8)In+OFF (级差≤2%) (Step≤2%)		(0.2~1.0)In+OFF (级差≤2A Step≤2A)	
设定时间 ts (s) Setting time			0.2、0.4 0.6、0.8	0.1、0.2、0.3、0.4、OFF		0.1~1.0+OFF (级差 0.1 Step 0.1)	
反时限系数KG Faction for inverse time						1.5~6+OFF (级差 0.5 Step 0.5)	
漏电保护 Leakage protection						漏电与接地保护只能任选其一 leakage protection or earth fault protection	
整定电流 I△n (A) Setting current						(0.3~30)I△n+OFF（级差 0.1A Step 0.1A） < 0.8 I△n：不动作 No action ≥ 1.0 I△n：延时动作 Delayed action	
设定时间 t△n (s) Setting time						ON、0.06、0.08、0.10~0.96、0.98、1.00、OFF（级差为0.02s Step 0.02s） ON:瞬时动作Instantaneous action OFF:只报警不跳闸Alarm only and no trip	
反时限系数KG Faction for inverse time						5 <5I△n:反时限Inverse time ≥5I△n:定时限Timing limit	

智能型控制器
Intelligent controller

参数 Technical data	型式 Type	经济型 Economic Type			标准型 Standard Type		通讯型 Communication Type
		L2	L3	L4	M	2M	2H
特性 Characteristic							
负载监控 Long monitoring					反时限动作，动作特性同长延时，方式一与方式二任选其一 Inverse time operating as long time delay, pattern1 or pattern2 can selected		
方式一 Pattern 1					分别控制二路负载的卸载 Used to control two loads separately		
负载1限值Ic1 (A) Setting value load					(0.2~1.0)In+OFF (级差≤2% Step≤2%)	(0.2~1.0)In+OFF (级差≤2A Step≤2A)	
负载1延时tc1 (S) Unload delay time for load 1					1/2tL	可单独设定，同长延时保护 May setting separately as TL	
负载2限值Ic2 (A) Setting value load					(0.2~1.0)In+OFF (级差≤2% Step≤2%)	(0.2~1.0)In+OFF (级差≤2A Step≤2A)	
负载2延时tc2 (S) Unload delay time for load 2					1/4tL	可单独设定，同长延时保护 May setting separately as TL	
方式二 Pattern 2					只控制一路负载的卸载和重合 Used to control one load ' s unload and reclose		
卸载限值Ic1 (A) Setting value for load 1					(0.2~1.0)In (级差≤2% Step≤2%)	(0.2~1.0)In+OFF (级差≤2A Step≤2A)	
卸载延时tc2 (S) Unload delay time for load 2					1/2tL	可单独设定，同长延时保护 May setting separately as TL	
重合限值Ic1 (A) Setting value for reclose					(0.2~1.0)In (级差≤2%) (Ic2<Ic1) Step≤2% (Ic2<Ic2)	(0.2~1.0)In+OFF (级差≤2A) (Ic2≤Ic1) Step≤2A	
重合延时Ic2 (S) Delay time for reclose					60	60	
电流不平衡保护 Unbalanced current protection						定时限动作 Definite time	
电流不平衡整定值 δ Setting value δ of Unbalanced current						40%100%+OFF (级差≤1% Step≤1%)	
设定时间tδ (S) Setting time						0.1-1.0+OFF (级差 0.1 Step 0.1)	

智能型控制器

Intelligent controller

参数 Technical data	型式 Type	标准型 Standard Type	通讯型 Communication Type
特性 Characteristic		3M	3H
长延时保护 Long time delay protection		由六种过载保护特性曲线表达式 (详见《使用说明书》) There are six characteristic curves for Long time overload protection (see the user's manual)	
整定电流 I_r (A) Setting current		$(0.4 \sim 1)I_n + \text{OFF}$ (级差 $\leq 2A$ Step $\leq 2A$)	
设定时间 t_r (s) Setting time		由六种过载保护特性曲线整定值 Setting values for six characteristic curves for Longtime overload protection	
短延时保护 Short time delay protection		1. 定时限动作 2. 反时限动作 注: 反时限动作电流和定时限动作电流可分别整定详见《使用说明书》	1. Definite time 2. Inverse time Note: The rated current can be setting according to the user's manual
整定电流 I_{sdA} Setting current		型曲线1~6时: $(0.4 \sim 15)I_r + \text{OFF}$, 如 $I_r = \text{OFF}$, 则 $I_r = I_n$ For 3M/H cure 6 curve: $(0.4 \sim 15) I_r + \text{OFF}$, If $I_r = \text{OFF}$, $I_r = I_n$	(级差 $\leq 2A$ Step $\leq 2A$)
设定时间 t_s (s) Setting time		定时限时: $0.1 \sim 0.4$ (级差 Step 0.1) For definite time $0.1 \sim 0.4$, Step 0.1	反时限: 详见《使用说明书》 Inverse time: setting according to the user's manual
瞬时保护 Instantaneous protection		动作时间 $< 40\text{ms}$ operating $< 40\text{ms}$	
整定电流 I_i (A) Setting current		$2.0I_n \sim 50\text{kA}/75\text{kA}/100\text{kA} + \text{OFF}$ (级差 $\leq 2A$ Step $\leq 2A$)	
接地保护 Earth fault protection		定时限+反时限动作 (详见《使用说明书》) Definite time + Inverse time	
整定电流 I_g (A) Setting current		$(0.2 \sim 0.1)I_n + \text{OFF}$ (级差 $\leq 2A$ Step $\leq 2A$)	
设定时间 t_g (s) Setting time		$0.1 \sim 0.4 + \text{OFF}$ (级差 0.1 Step 0.1)	
反时限系数 K_g Faction for inverse time		$1.5 \sim 6 + \text{OFF}$ (级差 0.5 Step 0.5)	
漏电保护 Leakage protection		漏电与接地保护只能任选其一 leakage protection or earth fault protection	
整定电流 $I_{\Delta n}$ (A) Setting current		$0.3 \sim 30.0 + \text{OFF}$ (级差 0.1A Step 0.01A)	
设定时间 $t_{\Delta n}$ (s) Setting time		瞬时: 0.06s, 0.08s, 0.17s, 0.25s, 0.33s, 0.42s, 0.5s, 0.58s, 0.67s, 0.75s, 0.83s (级差 0.02 Step 0.02)	
接地报警 启动值/返回值 (A) Grounding alarm start/return value		启动值: $\text{OFF} + (0.2 \sim 1.0) \times I_n$ / 返回值: $0.2 \sim$ 启动值 Start value: $\text{OFF} + (0.2 \sim 1.0) \times I_n$ / return value: $0.2 \sim$ start value (级差 $\leq 2A$ Step $\leq 2A$)	
启动时间/返回时间 (s) Start time/return time		$0.1s \sim 0.4s$ (级差 0.1s Step 0.1s)	
漏电报警 启动值/返回值 (A) Leakage alarm start/return value		启动值: $0.3 \sim 30.0$ / 返回值: $0.3 \sim$ 启动值 Start value: $0.3 \sim 30.0A$ / return value: $0.2 \sim$ start value (级差 $\leq 0.1A$ Step $\leq 0.1A$)	
启动时间/返回时间 (s) Start time/return time		$0.1s \sim 1.0s$ (级差 0.1s Step 0.1s)	
短路合闸保护/越限跳闸 (MCR/HSISC)		启动值详见《使用说明书》 Please refer to the manual for startup value.	动作时间 $< 40\text{ms}$ operating $< 40\text{ms}$
中性线保护(仅 4 p) Neutral protection(only 4 p)		过载、短路短延时动作点为设定值 (50%/100%/160%/200%)倍; 短路瞬时、接地故障动作点与设定值相等 Overload, short circuit short delay action point is set value (50% / 100% / 160% / 200%) times; The action point of short circuit instantaneous and ground fault is equal to the set value	
设定值 Set point		50%, 100%, 160%, 200%+OFF	
电流不平衡 启动值/返回值 Current imbalance start/return value		启动值: 5%~60% / 返回值: 5%~启动值 Start value: $0.3 \sim 30.0A$ / return value: $0.2 \sim$ start value (级差 $\leq 1\%$ Step $\leq 1\%$)	
启动时间/返回时间 (s) Start time/return time		启动时间: $0.1s \sim 120s$ 级差 0.1s / 返回时间: $10 \sim 200s$ 级差 1s Start time: $0.1s \sim 120s$ step 0.1s / return time: $10s \sim 200s$ step 1s	
需用电流 启动值/返回值 (A) With current start/return value		启动值: $0.2 \sim 1.0$ / 返回值: $0.2 \sim$ 启动值 Start value: $0.2 \sim 1.0A$ / return value: $0.2 \sim$ start value (级差 $\leq 2A$ Step $\leq 2A$)	
启动时间/返回时间 (s) Start time/return time		启动值: $15s \sim 1500s$ / 返回值: $15 \sim 3000s$ Start value: $15s \sim 1500s$ / return value: $15 \sim 3000s$ (级差 1s Step 1s)	

智能型控制器 Intelligent controller

参数 Technical data	型式 Type	标准型 Standard Type	通讯型 Communication Type
特性 Characteristic		3M	3H
欠压保护 启动值/返回值 (V) Undervoltage protection start/return value		启动值:100V~1200V/返回值:启动值~1200V Start value :100V ~ 1200V/ return value: start value ~ 1200V	(级差: 1% Step : 1%)
启动时间/返回时间 (s) Start time/return time		0.2~60S (级差 0.1s Step 0.1s)	
过压保护 启动值/返回值 (V) overvoltage protection start/return value		启动值:100V~1200V/返回值:100V~启动值 Start value :100V ~ 1200V/ return value: 100V ~ start value	(级差: 1V Step : 1V)
启动时间/返回时间 (s) Start time/return time		0.2~60S (级差 0.1s Step 0.1s)	
电压不平衡保护 启动值/返回值 (V) Voltage imbalance protection start/return value		启动值:2%~30%/返回值:2%~启动值 Start value :2% ~ 30%/ return value :2% ~ start value	(级差: 1V Step : 1V)
启动时间/返回时间 (s) Start time/return time		0.2~60S (级差 0.1s Step 0.1s)	
欠频保护 启动值/返回值 (V) Low frequency protection start/return value		启动值:45.0~65.0Hz/返回值:启动值~65.0Hz Start value :45.0 ~ 65.0Hz/ return value: start value ~ 65.0Hz	(级差: 0.5Hz Step : 0.5Hz)
启动时间/返回时间 (s) Start time/return time		启动值:0.2~5.0s/返回值:0.2~36.0s Startup value :0.2 ~ 5.0s/ return value :0.2 ~ 36.0s	(级差 0.1s Step 0.1s)
过频保护 启动值/返回值 (V) Over frequency protection start/return value		启动值:45.0~65.0Hz/返回值:45.0Hz~启动值 Start value :45.0 ~ 65.0Hz/ return value: 45.0Hz ~ start value	(级差: 0.5Hz Step : 0.5Hz)
启动时间/返回时间 (s) Start time/return time		启动值:0.2~5.0s/返回值:0.2~36.0s Startup value :0.2 ~ 5.0s/ return value :0.2 ~ 36.0s	(级差 0.1s Step 0.1s)
逆功率保护 启动值/返回值 (V) Reverse power protection start/return value		启动值:5~500kW/返回值:5kW~启动值 Start value :5~500kW/ return value: 5kW ~ start value	(级差: 1kW Step : 1kW)
启动时间/返回时间 (s) Start time/return time		启动值:0.2~20s/返回值:1.0~360s Startup value :0.2~20s/ return value :1.0~360s	(级差 1s Step 1s)
相序保护 启动值 Phase sequence protection start value		A, B, C / A, C, B	
负载监控 Load monitoring		监控方式:1.电流方式1; 2.电流方式2; 3.功率方式1; 4.功率方式2; 5.关闭 Monitoring mode :1.Current mode 1; 2. Current mode 2; 3. Power mode 1; 4. Power mode 2; 5. Close the	
卸载I动作设定值 Unloading I action set value		电流方式1/2 0.2~1.0Ir (级差≤2A) ; 功率方式1/2 200~10000kW (级差≤2A) Current mode 1/2 0.2 ~ 1.0Ir (Step≤2A); Power mode 1/2 200 ~ 10000kW (Step≤2A)	
卸载I动作延时 Uninstall I action delay		电流方式1/2 20~80%Tr (级差 1%) /功率方式1/2 10~3600s (级差 1s) Current mode 1/2 20 ~ 80%Tr (Step 1%)/power mode 1/2 10 ~ 3600s (Step 1s)	
卸载II动作设定值 Unloading II action set value		电流方式1:0.2~1.0Ir; 电流方式2:0.2Ir~卸载I (级差≤2A) /功率方式1:200~10000kW; 功率方式2:100~卸载I (级差: 1kW) Current mode 1:0.2 ~ 1.0Ir; Current mode 2:0.2Ir ~ unloading I (Step ≤2A)/power mode 1:200 ~ 10000kW; Power mode 2:100 ~ unloading I (Step: 1kW)	
卸载II动作延时 Uninstall II action delay		电流方式1:20~80%Tr(级差: 1%)/电流方式2:10~600s(级差 1s)/功率方式1/2 10~3600s(级差 1s) Current mode 1:20-80% Tr Step: 1%/ current mode 2:10-600s (Step1s)/power mode 1/2 10-3600s (Step 1s)	
链接超时 Connection timeout		2~200s (级差 1s Step 1s)	
自诊断报警 Self-diagnosis give an alarm detail		EEPROM故障、设置参数丢失、AD采样错误、环境超温、供电电压异常等错误 EEPROM failure, missing setting parameters, AD sampling error, environment overtemperature, abnormal power supply voltage, etc	
测量功能 Measurement functions		电流,电压,频率,电能,功率,谐波 Current, voltage, frequency, electrical energy, power, harmonic	
测量功能 Maintenance history		维护:自诊断,操作次数,变位次数,触头磨损;历史:变位记录,脱扣记录,报警记录 Maintenance: self-diagnosis,operation times,displacement times,contact wear;History:displacement record,trip record,alarm record	
其他功能 Other functions		时钟,测量表,热记忆,区域联锁,试验&锁,可编程触点,通信 Clock,meter,heat memory,area interlock,test & lock,programmable contact,communication	

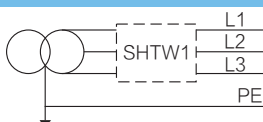


图1 (Fig1) 3PT型
注: T1、T2为外接电流互感器
Note: T1, T2 is the external CT

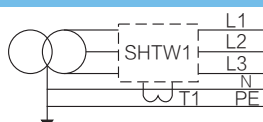


图2 (Fig2) (3P+N) T型

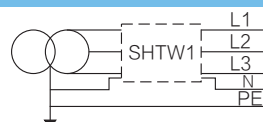


图3 (Fig3) 4PT型

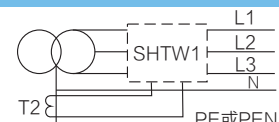


图4 (Fig4) W型

智能型控制器 Intelligent controller

功 能 Function	型 式 Type						说 明 Specification
	L2	L3	L4	M	2M	2H	
过载长延时保护 Long time dealy protection	●	●	●	●	●	●	热记忆断路器过载后控制器具有热记忆功能：在规定时间内再次发生过载时，控制器的延时时间变短，如脱扣后超过30s或控制器断电，热记忆自动清零。 When the circuit breaker happens with overload current occurs.During the period,if the overload current occurs again,the time delay will be reduced automatically,if the breaker reclosed after 30s or the intelligent controller turn off its power supply once,the Thermal memory disappear.
短路短延时保护 Short time dealy protection		●	●	●	●	●	用作配电系统中做选择性保护 Discrimination (selective) between circuit breakers
接地故障保护 Earth fault protection			●	●	●	●	① 差值型 (T) 见图1、2、3 ② 地电类型 (W) 见图4，在选用图2、图4接地故障保护时，外接中性极电流互感器应与智能控制器组合使用由制造厂提供外接中性极电流互感器 Diagram1、2、3for vector sum current type,diaagram 4 for earthing current type external CT will be used for diagram 2、4
短路瞬时保护 Instantaneous	●	●	●	●	●	●	瞬时动作时间<100ms (含断路器固有分断时间) Total operating time of instantaneous protection<100ms
电流不平衡保护 Total operating time					●	●	对A、B、C三相之间的电流不平衡实施保护 Un-balanced current protection of phase A、B、C
负载监控 Load monitoring				●	●	●	方式一：当负载接近过载时，延时分断下级不重要负载，保证重要负载供电。可分别控制二路负载的卸载 方式二：当负载接近过载时，延时分断下级不重要负载，保证重要负载供电。当电流恢复正常时，延时60s自动接通已切断的负载 Pattention 1 : When the current is approach to overload current,It controls one down stream load which is unimportant to switch off after a delay time, it can control two loads. Pattention 1 : When the current is approach to overload urrent,it controlsone down stream load which is unimportant to switch off after a delay time:If the current back to usual value,It controls the load ti switch-on after 60s.(Only additional sign contacts have this function for Type M and Type 2M)
电流光柱指示 Current indicate lamp	●	●	●				电流光柱指示最大相电流。显示范围40%~100% The lamp indicates the Maxumum current for range 40%-100
电流表 Current meter				●	●	●	显示主回路A、B、C三相的电流及接地电流等 Indicate the current of phase A、B、C or earthing current
电压表 Voltage meter					●	●	显示主回路相电压线电压和频率 (为增选功能) Indicate the voltage of phase A、B、C and frequency (Optional function)
功能表 Function meter					●	●	显示主回路相电压、线电压、功率、频率因素等 (2M型增选功能，2H为必备功能) Indicate the voltage of phase A、B、C power,frequency power facts etc. (Optional function for Type 2M, base function for Type 2H)
预报警 Pre-alarm				●	●	●	超限报警：保护延时开始报警 (M型、2M型只有增选信号触点输出功能才能实施对外输出报警) Pre-alarm : Alarm when the time delay protection begin(Only additional sign contacts have this function for Type M、2M)
故障报警 Fault-alarm				●	●	●	故障跳闸报警：各种故障跳闸后报警 (M型、2M型只有增选信号触点输出功能才能实施对外输出报警) Fault-alarm : Alarm when the circuit breaker switch off when the fault occurs (Onlyadditional sign contacts have this function for Type M、2M)
自诊断 Self-inspect	●	●	●	●	●	●	用于对控制器自身运行情况的检查和保护 Self inspect or protection
系统时钟功能 System o'clock function					●	●	可记录故障发生的日期和时间 (增选功能) To record the time when the fault occurs(Optional function)
MCR功能 MCR function				●	●	●	用模拟电路进行保护，是一种后备保护 (增选功能) Protect with electrical wire directly(Optional function)
RS485 通讯接口 Communication interface						●	与上位机的通讯接口。通讯协议有三种：Modbus-RTU、Profibus-DP、DeviceNet：三者可选其一。其中Modbus-RTU协议已内含，其他协议要外加转换模板 Communication interface with personal computer.It have three communication agreement:Modibus - RTU、Profibus DP、Device Net etc

智能型控制器

Intelligent controller

功 能 Function	型 式 Type		说 明 Specification
	3M	3H	
液晶显示屏 LCD display	●	●	由液晶显示屏显示断路器各项整定参数、实时数据及历史记录 The LCD screen displays the circuit breaker setting parameters, real-time data and historical records
过载长延时保护 Long time dealy protection	●	●	由六种过载保护特性曲线表达式（详见《使用说明书》） There are six characteristic curves for Longtime overload protection (see the user's manual)
短路短延时保护 Short time dealy protection	●	●	用作配电系统中做选择性保护 Discrimination (selective) between circuit breakers
短路瞬时保护 Instantaneous	●	●	瞬时动作时间<100ms（含断路器固有分断时间） Total operating time of instantaneous protection<100ms
接地故障保护 Earth fault protection	●	●	见P10,接地故障保护和剩余电流保护二选一（详见《使用说明书》） See P10, Earth fault protection and residual current protection (see the user's manual)
剩余电流保护 Current leakage	●	●	接地故障保护和剩余电流保护二选一（为增选功能，详见《使用说明书》） Earth fault protection and residual current protection (Optional function, see the user's manual)
电流不平衡保护 Current imbalance protection	●	●	对A、B、C三相之间的电流不平衡实施保护 Un-balanced current protection of phase A、B、C
中性极过电流保护(仅4P) Neutral protection(only 4P)	●	●	过载、短路短延时动作点为设定值（50%/100%/160%/200%）倍；短路瞬时、接地故障动作点与设定值相等 Overload, short circuit short delay action point is set value (50% / 100% / 160% / 200%) times; The action point of short circuit instantaneous and ground fault is equal to the set value
MCR功能 MCR function	●	●	接通电流保护，控制器内置软件保护（控制器默认关闭） Turn on current protection, Controller built-in software protection (controller off by default)
HSISC功能 HSISC function	●	●	越限跳闸保护，控制器内置软件保护（控制器默认关闭） Overlimit trip protection, Controller built-in software protection (controller off by default)
过电压保护 Overvoltage protection	●	●	保护可能对设备造成损害的高电压 Protect high voltages that may cause damage to equipment
欠电压保护 Undervoltage protection	●	●	保护可能对设备造成损害的低电压 Protect low voltages that may cause damage to equipment
电压不平衡保护 Voltage Un-balanced protection	●	●	对A、B、C三相之间的电压不平衡实施保护 Un-balanced voltage protection of phase A、B、C
过频率保护 Overfrequency protection	●	●	保护可能对设备造成损害的高频电压 Protect high frequency voltage that may cause damage to equipment
欠频率保护 Underfrequency protection	●	●	保护可能对设备造成损害的低频电压 Protect low frequency voltage that may cause damage to the device
相序保护 Phase order protection	●	●	避免一些特殊机电设备因为电源相序接反，从而导致事故或设备损坏 Avoid some special mechanical and electrical equipment because of the power phase sequence connection, resulting in accidents or equipment damage
逆功率保护 Reverse power protection	●	●	当发电机功率反向时进行保护 Protection when generator power is reversed
负载监控 Load monitoring	●	●	监控方式:1.电流方式1；2.电流方式2；3.功率方式1；4.功率方式2；5.关闭 Monitoring mode :1.Current mode 1；2. Current mode 2；3. Power mode 1；4. Power mode 2；5. Close the
测量电流 Measuring circuit	●	●	测量三相电流、瞬时最大值、不平衡率 Measuring three - phase current, instantaneous maximum, unbalance rate
测量中性极、漏电电流 Measuring neutral, leakage current	●	●	测量中性极电流、接地电流、漏电电流（2选1） Measuring neutral current, grounding current \ leakage current (2 choose 1)
测量电压 Voltage measuring	●	●	测量线电压、相电压、平均电压、不平衡率 Measuring line voltage, phase voltage, average voltage, unbalanced rate
测量频率、功率 Measure frequency, power	●	●	测量频率（A相电压）、有功功率、无功功率、视在功率、功率因数 Measurement frequency (A phase voltage), active power, reactive power, apparent power, power factor
测量电能 Measuring electrical energy	●	●	测量有功电能、无功电能、视在电能 Measurement of active, reactive and apparent electrical energy
其他测量 Other measurement	●	●	测量相序、波形捕捉、系统时钟、过载长延时热容量 Measure phase sequence, waveform capture, system clock, overload long delay heat capacity
谐波测量 Harmonic measurement	●	●	测量谐波，支持31次谐波测量，并显示谐波波形（3M/3H增选功能） Measure harmonic, support 31 times harmonic measurement and display harmonic waveform (Optional function see of 3M/3H)
维护功能 Maintenance functions	●	●	自检功能、试验功能、锁定功能、操作次数、触头磨损率、历史记录 Self-check function, test function, locking function, operation times, contact wear rate, historical record
可编程触点输出 Contact output	●	●	各种报警及保护的触点输出（3M增选功能，详见《使用说明书》） Various contact outputs for alarm and protection (Optional function see of 3M, see the user's manual)
RS485 通讯接口 RS485 communication interface and contact output		●	与上位机的通讯接口。通讯协议有三种：Modbus-RTU、Profibus-DP、DeviceNet； 三者可选其一。其中Modbus-RTU协议已内含，其他协议要外加转换模板 Communication interface with personal computer. It has three communication agreement: Modbus - RTU, Profibus DP, Device Net etc

特性曲线 Characteristic curve

过载保护特性 Characteristic of over load protection

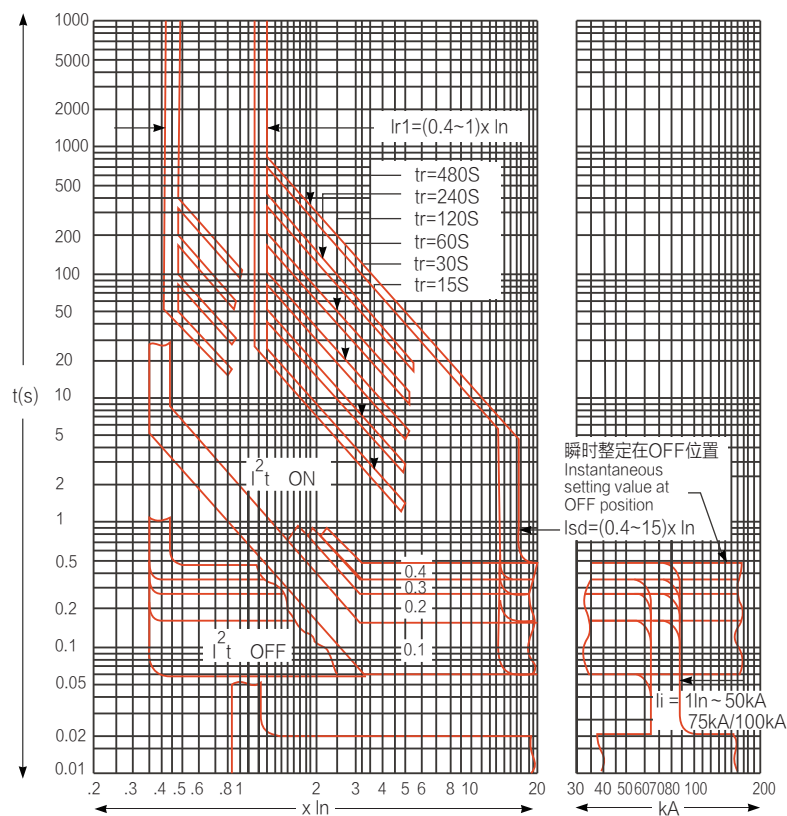


图1 Fig.1

接地保护特性 Characteristic of earth fault protection

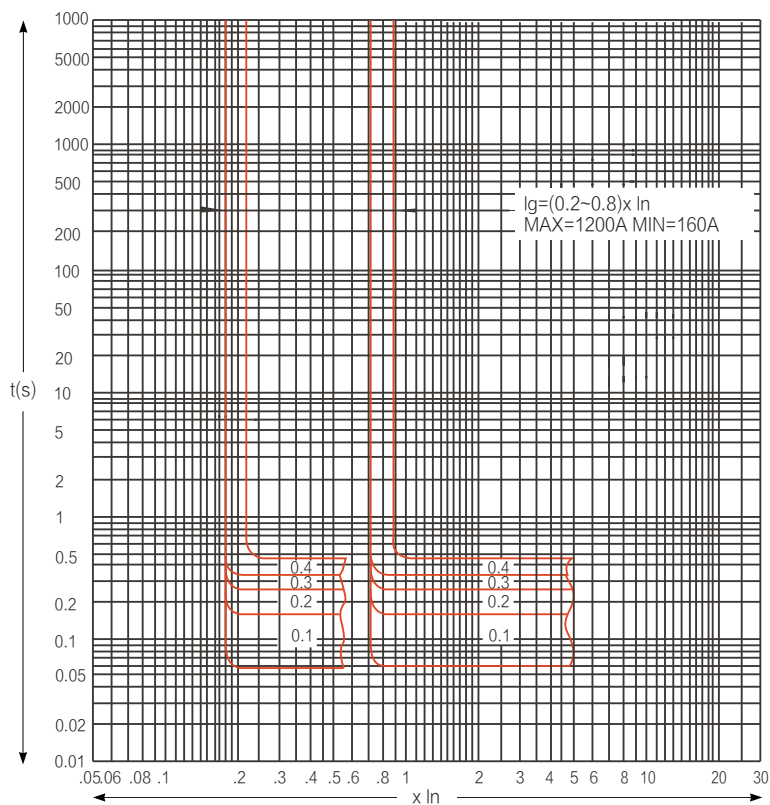


图2 Fig.2

特性曲线

Characteristic curve

负载监控保护特性(方式一) Characteristic of over load monitoring protection(pattern 1)

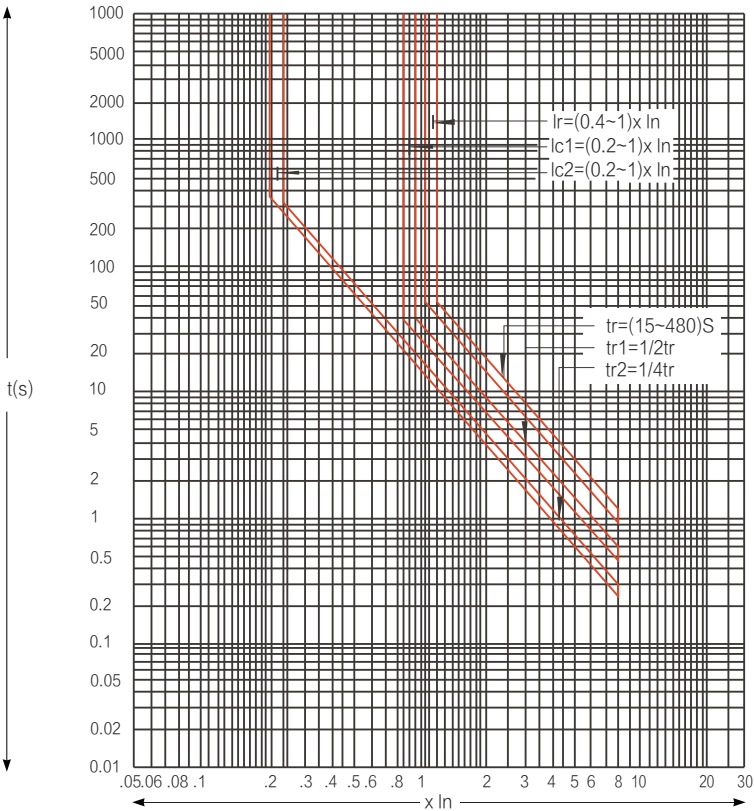


图3 Fig.3

负载监控保护特性(方式二) Characteristic of over load monitoring protection(pattern 2)

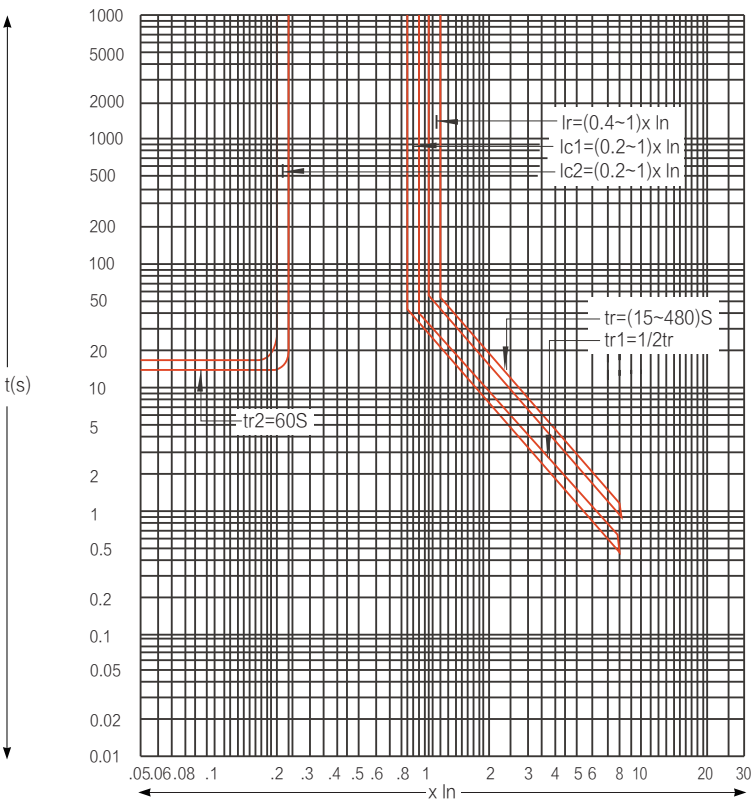


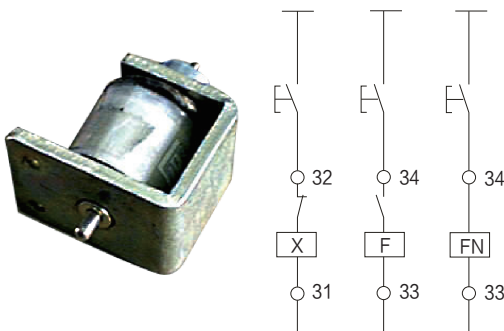
图4 Fig.4

附件\电气附件

Accessories\Electrical accessories

电气附件 Electrical accessories

F Shunt trip
FN Keep power on at all times of shunt trip
X Closing solenoid



合闸线圈(X) Closed solenoid

如果弹簧储能，X完成远程合闸功能。
If the mechanism spring Recharged it can make the Breaker closed.

分励脱扣器(F/FN) Shunt trip

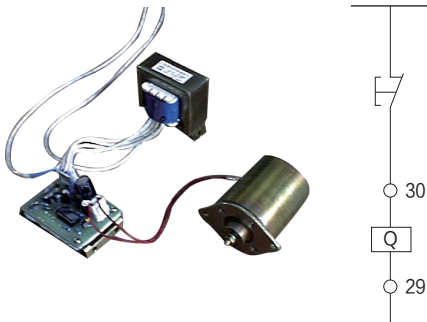
分励脱扣器通电后，会将断路器瞬时断开。选用FN（常通电型分励脱扣器）则分闸回路不串联辅助触点。
It can make the breaker open, If FN (Long term power on shunt trip) is selected, auxiliary contacts will not be connected in series in the opening circuit.

特 性	Characteristic	X	F/FN
Ue V AC 50/60Hz V DC		220V、380V 110V、220V	
动作值 Operating voltage		0.85~1.1 Ue	0.7~1.1 Ue
功耗 (VA or W) Power consumption instantaneous	瞬时	280	280
1.0 Ue时响应时间 Total operating time under 1.0 Ue		≤ 70 ms	≤ 30 ms

欠压线圈(Q) Under voltage release

如果供电电压下降至额定电压35%~70%之间的一个值，此脱扣线圈引起断路器瞬时断开，如果Q脱扣器未被供电，断路器不能合闸。
If the power supply voltage reduce to 35%~70% Ue it can make the breaker open

特 性	Characteristic	
Ue V AC 50/60Hz		220V、380V
动作值 Operating voltage	释放 Release 吸合 Close	0.35~0.7 Ue 0.85 Ue
功耗 (VA or W) Operating voltage		36
1.0 Ue时响应时间 Total operating time under 1.0 Ue		≤ 50 ms



延时单元 Time delay unit

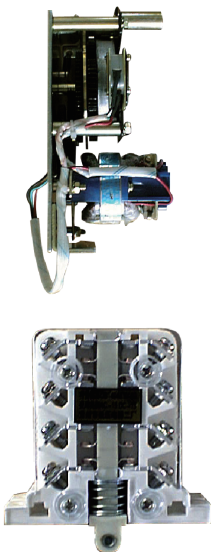
为了防止短时电压降引起断路器误动作，需外加一个延时单元。
Used to add a delay time to keep the breaker from unexpected open.

特 性	Characteristic	
动作值 Operating voltage	释放 Release 吸合 Close	0.35~0.7 Ue 0.85 Ue
延时时间 Delay time		1s~3s~5s

电动机机构 Motor-driven operating mechanism

断路器合闸以后，电动机机构自动释能及自动储能。
After the breaker closed, the mechanism can be recharged.

特 性	Characteristic	
Ue V AC 50/60Hz V DC		220V、380V 110V、220V
功耗 (VA or W) Power consumption		180
储能时间 Time of store energy	Inm ≤ 3200A Inm > 3200A	5s 7s



辅助触头 Auxiliary switches

用来显示断路器分合状态及电气控制。
indicates the ON/OFF position or used in electrical control system.

特 性	Characteristic	
约定发热电流Ith	AC-15 DC-13	220V、380V 6A 220V、6A
约定发热电流Ith Qualities	4NO+4NC	

附件\电气附件
Accessories\Electrical accessories



检有压合闸模块 Automatic closing when the voltage returns to normal

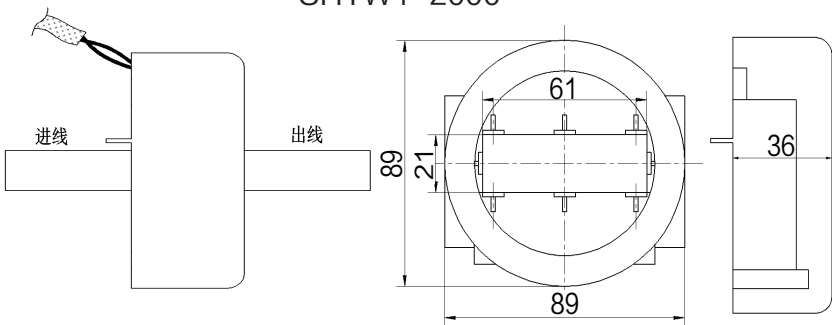
SHTW1系列万能式断路器检有压合闸模块使用于断路器经欠压跳闸后电源电压恢复正常时有自动合闸要求的场合，如光伏系统的并网用断路器。

动作特性如下：

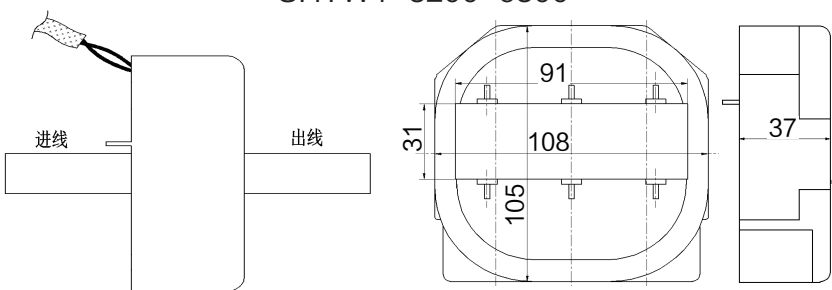
- 1、控制电源电压可选AC220V、AC380V
 - 2、欠压发生时，由断路器原欠压装置动作，使断路器跳闸。
 - 3、当检测到电源电压恢复至85%Us及以上，根据用户要求可以设定0-10S延时闭合断路器。
- SHTW1 series ACB has Automatic closing when the voltage returns module, which is used in the situation of automatic closing when the power supply voltage returns to normal after undervoltage tripping of the circuit breaker, such as the circuit breaker for grid connection of photovoltaic system.
- Action characteristics:
- 1.The control power supply voltage can be AC220V, AC380V
 - 2.When undervoltage occurs, the original undervoltage device of the circuit breaker acts to trip the circuit breaker.
 - 3.When the power supply voltage is detected to recover to 85% us or above, the 0-10s delay closing circuit breaker can be set according to the user's requirements.

外接电流互感器 External current transformer

SHTW1-2000

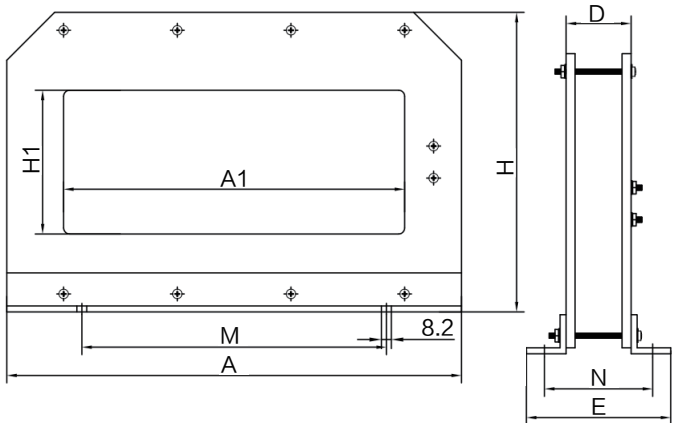


SHTW1-3200~6300



注：如用户需要选用特殊尺寸的电流互感器则与制造厂协商，协议供货。
Note: If the user needs to select a special size of current transformer, he shall negotiate with the manufacturer and supply by agreement.

外接漏电互感器 External leakage transformer

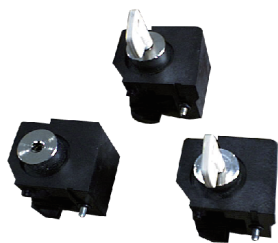


序号 Code	外形尺寸 Boundary dimension							
	A	H	D	E	A1	H1	M	N
1	380	250	54	114	285	120	250	72
2	465	250	54	114	370	120	250	72
3	485	250	54	114	390	120	300	72
4	515	250	54	114	420	120	300	72
5	595	250	54	114	500	120	300	72

注：根据用户安装需求选择相应序号的漏电互感器
Note: according to the installation requirements of users, select the leakage current transformer with corresponding code

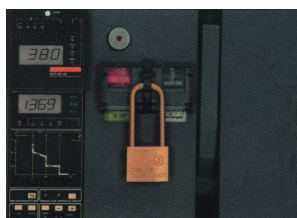
附件\机械附件 Accessories\Mechanical accessories

机械附件（选装） Mechanical accessories(Optional)



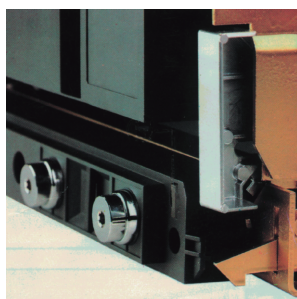
防合锁 OFF key lock

当断路器处于断开状态下，防止断路器合闸。
To prevent the breaker against closing operation when the breaker is in OFF state.



按钮闭锁装置 Push-button locking device

用塑料透明罩盖住“1”和“0”按钮，然后用挂锁闭锁。
挂锁用户自备。
Option: The push-buttons "1" and "0" are covered by a transparent cover ,and then locked padlock.
Padlock not supplied



门联锁 Door interlock

联锁机构安装在断路器上，避免断路器在“连接”位置上柜体小室门打开。
门联锁装置在右边。适用抽屉式断路器。用户提出选装。

The interlock device is mounted on the circuit breaker to prevent the cubicle door from being opened when the circuit breaker is in the connected position. The door interlock device is designed in the right side It is suitable for drawout circuit breaker. Option of supply.



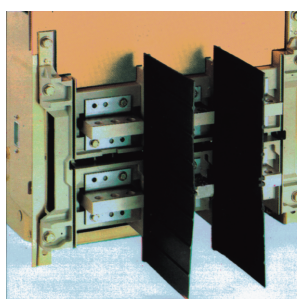
三位置锁定装置 Three-position locking device

“退出”“连接”和“试验”位置的锁定
To lock "disconnected", "connected" and "test" position.

三位置电气指示 Three-position electrical indication

对应于“退出”“连接”和“试验”位置的信号指示，拥有三组触点可用于电气控制回路。

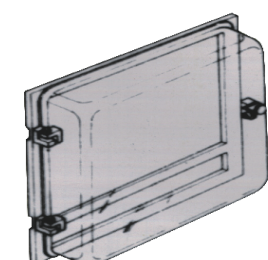
Corresponding to the "disconnected", "connected" and "test" position of signal indication, , while three sets of contacts can be used for electrical control circuit.



相间隔板 Interphase barrier

电源侧发生故障的情况下防止电弧传播到断路器上。在带绝缘母线排的装置里，使断路器进行绝缘。

In the case of a line side fault , prevents the arc being Propagated to the breaker. enables the circuit breaker's insulation in installations with insulated bus bars.



透明罩 Transparent cover

安置在柜体小室的门框上，防护等级达到IP54。适用于抽屉式及固定式断路器。

Fixed to the door frame of cubicle provide degree of protection IP 54. It is suitable for drawout type and type circuit breakers.

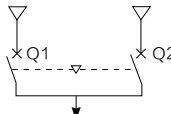
附件
Accessories

机械联锁 Mechanical interlocking

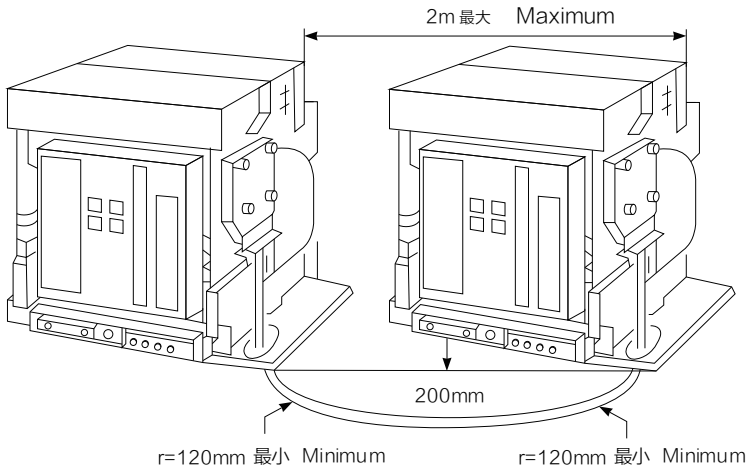
用于多路电源供电的系统，是一个安全联锁装置，以防止二个或多个断路器并联合闸。

A safety interlocking device used in systems powered by multi power supplies to prevent two or more circuit breakers from closing parallelly.

机械联锁形式 Mechanical interlocking for Type

2个断路器 2 breakers	可能的组合 Combination																								
	<table><tr><th>Q1</th><th>Q2</th></tr><tr><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td></tr><tr><td>1</td><td>0</td></tr></table>	Q1	Q2	0	0	0	1	1	0																
Q1	Q2																								
0	0																								
0	1																								
1	0																								
3个断路器:3个正常电源和1个备用电源 3 breakers:2N+1R	<table><tr><th>Q1</th><th>Q2</th><th>Q3</th></tr><tr><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>1</td><td>1</td><td>0</td></tr><tr><td>0</td><td>1</td><td>0</td></tr></table>	Q1	Q2	Q3	0	0	0	1	0	0	0	0	1	1	1	0	0	1	0						
Q1	Q2	Q3																							
0	0	0																							
1	0	0																							
0	0	1																							
1	1	0																							
0	1	0																							
3个断路器:3个电源只能合一台 3 breakers:(only 1 breaker can be closed)	<table><tr><th>Q1</th><th>Q2</th><th>Q3</th></tr><tr><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td><td>0</td></tr><tr><td>0</td><td>0</td><td>1</td></tr></table>	Q1	Q2	Q3	0	0	0	1	0	0	0	1	0	0	0	1									
Q1	Q2	Q3																							
0	0	0																							
1	0	0																							
0	1	0																							
0	0	1																							
3个断路器:双电源一个分断 3 breakers:(one of two power supplies switch off)	<table><tr><th>Q1</th><th>Q2</th><th>Q3</th></tr><tr><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td><td>0</td></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>1</td><td>1</td><td>0</td></tr><tr><td>0</td><td>1</td><td>1</td></tr><tr><td>1</td><td>0</td><td>1</td></tr></table>	Q1	Q2	Q3	0	0	0	1	0	0	0	1	0	0	0	1	1	1	0	0	1	1	1	0	1
Q1	Q2	Q3																							
0	0	0																							
1	0	0																							
0	1	0																							
0	0	1																							
1	1	0																							
0	1	1																							
1	0	1																							

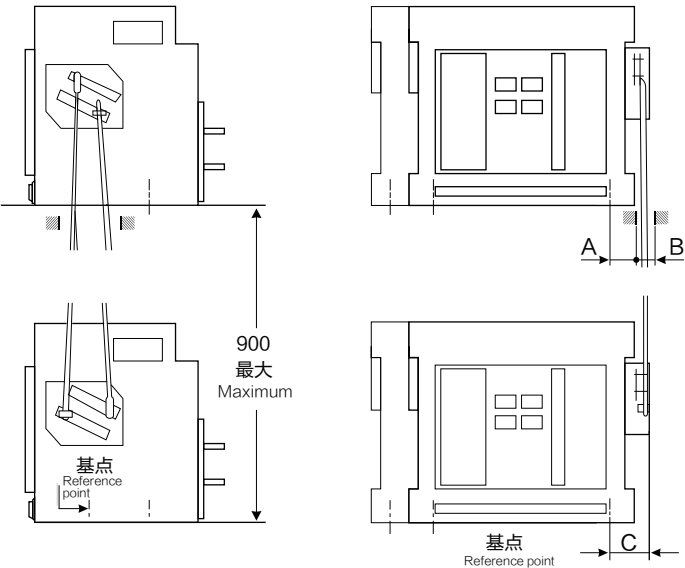
水平联锁二个固定式或抽屉式断路器
Shows two fixed or circuit breakers interlocked horizontally.



附件
Accessories

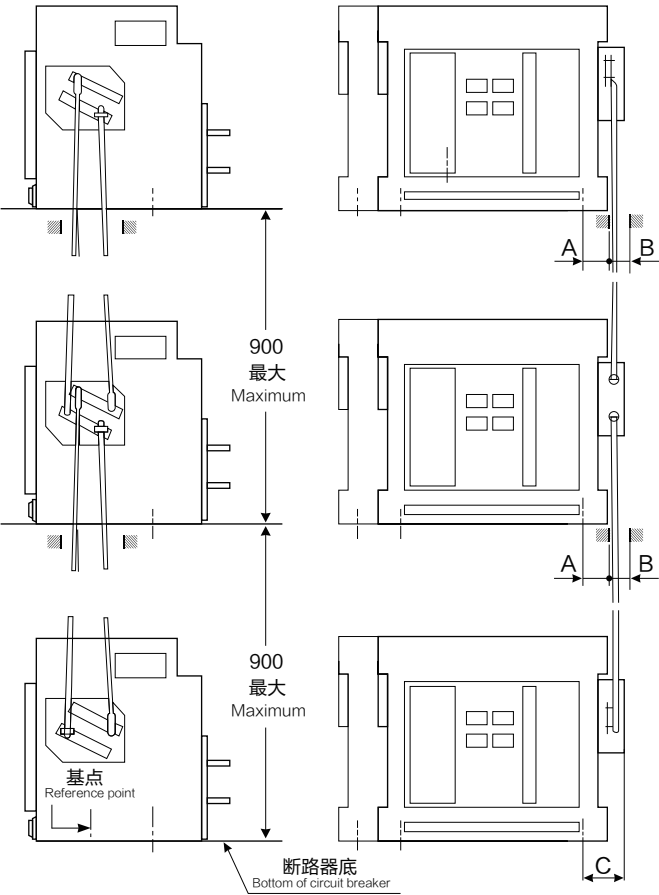
连杆联锁二个叠装断路器 Shows two overlapping mounted circuit breakers

	A	B	C
抽屉式	52	30	82
固定式	14	30	44



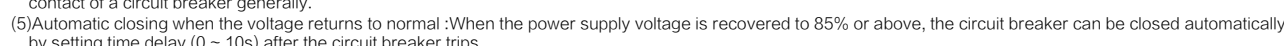
连杆联锁三个叠装断路器 Shows three overlapping mounted circuit breaker

	A	B	C
抽屉式	52	60	100
固定式	14	30	44



F

The electrical principle diagram is the wiring diagram when the circuit breaker is in the state of disconnection, there is no energy storage, and the controller has no fault indication



二次回路接线图

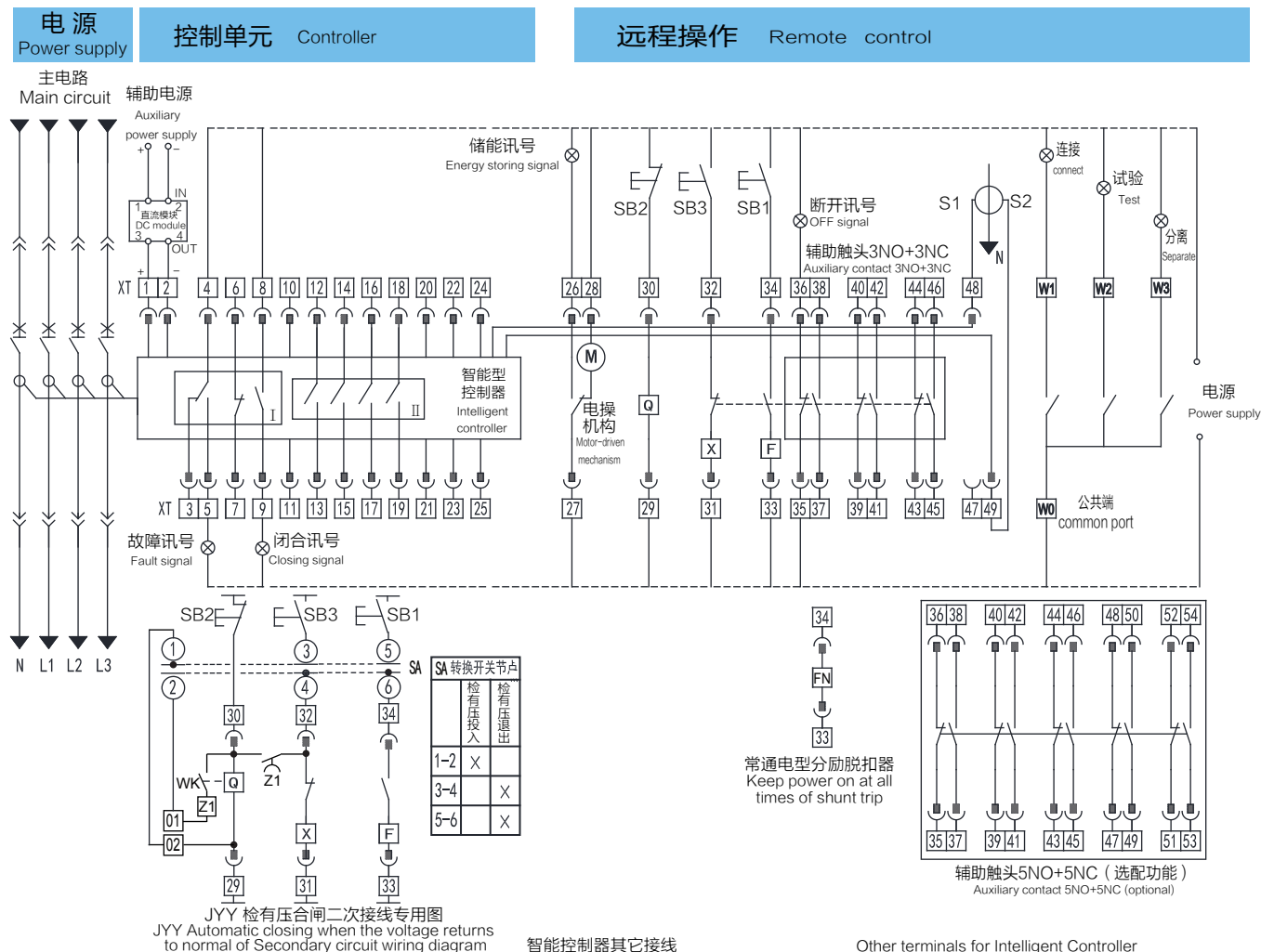
Secondary circuit wiring diagram

断路器控制回路接线图（智能控制器为M、2M、2H、3M、3H型）

Wiring diagram of control circuit for the Breaker (Type M、2M、2H Intelligent Controller)

电气原理图为断路器处于断开状态、未储能,且控制器无故障指示时的接线图

The electrical principle diagram is the wiring diagram when the circuit breaker is in the state of disconnection, there is no energy storage, and the controller has no fault indication



SB1 分励按钮 SB1 Shunt pushbutton

SB2 欠压按钮 SB2 Undervoltage button

SB3 合闸按钮 SB3 Closing pushbutton

Q 欠压脱扣器 Q Under voltage trip

F 分励脱扣器 F Shunt trip

FN 常通电型分励脱扣器 FN Keep power on at all times of shunt trip

X 闭合电磁铁 X Closing solenoid

M 储能电机 M Energy storing motor

XT 接线端子 XT Wiring terminal

JYY 检有压合闸模块⁽⁵⁾

JYY Automatic closing when the voltage returns to normal

注:

(1) 若智能控制器和Q、F、X、M的控制电源不同时应分开连接,若分励选用FN型则分励回路不串联辅助触点。

(2) 智能控制器辅助电源为直流时,输入电源应接至断路器左侧电源模块的U1(+)、U2(-)

(3) 接地(3P+N)或漏电保护的外接互感器(CT、ZCT)次级接至接线端子48#、49#(5NO+NC接至接线端子25#、55#)

(4) 图中I框部分为控制器辅助触点;触点容量:AC380V.3A II框部分为控制器内部各种报警、远端输出监视用的信号单元,触点容量:AC125V.3A/DC28V.3A。

(5) 检有压合闸模块功能:断路器经失压跳闸后,当检测到电源电压恢复到85%及以上,断路器可经人为设定延时(0~10s)自动合闸

(6) M型产品没有10#、11# RS485串行通讯口线

Notes:

(1) If different control power supplies are employed for Intelligent Controller and Q,F,X,M, they should be connected separately, If FN type shunt excitation is selected, auxiliary contacts will not be connected in series in the opening circuit.

(2) If the auxiliary power supply of the Intelligent Controller is a DC one, it should be connected to U1(+) and U2(-) on the power module situated on the left side of the circuit breaker.

(3) The secondary windings of external instrumental transformers such as CTs and ZCTs for earthing (3P+N) or leakage protections should be connected to 48# and 49# of the terminal block (5NO+NC is connected to terminal 25#, 55#).

(4) Section I of the drawing includes auxiliary contacts of the Intelligent Controller, their capacity being AC380V.3A. Section II includes its signalling inlets for various alarmings and remote output supervision, their contact's capacity being AC125V.3A and DC28V.3A.

(5) Automatic closing when the voltage returns to normal: When the power supply voltage is recovered to 85% or above, the circuit breaker can be closed automatically by setting time delay (0 ~ 10s) after the circuit breaker trips.

(6) For M type product, RS485 serial communication interface wirings should be added in Terminals 10# and 11#.

Other terminals for Intelligent Controller

1#、2# : Input terminals for AC auxiliary power supply
If DC module 1 as "+" 2 as "-"

10#、11# : Communication wiring

12#、13# : Output of unload 1 signal

14#、15# : Output of unload 2 signal

16#、17# : Output of unload 3 signal

18#、19# : Output of unload 4 signal

20# : Earthing protective

21# : Power making of N-phase

22#、23#、24# : ABC 3-phase power supply input terminals

35#、46# : Auxiliary contact 3NO+NC

35#、54# : Auxiliary contact 5NO+NC (Special orders)

W0#、W3# : Three-position electrical indication (optional)

二次回路接线图

Secondary circuit wiring diagram

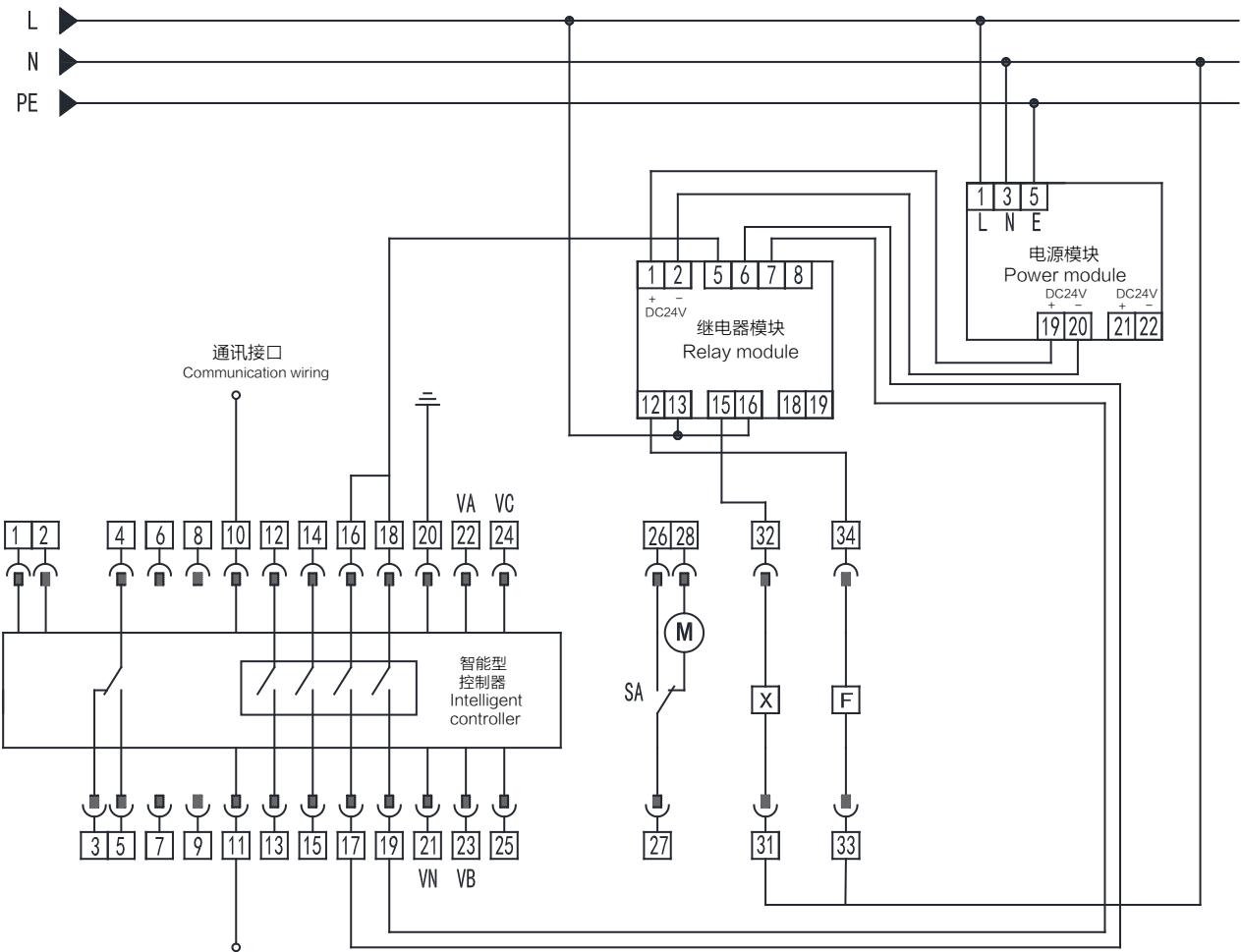
通讯带遥控功能典型接线图（智能控制器为2H、3H型）

Typical wiring diagram of communication with remote control function (Type M、2H、3H Intelligent Controller)

电气原理图为断路器处于断开状态、未储能,且控制器无故障指示时的接线图

The electrical principle diagram is the wiring diagram when the circuit breaker is in the state of disconnection, there is no energy storage, and the controller has no fault indication

通讯带遥控功能典型接线图 SHTW1 Electrical schematic



F 分励脱扣器 F Shunt trip
X 闭合电磁铁 X Closing solenoid
M 储能电机 M Energy storing motor

智能控制器其它接线
10[#]、11[#]: 通讯接口引出线 (H型)
12[#]、13[#]: 负载监控1卸载输出
14[#]、15[#]: 负载监控2卸载输出
16[#]、17[#]: 自诊断故障报警 (H型遥控分闸)
18[#]、19[#]: 故障跳闸报警 (H型遥控合闸)
20[#]: 保护地线
21[#]: N相电压输入
22[#]、23[#]、24[#]: A、B、C三相电源输入端

10[#]、11[#]: Communication wiring
12[#]、13[#]: Output of unload 1 signal
14[#]、15[#]: Output of unload 2 signal
16[#]、17[#]: Output of self-diagnose alarming signal(Remote open for type H trip unit)
18[#]、19[#]: Output of OCR fault tripping signal(Remote close for type H trip unit)
20[#]: Earthing protective
21[#]: Power making of N-phase
22[#]、23[#]、24[#]: ABC 3-phase power supply input teminals

自动电源转换系统

Automatic power transfer switching system

自动电源转换系统简介

WATSC702/802自动电源转换系统是一种具有可编程功能、自动化测量、LCD菜单显示、数字通讯为一体的智能化双电源切换产品，可自动实现电压、频率、相位等电参量测量，并根据设置参数进行自动化控制，可减少人为操作失误，是控制双电源切换的理想产品。

WATSC702/802自动电源转换系统主要是由双电源转换控制器、SHTW1/SHTW3万能式断路器、重载连接器及机械连锁构成，可精确地检测两路三相电压，对出现的电压异常(欠压、过压、缺相、过频、欠频)做出准确的判断并输出无源控制开关量。用户无需单独接线，只需接插专用电缆连接器。

其中WATSC702控制器控制两路进线开关，WATSC802控制器控制两路进线开关及一个母联开关，实现低压备自投。其结构紧凑、电路先进、接线简单、可靠性高，可广泛应用于电力、邮电、石油、煤炭、冶金、铁道、市政、智能大厦等行业、部门的电气装置、自动控制以及带母联开关的两路电源供电系统。

符合标准

IEC 60947-6-1

GB/T 14048.11

《低压开关设备和控制设备

第6-1部分：多功能电气转换电气》

Automatic power transfer switching system introduction

Watsc702/802 Automatic power transfer switching system is a programmable function, automatic measurement, LCD menu display, digital communication as one of the intelligent dual power switching products, can be automatic Voltage, frequency, phase and other electrical parameters measurement, and according to the set parameters for automatic control, can reduce human operation error, is an ideal product to control the dual power switch.

Watsc702/802 Automatic power transfer switching system is mainly composed of dual power conversion controller, SHTW1/SHTW3 universal circuit breaker, heavy-duty connector and mechanical linkage, which can accurately detect two or three phases Voltage, make accurate judgment of the abnormal voltage (undervoltage, overvoltage, missing phase, overfrequency, underfrequency) and output the switch quantity of passive control. Users do not need separate wiring, just plug in the special cable connector.

WATSC702 controller controls the two-way inlet switch, WATSC802 controller controls the two-way inlet switch and a busbar switch. Its compact structure, advanced circuit, simple wiring, can Highly reliable, can be widely used in electric power, posts and telecommunications, petroleum, coal, metallurgy, railway, municipal, intelligent buildings and other industries, departments of electrical equipment, automatic control and with bus switch two power supply The electrical system.

Standards applicable

IEC 60947-6-1

GB/T 14048.11

《Low-voltage switchgear and controlgear—Part 6-1:multiple function equipment—Transfer switching equipment》



WATSC702自动电源转换系统
WATSC702 Automatic power transfer switching system



WATSC802自动电源转换系统
WATSC802 Automatic power transfer switching system

WATSC自动电源转换系统示意图（机械连锁需根据现场实际距离选配）
Schematic diagram of WATSC Automatic power transfer switching system
(mechanical interlock shall be selected according to the actual distance on site)

● 型号及意义

WATSC□-□/□/□/□

R:电网-电网 / F:电网-发电机 R: Grid-Grid/F: Grid-Generator

选用断路器 Select ACB:W1(SHTW1)/W3(SHTW3)

极数 Pole number: 3-3P/4-4P

额定电流 Rated current: 02-200A、04-400A、06-630A、08-800A、10-1000A、12-1250A、16-1600A、20-2000A、25-2500A、29-2900A、32-3200A、36-3600A、40-4000A

壳架等级电流Frame rated current: 25(1600、2000A、2500A)/40(3200、4000A)

控制器类型:

702-控制两路电源、两台进线断路器

802-控制两路电源、两台进线断路器一台母联断路器

902-控制三路电源、三台进线断路器（注:2）

上海华通低压开关有限公司自动电源转换系统

Shanghai Hua Tong LV Electric Apparats co.,Ltd Automatic power transfer switching system

Controller Types:

702 - control two power supply, two incoming circuit breakers

802 - control two power supply, two incoming circuit breakers and one busbar circuit breaker

902 - control three power supply, three incoming circuit breakers (Note:2)

注: 1 R或F, 用户也可通过WATSC控制器现场调节。

2 用户需要选用WATSC902控制器则与制造厂协商, 协议供货。

Note: 1 R or f, The user can also adjust on site through WATSC controller.

2 Users need to control 3-way power supply and 3 incoming circuit breakers. WATSC902 controller is selected and supplied by agreement.

自动电源转换系统
Automatic power transfer switching system

WATSC参数表		WATSC Parameters table		
主要技术数据		Main technical parameters		WATSC702 WATSC802
壳架等级额定电流Inm(A) Frame Rated Current Inm(A)		25 (1600A/2000A/2500A)	40 (3200A/4000A)	■ ■
极数	Quantity of poles	3、4	3、4	■ ■
额定电流Ie(A)	Rated Current Ie(A)	02-200A、04-400A、06-630A、08-800A、10-1000A、12-1250A、16-1600A、20-2000A、25-2500A	20-2000A、25-2500A、29-2900A、32-3200A、36-3600A、40-4000A	■ ■
额定工作电压Ue(V)	Rated Working Voltage Ue(V)	AC400V 50Hz/60Hz		■ ■
额定绝缘电压Ui(V)	Rated Insulation Voltage Ui(V)	AC1000V 50Hz/60Hz		■ ■
额定冲击耐受电压Uimp(kV) Rated Impulse Withstand able Voltage Uimp(kV)		12		■ ■
额定短路分断能力Icn(kA) Rated short-circuit breaking capacity Icn(kA)		70	95	■ ■
额定短路接通能力Icm (kA)(峰值) Rated short-circuit making capacity Icm(kA)(Peak)		154	209	■ ■
使用类别	Use category	AC-33B		■ ■
自动电源转换功能		Automatic power transfer switching feature		
失压/断相/三相不平衡 Loss of voltage/phase failure/3-phase imbalance		主、备回路（三相） Main circuit, standby circuit (3-phase circuit)		■ ■
电网额定电压	Grid rated voltage	默认 default：AC380V(可调 Adjustable：AC 50-400V)		■ ■
电网额定频率	Grid rated frequency	默认 default：50Hz(可调 Adjustable：50 Hz/60 Hz)		■ ■
欠压 ⁽¹⁾	Undervoltage	默认 default：85%（可调 Adjustable：70%-95%±2%）		■ ■
欠压返回 ⁽¹⁾	Undervoltage return	默认 default：95%（可调 Adjustable：75%-100%±2%）		■ ■
过压 ⁽¹⁾	Overvoltage	默认 default：115%（可调 Adjustable：105%-130%±2%）		■ ■
过压返回 ⁽¹⁾	Overvoltage return	默认 default：105%（可调 Adjustable：100%-125%±2%）		■ ■
欠频 ⁽²⁾	Underfrequency	默认 default：95%（可调 Adjustable：80%-99%±2%）		■ ■
欠频返回 ⁽²⁾	Underfrequency return	默认 default：97%（可调 Adjustable：81%-100%±2%）		■ ■
过频 ⁽²⁾	Overfrequency	默认 default：105%（可调 Adjustable：101%-120%±2%）		■ ■
过频返回 ⁽²⁾	Overfrequency return	默认 default：103%（可调 Adjustable：100%-119%±2%）		■ ■
信号保持时间	Signal hold time	默认 default：0.5s（可调 Adjustable：0.1~0.5s）		■ ■
I路/II路电源正常延时 ⁽³⁾	I / II power supply normal delay	默认 default：5s（可调 Adjustable：0~60s）		■ ■
I路/II路电源异常延时 ⁽⁴⁾	I / II power supply Abnormal delay	默认 default：0.1Min（可调 Adjustable：0~60Min）		■ ■
I路/II路电源零位延时 ⁽⁵⁾	I / II power supply zero delay	默认 default：0s（可调 Adjustable：0.1~20s）		■ ■
I路/II路电源正常延时 ⁽³⁾	I / II power supply normal delay	默认 default：3s（可调 Adjustable：0~99s）		■ ■
I路/II路电源异常延时 ⁽⁴⁾	I / II power supply Abnormal delay	默认 default：3s（可调 Adjustable：0~99s）		■ ■
I路/II路电源异常延时 ⁽⁵⁾	I / II power supply zero delay	默认 default：0.5s（可调 Adjustable：0~2.0s）		■ ■
工作模式		Work-pattern		
手动模式：长按手动模式键3s进入手动模式 Manual mode: Long press the manual mode key for 3s to enter the manual mode		按下I位置键、II位置键、O位置键可将开关切换至对应位置。Press the I position key, II position key, and O position key to switch the switch to the corresponding position.		■ ■
自动模式：长按自动模式键3s进入自动模式 Auto mode: Long press the auto mode key for 3s to enter the auto mode		按下101键、110键、011键、100键、001键、000键可将开关切换至对应位置。Press 101, 110, 011, 100, 001 key, 000 key can switch the switch to the corresponding position.		■ ■
通信功能	Communication function	在自动模式下，设备自动切换开关位置。 In automatic mode, the device switches the switch position automatically.		■ ■
		RS-485接口, MODBUS 协议 RS-485 interface, MODBUS protocol.		■ ■

注：

1 欠压、过压门限与返回门限差值必须大于5%

2 欠频、过频门限与返回门限差值必须大于1%

3 正常延时指电源从异常到正常开关转换延时时间

4 异常延时指电源从正常到异常开关转换延时时间

5 零位延时指开关转换过程的断开状态保持时间

Note:

1 The difference between undervoltage, overvoltage threshold and return threshold must be greater than 5%.

2 The difference between underfrequency, overfrequency threshold and return threshold must be greater than 1%

3 Normal delay refers to the delay time for the power supply to switch from abnormal to normal.

4 Abnormal delay refers to the switching delay time of the power supply from normal to abnormal.

5 Zero delay refers to the hold-off time of the switch state during the switch.

自动电源转换系统

Automatic power transfer switching system

产品特点

- 液晶屏
WATSC702 控制器采用 128x64 像素 LCD 屏。
WATSC802 控制器采用 800x480 像素 5.0 寸 TFT 屏。
- 2 路交流电源输入：三相四线。
- 测量值、设置和消息文本支持中文语言。
- 10~30VDC 直流电源。
- 具有过压、欠压、缺相、逆相序、过频、欠频检测功能。
- 8 路可编程数字输入（接地有效）。
- 10 路可编程数字输出。
- 集成 RS-485 隔离接口，MODBUS 通讯协议。
- 可存储最近的 200 个事件（动作记录及报警记录各 100）。
- 实时时钟。
- 所有参数现场可编程，采用密码保护访问，防止非专业人员误操作。
- 标配防水垫圈，前面板防护等级为 IP65。
- 模块化结构设计，阻燃 PC 外壳，可插拔式接线端子，嵌入式安装方式，结构紧凑，安装方便。

Features

- Lcd panel
WATSC702 controller uses a 128x64 pixel LCD screen.
WATSC802 controller uses 800x480 pixel 5.0 inch TFT screen.
- 2 - way ac power supply input: three - phase four - wire.
- Measurement values, Settings and message text support the Chinese language.
- 10~30VDC dc power supply.
- With overvoltage, undervoltage, missing phase, inverse phase sequence, overfrequency, underfrequency detection function.
- 8 channels programmable digital input (effective grounding).
- 10 channel programmable digital output.
- Integrated rs-485 isolation interface, MODBUS communication protocol.
- Can store the latest 200 events (action record and alarm record 100 each).
- Real time clock.
- All parameters are field programmable, password protected access to prevent non-professional misoperation.
- Standard waterproof gasket, front panel protection grade IP65.
- Modular structure design, flame retardant PC housing, pluggable terminal, embedded installation, compact structure, easy installation.

WATSC702型控制器

WATSC702 Controller



WATSC702面板指示灯

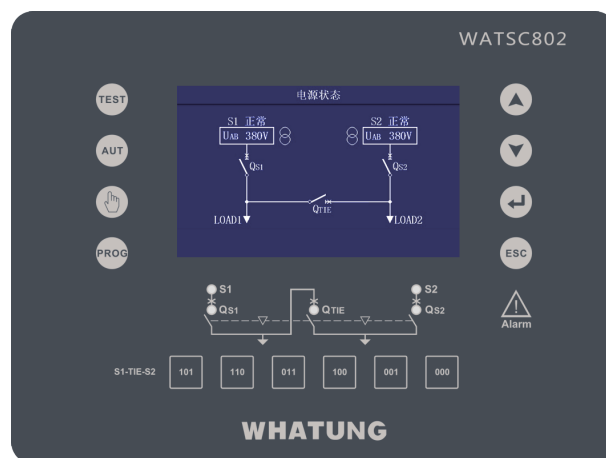
- 报警指示灯（红色）——常亮，表示有报警激活。
- I 路电压状态指示灯（绿色）——I 路正常，灯亮；I 路异常，灯闪烁。
- II 路电压状态指示灯（绿色）——II 路正常，灯亮；II 路异常，灯闪烁。
- I 路开关状态指示灯（绿色）——亮，表示闭合；灭，表示断开。
- II 路开关状态指示灯（绿色）——亮，表示闭合；灭，表示断开。

WATSC802面板指示灯

- Alarm 报警指示灯（红色）——常亮，表示有报警激活。
- S1 电压状态指示灯（绿色）——S1 路正常，灯亮；S1 路异常，灯闪烁。
- S2 路电压状态指示灯（绿色）——S2 路正常，灯亮；S2 路异常，灯闪烁。
- QS1 开关状态指示灯（绿色）——亮，表示闭合；灭，表示断开。
- QS2 开关状态指示灯（绿色）——亮，表示闭合；灭，表示断开。
- QTIE 开关状态指示灯（绿色）——亮，表示闭合；灭，表示断开。

WATSC802型控制器

WATSC802 Controller



WATSC802 Panel indicator light

- Alarm indicator (red) -- always on, indicating alarm activation.
- Voltage I road status indicator light (green) - I LuZhengChang, light; Abnormal I road, lights flashing.
- Voltage II road status indicator light (green) - II LuZhengChang, light; Abnormal II road, lights flashing.
- I way switch state indicator (green) - on, said closed; Off, means disconnect.
- II way switch state indicator (green) - on, said closed; Off, means disconnect.

WATSC702 Panel indicator light

- Alarm Alarm light (red) -- always on, indicating Alarm activation.
- S1 voltage status indicator (green) -- S1 is normal and the lamp is on; S1 abnormal, flashing lights.
- S2 voltage status indicator (green) -- S2 is normal and the lamp is on; S2 abnormal, flashing lights.
- QS2 switch status indicator (green) -- light, indicating closure; Off, means disconnect.
- QS2 switch status indicator (green) -- light, indicating closure; Off, means disconnect.
- QTIE switch status indicator (green) -- light, indicating closure; Off, means disconnect.

自动电源转换系统

Automatic power transfer switching system

WATSC控制器面板按键说明 WATSC Controller Panel Key Description

图标 Icon	按键名称 The key name	功能描述 Functional description	WATSC702	WATSC802
	I 键 I key	手动模式下，按下此键，切换到I位置。 In manual mode, press this key to switch to the I position	■	
	II 键 II key	手动模式下，按下此键，切换到II位置。 In manual mode, press this key to switch to II position	■	
	O 键 O key	手动模式下，按下此键，切换到O位置。 In manual mode, press this key to switch to the O position	■	
	101键 101 key	手动模式下，按下此键，切换断路器为101状态。 In manual mode, press this button to switch the circuit breaker to 101.		■
	110键 110 key	手动模式下，按下此键，切换断路器为110状态。 In manual mode, press this button to switch the circuit breaker to 110.		■
	011键 011key	手动模式下，按下此键，切换断路器为011状态。 In manual mode, press this button to switch the circuit breaker to 011.		■
	100键 100 key	手动模式下，按下此键，切换断路器为100状态。 In manual mode, press this button to switch the circuit breaker to 100.		■
	001键 001 key	手动模式下，按下此键，切换断路器为001状态。 In manual mode, press this button to switch the circuit breaker to 001.		■
	000键 000 key	手动模式下，按下此键，切换断路器为000状态。 In manual mode, press this button to switch the circuit breaker to 000.		■
	测试键 Test key	长按此键3S进入测试功能。 Long press this button 3S to enter the test function.	■	■
	自动模式键 Automatic mode key	长按此键3S将控制器设置为自动模式。 Long press this button 3S to set the controller to automatic mode.	■	■
	手动模式键 Manual mode key	长按此键3S将控制器设置为手动模式。 Long press this button 3S to set the controller to manual mode.	■	■
	编程模式键 Programming mode key	长按此键3S将控制器设置为编程模式。 Long press this key 3S to set the controller to programming mode.	■	■
	增加键/上翻键 Increase key/Up key	在进入菜单界面后，可向上移动光标或增加光标所在位的数字；在参数配置界面调整参数时为数值增加键。 After entering the menu interface, you can move the cursor up or increase the location of the cursor;a number of bits;In the parameter configuration interface to adjust parameters for the value of the increase key.	■	■
	减少键/下翻键 Decrease key/Down key	在进入菜单界面后，可向下移动光标或减少光标所在位的数字；在参数配置界面调整参数时为数值减少键。 After entering the menu interface, you can move the cursor down or reduce the location of the cursora number of bits; Is the value reduction key when adjusting parameters in the parameter configuration interface.	■	■
	确认键 Identify key	在进入菜单界面后，确认键可进入子菜单及确认设置信息。 After entering the menu interface, the confirm key can enter the sub-menu and confirm the setting information.	■	■
	返回键 Return key	返回上层菜单界面，长按3S锁定按键/解锁按键。产生报警时按此键解除报警，如报警类型是开关动作超时报警，则同时切换到手动模式。 Back to the upper menu interface, long press 3S lock/unlock button.Press this button to remove the alarm when an alarm is generated, if the alarm type is switch Action timeout alarm, switch to manual mode at the same time.	■	■

注：
1 编程模式：该模式下进行参数设置操作，长按编程模式键3s弹出密码输入界面，输入正确密码后进入参数设置。
2 控制器上电后的工作模式为上一次断电前的模式
3 断路器脱扣或人为分闸后不再发出合闸动作，自动切换到手动模式
4 ESC键只是解除声光报警，完全解除报警操作为回到主菜单 ->参数设置 ->解除报警 -> ENTER键

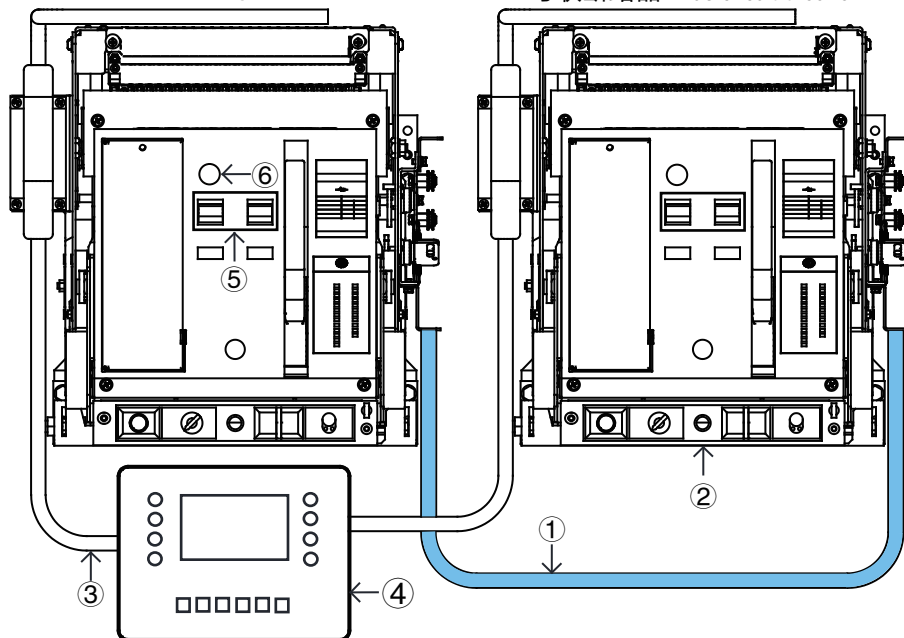
Note:
1 Programming mode: parameter setting operation is carried out in this mode,Long press the 3s key of programming mode to pop up the password input interface.Enter the correct password to enter the parameter Settings.
2 The operating mode of the controller after power-on is the mode before the last power-off
3 After the circuit breaker is tripped or opened manually, the closing action will no longer be issued.
4 the ESC key only disactivates the sound and light alarm, and the complete disalarm operation is to return to the main menu -> parameter setting -> disalarm -> ENTER key

自动电源转换系统 Automatic power transfer switching system

WATSC702 自动电源转换系统结构说明 WATSC702 Automatic power transfer switching system structure description

进线断路器1 Incoming circuit breaker 1

母联断路器 Bus circuit breaker



- ① 机械二连锁 (蓝色)
- ② SHTW1万能式断路器(2台)
- ③ 重载连接器及连接线
- ④ WATSC702型控制器
- ⑤ 分合闸按钮锁
- ⑥ 防合锁

注: ①根据现场情况配置

- ① mechanical 2 chain (blue)
- ② SHTW1 ACB (2)
- ③ Heavy-duty connectors and wire
- ④ WATSC702 controller
- ⑤ Button lock
- ⑥ Off key lock

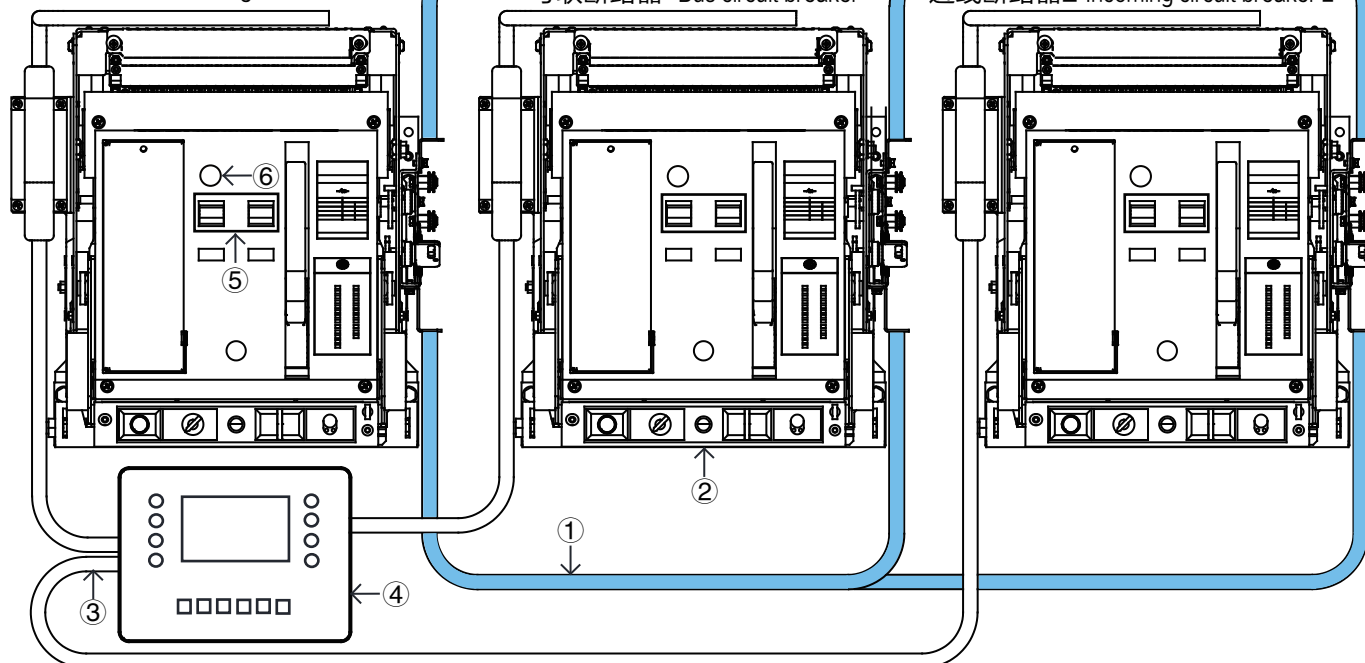
Note: ① according to the site configuration

WATSC802 自动电源转换系统结构说明 WATSC802 Automatic power transfer switching system structure description

进线断路器1 Incoming circuit breaker 1

母联断路器 Bus circuit breaker

进线断路器2 Incoming circuit breaker 2



- ① 机械三连锁 (蓝色)
- ② SHTW1万能式断路器(3台)
- ③ 重载连接器及连接线
- ④ WATSC802型控制器
- ⑤ 分合闸按钮锁
- ⑥ 合闸钥匙锁

注: ①根据现场情况配置

- ① mechanical 3 chain (blue)
- ② SHTW1 ACB (3)
- ③ Heavy-duty connectors and wire
- ④ WATSC802 controller
- ⑤ Button lock
- ⑥ Off key lock

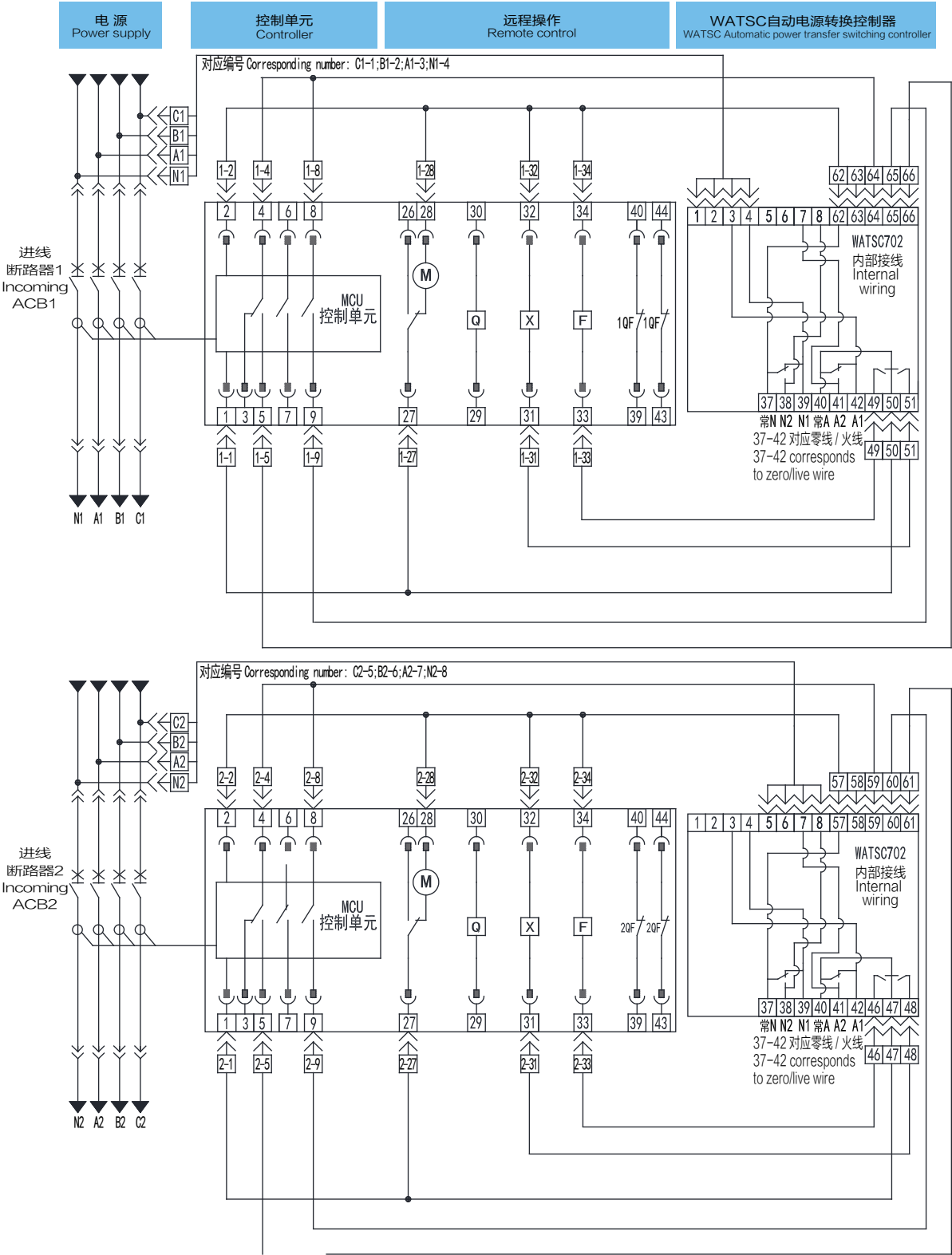
Note: ① according to the site configuration

自动电源转换系统

Automatic power transfer switching system

WATSC702 电气原理图

WATSC702 Electrical schematic



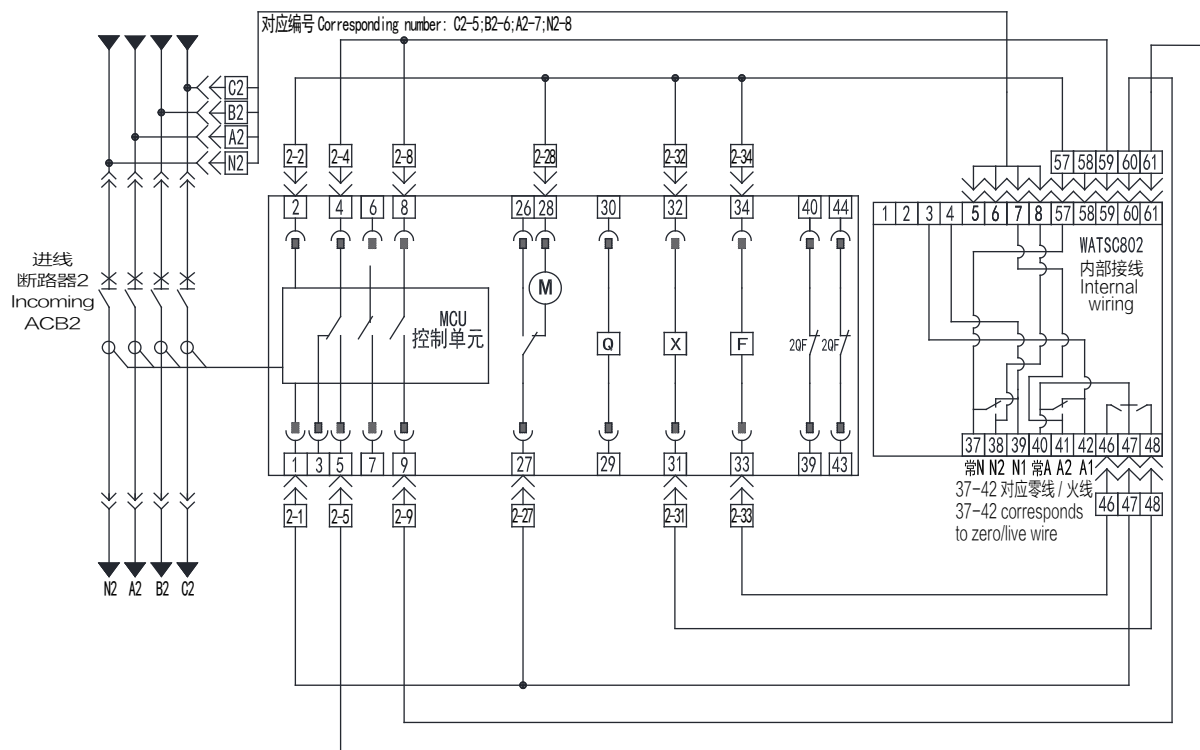
注:

1. 图中所示控制器均为常规上进线取电, 如有下进线取电要求请在采购时特殊注明。
2. 控制器数量仅一台, 为接线指示方便显示分开显示
3. 电气原理图为断路器处于断开状态、未储能, 且控制器无故障指示时的接线图。
4. 图中外接线为 WATSC702 控制器和二台断路器的二次接线通过重载连接器连接, 用户不需接线。

Note:

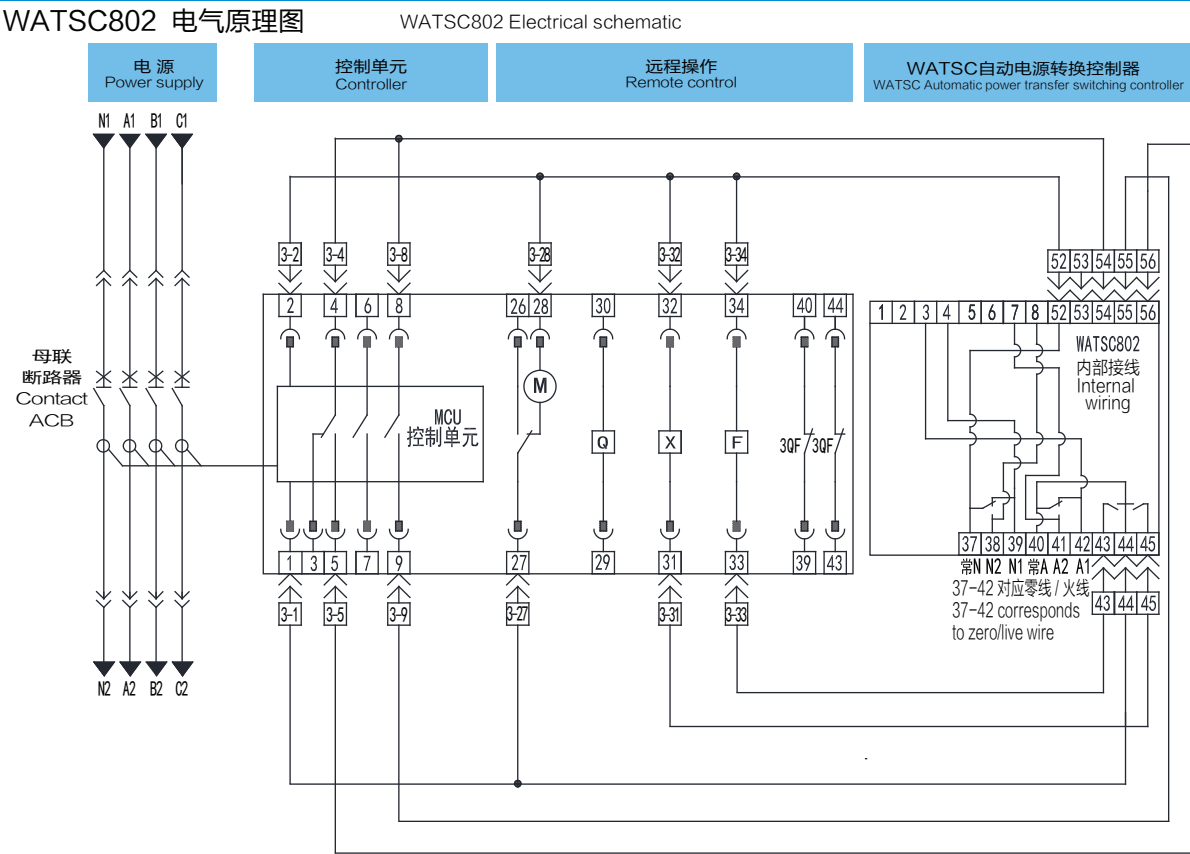
1. The controllers shown in the figure are all conventional power charging lines. If there is a down line to take electricity requirements, please specify in the purchase.
2. The number of controllers is only one, which can be displayed separately for convenient display of wiring instructions.
3. The electrical principle diagram is the wiring diagram when the circuit breaker is in the state of disconnection, there is no energy storage, and the controller has no fault indication
4. WATSC702 controller and 2 of ACB in the figure Secondary wiring of station circuit breakers is connected by heavy-duty connectors. Users do not need wiring.

WATSC802 Electrical schematic



自动电源转换系统

Automatic power transfer switching system



注:

- 1、图中所示控制器均为常规上进线取电,如有下进线取电要求请在采购时特殊注明。
- 2、控制器数量仅一台,为接线指示方便显示分开显示
- 3、电气原理图为断路器处于断开状态、未储能,且控制器无故障指示时的接线图。
- 4、图中外接线为 WATSC802 控制器和三台断路器的二次接线通过重载连接器连接,用户不需接线。

Note:

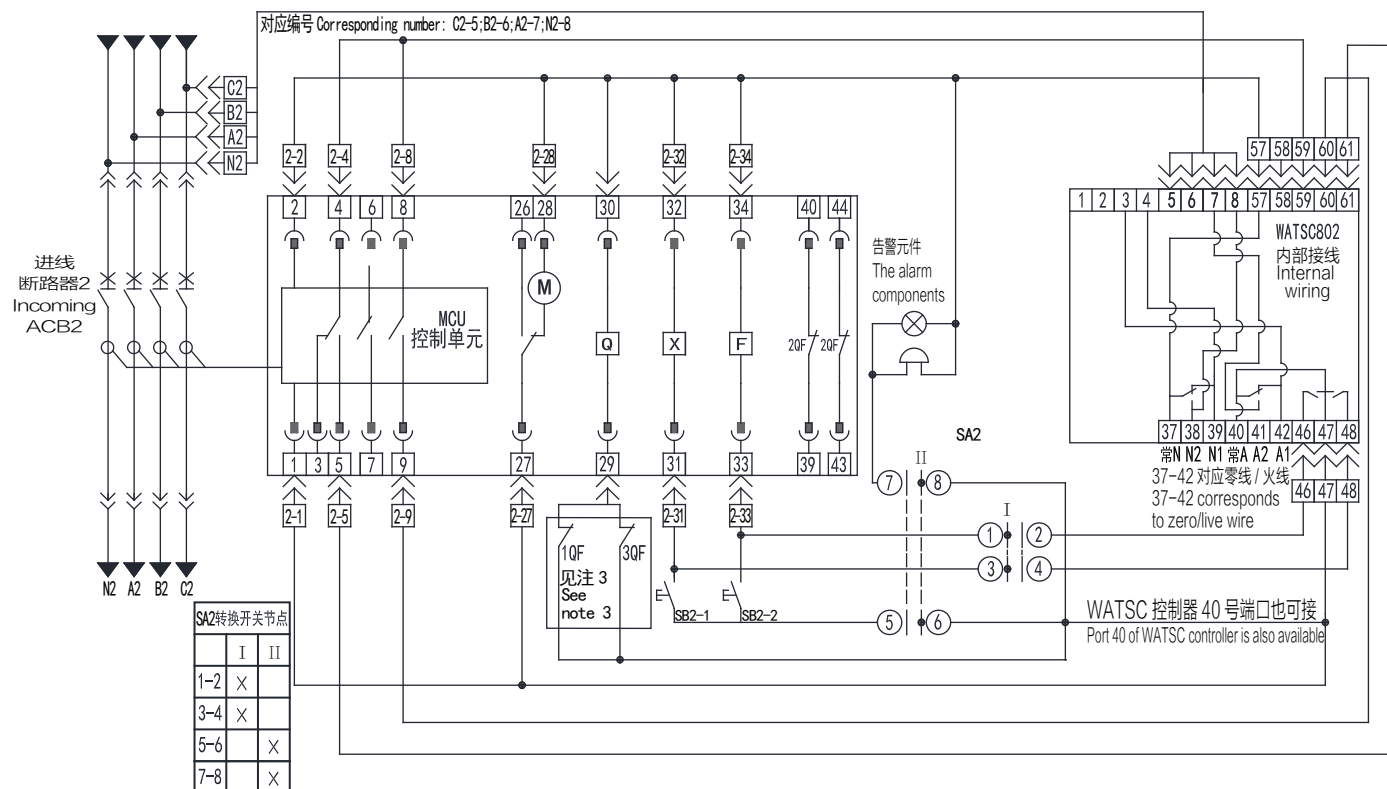
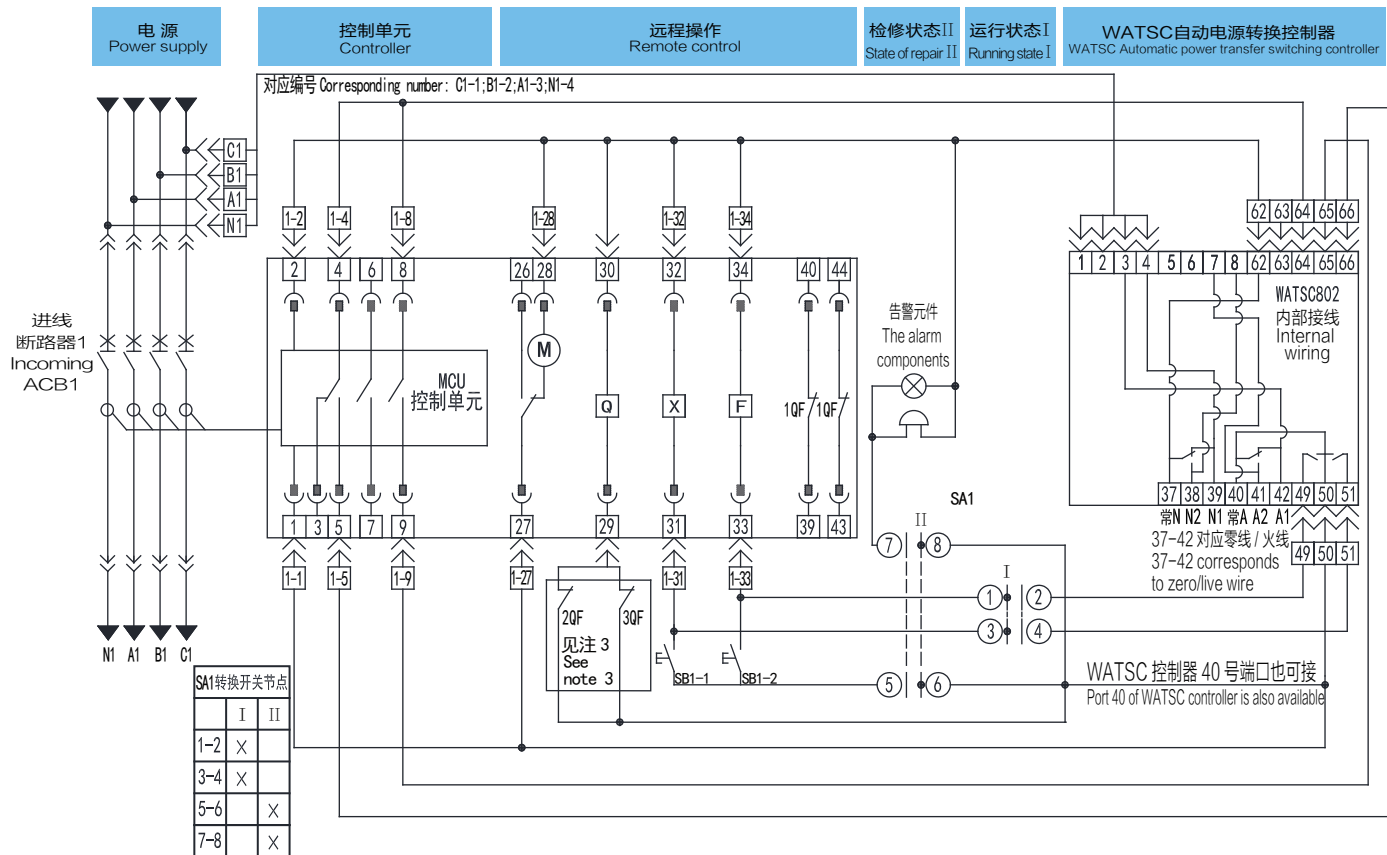
1. The controllers shown in the figure are all conventional power charging lines. If there is a down line to take electricity requirements, please specify in the purchase.
2. The number of controllers is only one, which can be displayed separately for convenient display of wiring instructions.
3. The electrical principle diagram is the wiring diagram when the circuit breaker is in the state of disconnection, there is no energy storage, and the controller has no fault indication
4. WATSC802 controller and 3 of ACB in the figure Secondary wiring of station circuit breakers is connected by heavy-duty connectors. Users do not need wiring.

自动电源转换系统

Automatic power transfer switching system

WATSC802 运行/检修切换示例电气原理图

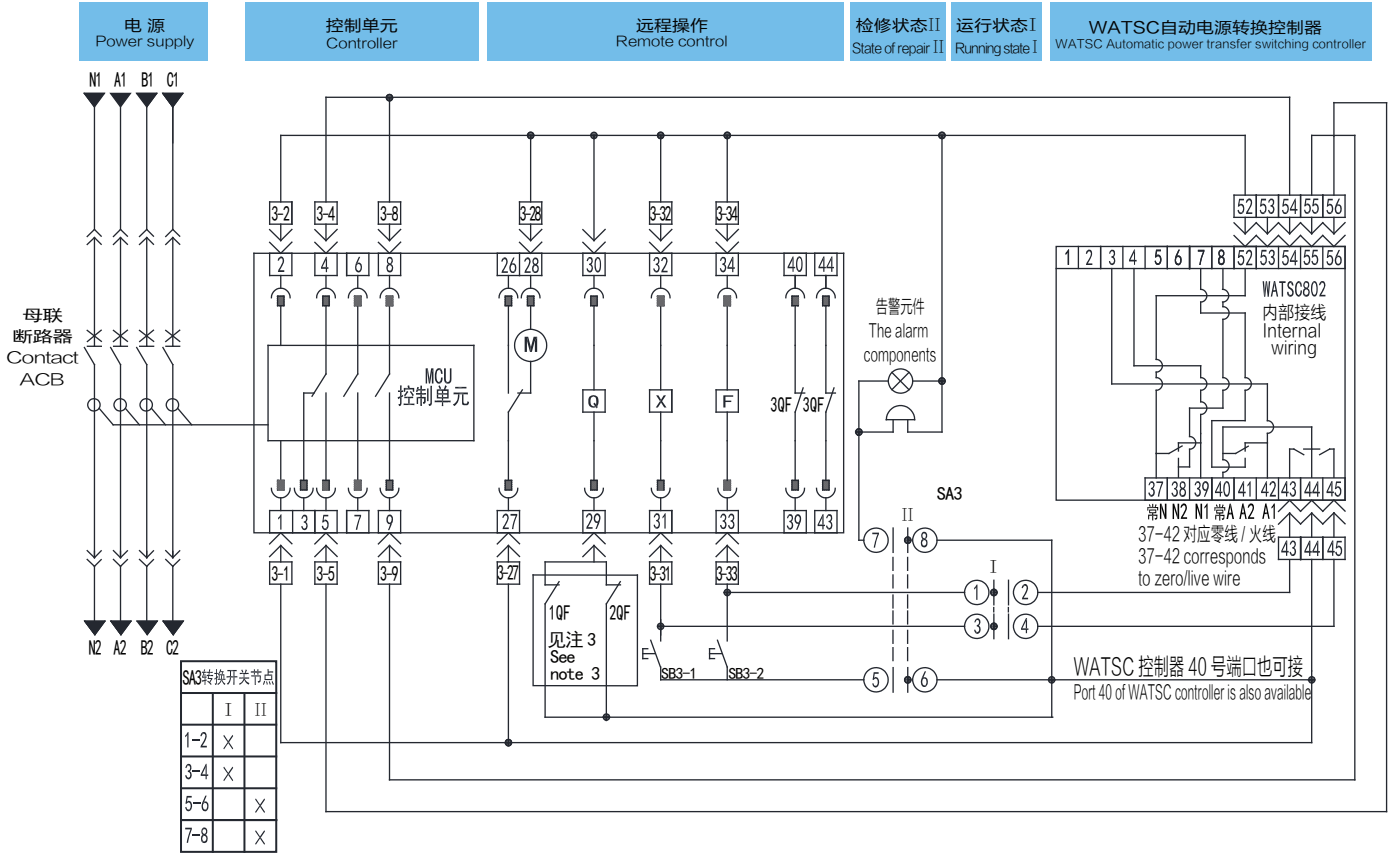
WATSC802 Operation / maintenance switch sample electrical schematic



自动电源转换系统

Automatic power transfer switching system

WATSC802 运行/检修切换示例电气原理图 WATSC802 Operation / maintenance switch sample electrical schematic



注:

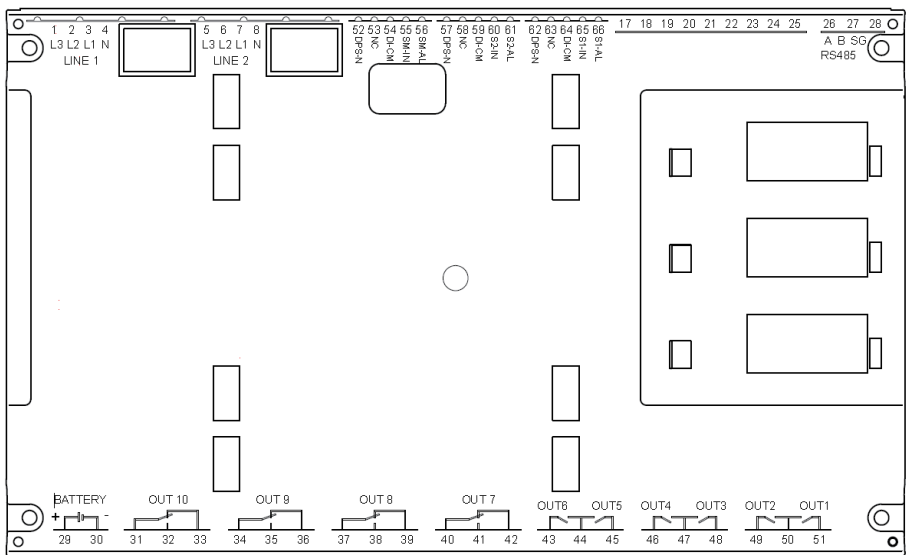
- 1、图中所示控制器均为常规上进线取电,如有下进线取电要求在采购时特殊注明。
- 2、控制器数量仅一台,为接线指示方便显示分开显示
- 3、电气原理图为断路器处于断开状态、未储能,且控制器无故障指示时的接线图。
- 4、图中外接线为 WATSC802 控制器和三台断路器的二次接线通过重载连接器连接,用户不需接线。
- 5、图中欠压电气互锁回路用户可根据需求接入,若无需则不用接该回路。
- 6、转换开关 SA1/2/3 中的 7、8 节点用户可接入检修警告元件(蜂鸣器、报警灯等),若无警告需要则不用接该回路。

Note:

1. The controllers shown in the figure are all conventional power charging lines. If there is a down line to take electricity requirements, please specify in the purchase.
2. The number of controllers is only one, which can be displayed separately for convenient display of wiring instructions.
3. The electrical principle diagram is the wiring diagram when the circuit breaker is in the state of disconnection, there is no energy storage, and the controller has no fault indication
4. WATSC802 controller and 3 of ACB in the figure Secondary wiring of station circuit breakers is connected by heavy-duty connectors. Users do not need wiring.
5. The under-voltage electrical interlock loop in the figure can be customized by users Access, if no need is not connected to the loop.
6. 7 and 8 node users in transfer switch sa1/2/3 Access to maintenance warning components (buzzer, alarm lamp, etc.), if no warning is required, do not connect the loop.

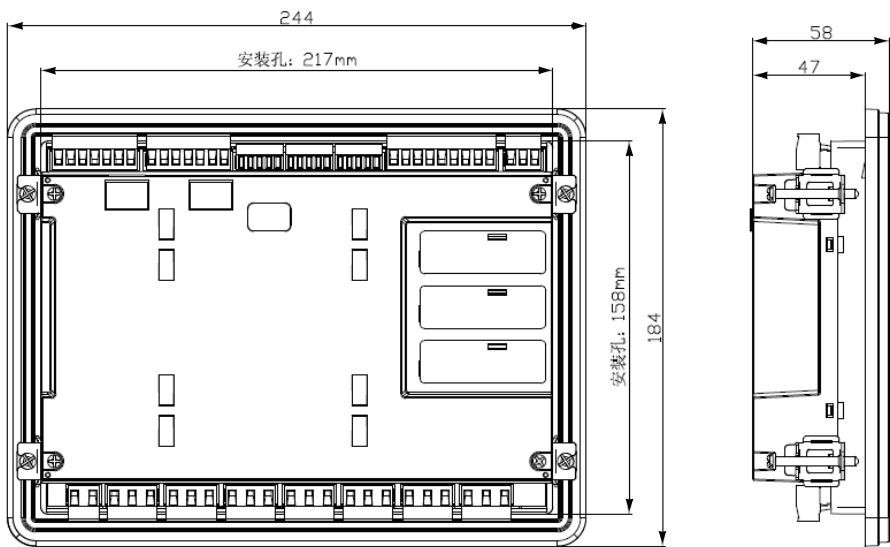
WATSC 型控制器端子布置图

WATSC Controller Node layout



WATSC 型控制器机械尺寸与面板开孔

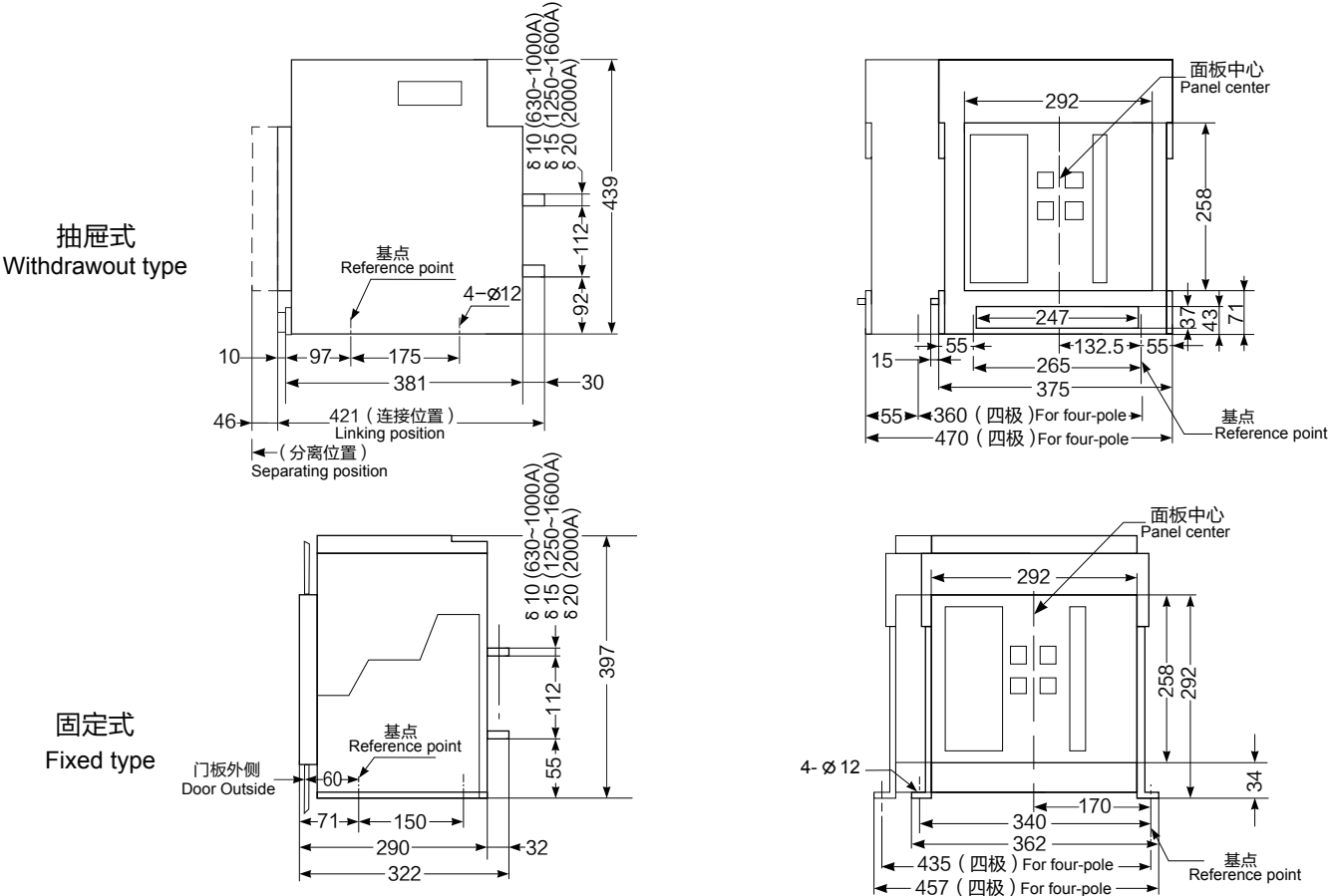
WATSC Controller Mechanical dimensions with panel openings



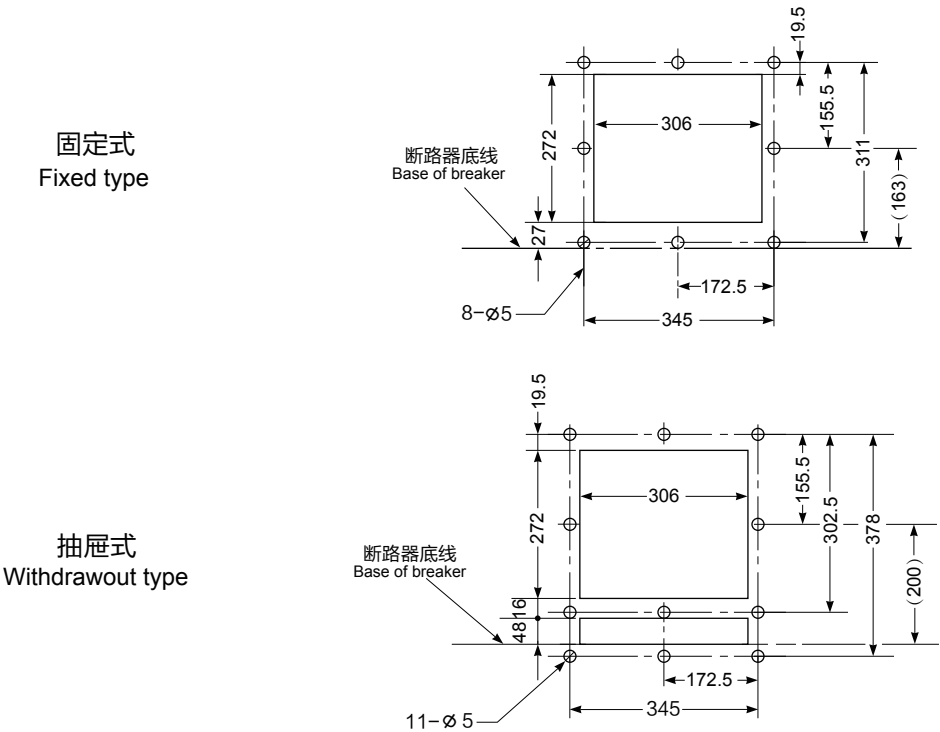
外形尺寸及安装尺寸

Overall and installing dimensions

SHTW1-2000型外形尺寸及安装尺寸 Overall and installing dimensions of SHTW1-2000

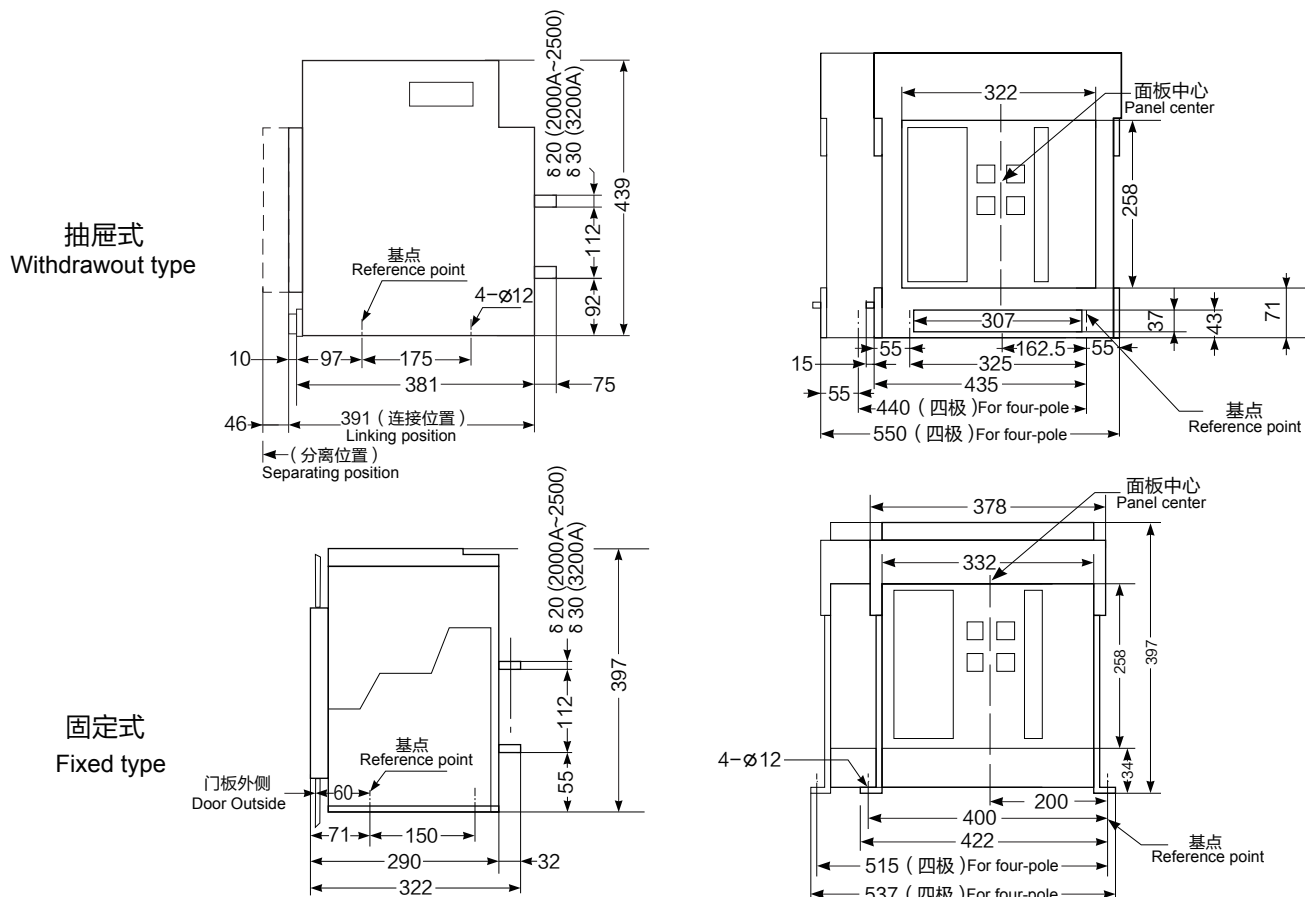


SHTW1-2000型门框安装开孔尺寸 Door frame assembly and piercing dimensions for SHTW1-2000

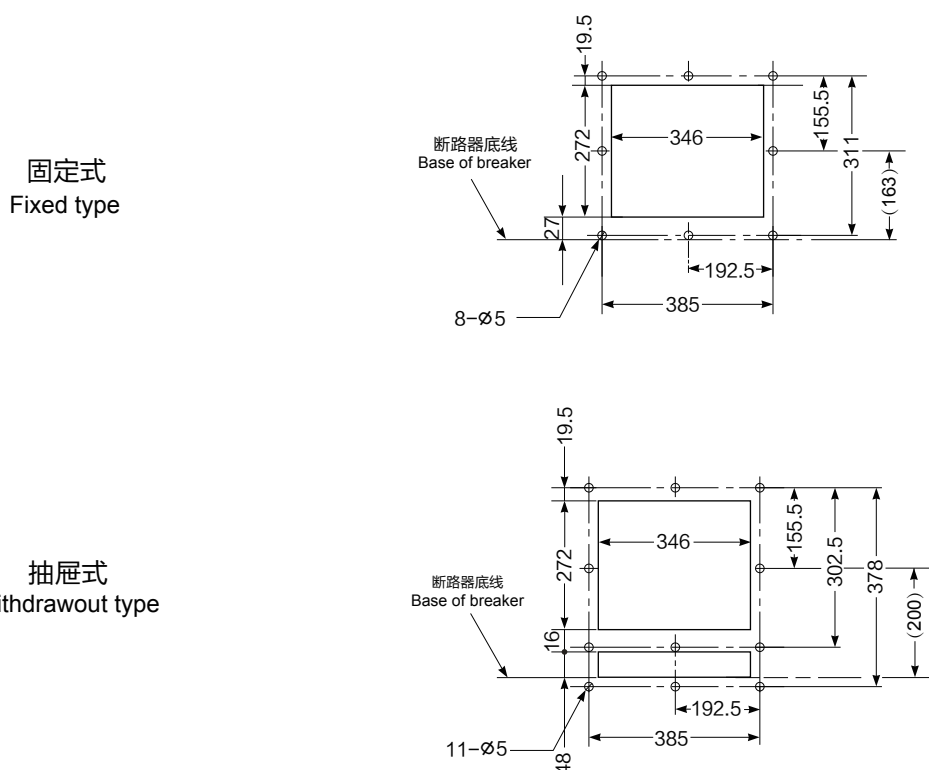


外形尺寸及安装尺寸 Overall and installing dimensions

SHTW1-3200型外形尺寸及安装尺寸 Overall and installing dimensions of SHTW1-3200



SHTW1-3200~6300型门框安装开孔尺寸 Door frame assembly and piercing dimensions for SHTW1-3200~ 6300



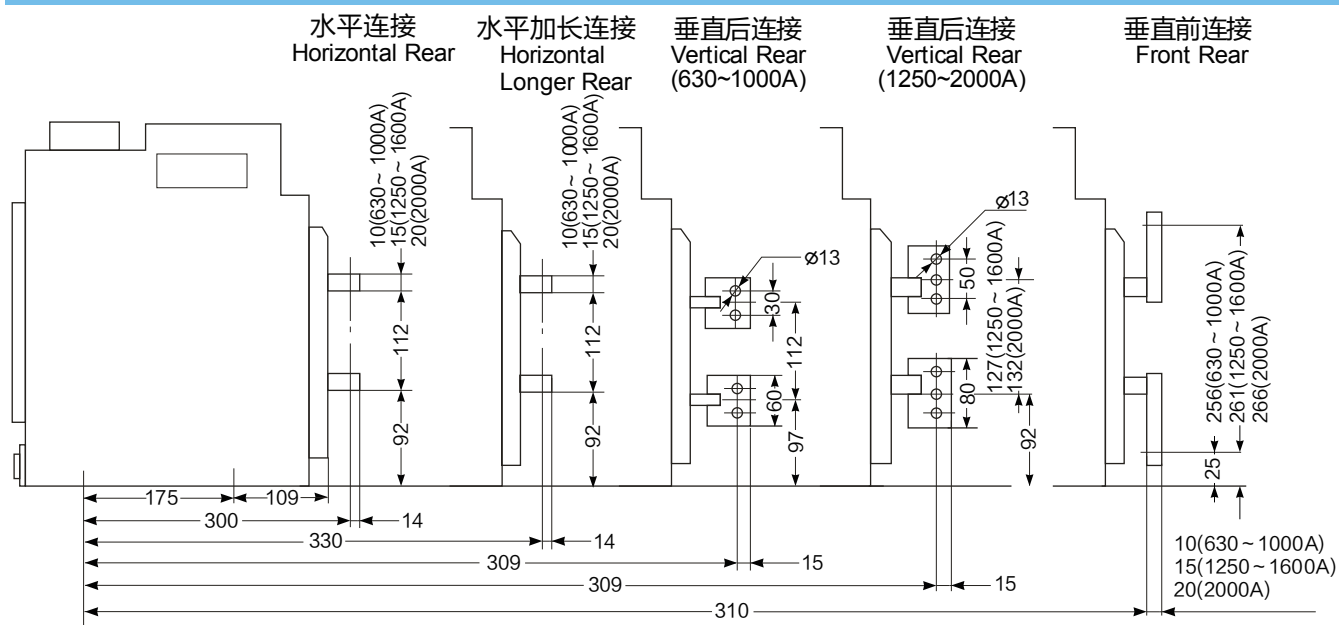
外形尺寸及安装尺寸

Overall and installing dimensions

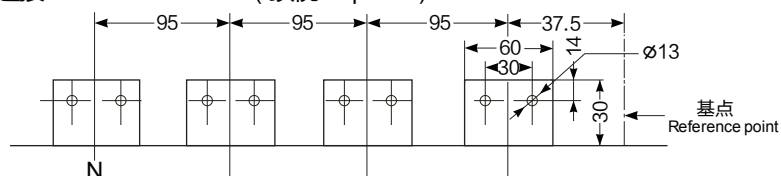
断路器接线方式及尺寸 Connection mode and dimensions for the breaker are shown

(其开孔及尺寸也可以根据用户特殊要求供货。)

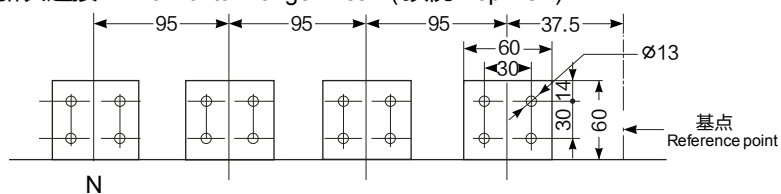
SHTW1-2000抽屉式方式及尺寸 Connection mode and dimensions for SHTW1-2000 withdrawout cubicle



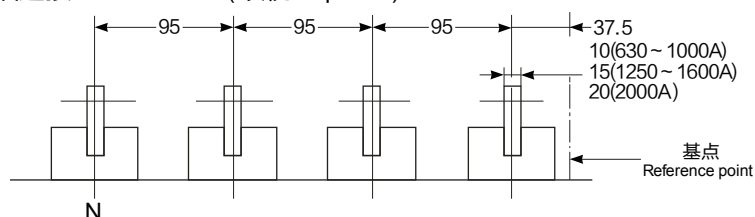
水平连接 Horizontal Rear (顶视 Top view)



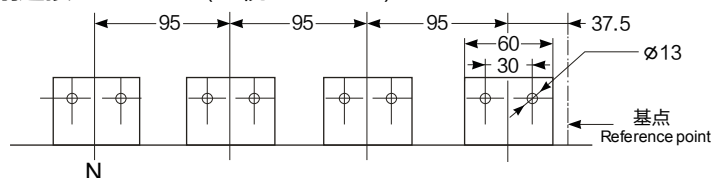
水平加长连接 Horizontal Longer Rear (顶视 Top view)



垂直后连接 Vertical Rear (顶视 Top view)



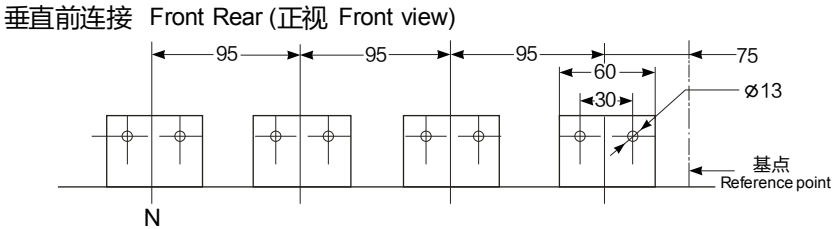
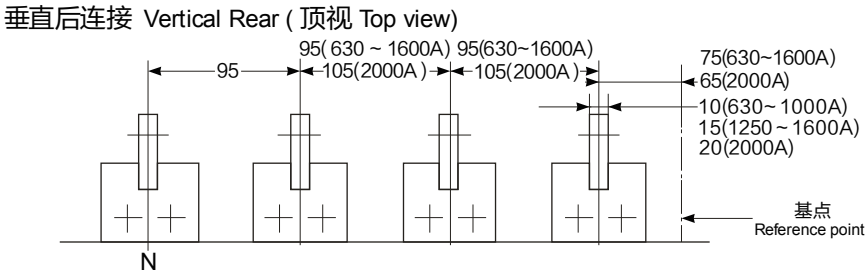
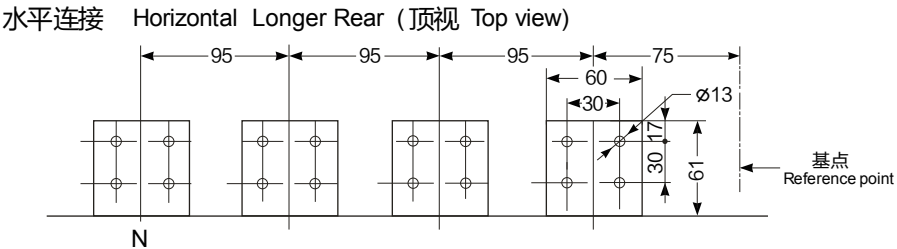
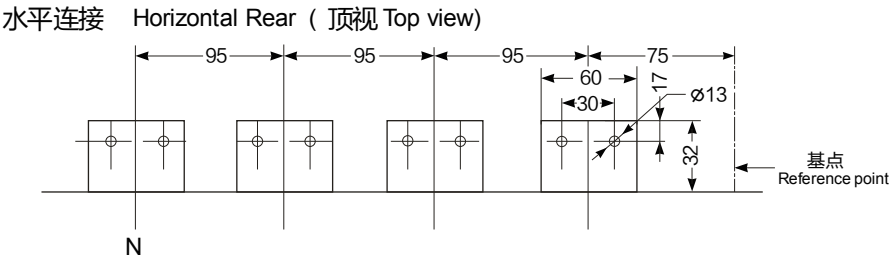
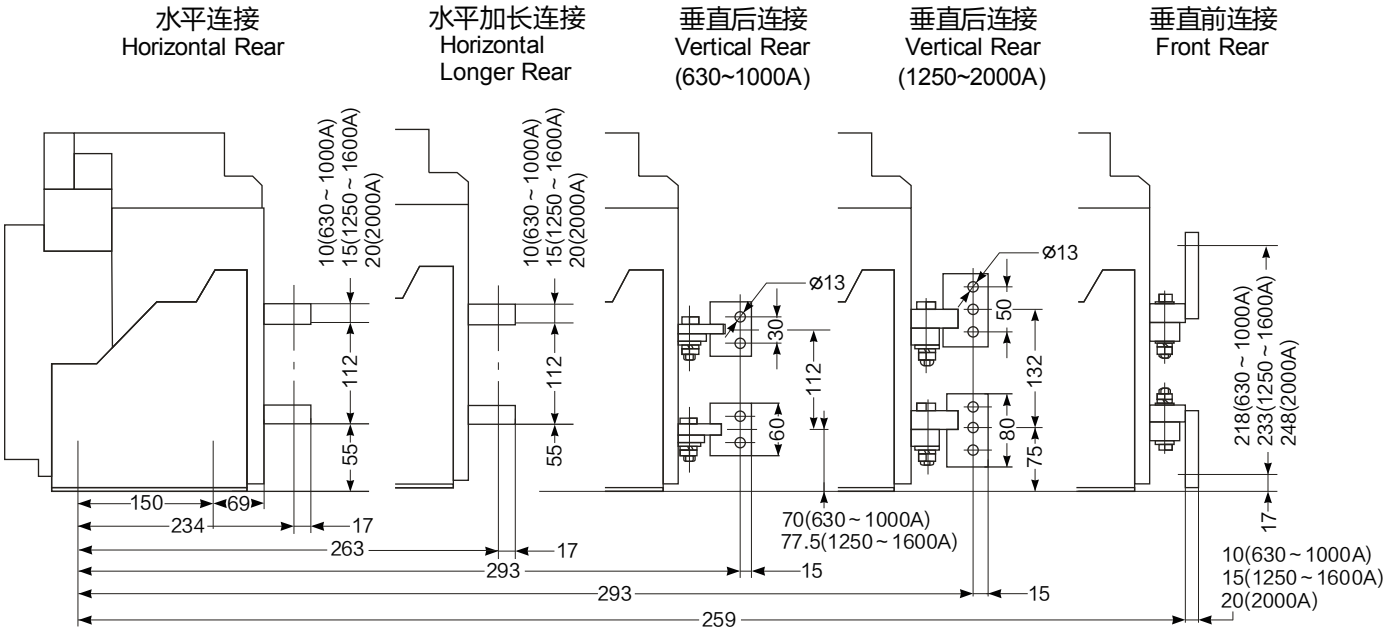
垂直前连接 Front Rear (正视 Front view)



外形尺寸及安装尺寸

Overall and installing dimensions

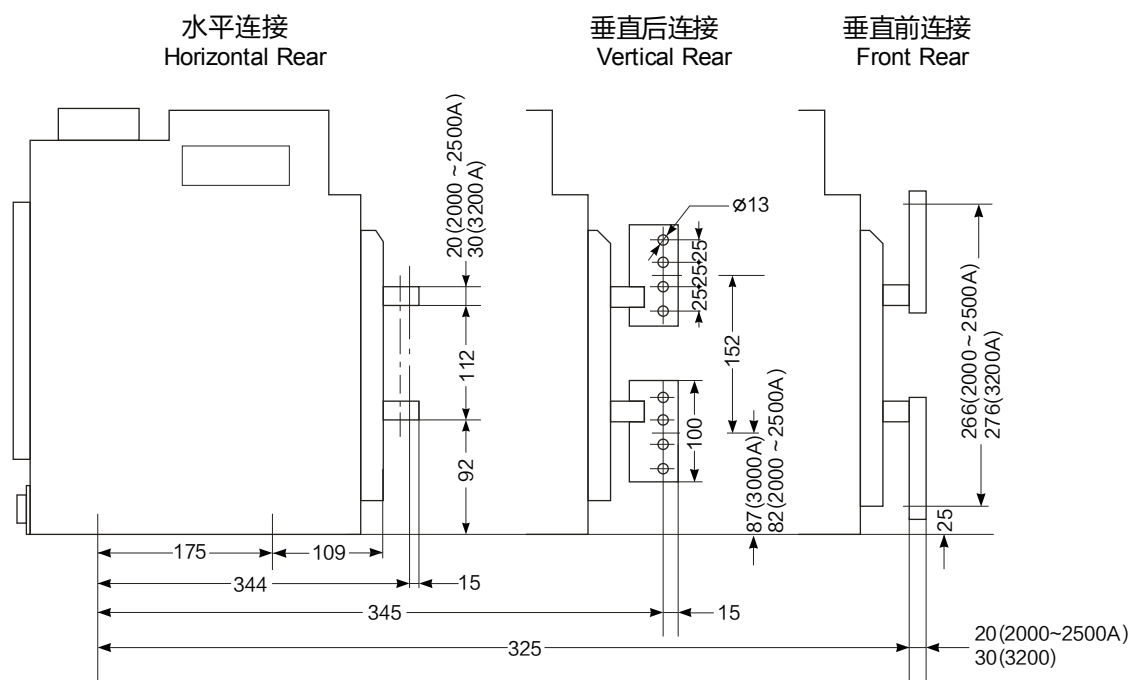
SHTW1-2000固定式接线方式及尺寸 Connection mode and dimensions for SHTW1-2000 Fixed cubicle



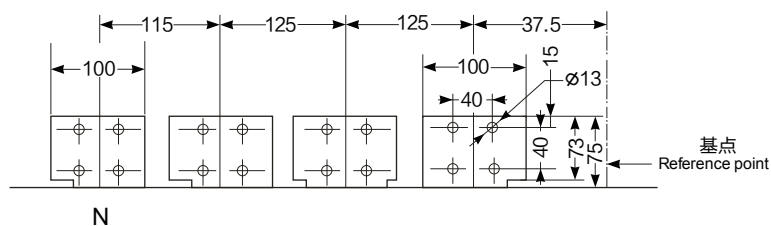
外形尺寸及安装尺寸 Overall and installing dimensions

SHTW1-3200抽屉式接线方式及尺寸 Connection mode and dimensions for SHTW1-3200 withdrawout cubicle

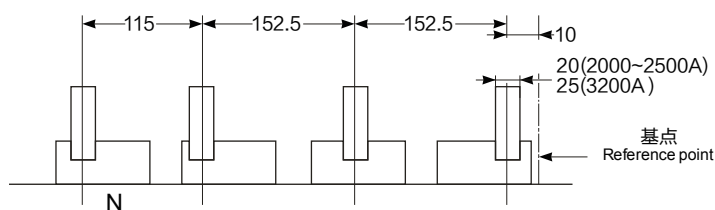
抽屉式 Withdrawout type



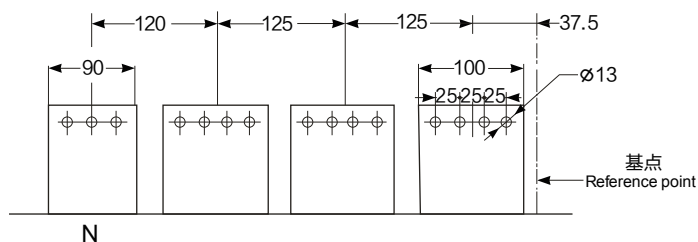
水平连接 Horizontal Rear (顶视 Top view)



垂直后连接 Vertical Rear (顶视 Top view)



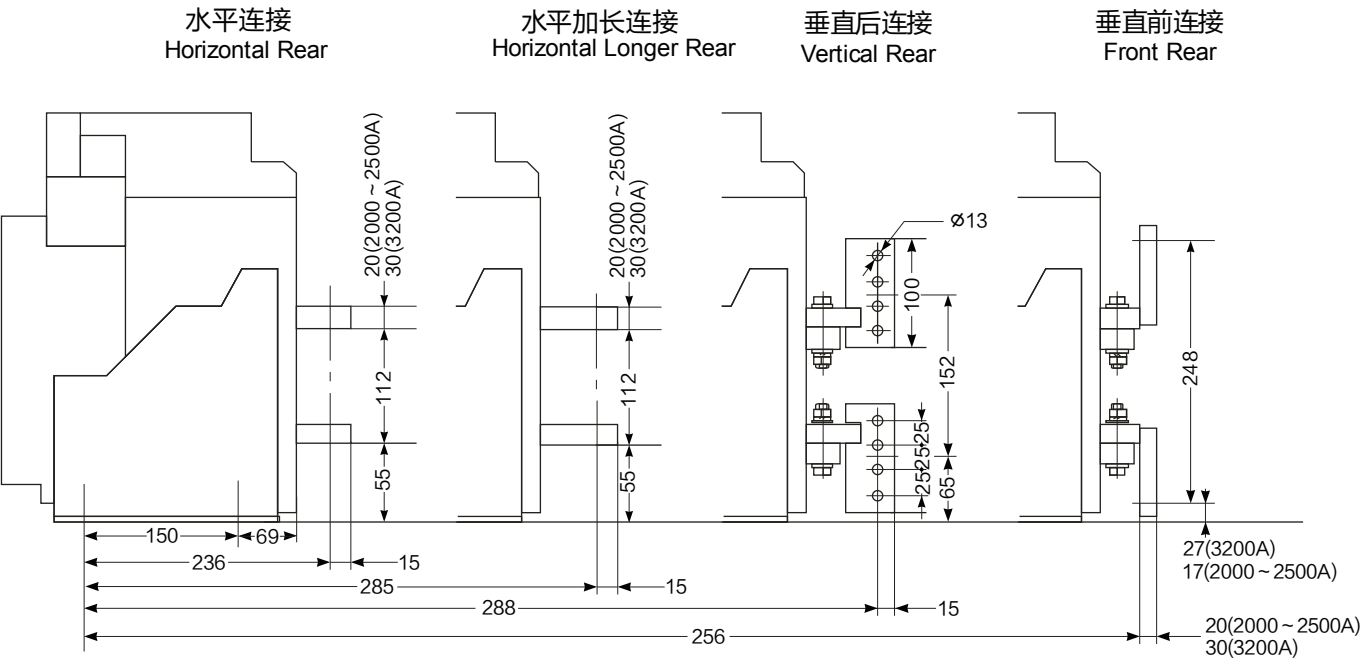
垂直前连接 Front Rear (正视 Front view)



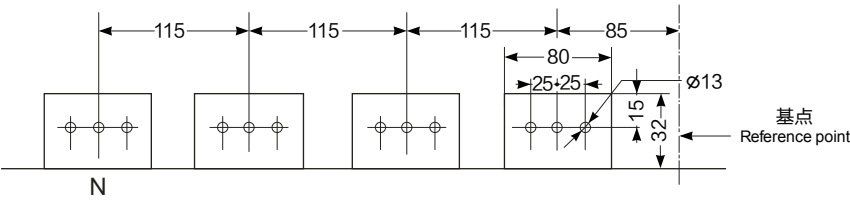
外形尺寸及安装尺寸

Overall and installing dimensions

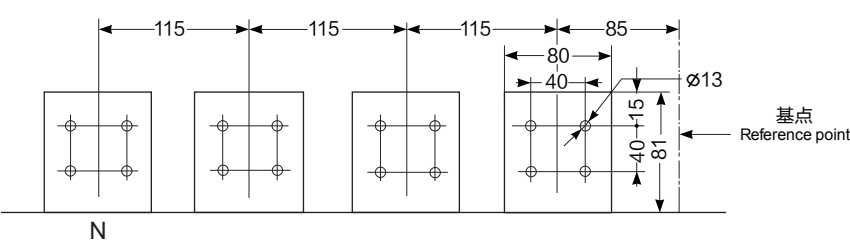
SHTW1-3200固定式接线方式及尺寸 Connection mode and dimensions for SHTW1-3200 Fixed cubicle



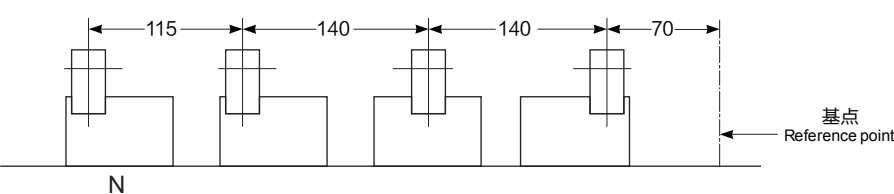
水平连接 Horizontal Rear (顶视 Top view)



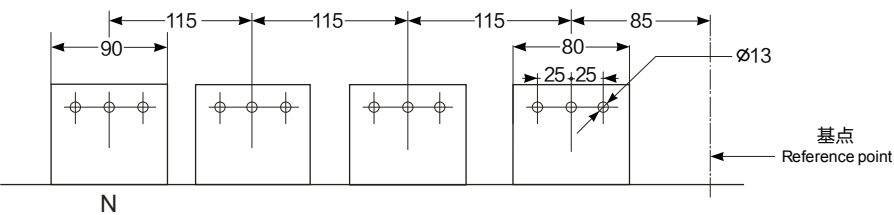
水平加长连接 Horizontal Longer Rear (顶视 Top view)



垂直后连接 Vertical Rear (顶视 Top view)



垂直前连接 Front Rear (正视 Front view)



外形尺寸及安装尺寸 Overall and installing dimensions

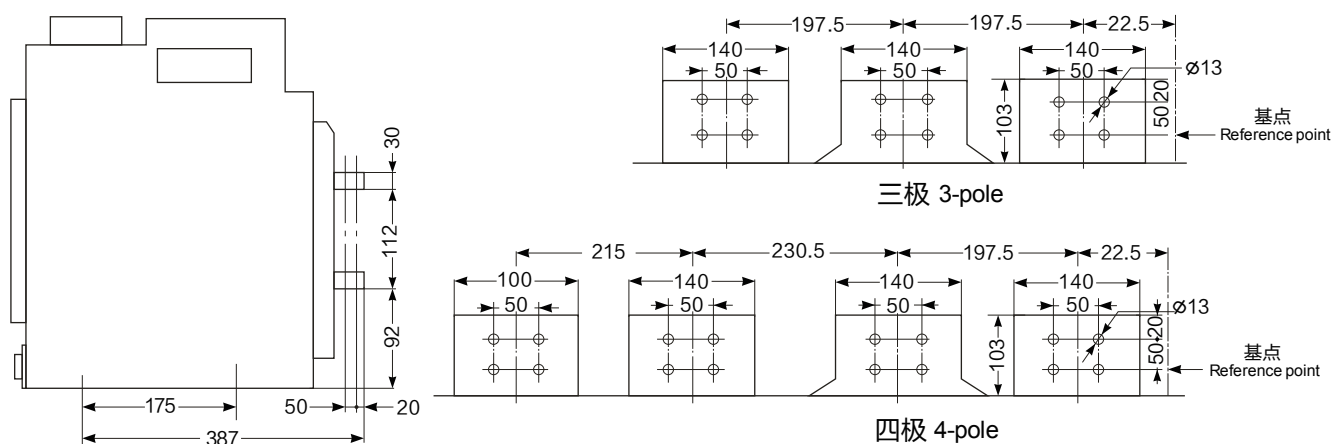
SHTW1-4000接线方式及尺寸

Connection mode and dimensions for SHTW1-4000

抽屉式 Withdrawout type

水平连接 Horizontal Rear

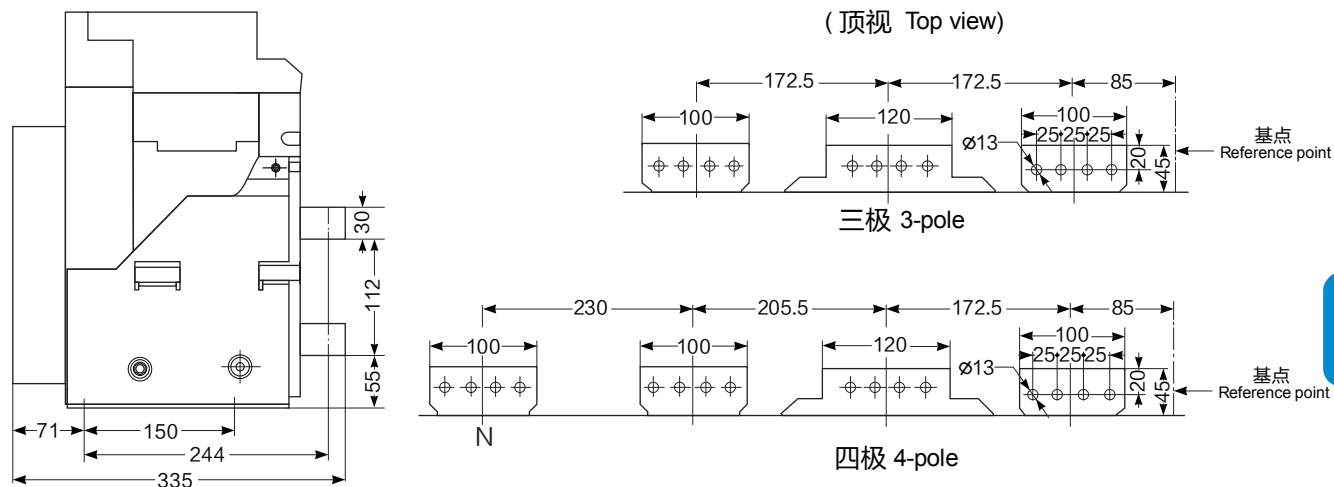
(顶视 Top view)



固定式 Fixed type

水平连接 Horizontal Rear

(顶视 Top view)



外形尺寸及安装尺寸

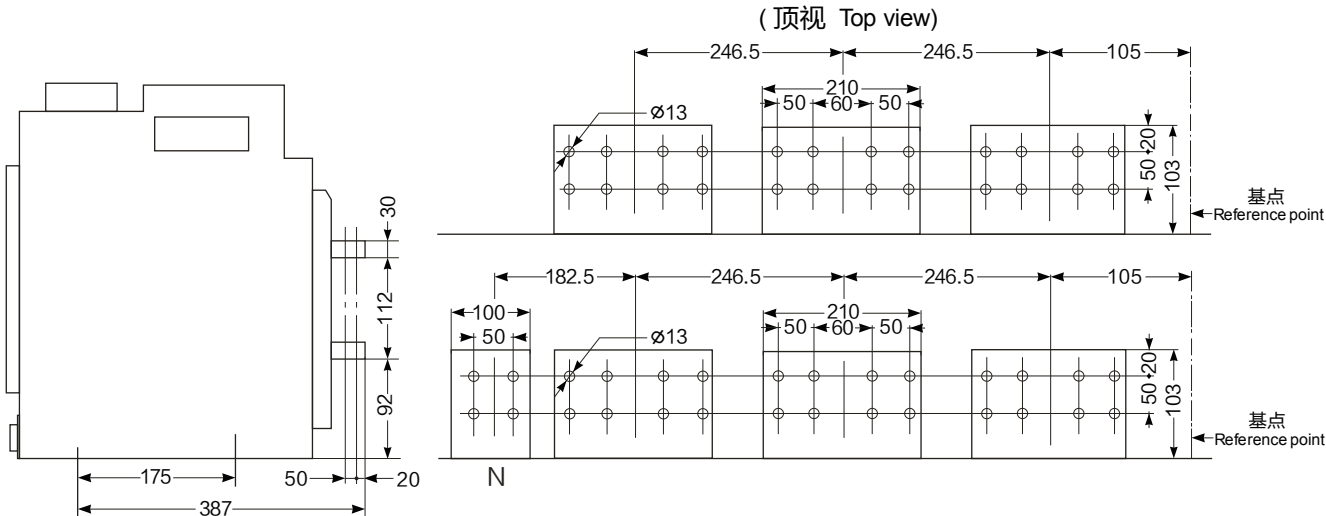
Overall and installing dimensions

SHTW1-5000接线方式及尺寸

Connection mode and dimensions for SHTW1-5000

抽屉式 Withdrawout type

水平连接 Horizontal Rear

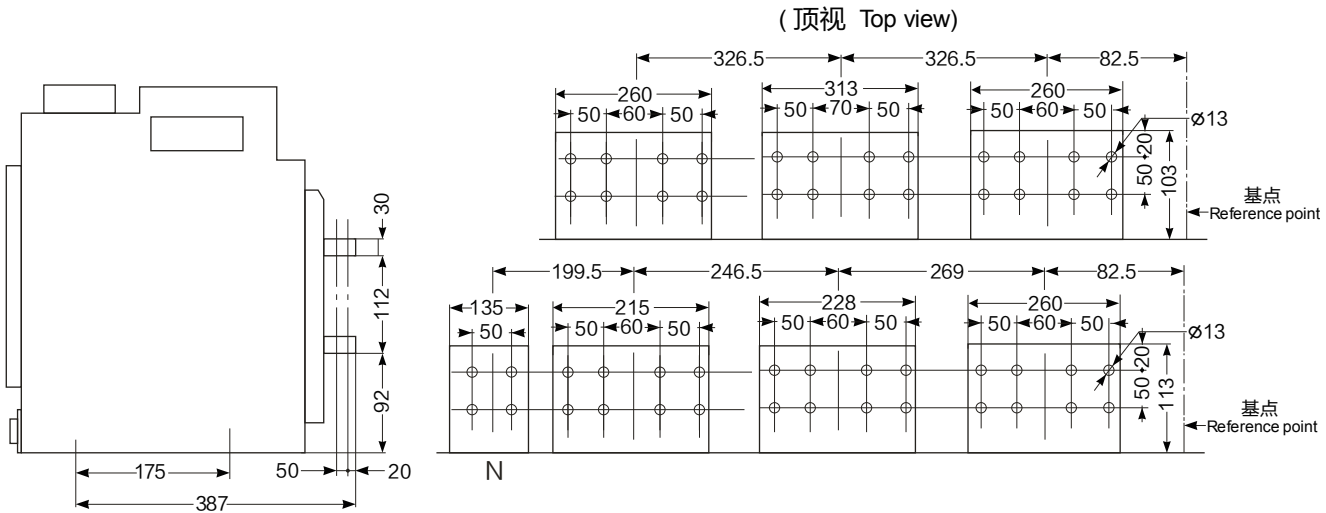


SHTW1-6300接线方式及尺寸

Connection mode and dimensions for SHTW1-6300

抽屉式 Withdrawout type

水平连接 Horizontal Rear



订货规范

Form of ordering specification

(请在 ☐ 内打 ☒ 或在 填上数字) Please fill in the ☐ with ☒ or fill in the with digit.

用户单位 Customer	订货台数 Qty	订货编号 Code	订货日期 Date
型号 Type	☐ SHTW1-2000 ☐ SHTW1-5000 ☐ SHTW1-3200 ☐ SHTW1-6300 ☐ SHTW1-4000	☐ 三极 3-Pole ☐ 固定式 Fixed type ☐ 四极 4-Pole ☐ 抽屉式 Withdrawout type	额定电流 Rated current In=___A 长延时整定电流 Ir1=___A Long time delay current

ST 智能型控制器 ST Type Intelligent Controller	型号 Type (“F”表示发电机保护) (F for generator protection)	基本功能 Basic function	可增选功能 Additional function for option
	L 型 Type	☐ L3 ☐ L3/F 长延时、短延时、瞬时保护 Long time delay, short time delay, instantaneous	☐ MCR接通分断(硬件保护) MCR making-breaking (hardware protection) ☐ 预报警、接地报警、自诊断OCR脱扣报警信号单元 Pre-alarming, earth alarming self-diagnosis OCR tripping alarming signal unit.
	☐ L4 ☐ L4/F 长延时、短延时、瞬时、接地保护 Long and short time delay, instantaneous and earth fault and leakage protection	4.故障热记忆功能 4.Fault state indication 5.故障记忆功能 5.Fault memory 6.瞬动试验功能 6.Instantaneous test	4L或4L/F特有功能 4L or 4L/F features ☐ 3P+N*(外接零序互感器) (Zero sequence transformer) 漏电流保护*(外接漏电互感器序号) Current leakage(current leakage transformer code)
	M型 Type	☐ M ☐ M/F 1.长延时、短延时、瞬时保护 1. Long delay, short delay, instantaneous protection 2.单相接地保护 2. Single-phase ground protection 3.负载监控保护 3. Load monitoring and protection	☐ 3P+N*(外接零序互感器) (Zero sequence transformer) 漏电流保护*(外接漏电互感器代号) Current leakage(current leakage transformer code)
	2M型 Type	☐ 2M ☐ 2M/F 4.各种状态指示和数值显示 4. Various status indicators and numerical display	☐ 电压表功能 Voltmeter function
	2H型 Type	☐ 2H ☐ 2H/F 5.电流表功能 5. Ammeter function 6.故障记忆功能 6. Fault memory function 7.热记忆功能 7. Thermal memory function 8.试验功能 8. Test function	☐ MCR接通分断(硬件保护) MCR making-breaking (hardware protection) ☐ 报警或故障状态指示、远端输出用信号单元 Alarming or fault state indication signal unit for remote control output
	3M型 Type	☐ 3M ☐ 3M/F 1.长延时、短延时、瞬时保护 1. Long delay and short delay, instantaneous protection 2.电流、电压不平衡保护 2. Current and voltage unbalanced protection 3.过电压、欠电压保护 3. Overvoltage and undervoltage protection 4.中性极过电流保护(仅4P) 4. Neutral overcurrent Protection (4P only) 5.电流表、电压表功能 5. Ammeter and voltmeter functions 6.MCR和HSISC功能 6. MCR and HSISC functions 7.维护功能 7. Maintenance function 8.热记忆功能 8. Thermal memory function 9.负载监控 9. Load monitoring 10.欠频率及过频率保护 10. Underfrequency and Overfrequency protection 11.相序保护 11. Phase sequence protection 12.逆功率保护 12. Inverse power protection 13.各种状态指示和数值显示 13. Various status indicators And numerical display	☐ 3P+N*(外接零序互感器) (Zero sequence transformer) 漏电流保护*(外接漏电互感器代号) Current leakage(current leakage transformer code) ☐ 报警或故障状态指示、远端输出用信号单元 Alarming or fault state indication signal unit for remote control output ☐ 谐波测量 Harmonic measurement

附件 Accessories	标准 Standard	☐ AC400V	☐ AC380V	☐ AC220V	☐ DC220V	☐ DC110V
		☐ 分励脱扣器 Shunt trip	☐ AC380V	☐ AC220V	☐ DC220V	☐ DC110V
		☐ 闭合电磁铁 Closing solenoid	☐ AC380V	☐ AC220V	☐ DC220V	☐ DC110V
		☐ 电动操作机构 Motor-driven operating mechanism	☐ AC380V	☐ AC220V	☐ DC220V	☐ DC110V
		☐ 辅助开关 Auxiliary switch	☐ 3NO+NC	☐ 5NO+NC		
	Option 选配	☐ 门框 Door frame	☐ 抽屉式门框 Withdrawout door frame	☐ 固定式门框 Fixed door frame		
		☐ 常通电型分励脱扣器 Long term power on shunt trip				
		☐ 欠电压脱扣器 Undervoltage trip	☐ AC380V ☐ AC220V	☐ 瞬时 Instantaneous ☐ 延时 Time delay ___S		
		☐ 机械联锁 Mechanical Interlocking	☐ 垂直联锁二个 2 vertical interlockings ☐ 垂直联锁三个 3 vertical interlockings	☐ 水平联锁二个 2 horiz interlockings ☐ 水平联锁三个 3 horiz interlockings		
		☐ 防合锁 Off key lock				
		☐ 防分锁 Opening proof lock				
		☐ 按钮闭锁装置 Push-button locking device				
		☐ 门联锁 Door interlock				
		☐ 三位置锁定装置 Three-position locking device				
		☐ 三位置电气指示 Three-position electrical indication				
	WATSC ATSE system	☐ 相间隔板 Interphase barrier				
		☐ 透明罩 Transparent cover				
		☐ WATSC自动电源转换系统 WATSC ATSE system	☐ WATSC702 ☐ WATSC802			
	☐ 检有压合闸模块 Automatic closing when the voltage returns to normal modular					

备注
Remarks

*注：用户选用智能型控制器可增选功能内容需另行增加费用，外接电流互感器和外接漏电互感器只能二选一使用，如需特殊功能的订货可与我司联系。

Note: When customers select Intelligent Controllers, external current transformer and external leakage transformers can only be used one of two, Orders for special functions are available contact us.



公司主要业绩 Main achievements of the company

巴基斯坦电厂

Pakistan Power Plant

秦山核电站

Qinshan Nuclear Power Plant

广东佛山供电局

Guangdong Foshan Power Supply Bureau

上海市供电局

Shanghai Power Supply Bureau

中国核工业连云港核电项目

China Nuclear Industry Lianyungang Nuclear Power Project

福建晋江五十万伏变电站

500,000 volt substation in Jinjiang, Fujian

上海飞机制造厂

Shanghai aircraft factory

江西省江中制药厂

Jiangzhong Pharmaceutical Factory in Jiangxi Province

北京东方化工厂

Beijing Dongfang Chemical Plant

南京钢铁厂

Nanjing Iron and Steel Plant

上海金山石化

Shanghai Jinshan Petrochemical

云南玉溪卷烟厂

Yunnan Yuxi Cigarette Factory

烟台卷烟厂

Yantai Cigarette Factory

上海宝钢

Shanghai Baosteel

北京首都钢铁公司日电 NEC 工程

NEC Engineering of Beijing Capital Iron and Steel Company

青岛卷烟厂

Qingdao Cigarette Factory

大连钢厂

Dalian Steel Works

马鞍山钢铁公司

Maanshan Iron and Steel Company

南京城南水厂

Nanjing Chengnan Water Plant

武汉钢铁公司

Wuhan Iron and Steel Company

云南电解铝厂

Yunnan Electrolytic Aluminum Factory

贵州省电力科研试验办公楼

Guizhou Electric Power Research Office

浙江省国贸中心

Zhejiang International Trade Center

宝钢集团上海第一钢铁有限公司

Baosteel Group Shanghai First Iron and Steel Co., Ltd.

北京电力设备总厂

Beijing Power Equipment General Plant

上海东方明珠电视塔

Shanghai Oriental Pearl TV Tower

上海振华港机股份有限公司

Shanghai Zhenhua Port Machinery Co., Ltd.

上海船厂

Shanghai Shipyard

青岛监狱

Qingdao prison

云南昆明机场

Kunming Airport, Yunnan

山西省太原机场

Taiyuan Airport of Shanxi Province

广东白云机场

Guangdong Baiyun Airport

青岛港

Qingdao Port

宁波港

Ningbo Port

北京首都机场

Beijing Capital Airport

上海虹桥机场

Shanghai hongqiao airport

南京市政综合大厦

Nanjing Municipal Comprehensive Building

四川省成都市人民政府大楼

Chengdu People's Government Building, Sichuan Province

北京加拿大驻华使馆

Canadian Embassy Beijing

北京国家电网控制中心

Beijing National Grid Control Center

北京人民大会堂

Beijing Great Hall of the People

北京广播电视台

Beijing Radio and TV Series

国家广播电视部大厦

National Radio and Television Building

深圳国宾馆

Shenzhen State Guest House

上海地铁

Shanghai Metro

北京地铁

Beijing subway

北京西客站

Beijing West Railway Station

伊朗得黑兰地铁

Tehran Metro, Iran

上海磁悬浮工程

Shanghai Maglev Project

江苏扬州火车站

Jiangsu Yangzhou Railway Station



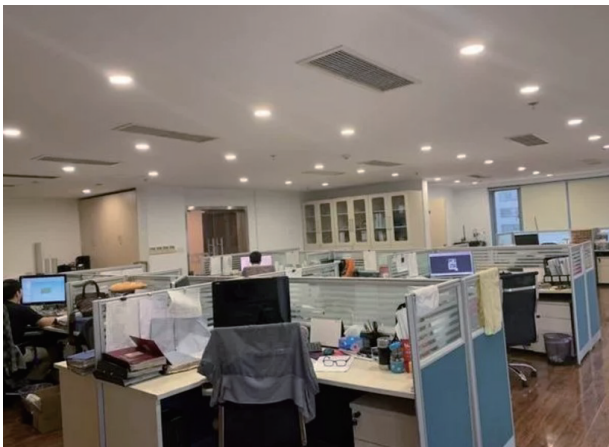
- ① 秦山核电站
Qinshan Nuclear Power Plant
- ② 巴基斯坦电厂
Pakistan Power Plant
- ③ 上海东方明珠电视塔
Shanghai Oriental Pearl TV Tower
- ④ 上海地铁
Shanghai Metro
- ⑤ 广东佛山供电局
Guangdong Foshan Power Supply Bureau



企业形象 Enterprise image



销售中心
Sales Center



研发中心
R & D Center



ACB生产线
ACB assembly line



MCCB生产线
MCCB assembly line



冲压工序
Stamping process



温升试验
Temperature rise test

记事/NOTES



鉴于样本中所涉及的标准，材料，技术要求，电气线路以及安装尺寸随着时间的推移都在不断地发展，因此这些技术条件均要以本厂最新的确认为准。

Due to the continuous development of Standards as well as of materials, the characteristics, electrical diagrams and reference only on confirmation from Hua Tong.

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