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TGOOD
川开电气



川开电气有限公司
Chuan Kai Electric Co., Ltd.



四川省成都市双流区西南航空港经济开发区空港五路1888号
NO.1888, Airport 5 Road, Southwest Airport Economic Development Zone, Shuangliu ,
Chengdu, Sichuan



邮编/Post Code: 610200



网址/Website: www.cckdq.com



综合服务热线/ Integrated service hotline: 400-64-30001

CMD190低压成套开关设备 CMD190 LV switchgear

技术手册 Technical Manual



川开电气有限公司
Chuan Kai Electric Co., Ltd.



企业概况

Company Profile

川开电气有限公司(Chuan Kai Electric Co.,Ltd.,简称“川开电气”),位于天府之国成都。系青岛特锐德电气股份有限公司(创业板第一股,股票代码:300001)全资子公司,占地301亩,注册资本金3.0468亿元。

川开电气专业从事输配电成套设备研发、设计、制造、销售、安装、技术咨询、融资租赁等一体化服务,是原机械部、电力部定点生产许可企业。整体规模和实力名列西南地区第1名,全国电气开关行业前10名。先后荣获国家级高新技术企业、四川省先进企业、四川省重合同守信用企业、四川省名牌产品企业等荣誉称号。

川开电气主要产品及服务包括:252kV及以下高、中、低压开关柜、110kV预装式中心变电站、电气元件、12-40.5kV预装式变电站(开关站)、交/直流一体化系统、EPS应急电源、配电箱、动力箱、电缆桥架、封闭母线槽、共箱母线、预分支电缆及融资租赁、电力工程总承包施工、电力设备维保等。2006年全国首家通过核级中低压成套设备国家级鉴定。产品适用于电厂、电网、核电、军工、航空航天、轨道交通、通信、石油石化、冶金、市政、机械、电子、轻工、建材等各领域,畅销全国,远销东南亚、中亚及非洲国家,以其高品质性价比及优良、快捷、完善的服务,赢得了社会各界和广大客户的一致认同和好评。

川开电气以人为本,重视人力资源开发和综合素质培养,聚集了一大批高素质的管理和技术人才。建立了院士专家工作站、国家输配电重点实验室实训基地及四川省级企业技术中心。始终奉行与巨人同行的原则,与西门子、ABB、阿尔斯通、GE、施耐德等世界著名电气公司开展了全方位的技术引进和OEM合作,不断提升产品可靠性、安全性;率先引进美国、日本、德国、瑞士等国家先进加工设备;产品的设计、制造全部过程采用CAD、CAPP、CAM、INVENTOR,建立了产品数据管理系统(PDM);通过ISO9001质量管理体系、ISO14001环境管理体系认证、OHSAS18001职业健康安全管理体系认证、核工业质量管理体系认证证书,并完善了计量管理体系。所有产品均按国际、国家和行业标准通过了型式试验和相应认证。

川开电气的发展,得到了社会各界的信赖和支持。川开电气将秉承“感动客户、以人为本、和谐高效、回报社会”的核心价值观,以成为国内电力设备制造业的领军者,带动中国电力设备制造业步入国际梯队为目标,把川开电气打造成行业内最受尊重的伟大公司。

川开电气致力于为您提供更优的整体输配电解决方案,点亮和谐美好生活!

Chuan Kai Electric Co., Ltd. (Chuan Kai Electric) is located in Chengdu, the land of abundance. It was established in 1980 and originally attached to Chuan Kai Industry Group Co., Ltd. Chuan Kai Electric achieve the reorganization of assets and with Qingdao TGOOD Electric Co., Ltd.(the first gem shares, stock code: 300001) in November 2015 and became its wholly owned subsidiary with registered capital of RMB 304.68million.

Chuan Kai Electric specializes in R&D, design, manufacturing, sales, installation, technical consulting, financial lease and other integrated services on power transmission and distribution equipment, which makes it become a enterprise with production license designated by the former Machinery Department and Power Department. Its overall scale and strength rank first in the southwest and top 10 in the national electrical switch industry. It wins many honorary titles such as the national high-tech enterprise, advanced enterprise in Sichuan Province, Enterprise in Good Credit in Sichuan Province, Famous Brand Product Enterprise in Sichuan Province.

The main products and services of Chuan Kai electric include: 252kV and below high, medium and low voltage switchgear, 110kV preinstalled central substation, electrical components, 12-40.5kV preinstalled substation (switch station), AC / DC integrated system, EPS emergency power supply, power distribution box, power box, cable bridge, closed bus slot, common bus bus, preview. Supporting cable and finance leasing, power engineering general contracting construction, power equipment maintenance and so on. In 2006, the first national evaluation of nuclear power equipment in China was carried out. The products are suitable for power plants, power grids, nuclear power, military industry, aerospace, rail transportation, communications, petroleum and petrochemical, metallurgical, municipal, mechanical, electronic, light industry, building materials and other fields. It is sold to the whole country and exported to Southeast Asia, Central Asia and African countries, with its high quality, good, fast and perfect service. The consensus and recognition from all walks of life and customers.

Chuan Kai Electric keeps people-oriented, pays attention to the development of human resources and comprehensive quality training, gathering a large number of high-quality management and technical personnel and sets academician expert workstation, the training base of national transmission and distribution key laboratory and Sichuan provincial enterprise technology center. It always adheres to following the step of the excellent counterparts, so it carries out a full range of technology introduction and OEM cooperation with Siemens, ABB, ALSTOM, GE, Schneider and other world famous electric company for continuously product improvement in reliability and safety. In addition, Chuan Kai Electric takes the lead in the introduction of advanced processing equipment from the United States, Japan, Germany, and Switzerland and so on. The design and manufacturing process of product adopts CAD/CAPP/CAM/INVENTOR, which establishes the product data management system (PDM); it has passed the ISO9001 quality management system, ISO 14001 environmental management system, OHSAS18001 occupational health, Certification of the quality management system of the nuclear industry and safety management system, and improved the measurement management system. All products of Chuan Kai Electric pass the type test and the corresponding certification in accordance with international, national and industry standards.

The development of Chuan Kai Electric has gained the trust and support of social circles. Chuan Kai Electric will be adhering to the core values of the customer touched, people-oriented, harmony and efficiency, and society reward to become the leader of domestic power equipment manufacturing industry, and aim at bringing along Chinese power equipment manufacture into the international echelon, and building the Chuan Kai Electric into a company with high respect in same industry.

Chuan Kai Electric is dedicated to provide you with the best whole power transmission and distribution solutions for harmonious and better life!

CMD190 低压成套开关设备

CMD190 Low Voltage Switchgear

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概述 Overview

适用范围

Scope of Application

CMD190低压成套开关设备是我公司按IEC61439、IEEE323、IEEE384、RCC-E和GB7251等标准研制的小型化、智能化、高可靠性开关设备。主要用于发电厂、变电所及工矿企业中接受、分配电能，实现控制、保护、监测、通讯等功能。

CMD190 Low Voltage Swithgear. It's in accordance with standards IEC61439, IEEE323, IEEE384, RCC-E and GB7251, etc. The switchgear is mainly used in power plants, transformer substations and industrial and mining enterprises to receive, distribute power, as well as to perform functions of controlling, protection, monitoring and communication.

使用场所如下：

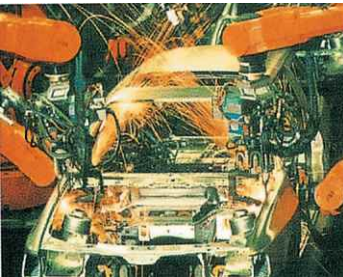
- 轨道交通和电信、航空航天
- 主、副动力柜、配电柜
- 电动机供电和电动机控制中心
- 开环或闭环控制系统电子柜
- 公用事业
- 电力系统
- 石油化工
- 船舶、石油钻井平台
- 市政供水及工矿企业
- 污水处理
- 商贸中心酒店、住宅等
- 核电厂IE级安全系统

Applicable Situations:

- Mrail transportation and telecommunications and aeronautics and astronautics
- Main and auxiliary power supply and distribution panel
- Motor supply and motor control center
- Open and closed loopcontrol system cubicle
- Publi cutility
- Power system
- Petrochemical industry
- Shipping、oil drilling platform
- Industry and mineral plant
- Sewage disposal
- Businessc enter、hotels、residence、etc.
- Class IE safety system in nuclear power plant

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产品特点

Features of CMD 190

CMD190低压成套开关设备，在市场上经过大量用户多年使用，证实了它的价值。整个系统充分考虑了将来的发展空间，可避免因为技术发展而被淘汰的风险。

CMD190 Low Voltage Swithgear has demonstrated its value through years of practice in the market. In order to avoid being eliminated in the market arising from technical progress, it has sufficiently taken into consideration of future technical development margin in the system design.

CMD190低压成套开关设备采用的框架结构具有高度灵活性，结构一旦组装完毕就不再需要维修。柜体内可安装不同的标准元件，以满足各种使用要求。由于整个系统包括电气结构均采用了组合式的设计，这种优化的结构设计满足了各种元件的要求并能符合不同工作环境，达到相应的防护等级。

The frame structure is of high flexibility and is maintenance-free after assembling. The cubicle body can be fitted with different standardized components to meet any application requirement. The whole system structure design including electric units has adopted optimized design of modular type, which facilitates system to be adaptable to any components and any different working environment, and comply with required degree of protection.

CMD190低压成套开关设备的设计和采用的材料均能最大程度的防止故障电弧发生，一旦发生故障电弧，能在短时间内熄灭。故障电弧产生后不影响相邻的功能单元，电弧熄灭，功能单元经清理后，仍具有操作功能；带有机锁的组件在柜中的位置没有变动，甚至在隔离位置上，柜体表面也没有故障的痕迹。

The design and materials can avoid fault arcing to the greatest extent. In case of fault arcing, it can be extinguished within short time. The fault arc shall not affect the adjacent functional unit, after the arc is extinguished and unit is cleaned up, it still can be operated normally. The components with mechanical interlock is still in position in cubicle, even at the disconnected position, there is no fault track on the cubicle surface.

CMD190低压成套开关设备中所选用的塑胶材料不含CFC或卤素，它具有阻燃和自熄灭的特性。

The plastic materials in CMD190 Low Voltage Swithgear contains no CFC or halogen, with fire-retarding and self-extinguishing characteristics.

新颖的CMD190低压成套开关设备与传统产品相比，具有更多的优越性：

Comparing with traditional switchgear, CMD190 Low Voltage Swithgear owns more advantageous features as follows:

- 高智能化
- Highly intelligentized
- 结构紧凑，节省柜体的体积
- More compact structures, reducing volumes of cubicle
- 柜体能背靠背排列，配电回路布置经济
- Back-to-back arrangement for cubicles, more economical arrangement way for power distribution system
- 全系列标准化，全部选用标准元件，方便工程设计人员设计
- All series standardization, standardized components make the design convenient for engineering technicians
- 柜体可按工作和环境的不同要求设计出相应的防护等级
- Corresponding protection degrees can be designed according to the requirements of

CMD190 低压成套开关设备

CMD190 Low Voltage Switchgear

service and conditions

- 在一个柜体中可自由组合不同型式，如固定式和抽出式
- Flexible combinations in one cubicle, such as fixed and withdrawable type
- 具有防电弧设计，柜体满足抗地震、抗震动和抗冲击的要求
- Design for protection against arc, the cubicle body meets protection requirements against seismic, vibration, and impulse
- 设备更新改进方便，最大程度做到免维修
- Convenient modification for equipment, and is maintenance-free to the most extent
- 设备运行连续性和可靠性高
- High operation continuity and reliability
- 操作人员人身安全有保障
- Safety guarantee for operator

技术标准 Technical Criteria

CMD190低压成套开关设备是经过型式试验的组合式低压开关柜（TTA），它符合：IEC61439-1, EN60439和GB7251.1等标准。系统的安装和连接按IEC364和DIN VDE0105标准执行。

CMD190 system is a type test approved (TTA) modular type low voltage switchgear, and it conforms to the standards of IEC61439-1, EN60439 and GB7251, etc. The system installation and connection shall be done according to the standards IEC364 and DINVDE0105.

工作和环境条件 Operation and Ambient Conditions

CMD190低压成套开关设备是适用于户内安装的电气设备，开关柜在正常工作条件下的防护等级可为IP40，特殊要求环境可达IP44。

CMD190 Low Voltage Switchgear is for indoor installation, and its protection degree under normal operation condition is IP40, for special environment, it can be IP44.

环境温度 Ambient Temperature

最高温度	+40℃
Max. Temperature	+40℃
24小时最高平均温度	+35℃
Max. mean temperature in 24 hours	+35℃
最低温度	—5℃
Min. Temperature	—5℃

设备在高于+40℃环境温度中使用应降容运行。

Switchgear shall service at a lower current-carrying capacity if ambient temperature is higher than +40℃.

对于测量与计量仪表、保护继电器等的工作条件，应遵照制造厂家的规定。

Operation conditions of metering instruments, protection relay, etc. shall comply with the manufacturer's instructions.

CMD190 低压成套开关设备

CMD190 Low Voltage Switchgear



环境条件 Ambient Conditions

正常工作气候环境按IEC61439-1，GB-7251.1的规定。周围环境相对湿度在40℃时为50%。

Under normal service, ambient climate shall conform to the specifications stipulated in IEC61439-1, GB7251.1, and the ambient relative humidity shall be 50% at the temperature +40℃.

开关柜户内安装地点的条件应符合相应标准的要求。在会产生凝露的场合，开关柜中应采用通风或加热等措施。

The indoor installation location shall conform to relevant requirement of criteria. At the condensation area, measures like ventilation and heating shall be applied.

开关柜安装在高于海拔4500米以上时，设备要相应降容运行。

If installed on site above 4500m, switchgear shall service at a lower current-carrying capacity

特殊运行环境设计 Design for Special Service Conditions

- 热带
- Tropics
- 地震地区
- Seismic area
- 防空掩体
- Antiaircraft emplacement
- 船舶
- Shipping
- 近海海洋使用
- Offshore

热带型开关柜的表面要使用专用油漆作涂覆。

CMD190系统配上附件和加强部件后可满足地震区域内开关设备的安全和连续运行要求。

Equipped with fittings and consolidated parts, CMD190 system can satisfy requirements of safety and continuous operation in seismic area.

CMD190 低压成套开关设备

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资质证书 Qualification Certificate



CMD190低压开关柜PCCC试验报告



CMD190低压开关柜电磁兼容报告



核电站1E级CMD190抗震鉴定试验报告



CMD190低压开关柜7500A~120kA试验报告

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技术数据 Technical Data

标准 Standards	通过型式试验的成套开关设备 TTA modular type switchgear		GB7251.1 IEC61439-1, EN60439-1, DIN VDE0660, 第500部分 (DIN VDE0660, Section 500) BS5486, UTE63-410 IEEE323 IEEE384 RCC-E
试验报告 Test reports	国家强制性产品认证 (CCC) China Compulsory Certification (CCC) 中国长征电器研究所 (型式试验) China Long March Electrical Apparatus Research Institute (Type test) 中国天津电气传动研究所 (型号使用证书) Tianjin Design & Research Institute of Electric Drive (Type use approval certificate) IE级 开关设备老化试验 (江苏电器科学研究院) Aging test on class IE switchgear (Jiangsu Electrical Apparatus Research Institute) IE级开关设备抗震试验 (成都核动力研究院) Seismic test on class IE switchgear (Chengdu Nuclear Power Research Institute)		
电气参数 额定电压 Electrical Parameter	额定绝缘电压U _i Rated insulation voltage 额定工作电压U _e Rated operation voltage 额定冲击耐受电压U _{imp} Rated impulse withstand Voltage 过电压等级 Over-voltage degree 污染等级 Pollution degree 额定频率 Rated frequency	1000V交流 1000V AC 400V/690V交流, 三相 400V/690V AC, 三相3 phase, 8kV 8kV III III 3 3 50或60Hz 50Hz/60Hz	
额定电流 Rated current	主 母 线 Main busbar	额定电流I _e Rated current 额定短时耐受电流I _{cw} Rated short-time withstand current 额定峰值耐受电流I _{pk} Rated peak withstand current	至7500A Up to 7500A 至120kA Up to 120kA 至264kA Up to 264kA
	配 电 母 线 Distribution busbar	额定电流I _e Rated current 额定短时耐受电流I _{cw} Rated short-time withstand current 额定峰值耐受电流I _{pk} Rated peak withstand current	至2000A Up to 2000A 至80kA Up to 80kA 至176kA Up to 176kA

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技术数据 Technical Data

结构特性 Structural Features	尺寸 Dimensions	推荐高度 Recommended height	2200mm
		推荐宽度 Recommended width	400, 600, 800, 1000, 1200mm
		推荐深度 Recommended depth	600, 800, 1000, 1200mm
		模数 Modulus	E=25mm
			E=25mm
表面保护 Surface protection	柜架 Cubicle body	敷铝锌板 Al-Zn plated steel plate	
	内部小室隔板 Inner compartment partition	敷铝锌板 Al-Zn plated steel plate	
	横梁 Beam	电镀锌 Zn-Galvanized	
	外壳 Enclosure	喷塑 Electrostatic powder spray	
防护等级 Protection Degree	GB4208		IP40至IP44
	GB4208		IP40 to Ip44
塑料零件 Plastic components	无卤素、自熄 Halogen-free, self-extinguishing	DIN VDE0304第3部分 DIN VDE0304 Section 3	
	无CFC、阻燃 CFC-free, fire-retarding	IEC707 IEC707	
内部小室 Inner compartment	内部隔离形式 Interior segregation	垂直母线小室 Vertical busbar compartment	
	形式1~形式4 Form 1~Form 4 (IEC60439)	装置小室 Installation compartment	
	主母线小室 Main busbar compartment	电缆小室 Cable connection compartment	

• 结构设计 Structure Design

框架 Frame

CMD190低压成套开关设备框架由带有25mm间距模数孔的C形材组成。框架结构的连接采用了新工艺的自攻锁紧螺钉，所有框架的零件均为免维修型。结构为抗震型结构。

The frame structure is made up of C-shape steel plates with 25mm interval modular holes. The frame structures are connected by newly processed tapping and locking screeps, so all frame elements are maintenance-free.

CMD190低压成套开关设备由于采用了25mm模数孔系统，框架结构无需专用工具即能组装成各种型式的柜体。

With standard 25mm modular holes system, the frame structure can be assembled into different types of cubicle bodies without any special tools.

C形材的设计，适合前操作式和背靠背式单独柜或多个柜组合的开关柜。

The design of C-type framework is applicable for switchgears for front operation and back-to-back single cubicle arrangement and multi-cubicle combination arrangement.

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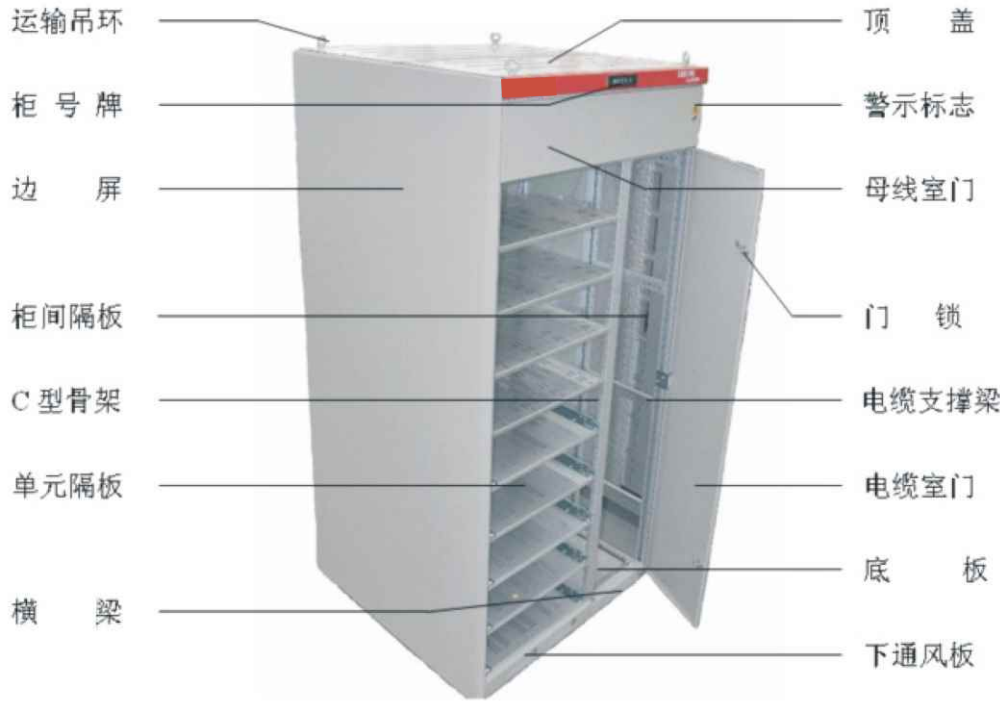
外壳 Enclosure

CMD190低压成套开关设备按不同的使用要求，可设计出不同防护等级的外壳。全封闭外壳防护等级为IP40-IP54。

The enclosures for different protection degrees can be designed according to the requirements of operation. The completely-enclosed enclosure’s protection degree shall be IP40-IP54.

带铰链的框架可作安装电子器件和仪表板用，也可作装置框架用。铰链框架的安装位置上可加带 / 不带观察孔的盖板。柜底部可提供底板，加装法兰板后可安装电缆槽。门板和外壳可装配单个 / 多个通风口，顶板可为全通风型（适合于IP40和IP41）。

The framework with hinge can be used for mounting electrical devices and instrument panel, and it can be used as installation frame as well. The frame may be provided with cover plates with or without inspection holes at its hinged points. Sole plate can be applied to the bottom of frame, on which cable channel can be installed after installation of flanged plate. The door and enclosure shall have one or several ventilation holes, and cover plates may be completely ventilated type. (applicable to IP40 and Ip41)



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带装有空气断路器的装置小室、
母线小室、母线连接小室的开关
柜
Switchgear with busbar compartment,
busbar connection compartment, device
compartment in which equipped with
air circuit breaker



带母线、分支母线框架
Cubicle framework with busbars,
branch busbars

柜架结构 Cubicle Structure

CMD190低压成套开关设备的柜架结构可分为装置小室，母线小室和电缆小室，其尺寸（高×宽×深）为2200mm×400/600/800/1000/1200mm×600/800/1000/1200mm。空气断路器为2000A以下的开关柜柜宽可为400mm。运输单元最长为3000mm。

The cubicle frame structure consists of device compartment, busbar compartment, and cable connection compartment. The dimension (height × width × depth) is 2200mm×400/600/800/1000/1200mm × 600/800/1000/1200mm. Switchgear cubicle with air circuit breakers under 2000A can be made into 400mm in width. Max. length of the transport unit is 3000mm.

进出线柜、母联柜均安装有一个开关，这个开关可以是固定式隔离开关，也可以是固定式或抽出式塑壳断路器，或者是空气断路器。

Incoming and outgoing cubicles, busbar coupling cubicle are all installed with a switch, which may be a fixed type disconnecter, or a fixed or withdrawable type molded case circuit breaker, or an air circuit breaker.

在CMD190低压成套开关设备中将同一功能组的零部件组装后，可构成一个简便的机械和电气功能组件，包括动力组件和控制组件。

In CMD190 Low Voltage Swithgear, the same functional assembly composes a basic mechanical and electrical functional unit, which consists of power components and control components.

柜内小室分隔 Cubicle Compartments

按不同要求，柜架结构可分为下列小室：装置小室、母线小室、电缆小室。

As per different requirements, the cubicle frame structure consists of following compartments: device compartment, busbar compartment, and cable connection compartment.

装置小室中为功能单元组件，母线小室为母线和配电母线，电缆小室中为进出线电缆（上、下进出线均可）、功能单元组件之间的连接以及附件，如电缆夹、电缆连接件、并联线、走槽线等。

The device compartment is installed with functional unit modules, and busbar compartment with busbars and distribution busbars, cable connection compartment with incoming and outgoing cables (both for upper and lower incoming and outgoing), and connections for functional unit modules and fittings, such as cable clips, cable connections, parallel connection wire, and wiring channel etc.

功能单元之间及柜内小室之间均可作分隔，内部分隔可将电弧破坏性降低到最小程度。

Interior segregation can be made between functional units or compartments to minimize destructions by arcing to the greatest extend.

主母线 Main Busbar

主母线布置在开关柜的背部或上部（母线小室内），可分为上、下层。双层主母线系统分别布置在上、下两层，单层主母线系统布置在上层或下层。两层主母线的截面大小可以不相同。主母线单独、串联、并联均可。视母线电流大小，每相可由1~8条主母线组成。背靠背排列的柜体采用共同母线的设计，每相只能由2条母线组成。联屏柜的母线按其运输单元作分隔。母线材料为铜（Cu），截面积为(30~150)×10mm²多种规格，不同截面的母线也能相接。

Main busbars are arranged at the back of cubicle or on the upper of cubicle, and it can be divided into upper and lower layers. Duplicate-layer main busbar system shall be arranged separately in upper and lower layers, and single layer main busbar system can be arranged in either upper or lower layer. The cross sections of main busbars for 2 layers can be different. The main busbars can be connected in single, in series or in parallel. Each phase shall consist of 1 to 8 pieces of main busbars, which depends on busbar's current carrying capacity. Back-to-back

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear



Lsmax T系列塑壳断路器
Isomax T series molded-case
circuit breaker (MCCB)



Emax 系列空气断路器
Emax Plug-in Type Switchgear

arranged cubicles are of common busbar design, only 2 pieces of busbars are applied to each phase. The Busbars of coupling-arranged cubicles are separated by transport unit. Busbar is of copper(Cu) material, with several types of cross sections: specifications (30~150)×10mm², and the busbars of different cross sections can be connected together.

配电母线 Distribution Busbar

配电母线

配电母线用于功能单元组件和母线之间的连接，垂直分布在母线小室内。一个开关柜中最多能安装两个3相或4相配电母线，可以全高度、半高度或中间分开呈两段布置。配电母线每相为单根矩形或直角型铜排，其截面为(50~100)×5 mm²或L型（50+30）×5 mm²。配电母线材料为铜。

The distribution busbars are for link between busbars and functional units and are arranged vertically in busbar compartment. One cubicle shall hold at most two 3- or 4-phase busbars, which can be mounted in full-height, semi-height or in 2-section, separated in middle. Each phase shall be single busbar of right-angle type or rectangle type, with its cross section of (50~100) ×5 mm², or L-shape (50+30) ×5 mm². The material of busbar is copper.

开关装置 Switching Device

CMD190低压成套开关设备中安装7500A以下隔离开关，1250A以下塑壳断路器和7500A以下空气断路器均作为标准型开关柜。抽出式结构设有固定安装带分离触头的框架。CMD190 Low Voltage Swithgear contains disconnecter under current of 7500A, molded case circuit breaker (MCCB) under current of 1250A and air circuit breaker under current of 7500A, all can be taken as standardized switchgear. Withdrawable unit structure is designed with frame of fix installation, with disconnection contacts.

断路器配有全套的附件：微处理过电流电子脱扣器、分励、欠电压、合闸线圈、储能电动机、辅助触点、锁及钥匙等。

Circuit breaker is provided with complete set of accessories, e.g. micro-processing over-current release, shunt release, under-voltage release, closing coil, charging motor, auxiliary contacts, locks and keys.

CMD190低压成套开关设备的机械附件包括有计量仪表壁龛和抗冲击防护盖。电流测量和电压测量等电气仪表都安装在门板前，以方便观察和操作。电源保护和电流互感器等电气元件都安装在装置小室及母线小室，以方便检查。1000A及以上隔离开关、630A及以上塑壳断路器和空气断路器可直接与母线相连接。母线或电缆（至12根并联电缆）可用作进/出线的连接。在装置小室内进线可上/下连接。

The mechanical accessories include measuring instrument recess and anti-impulse protection cover. The electric instruments for current and voltage measuring are all mounted at the front of the door for purpose of inspection and operation. The electrical devices like power supply protection device and current transformers shall be mounted in device compartment or busbar compartment for convenience of inspection. The disconnectors of 1000A or above, molded case circuit breakers (MCCBs) of 630A or above and air circuit breakers can be directly connected with busbar. The busbars or cables (max 12 cables for parallel connection) can be used as connecting wires for cable incoming and outgoing. In the device compartment, incoming cables can be of upper/lower connection.

由于采用锁紧螺栓，CMD190低压成套开关设备的电气连接和机械安装均为免维修型。柜内元件的操作按相应的说明书执行（安装、调试、操作、维护等）。

Since lock bolts are adopted, the CMD190 Low Voltage Swithgear's electric connection and mechanical installation are maintenance-free. The operation of device in cubicle shall be performed according to the relevant instruction manuals. (Installation, commissioning, operation, maintenance, etc.)

保护线和中性线连接排

Protection Earthing(PE) and Neutral(N)Connection Bars

CMD190低压成套开关设备可布置成4线或5线制的母线系统。除主母线和配电母线外，4线制系统还包括保护中性线（PEN），5线制系统则包括保护接地线及中性线（PE+N）。

The CMD190 Low Voltage Swithgear can be arranged as 4- or 5-wire busbar system. Except for main busbars and distribution busbars, the 4-wire system includes protection earthing neutral (PEN) line, and the 5-wire system includes protection earthing lines and neutral lines (PE+N).

系统连接用的保护/中性线连接排水平安装在装置小室、电缆小室的下方，并用绝缘端子作固定，排的长度按运输单元分段。供本柜连接用的保护/中性线连接排垂直安装在电缆小室内，用绝缘端子固定。

PE/N connection bars for system are mounted horizontally in lower part of device compartment and cable connection compartment, and secured with insulating terminals. The length of bars shall be sectionalized by transportation unit., PE/N connection bars for this cubicle are vertically mounted in cable connection compartment, and secured with insulating terminals.

PE+N，PEN排及连接排上均开有模数孔，用于电缆的连接。

PE+N, PEN bars are made with modular holes for cable connection.

走槽线、电缆安装件

Wire Channel, Cable Fittings

控制线走线槽安装在柜的上方或下方，用于布置柜内电气装置的二次回路控制电缆走线及柜与柜之间的连接线。走线槽按柜的宽度截取。柜前方装有卡轨，用于元件的安装，如控制电源断路器等。

The control wire channel is mounted on the top or at the bottom of cubicle, for arrangement of secondary circuit control cables and connection wires between cubicles. The cable channel’ s length shall be as per cubicle width. In the front of cubicle is equipped with guide rail for mounting devices like power supply control breakers, etc.

柜体上方的控制线走线槽及下方的PEN母线均有组件门或面板作保护，面板的下部带有通风孔。

The control wire channel on the top of cubicle and PEN busbars at the bottom of cubicle are all protected by assembling doors and face plates, with ventilation holes on the bottom of face plates.

• 插入式开关柜

Plug-in TypeSwitchgear

插入式组件 Plug-in Subassembly

插入式开关柜的基本零件是插入式组件，它由數铝锌板成形部件和电器元件组成，可组成不同高度的功能组件，组件高度依额定容量大小而定。

The plug-in type switchgear are essentially composed by the plug-in subassemblies, which consists of Al-Zn plated steel plates formed components and electric device. Functional modules of different height can be assembled, which depends on the rated capacity.

插入式组件可与组件前的提示、计量、信号和操作装置相连。组合式的结构具备下列优点：

- 结构紧凑
- 一次线进线连接采用插入式，整个功能单元更换方便
- 维修及试验时间少
- 运行条件变化后组件可作相应变更
- 电缆小室空间大，接线方便
- 630A以内的连接可用插入式的连接方式（不必用螺丝）

The plug-in type subassembly can be connected with indication, measuring, instruction and operation devices in front of them, and the combined structure owns special features as follows:

--- Compact Structure

--- Plug-in connection for primary cale incoming, facilitating replacement of the whole functional unit.

---Shorten time for maintenance and test --- Changes to modules vary with conditions --

-Large space of cable connection compartment, facilitating connections ---Plug-in connections for the conditions under 630A (No need of screws).

插入式组件安装在600mm宽的装置小室中，用插入式插座与配电母线连接。出线电缆和馈电电缆通过端子连接。馈电回路和马达控制回路均采用标准元件（参见一次回路方案介绍）。如组件需更换、改进或扩展（备用空间增加组件），开关柜的主电源必须切断。

The plug-in type subassembly is mounted in the device compartment of 600 mm width, and connected to power distribution busbars by plug-in type socket. The outgoing cables and feed cables are connected through terminals. The feed circuit and motor control circuit are all applied with standardized components (Refer to primary circuit scheme). If the subassembly needs to be replaced, improved or expanded (adding modules in reserved space), the main power supply must be disconnected.

标准的插入式基本组件包括安装板、配电母线连接触头和出线电缆端子。安装用户要求，可安装不同的元件：

Standard plug-in essential subassembly consists of mounting plate, power distribution busbar contact, and outgoing cable terminals. According to the customer’ s requirements, it can be mounted with different types of components:

- 隔离开关（带/不带熔丝监视）
- Disconnecter (with/without fuse monitor)
- 配电，熔断器隔离开关（XLP）
- Power distribution, fuse disconnecter (XLP)
- 负荷断路器
- (OETL)Load circuit breaker (OETL)
- 塑壳断路器
- (MCCB) Molded case circuit breaker (MCCB)
- 带HRC熔断器的马达起动机
- Motor starter with HRC fuse
- 带塑壳断路器的马达起动机
- Motor starter with MCCB
- 无功功率补偿
- Reactive power compensation



插入式开关柜
Plug-in Type Switchgear



装置小室中的插入组件
Plug-in modules in device compartment



抽出式开关柜带装置、电缆、
母线小室
Withdrawable Switchboard with device,
cable and busbar compartment

•抽出式开关柜 Withdrawable Type Switchgear

柜架结构 Frame Structure

抽出式开关柜可分为装置小室、母线小室、电缆小室，其尺寸（高×宽×深）为2200mm×1000mm×600/800/1000/1200mm。

The withdrawable switchgear cubicle contains device compartment, busbar compartment, cable connection compartment, with dimensions of (height× width× depth) 200mm × 1000mm × 600/800/1000/1200mm.

抽出式组件由抽屉组件和组件安装小室两部分组成，动力单元和控制单元的组件为抽出式安装，标准规格为8E/4，8E/2，8E，12E，16E，20E，24E。4个8E/4或2个8E/2组件可以水平安装在600mm宽度的装置小室，组件高度为8E（200mm）。8E，16E，20E，24E的单个组件就需要600mm宽的装置小室，组件的高度就是组件规格所指的尺寸。

The withdrawable subassembly consists of drawer unit and installation compartment, the power unit and control unit’ s subassemblies are of withdrawable type installation. The standard specifications are 8E/4, 8E/2, 8E, 12E, 16E, 20E, 24E. Four 8E/4 or two 8E/2 units can be horizontally fixed in the device compartment of 600mm width, and the height of unit is 8E (200mm). Each individual 8E, 16E, 20E, 24E unit shall require 600mm-wide compartment, here the unit height means dimensions specified by subassembly specification.

抽出式组件作抽出操作时，开关柜的主电源不必切断，在相邻组件不断电的情况下操作组件插入/抽出，不会发生触电的危险。

When pulling out the withdrawable subassembly, the switchgear’ s power supply is unnecessary to be disconnected. when plugging in or pulling out the withdrawable subassembly with adjacent units power on, shall not cause any danger of electrical shock.

多功能分隔板

Multi-functional Partition

在抽出式或固定式、抽出式混合设计的开关柜中，配电母线（直角L型截面或I型截面）安装在绝缘多功能分隔板中，同整个母线系统一起，无需另加隔板即可达到抗电击防护等级（IP20）的要求。

In the withdrawable or fixed-withdrawable mixed-designed cubicles, the distribution busbars (right angle L-shape with cross sections or I-shape section) are mounted on the insulated multifunctional partitions. The whole busbar system with partition can reach protection degree (IP20) against electric shock without additional partition.



8E/4和8E/2抽出式组件小室
Compartments for 8E/4 and 8E/2
Withdrawable Modules



8E装置小室
8E Device Compartments

8E/4、8E/2装置小室

8E/4, 8E/2 Device Compartment

8E/4、8E/2装置小室包括底板、导轨、前档和插头转接组件。动力和控制回路与配电母线，组件和电缆小室之间的电气连接由插头转接件来完成。

8E/4, 8E/2 device compartment consists of sole plate, guide rail, front baffle, plug change-over unit. The connections are achieved by plug change-over unit between power and control circuits and power distribution busbars, subassemblies and cable connection compartment.

抽出式插头转接组件可容纳四个8E/4（电流至45A）或两个8E/2（电流至63A）的插头，每个8E/4组件配一个20芯的端子，每个8E/2组件配一个或两个20芯的控制端子。

The withdrawable plug change-over unit may contain four 8E/4 (current up to 45A) plug or two 8E/2 plugs (current up to 63A), and each 8E/4 unit is fitted with one 20-core terminal, while each 8E/2 unit is equipped with one or two 20-core terminals.

进、出线电缆的连接侧位于抽出式插头组件内，并有抗故障电弧保护功能。

Incoming and outgoing cables’ connection terminals are inside of withdrawable plug unit, and it has protection function against fault arc.

8E. . . 24E装置小室

8E...24E Device Compartment

8E....., 24E装置小室装置小室包括底板、导轨、金属侧板（带控制出线端子）。抽出式组件的进线与多功能分隔板中的配电母线通过一次插头连接，出线电缆连接采用电缆接头（主回路），控制电缆连接用由20芯或16芯控制接线头组成的高度为4E的16芯或32芯控制接线端子（二次回路）来实现。主回路电缆接头安装在多功能分隔板上。

The 8E...24E device compartments consist of sole plate, guide rail, metal side plate (with control outgoing terminals). Incoming of withdrwable subassembly and power distribution busbars in multifunctional partition are connected by primary plugs; and outgoing cables are connected by cable connectors (for main circuit). For control cable connection, it is connected by 16-core or 32-core connection terminals (secondary circuit) of 4E height, which is formed by 20-core or 16-core control cable connectors. The main circuit’ s cable connector is mounted on the multifunctional partition.



电缆和控制线在开关柜中的接线方法
Connection of cable and control wire in the switchgear

电缆及接线

Cable and Cable Connection

在电缆小室中，抽出式组件的一侧安装有接线装置和端子，用于出线电缆、控制线和组件之间的接线。

In the cable connection compartment, connection device and terminals are mounted on one side of the withdrawable subassembly, which are used for connection between outgoing cables, controlling wire and subassemblies.

进、出线电缆和控制接线位置位于电缆小室右侧电缆安装导轨上，主回路端子位于其后部，控制线端子位于其前方45° 方向上。

The connection point of incoming & outgoing cables and controlling wire is on the cable mounting guide rails on the right side of cable connection compartment. Main circuit terminals are at its rear, and the control wire terminals are at an angle of 45° in front.

控制线端子的接线可用螺丝或插入式线鼻子连接，或者用端子连接，主回路端子小于63A的抽出式组件，转接件上配有PE端子。

Control wire terminals shall be connected by screws, plug-in connection terminals, or by terminals. For withdrawable subassembly whose main circuit terminals’ current is under 63A , PE terminals shall be provided on its change-over parts.

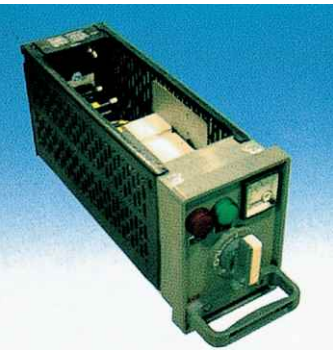
抽出式组件

Withdrawable Subassembly

标准组件方案 The standard subassembly scheme

- 配电用熔芯开关或塑壳断路器
- Fuse switch or MCCB for power distribution
- 带熔断器的马达起动机
- The motor starter with fuse
- 带塑壳断路器的马达起动机
- The motor starter with MCCB

组件规格Specifications: 8E/4, 8E/2, 8E, 16E, 24E。



8E/4抽出式组件
8E/4 Withdrawable Subassembly



8E/2抽出式组件
8E/2 Withdrawable Subassembly



8E抽出式组件
8E Withdrawable Subassembly

8E/4和8E/2抽出式组件 8E/4, 8E/2 Withdrawable Subassembly

8E/4和8E/2抽出式组件结构包括仪表板、绝缘材料侧板、带电缆接线端子的后盖和一个或两个20芯控制端子安装件，按不同要求8E/2可配两个20芯的端子。

8E/4, 8E/2 withdrawable subassembly consists of meter panel, insulation material side plate, rear cover with cable connection terminals, and one or two 20-core control terminal mounting fittings. The 8E/2 unit can be equipped with 20-core terminals as per requirements.

仪表板上设有敲落孔，用于安装计量、操作、显示器组件。主开关（一般为马达开关带熔断器或断路器）的操作由安装在仪表板上的手柄来实现，该手柄具有电气及机械联锁功能，电气联锁采用带一个常开一个常闭触点的微动开关来完成。

There are knock-off holes on the panel for installing measuring, operating, display elements. The main switch (motor switch with fuse or breaker) is operated by switch handle mounted on meter panel, which has function of electric and mechanical interlocking, and the electric interlocking function shall be performed by a sensitive switch with one normally open (NO)and one normally close(NC) contacts.

操作手柄向里按动后，方能从0位置向I位置操作，操作手柄上可给主开关分闸、试验、隔离三个位置加挂锁以作为安全保护，最多可加3把锁。

Only after pushing the operating handle, it’ s possible to switch from “0” position to “I” position. On the operation handle, it can provide padlocks for safety protection on the opening, testing, isolating positions of main switch, and max 3 padlocks.

8E，12E，16E，20E，24E
抽出式组件 Withdrawable Subassembly

4E至24E抽出式组件包括仪表板、绝缘后板、前盖板、金属侧板和走线槽。

The 8E, 12E, 16E, 20E, 24E withdrawable subassembly consists of meter panel, insulation rear plate, front cover plate, metal side plate, and cable channel.

铰链组件门为从前方更换元件提供了方便（如更换熔断器），无需抽出组件即可实现。当组件处于工作及试验位置时，只有使用工具（螺丝刀，双锁）才能将前门打开。当组件处于隔离位置时，可以配双锁。

The hinge facilitate easy replacement for elements from front, (like fuse), without pulling out withdrawable subassembly. When withdrawable subassembly is in service or test position, the front door can be opened only by tools (screw driver, double locks), and when withdrawable subassembly is in disconnected position, it can be fitted with double locks.

前盖板上安装有仪表板的孔，仪表板在前盖板开启、关闭时留在原位置不动。仪表板设有敲落孔以安装计量、操作和指示器件。操作手柄具有电气及机械联锁功能，电气联锁采用带一个常开一个常闭触点的微动开关来完成。

The holes on the front cover plate are for mounting meter panel, and the meter panel keeps at the original position when front door is open or closed, and on the meter panel, there are knock-off holes for mounting measuring, operating, indicating devices. The operation handle has functions of electric and mechanical interlocking, and the electric interlocking function is performed by a sensitive switch with one normally open (NO) and one normally close (NC) contacts.

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

后出线开关柜 Cable Rear Outgoing Cubicle

开关柜结构 Switchgear’s Structure

CMD190低压成套开关设备后出线方案是专为减少开关柜排列宽度而设计的。后出线开关柜的主母线水平安装在开关的顶部，柜的后半部为电缆室，进出线电缆均从柜后电缆室连接。开关柜的正面为装置小室，安装开关设备的功能单元。该系统设计将开关柜侧面的电缆室移至后半柜，大大减少了开关柜的排列宽度，以进一步满足变电所空间布置的要求。

CMD190 Low Voltage Swithgear’s rear outgoing scheme is specially designed for reducing cubicle arrangement width. The main busbars are mounted horizontally on the top of cubicle; cable connection compartment is located at the rear part of cubicle, and incoming and outgoing cables are all connected from rear cable connection compartment. Device compartment is located at the front of cubicle, to install cubicle’s functional units. In this system, the cable connection compartment is designed at the rear of cubicle, which greatly reduced the width in cubicles’ arrangement, so as to meet further requirement of substation space arrangement.

馈电柜柜宽600mm，深1000/1200mm，顶部为独立的主母线室，与装置小室隔离。正面装置小室有效安装高度为72E（E=25mm），经多功能板与后部电缆室隔离，充分利用了开关柜的安装空间，结构紧凑，单元配置灵活。背面电缆室带门，安装及维护方便。进线柜的宽度按进线单元的框架电流确定，推荐宽度为400/600/800/1000/1200mm。柜深1000/1200mm。

Feeder cubicle’s width is 600mm, and depth is 1000/1200mm. On the top of cubicle is main busbar compartment, which is isolated from device compartment. The front device compartment’s effective installation height is 72E (E=25mm), and is isolated from rear cable connection compartment by multi-functional plate, which sufficiently utilized cubicle installation space. It’s of compact structure, flexible unit arrangement. The rear cable connection compartment’s door facilitates convenient installation and maintenance. Incoming cubicle’s width shall be decided according to the current of frame of cable incoming unit. The recommended width is 400/600/800/1000/1200mm. Depth of cubicle is 1000/1200mm.

电气参数 Electric Parameter

额定绝缘电压Ui Rated insulation voltage Ui		1000V交流，1500V直流 1000V AC, 1500V DC
额定工作电压U Rated operating voltage Ue		400/690V 3相交流，750V直流 400/690V 3phase AC, 750V DC
额定冲击耐受电压Uimp Rated impulse withstand voltage		8kV 8kV
过电压等级 Over-voltage degree		III III
污染等级 Pollution degree		3 3
额定频率 Rated frequency		50/60Hz 50/60Hz
主母线 Main Busbar	额定电流 Rated current	至7500A To7500A
	额定短时耐受电流 Rated short time withstand current	至120kA To120 kA
	额定峰值耐受电 Rated peak withstand current	至264kA To264 kA

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

垂直主母 Vertical busbar	额定电流 Rated current	至2000A To2000A
	额定短时耐受电流 Rated short time withstand current	至80 kA To80 kA
	额定峰值耐受电 Rated peak withstand current	至176 kA To176 kA

母线系统 Busbar System

主母线采用矩形铜母线，三相母线水平安装在柜体顶部。柜顶主母线可为单组母线或双组母线，采用双组母线时额定电流最大为5000A。矩形母线极大地提高了母线的动热稳定性能，节省了安装空间。主母线按运输单元分段连接。

The main busbar system adopts rectangle copper busbars. The 3-phase busbars are mounted horizontally on the top of cubicle. The main busbars on the top of cubicle can be either single busbar or duplicate busbars, and the duplicate busbars’ rated current can be max 5000A. The rectangle busbars have greatly improved busbar thermal or dynamic stability, and reduced busbar mounting space. The main busbars are connected by sections as per the transport unit.

分支母线为直角L型铜母线，垂直安装在多功能板中。

The branch busbar is of right-angle L-shape copper busbar, and it is mounted vertically on multifunctional plate.

保护接地及中性母排水平安装在柜背部电缆室的下方。母排的长度按开关柜的运输单元确定。保护接地及中性分支母排垂直安装在柜后电缆室内，长度与柜体宽度相同。PE/N排上均带模数孔，用于电缆连接。

The protection earthing and neutral（PE/N）busbars are horizontally mounted in the bottom of cable connection compartment at rear of cubicle. The busbar length is decided by transport unit of the cubicle. The protection earthing and neutral branch busbars are vertically mounted in cable connection compartment at the rear of cubicle. Its length is same as cubicle width. PE/N busbars are with modular mounting holes for cable connection.

柜体及主母线系统配置

The Cubicle and Main Busbar System Layout

主母线额定电流为4000A及其以下系统

The main busbar system at or under rated current of 4000A

主母线额定电流为4000A及其以下系统

• 柜顶主母线为单组母线

• The main busbar on the top of cubicle is single busbar

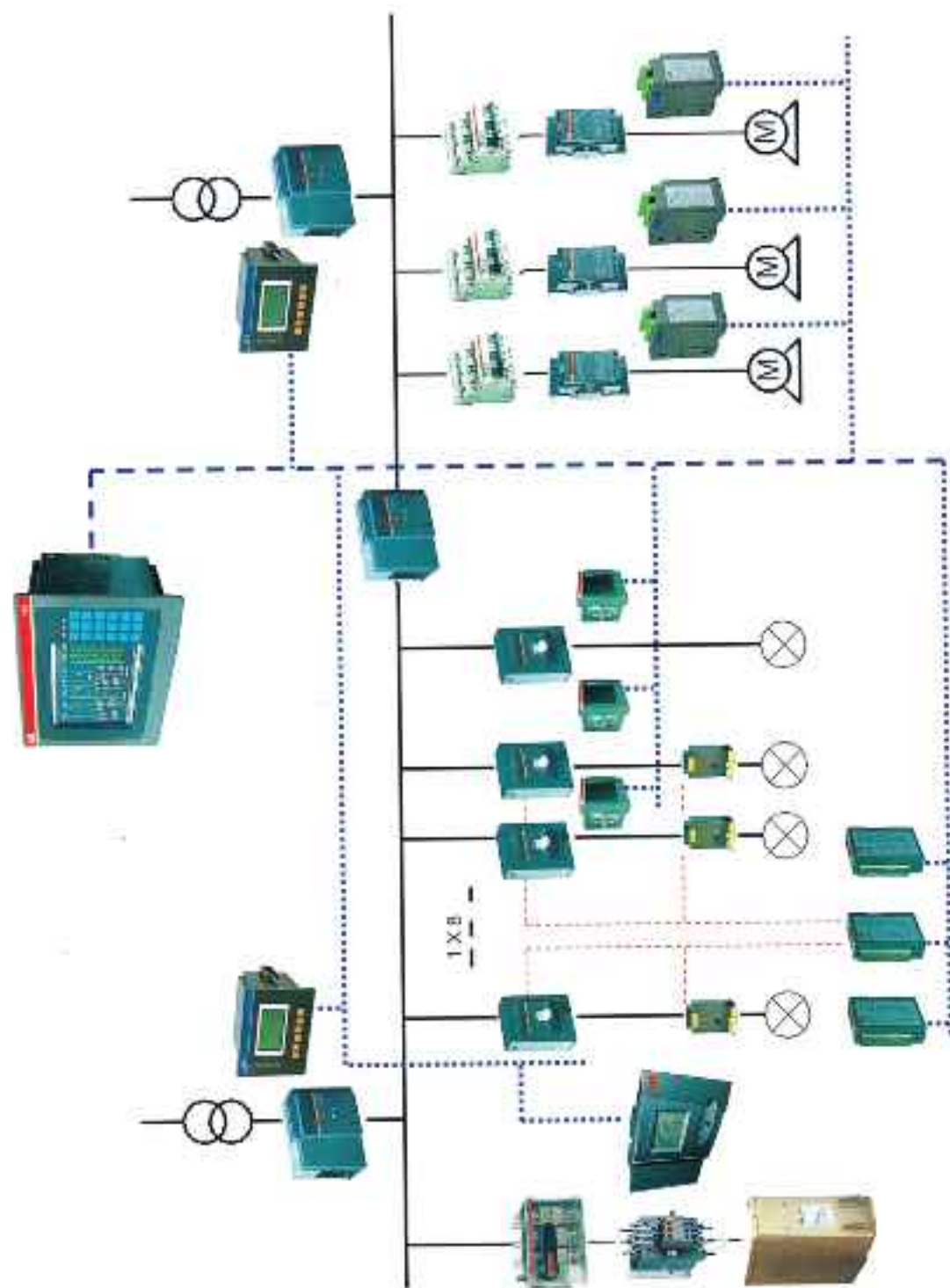
• 电缆下出线系统，进线柜为下进线或上进线，开关柜深度为1000mm

• Cable lower outgoing system, incoming cubicle is of upper and lower incoming, the cubicle depth is 1000mm

• 电缆上出线系统，进线柜为下进线或上进线，开关柜深度为1000mm

• Cable upper outgoing system, incoming cubicle is of upper and lower incoming, the cubicle depth is 1000mm

• 智能配电及监控系统
Intelligent Power Distribution and Monitor System



智能化网络示意图 Schematic Diagram for Intelligent Network

• HMI人机界面
HMI Operator Interface



HMI外观图

在配电系统自动化中，HMI是用于实现配电系统的通信处理和设备管理功能的智能单元。其具有良好的人机界面，能够将多种装置和设备通过现场总线技术有机地连接起来，并且在测控网上实现信息交换和共享利用，同时还能够实现现场层面的人机对话。

As for automation of power distribution system, HMI is an intelligent functional unit to perform function of system data communication and equipment management. It has excellent operator interface. It can connect effectively with various devices and equipment by field bus, and facilitate data exchange and share via monitoring networks, and facilitate field communication between operator and system.

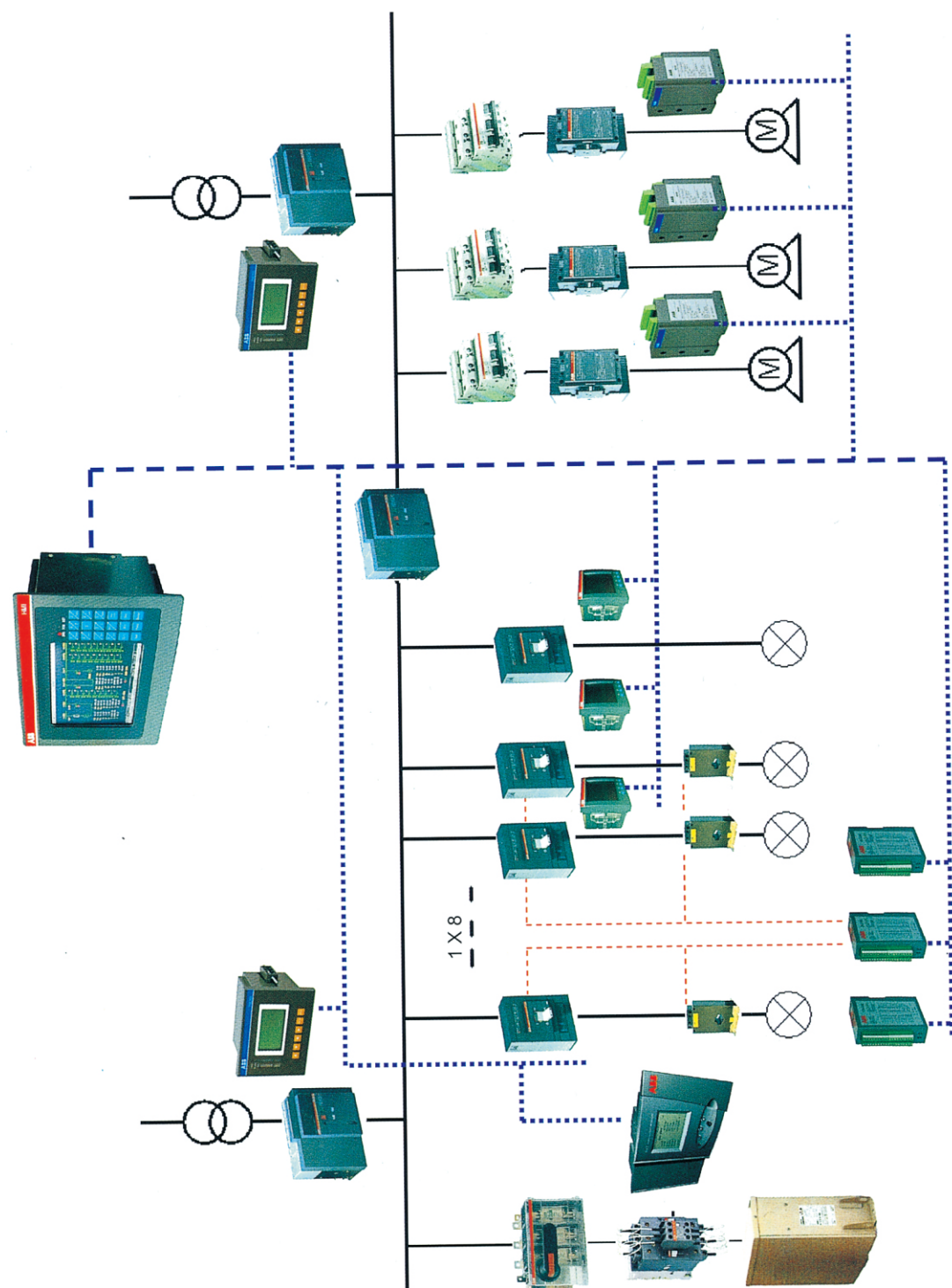
HMI与其他系统（如配电监控或调度中心、楼宇自控中心BAS、工厂过程控制中心DCS、消防系统控制中心FC等）均可通过标准接口和标准通信协议转发和交换配电系统数据，在配电系统自动化中起到通信枢纽作用。

HMI and other system (e.g. power distribution monitor and control center, Building Auto Control System (BAS), Device Control System (DCS), Fire Control System(FC)), all can transmit and exchange power distribution data via standard interface and data communication protocol, and act as data communication center in automation of power distribution system.

结构和技术参数 Structure and Technical Data

- 32位100MHz CPU（586架构），具有强大的通信和数据处理能力
- 32 bits 100MHzCPU (586 type), with powerful communication and data processing capacity
- 标准工业总线PC104结构，实时嵌入式系统技术，多任务处理机制，保证通讯的实时性，从根本上解决系统不稳定的隐患
- Standard industrial field bus PC104 structure, embeded real time operating system, multi-mission processing system, can ensure real time communication, and fundamentally solve the problem of unstable operation of system
- 通讯口设备：10/100M高速以太网、2个PS232接口、8个隔离性PS485接口。实现与配电现场各种智能设备的通讯连接和通讯数据处理，既可进行现场监测，同时能向上级系统转发数据
- Communication interface device: 10/100M high speed Ethernet, two RS232 interfaces, eight isolation RS485 interfaces, which facilitates communication connection and communication data processing of various power distribution field intelligent equipments. It can provide field monitoring, but also transmit data to higher system
- 大容量、高可靠性存储配置，可保存最近一年内发生的告警信息，包括通信告警、遥测告警、遥控告警、SOE信息
- Large capacity, high reliable storage configuration, and it can store alarm data of recent one year, including communication alarm, remote measuring alarm, remote control alarm, SOE information
- 6.4英寸真彩色液晶显示屏、图形界面、操作方便
- 6.4 inch real color LCD display, graphics interface, convenient operation
- 体积小、安装方便，可直接安装在开关柜门板上
- Small and flexible type, easy installation, and can be mounted on the cubicle door

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CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

主母线额定电流为4000A以上系统
The main busbar system above rated current of 4000A

- 柜顶主母线为双组母线
- The main busbars on the top of cubicle are duplicate busbars
- 进线柜为上进线或系统为上进线时，开关柜深度为1200mm
- Upper incoming for incoming cubicle or upper outgoing for system, the cubicle depth is 1200mm
- 进线柜为上进线且系统为上进线时，开关柜深度为1000mm
- Upper incoming for incoming cubicle and lower outgoing for system, the cubicle depth is 1000mm
- 联络柜应加母线转接柜，柜宽600mm
- Busbar coupling cubicle shall be provided with change-over panel, with its width of 600mm

主母线电流 Main busbar	≤4000A系统 ≤4000A System	≥4000A系统 ≥4000A System
母线系统 Busbar system	单组母线 Single busbar	双组母线 Duplicate busbars
电缆下出线系统 Cable lower outgoing system	柜深D=1000mm Depth =1000mm 母联柜不需要转接柜 Without change-over cubicle.	进线柜为下进线时，柜深D=1000mm Lower incoming (Incoming cubicle) D=1000mm 进线柜为上进线时，柜深D=1200mm Upper incoming (Incoming cubicle) D=1200mm 母联柜须加转接空柜，柜宽W=600mm With empty change-over cubicle, W=600mm
电缆下出线系统 Cable lower outgoing system	柜深Depth D=1000mm 母联柜需要转接空柜，柜宽600mm，当母线电流小于2500A时，若电容柜与母联柜相邻排列则电容柜可同时作为母联柜转接柜 Bus coupling cubicle shall be provided with empty change-over panel, with its width=600mm; when busbar current is under 2500A and capacitance cubicle is adjacent to busbar coupling cubicle, then capacitance cubicle, in the meanwhile, can be used as change-over cubicle for busbar coupling cubicle.	柜深Depth D=1200mm 母联柜须加转接空柜，柜宽W=600mm Bus coupling cubicle shall be provided with empty change-over panel, with its width W=600mm

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

Emax开关柜 Emax cubicle

一个开关柜一般只安装一台E开关，柜体基本配置见下表：
One cubicle is generally fitted with one E-max switch. Cubicle’ s basic arrangement is listed in table below:

开关规格 Specifications		柜体尺寸Cubicle dimension		
		宽Width(mm)	高Height(mm)	深Depth(mm)
Emax E1	三极Poles	400	2200	800/1000
	四极Poles	600	2200	800/1000
Emax E2	三极Poles	400	2200	800/1000
	四极Poles	600	2200	800/1000
Emax E3	三极Poles	600	2200	800/1000
	四极Poles	800	2200	800/1000
Emax E4	三极Poles	800	2200	800/1000
	四极Poles	1000	2200	800/1000
Emax E6	三极Poles	1000~1200	2200	1000/1200
	四极Poles	1200	2200	1200

抽出式功能单元 Withdrawable Functional Unit

抽出式功能单元规格见下表。回路配置见一次回路方案。
The withdrawable functional unit’ s specification is shown in the table below. As to the circuit scheme, please refer to primary circuit scheme.

柜型 Type of cubicle	功能单元规格 Specification of function unit							
CMD190后出线rear outgoing	8E/4	8E/2	---	8E	---	16E	---	24E
CMD190侧出线side outgoing	8E/4	8E/2	---	8E	12E	16E	20E	24E

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

基本功能Basic Functions

- 实现与现场各种智能设备通讯连接个数据处理
- Realize communication connection and data processing of field intelligent devices
- 利用图形直观显示现场的状态信息和测量信息
- Directly indicate the field status information and testing data by graphics
- 系统具有实时拓扑分析功能，帮助用户判断电力系统运行状况
- Real time topological analysis function may facilitate customer on judging power system operation status
- 实时对电力设备远程测控
- Power system remote controlling and testing
- 实现对电力设备的保护值进行远程读写操作
- Remote read-write operation for protection value of power system
- 实现对智能电力设备进行保护复归
- Protective resetting for intelligent power system
- 采集和查询电力系统的通信、遥脉、遥测等数据
- Collection and inquiry on data of remote control, remote pulse, remote test of power system, etc
- 查询和保存最近一年的告警信息
- Inquiring and storing the alarm information in one year
- 向其他系统转发数据
- Transmitting data to other system
- 监视现场各种智能设备的通讯状态及报文文件输出状态
- Monitoring various field intelligent device communication and message output state
- 通过对用户权限的设置，口令检查等方法，保证系统操作的安全性
- To ensure system operation safety by means of user password checking, and user’ s operation authority
- 提供监控系统保护和维护的设置功能
- Setting functions of protection and maintenance for monitoring system
- 能够实现双机设备的功能，保证系统的可靠性
- Function of duplicate system hot standby, to ensure reliability of system

主要技术指标 Main Technical Index

工作电源Operation power supply	85V~265VAC or 85V~265VDC
功耗Power consumption	≦30W
	CPU 32 digit 100MHz
系统配置System configuration	RAM: 32M
	DOC2000: 64M
通讯速度Communication velocity	57600/38400/19200/9600/4800/2400/1200/600/300bps
通讯响应时间Communication response time	20ms
	RS232: 2
通讯口配置Com port configuration	RS485: 8
	10/100Methernet interface:1
防护等级Degree of protection	Front panel IP52, terminals: IP20
工作环境Operation environment	0℃-55℃
存储温度Storage temperature	-10℃- +70℃
相对湿度Relative humidity	≦95%

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

• M101/M102电动机控制单元 M101/M102 Motor Control Unit



M102外观图
Appearance of M102

M101/M102马达管理中心是基于微处理技术开发研制的电动机智能管理系统。通过M101/M102电动机控制装置MCU，以及先进的现场总线通讯技术，M101/M102马达管理中心为低压电动机提供了一套专业化的集控制、保护与检测于一体的智能化管理方案，是过程控制系统电动机智能化管理的理想选择。
M101/M102 motor control center (MCC) is a motor intelligent management system based on micro-processing technology. The motor control unit MCU and advanced field bus technology combined in MCC, providing low voltage motor with a complete set of professional intelligent management program integrating functions of control, protection, and monitor. And it is an ideal option for motor intelligent management of process control system.

保护功能 Function of Protection

完善的马达保护是对马达运行过程中的各种运行状况的详细信息进线采集跟踪，通过对故障报警，保护（保护脱扣），以及动作延时时间的设定来实现及时准确的保护，保证生产的安全。同时经通讯，可以对马达运行状况的详细信息在上位机上进线实时监测，并经计算机数据处理提供管理信息。在设备可能产生重大故障前，越限报警可及时提醒管理人员进行处理，避免了不必要的停机而对正常生产造成影响，最大限度的保证设备运行的有效性。
The perfect motor protection is to collect and track details of motor operation status, and by setting up the default alarm, protection (protective trip), and operation time-delay, it can realize accurate and on-time protection to ensure the safe operation of process. It can realize real-time monitor on motor operation status on the supervisory computer via communication, and provide control information through data processing by computer. Before serious malfunction occurs, the over-limit alarm can remind operator to take actions. It can avoid unnecessary breakdown that will affect normal operation, and it ensures the effective operation of equipment to the utmost extent.

M101/M102马达保护的特点 Special Features of M101/M02 Motor Protection

- 各种保护功能已内置在装置中，可根据实际需要进行配置
- The various protection functions are built-in type, it is optional according to specific requirement
- 通过设置软件可轻松选择所需的保护功能
- It can select protection function easily by setting relative software
- 保护功能可设置为报警并延时脱扣，只报警不脱扣或直接进入延时脱扣保护
- Protection can be set as alarm and time-delay release, or only alarm without release, or direct time-delay release protection
- 通过对保护脱扣的复位模式的预先设定，用户可选择故障保护脱扣的复位方式：自动复位 远程复位 本地复位 本地及远程复位
- By presetting reset mode of protection release, the user can select reset mode of default protection release: Auto reset Remote reset Local reset local and remote reset
- 在起动期间自动判别并避开起动电流，保证保护功能不发生误动作
- Auto identification and avoidance of starting current during start-up period, ensuring no malfunction in protective function
- 配套的操作面板MD直接显示电机电参量及故障信息
- Motor electrical parameter and fault information can be displayed directly on associated operation panel

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear



马达保护功能 Motor protection	M101-M	M010-P	M102-M	M102-P
热过载保护 Thermal overload protection	■	■	■	■
防爆电机EExe的热过载保护 Thermal overload protection for explosion-proof motor EExe			■	■
断相保护 Open phase protection	■	■	■	■
三相不平衡保护 3-phase unbalance protection	■	■	■	■
堵转保护 Stall protection	■	■	■	■
欠电压保护 Under-voltage protection			■	■
电压跌落自动重起动 Voltage drop automatic restart			■	■
电机热保护 Thermal protection of motor(PTC)			■	■
接地故障保护 Earthing fault protection	■	■	■	■
轻载保护 Light-load protection	■	■	■	■
空载保护 No-Load protection	■	■	■	■

控制功能 Function of Control

M101/M102通过程序控制，可实现各种不同的电机起动控制方式，并通过接触器辅助触点的状态反馈，对接触器运行状态进行检测。电动机的控制权限包括本地控制及上位机控制，通过对控制权限的选择规定电机控制的优先权。
M101/M102 realize motor start in different ways by means of program control, and through the feedback information of auxiliary contacts of contactor, it can monitor the operating status of contactor. The motor can be local control and supervisory computer control, either can be chosen as prior control authority.

控制启动方式 The Control Start-up Measures	M0101-M	M0101-P	M102-M	M102-P
直接启动 Direct starting	■	■	■	■
直接启动（带控制按钮盒） Direct Starting(with control button box)	■	■	■	■
正反转-直接起动 Forward-backward rotation-direct starting	■	■	■	■
正反转-直接起动（带控制按钮盒） Forward-backward rotation-direct starting (with control button box)			■	■
正反转-直接起动（带限位开关） Forward-backward rotation-direct starting (with limit switch)			■	■
起动 Start-up			■	■
双速控制（单绕组） Double-speed control(single winding)			■	■

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear



控制启动方式 The Control Start-up Measures	M0101-M	M0101-P	M102-M	M102-P
双速控制（双绕组） Double-speed control(double winding)			■	■
软起动器控制 Soft starter control			■	■
自藕变压器降压启动 Auto transformer, reduced voltage starting			■	■
正反转-软起动器控制 Forward-backward rotation- soft starter control			■	■

运行监测功能 Function of Operation Monitor

M101/M102提供丰富的马达运行监测功能，监测数据经现场总线上传到上位机集中管理，同时通过安装在开关柜面板上的操作面板MD直接显示。这些信息包括开关变位，脱扣，故障告警，维护信息及电参量等。

M101/M102 can provide various motor operation monitor functions, the monitored data can be uploaded to supervisory computer via field bus, and be displayed on the operating panel MD mounted on the cubicle panel, and the data shall include switch deflection, release, fault alarm, maintenance data, electric parameter.

马达运行监测 Motor Operating monitor	M101	M102	
马达运行状态 Motor operating status	■	■	运行、停机、故障脱扣等状态信号 Signals for operation, shutdown, fault release
故障信息 Fault data	■	■	过载、断相、三相不平衡、接地故障、电机热保护等 Overload, open phase, 3-phase unbalance, earthing fault, motor thermal protection
三相电流 3 phase current	■	■	三相电流有效值与额定电流之比 Ratio between 3-phase effective current and rated current
三相电压 3 phase voltage		■	三相电压有效值 3-phase voltage effective value
功率因数 Power factor		■	功率因数计算值 Power factor calculated value
有功功率 Active power		■	有功功率绝对值 Active power absolute value
电度量 Electric power consumption		■	电机消耗的电量 Electric power consumed by motor
漏电流 Leakage current	■	■	漏电流绝对值 Absolute value of leakage current
频率 Frequency		■	电力系统频率 Power system frequency
接触器操作次数 Contactor operating times	■	■	接触器操作次数被记录和累加，超过预定值时报警 Contactor operating times shall be record and accumulated,and alarm will operate when exceeding preseted value.
马达运行时间 Motor operating times	■	■	马达累计运行时间被记录，超过预定值时报警 Accumulated operating times of motor shall be recored,and alarm will operate when exceeding preseted value.



CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

马达控制与监测的操作面板

Operating Panel for Motor Control and Monitoring

电动机控制装置包括M101和M102两种规格。M101提供的功能包括电动机基本的控制、保护与监测，而M102在M101基本功能的基础上进一步扩展了附加功能及高级应用功能。

Motor control device has M101 and M102 specifications. The functions of M101 shall consist of motor control, protection, monitor, and based on M101, M102 is expanded with additional functions and senior applicable functions.

M101/M102均配置了操作面板，用于现场马达运行状况的显示及电机起停控制，同时为M101/M102的现场参数设置及编程提供入口。操作面板集成了仪表、指示灯及按钮的功能及故障监测功能，通过通信线与M101/M102连接。通过操作面板提供的调试接口，用笔记本电脑就可以很方便的对M101/M102进行现场设置及在线编程。

M101 and M102 are all fitted with operating panel, for display of motor operating state and motor start and breakdown control, which provide access for field parameter setting and programming. Operating panel combines the functions of metering, indicating, button and fault monitor, and it is connected with M101 and M102 by communication lines. Through debug interface on operating panel, it can accomplish field setting and on-line programming easily by notebook PC.

功能Function	MD2	MD3	描述Description
控制按钮 Control button	■	■	Start 1, Start 2,Stop
指示灯 Indicator light	■	■	Ready, Start 1 Start 2,Fault
故障类型显示 Display of fault type	■		过载、断相、三相不平衡、欠载、空载、接地、电机热保护 Overload, open phase, 3 phase unbalance, underload, no-load, earthing, motor thermal protection
电流 Current	■		三相电流，有效值或有效值与额定值之比 3 phase current: ratio between effective value and rated value
电压 Voltage	■		三相电压，相电压及线电压有效值 3 phase voltage: phase voltage and line voltage effective value
有功功率 Active power	■		有功功率绝对值 Absolute value for active power
功率因数 Power factor	■		功率因数绝对值 Absolute value for power factor
电度 Electric energy	■		三相有功电度，无功电度 3-phase active power and reactive power
调试接口 Debug interface	■		笔记本电脑接口 Access to notebook PC
LCD显示方式 Type of LCD display	■		液晶显示 LCD display

*MD3不带有显示功能。

*Md3 is without Display Function

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

电力监测及控制装置

Power Monitor and Control Device

PMC916是一款广泛应用于电力系统的智能化多功能电力参量测控装置，PMC916可以直接用作电参量测量仪表，可以同时对8路无源开关量进行监视；PMC916具有4路继电器输出，PMC916的继电器除了可以实现遥测外，还可以关联电压、电流、频率、功率等参量实现告警控制。

PMC916 is a type of intelligent multifunctional device for monitoring and controlling of electric parameter widely used in power system, and it can be used as metering instrument for electric parameter, and monitor 8 circuits of passive on-off quantity at one time. PMC916 is of 4 circuits relay output. The relay for PMC916 has function of remote control, as well as realize alarm control considering parameters like voltage, current, frequency, power.

PMC916具有面向用户的开放式通信协议，MODBUS-RTU通信协议和Hi1on通信协议。

PMC916 is in accordance with open communication protocol, MODBUS-RTU and Hilon communication protocol.

PMC916能方便地与各类计算机监控系统实现信息交换。

PMC916 can easily exchange data with each PC monitoring system.

功能Function

电量测量Electricity Metering

包括三相电压测量、三相电流测量、功率因数测量，并以上述测量为基础计算得出功率、电度等扩展电参量。

3 phase voltage metering, 3 phase current metering, power factor metering, and based on above measured values, calculate out electric parameters like power, electric energy etc.

电流、零序电流 Current, zero sequence current	Ia, Ib, Ic, In
线电压/相电压 Line voltage/phase voltage	Uab, Ubc, Uca/Ua,Ub,Uc
三相功率因数 3 phase power factor	PFa, PFb, PFc/LD(超前); LG (滞后)
系统频率和功率因数 System frequency, and power factor	F, PF
系统功率 System power	P, Q
三相频率 3 phase frequency	Fa, Fb, Fc
三相有功功率 3-phase active power	Pa, Pb, Pc
三相无功功率 3-phase reactive power	Qa, Qb, Qc
三相视载功率 3-phase apparent power	Sa, Sb, Sc
三相有功电能 3-phase active energy	KWH, KWHa, KWHb, KWHc
三相无功电能 3-phase reactive energy	KVARH, KVARHa, KVARHb, KVARHc
2-31次谐波分量 2-31 harmonic component	Ua, Ub, Uc, Ia, Ib, Ic, In



PMC916外观图
Appearance of PMC916

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear



Rs132外观图
Appearance of Rs132



RCM32外观图
Appearance of RCM32

RTU监测与控制装置 RTU Monitoring and Control Device

Rs132遥信装置

Rs132 Remote Signaling Device

用途Purpose

RSI32遥信装置是IPD配电智能化元件中的开关量采集模块，用于采集开关量信号转换为数字信号。经通讯连接实现与监控系统的数据交换。RSI32采用光电隔离输入，可以同时采集32路无源开关量信号。

RSI32 remote signaling device is an acquisition module for on-off quantity in IPD power distribution intelligent elements. It is used for acquiring on-off quantity signal and change over to digital signal, and realizing data exchange with monitoring and control system via communication connection. RSI32 adopts optoelectronic isolating input, it can acquire 32 circuits of passive on-off quantity signal at one time.

主要技术指标：

Main Technical Data:

- 输入回路：32路
- Input circuit: 32circuits
- 输入方式：无源干接点
- Input mode: passive dry contact
- 工作电源：24VDC±10%，波纹系数小于5%，
- Operating power: 24VDC±10%，Ripple factor <5%
- 功耗：≤2.5W
- Power consumption: ≤2.5W
- 总线方式：RS485/CAN
- Bus type: RS485/CAN
- 开关量事件分辨率：<2ms
- On-off quantity event resolution: <2ms
- 事件顺序记录容量：32
- Sequence of event (SOE) record capacity: 32
- 通讯速率：通过拨码有四种选择分别为：9600/4800/1200/600bit/s
- Communication speed: 4types optional by DIP: 9600/4800/1200/600bit/s
- 防护等级：IP40，端子部分：Ip20
- Degree of Protection:IP40,terminal part: Ip20
- 工作环境：-5℃ to 55℃
- Operating environment: -5℃ to 55℃
- 存储温度：-25℃ to 85℃
- Storage temperature: -25℃ to 85℃
- 外形尺寸(长×宽×高)：145×40×135mm
- Overall dimensions (L×W×H): 145×40×135mm
- 安装：标准卡轨 TS35×7.5
- Mounting: standard card track TS35×7.5

RCM32遥测装置

RCM32 Remote Measuring Device

用途Purpose

RCM32遥测装置是IPD配电智能化元件中的模拟量采集模块，通过配接互感器、变送器元件，用于采集电流、电压、功率、温度、湿度、压力、流量等模拟信号并转换为数字信号，经通讯连接实现与监控系统的数据交换。RCM32遥控装置可以同时采集32个0-20mA交流或4-20mA直流电流信号，实时反映被测对象的遥测值。

RCM 32 remote measuring device is an analog acquisition module in IPD power distribution intelligent unit. Equipped with transformer and transmitter, it is used for acquiring analog signals (current, voltage, power, temperature, humidity, pressure, flow etc)



RCU16外观图
Appearance of RCU16

and converting them into digital signals, and exchange data with monitoring system through communication connection. RCM 32 can acquire 32 AC signals of 0-02mA or DC signals of 4-20mA at one time, and provide real-time remote measuring value of tested item.

LNS系列电流互感器二次绕组可同时输出5A（1A）/ 20mA信号。配电回路电流可经LNS系列电流互感器二次0-20mA直接输入RCM32实现三相电流的采集，不需要再配置电流变送器。

LNS series current transformer' s secondary windings can output 5A(1A)/20mA at one time, and current of power distribution circuit can be input to RCM32 via LNS series current transformer secondary side at current of 0-20mA, and achieve data acquisition of 3 phase current, no need of current transmitter .

主要技术指标：

Main Technical Data:

- 输入回路：32路
- Input circuit: 32circuits
- 输入方式：0-20mA/AC, 4-20mA/DC
- Input mode: 0-20mA/AC, 4-20mA/DC
- 工作电源：24VDC±10%，波纹系数小于5%，
- Operating power: 24VDC±10%，Ripple factor <5%
- 功耗：<2.5W
- Power consumption: <2.5W
- 总线方式：RS485/CAN
- Bus type: RS485/CAN
- 遥测精度：0.5%
- Remote measuring precision: 0.5%
- 通讯速率：通过拨码有四种选择分别为：9600/4800/1200/600bit/s
- Communication speed: 4types optional by DIP: 9600/4800/1200/600bit/s
- 防护等级：IP40，端子部分：Ip20
- Degree of Protection:IP40,terminal part: Ip20
- 工作环境：-5℃ to 55℃
- Operating environment: -5℃ to 55℃
- 存储温度：-25℃ to 85℃
- Storage temperature: -25℃ to 85℃
- 外形尺寸(长×宽×高)：145×40×135mm
- Overall dimensions (L×W×H): 145×40×135mm
- 安装：标准卡轨 TS35×7.5
- Mounting: standard card track TS35×7.5

RCU16遥控装置

RCU16 Remote Control Device

用途Purpose

RCU16遥控装置是IPD配电智能化元件中远程继电器输出模块，用于接受计算机指令执行系统的遥控操作或自动控制。RCU16有16路继电器输出，继电器输出可分为脉冲和自保持两种形式。在脉冲型方式下，继电器触点闭合两秒后自动释放，而在自保持方式下，继电器输出长期保持闭合或断开状态。

RCU16 remote control device is a remote relay output module in IPD power distribution intelligent unit, and it is used for receiving PC' s instructions to execute remote operation and automatic control. RCU16 has 16 circuits relay output, which are including impulse and self-hold type. For the impulse type, relay shall automatically release in 2 seconds after relay contact closed, and for self-hold state, the relay output shall keep normal open(NO) or normal close(NC) state.

主要技术指标：

Main Technical Data:

- 输入回路：16路继电器输出
- Input circuit: 16 relay outgoing
- 输入容量：5A/250V (AC), 或电阻性负载5A/30V (DC)

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- Output capacity: 5A/250V(AC) or Resistive Load 5A/30V(DC)
- 工作电源：24VDC±10%，波纹系数小于5%，
- Operating power: 24VDC±10%，Ripple factor <5%
- 功耗: ≤2.5W
- Power consumption: ≤2.5W
- 总线方式: RS485/CAN
- Bus type: RS485/CAN
- 通讯速率：通过拨码有四种选择分别为：9600/4800/1200/600bit/s
- Communication speed: 4types optional by DIP: 9600/4800/1200/600bit/s
- 防护等级：IP40，端子部分：Ip20
- Degree of Protection:IP40,terminal part: Ip20
- 工作环境：-5℃ to 55℃
- Operating environment: -5℃ to 55℃
- 存储温度：-25℃ to 85℃
- Storage temperature: -25℃ to 85℃
- 外形尺寸(长×宽×高)：145×40×135mm
- Overall dimensions (L×W×H): 145×40×135mm
- 安装：标准卡轨 TS35×7.5
- Mounting: standard card track TS35×7.5

RPA32遥脉装置

RPA32 Remote Pulsing Device

用途Purpose

RPA32遥脉装置是IPD配电智能化元件中的脉冲量采集模块，用于采集脉冲量信号转换为数字信号。经通讯连接实现与上级系统的数据交换。RPA32采用光电隔离输入，可以同时采集32路无源脉冲量信号。

RPA32 remote pulsing device is an impulse acquisition module in IPD power distribution intelligent unit, for acquiring impulse quantity signal and changing to digital signal, and accomplishing data exchange with upper system. RPA adopts optoelectronic isolating input, and it can acquire 32 circuits passive impulse quantity signal at one time.

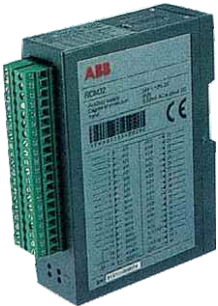
主要技术指标：

Main Technical Data:

- 输入回路：32路
- Input circuit: 32circuits
- 输入方式：无源干接点
- Input mode: passive dry contact
- 工作电源：24VDC±10%，波纹系数小于5%，
- Operating power: 24VDC±10%，Ripple factor <5%
- 功耗：≤2. 5W
- Power consumption: ≤2.5W
- 总线方式：RS485/CAN
- Bus type: RS485/CAN
- 累积脉冲数(Max)：4294967296 (4字节BCD码)
- Total impulse quantity (max): 4294967296 (4-byte BCD code)
- 通讯速率：通过拨码有四种选择分别为：9600/4800/1200/600bit/s
- Communication speed: 4types optional by DIP: 9600/4800/1200/600bit/s
- 防护等级：IP40，端子部分：Ip20
- Degree of Protection:IP40,terminal part: Ip20
- 工作环境：-5℃ to 55℃
- Operating environment: -5℃ to 55℃
- 存储温度：-25℃ to 85℃
- Storage temperature: -25℃ to 85℃
- 外形尺寸(长×宽×高)：145×40×135mm
- Overall dimensions (L×W×H): 145×40×135mm
- 安装：标准卡轨 TS35×7.5
- Mounting: standard card track TS35×7.5

详细的技术资料见该产品的技术说明书或专门样本。

Please refer to the relevant Technical Notes or special selection catalogue for technical information.



RPA32外观图
Appearance of RPA32

CMD190 低压成套开关设备

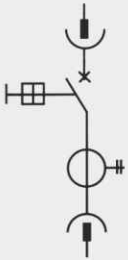
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一次回路方案

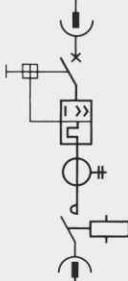
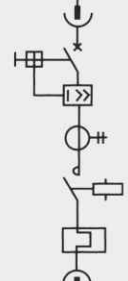
400V 50Hz

方案号				01												02																			
主电路器																																			
				用途												进进，馈电，联络																			
				柜宽 (mm)												400				600				800				1000				1200			
				柜深 (mm)												800								1000				1000-1200							
占用设备高度				85E																															
额定电流 (A)				630	800	1250	1600	2000	630	800	1250	1600	2000	2500	3200	2500	3200	4000	3200	4000	4800	4800	5300	5800											
开关	kA* (400V)	kA* (400V)	电流互 感器																																
T5S 630 3P	50	22		#																															
T5S 630 4P	50	22							#																										
T6S 800 3P	50	22			#																														
T6S 800 4P	50	22								#																									
S7S 1250 3P	50	20				#																													
S7S 1250 4P	50	20									#																								
E1B 800 3P	40	36			#																														
E1B 800 4P	40	36								#																									
E2N 1250 3P	65	55				#																													
E2N 1250 4P	65	55										#																							
E2N 1600 3P	65	55					#																												
E2N 1600 4P	65	55											#																						
E2N 2000 3P	65	55						#																											
E2N 2000 4P	65	55												#																					
E3N 2500 3P	65	65													#																				
E3N 2500 4P	65	65														#																			
E3H 2500 3P	100	85													#																				
E3H 2500 4P	100	85															#																		
E3N 3200 3P	65	65														#																			
E3N 3200 4P	65	65																#																	
E3H 3200 3P	100	85																	#																
E3H 3200 4P	100	85																		#															
E4S 4000 3P	75	75																			#														
E4S 4000 4P	75	75																				#													
E4H 4000 3P	100	85																					#												
E4H 4000 4P	100	85																						#											
E6H 5000 3P	100	75																																	
E6H 5000 4P	100	75																																	

抽出式结构400V 50Hz 50kA系统

方案号		03									
主电路图											
用途		馈电、照明									
柜宽 (mm)		1000									
占用设备高度		8E/4	8E/2	8E	16E	24E	开关选型		接触器	热继电器	
抽屉最大电流(A)		45	63	250	630	630	类型	长时整定范围	类型	类型	设定范围
功率 (kW)	电流 (A)										
	20	#					T2S160R20,3P				
	32	#					T2S160R32,3P				
	63		#				T2S160R63,3P				
	80			#			T2S160R80,3P				
	100			#			T2S160R100,3P				
	125			#			T2S160R125,3P				
	160			#			T2S160R160,3P				
	250			#			T3S250R250,3P				
	320				#		T4S320R320,3P				
	400				#		T5S400R400,3P				
	500				#		T5S500R500,3P				
	630				#		T5S630R630,3P				
	20	#					T2S160R20,3P				
	32	#					T2S160R32,3P				
	63		#				T2S160R63,3P				
	80			#			T2S160R80,3P				
	100			#			T2S160R100,3P				
	125			#			T2S160R125,3P				
	160			#			T2S160R160,3P				
	250			#			T3S250R250,3P				
	320				#		T4S320R320,3P				
	400				#		T5S400R400,3P				
	500					#	T5S500R500,3P				
	630					#	T5S630R630,3P				

抽出式结构380V 50Hz 50kA Type2系统

方案号		04						05					
主电路图													
		用途											
		电动机控制回路（直接起动）											
		柜宽(mm)											
		1000											
占用设备高度		8E/4(4E)	8E/2	8E	16E	24E	开关选型		接触器	热继电器			
抽屉最大电流(A)		45	63	250	400	630	类型	长时整定范围	类型	类型	设定范围		
功率(kW)	电流(A)												
0.06	0.22	#					MS325 - 0.25	0.16-0.25	A9				
0.09	0.33	#					MS325 - 0.4	0.25-0.4	A9				
0.12	0.42	#					MS325 - 0.63	0.4-0.63	A9				
0.18	0.64	#					MS325 - 1.0	0.63-1	A9				
0.25	0.88	#					MS325 - 1.0	0.63-1	A9				
0.37	1.22	#					MS325 - 1.6	1 - 1.6	A9				
0.55	1.5	#					MS325 - 1.6	1 - 1.6	A9				
0.75	2	#					MS325 - 2.5	1.6 - 2.5	A9				
1.1	2.6	#					MS325 - 4.0	2.5 - 4.0	A26				
1.5	3.5	#					MS325 - 4.0	2.5 - 4.0	A26				
2.2	5	#					MS325 - 6.3	4.0 - 6.3	A26				
3	6.6	#					MS325 - 9.0	6.3 - 9.0	A30				
4	8.5	#					MS325 - 9.0	6.3 - 9.0	A30				
5.5	11.5	#					MS325 - 12.5	9.0 - 12.5	A30				
7.5	15.5	#					MS325 - 16	12-16	A30				
11	22	#					MS325 - 25	20-25	A30				
15	30		#				S503 - K32	23-32	A30				
18.5	37		#				S503 - K41	34-41	A50				
22	44		#				S503 - K45	38-45	A50				
30	60			#			T2S160 RM80	80	A75	TA75 DU 63	45 - 63		
37	72			#			T2S160 RM80	80	A75	TA75 DU 80	60 - 80		
45	85			#			T2S160 RM100	100	A95	TA110 DU 90	65 - 90		
55	105			#			T2S160 RM160	160	A110	TA110 DU 110	80 - 110		
75	140			#			T3S250 RM200	200	A145	TA200 DU 150	110 - 150		
90	170				#		T5S 400/320 I		A185	TA200 DU 175	130 - 175		
110	205				#		T5S 400/320 I		A210	TA450 DU 235	165 - 235		
132	245				#		T5S 400/320 I		A260	TA450 DU 310	220 - 310		
160	295					#	T5S 400/400 I		AF400	TA450 DU 400	285 - 400		
200	370					#	T5S 630/630 I		AF400	TA450 DU 400	285 - 400		

CMD190 低压成套开关设备

CMD190 Low Voltage Switchgear

抽出式结构380V 50Hz 50kA系统

方案号	06					07				
主电路图										
	电动机控制回路（可选）									
用途	1000 (600*)									
柜宽(mm)										
占用设备高度	8E/4	8E/2	8E	16E	24E	开关选型		接触器	热继电器	
抽屉最大电流(A)	45	63	250	400	630	类型	长时整定范围	类型	类型	设定范围
功率(kW)	电流(A)									
0.06	0.22	#				MS325 - 0.25	0.16-0.25	A9		
0.09	0.33	#				MS325 - 0.4	0.25-0.4	A9		
0.12	0.42	#				MS325 - 0.63	0.4-0.63	A9		
0.18	0.64	#				MS325 - 1.0	0.63-1	A9		
0.25	0.88	#				MS325 - 1.0	0.63-1	A9		
0.37	1.22	#				MS325 - 1.6	1 - 1.6	A9		
0.55	1.5	#				MS325 - 1.6	1 - 1.6	A9		
0.75	2	#				MS325 - 2.5	1.6 - 2.5	A9		
1.1	2.6	#				MS325 - 4.0	2.5 - 4.0	A26		
1.5	3.5	#				MS325 - 4.0	2.5 - 4.0	A26		
2.2	5	#				MS325 - 6.3	4.0 - 6.3	A26		
3	6.6	#				MS325 - 9.0	6.3 - 9.0	A30		
4	8.5	#				MS325 - 9.0	6.3 - 9.0	A30		
5.5	11.5	#				MS325 - 12.5	9.0 - 12.5	A30		
7.5	15.5	#				MS325 - 16	12-16	A30		
11	22	#				MS325 - 25	20-25	A30		
15	30	#				S503 - K32	23-32	A30		
18.5	37	#				S503 - K41	34-41	A50		
22	44	#				S503 - K45	38-45	A50		
30	60		#			T2S160 RM80	80	A75	TA75 DU 63	45 - 63
37	72		#			T2S160 RM80	80	A75	TA75 DU 80	60 - 80
45	85		#			T2S160 RM100	100	A95	TA110 DU 90	65 - 90
55	105			#		T2S160 RM160	160	A110	TA110 DU 110	80 - 110
75	140			#		T3S250 RM200	200	A145	TA200 DU 150	110 - 150
90	170			#		T5S 400/320 I		A185	TA200 DU 175	130 - 175
110	205			#		T5S 400/320 I		A210	TA450 DU 235	165 - 235
132	245				#	T5S 400/320 I		A260	TA450 DU 310	220 - 310
160	295				#	T5S 400/400 I		AF400	TA450 DU 400	285 - 400
200	370				#	T5S 630/630 I		AF400	TA450 DU 400	285 - 400

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

抽出式结构380V 50Hz 50kA系统

[illegible]

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

主要电气元件的技术数据表

Technical Data Sheets for Main Electric Components

1、E系列低压空气断路器 E Series LV Air Circuit Breaker

型号Model	额定电流 Rated Current	额定电压Rated Voltage		额定分断能力有效值 Rated Breaking Capacity Effective Value			额定接通能力 Rated Making Capacity (峰值) 600V3~ (kA)	全分断时间 Full Breaking Time
		交流AC.	直流DC.	660/690 (V)	380/400 415 (V)	220/230 (V)		
E1B-800~1250	800~1250	690	250	36	42	42	75.5	30 (80)
E2N-1250~2000	1250~2000	690	250	55	65	65	121	30 (80)
E3N1250~3200	1250~3200	690	250	65	65	65	143	30 (80)
E4H-3200~4000	3200/4000	690	250	85	100	100	187	30 (80)
E6H-5000~6300	5000~6300	690	250	100	100	100	220	45 (80)

2、Isomax S 系列塑壳式高分断型断路器 Isomax S Series Moulded Case High Breaking

型号Model	额定电流 Rated Current	脱扣器额定电流 (A) Rated Current of Release	极限分断能力 (kA) Ultimate Breaking Capacity	
			400V	690V
S1B125/S1N125	125 80	10、12.5、16、20、25、32、40、50、63、80、100、125	16/25	
S2X80	80	1、1.6、2、2.5、3.2、4、5、6.5、8.5、11、12.5、16、20、25、32、42、52、63、80	70	10
S2B160/S2N160/S2S160	160	12.5、16、20、25、32、40、50、63、80、100、125、160	16/35/50	6/8/10
S2B160/S2N160/S2S160	160	32、50、80、100、125、160	35/65/85	14/18/20
S3N250/S3H250/S3L250	250	200、250	35/65/85	14/18/20
S4N160/S4H160/S4L160	160	0.4…1×In (In是电流互感器额定电流)	35/65/100	18/22/30
S4N250/S4H250/S4L250	250		35/65/100	18/22/30
S5N400/S5H400/S5L400	400		35/65/100	20/25/35
S6N630/S6H630/S6L630	630		35/50/65/100	20/22/25/35
S6N800/S6H800/S6L800	800		35/50/65/100	20/22/25/35
S7S1250/S7H1250/S7L1250	1250		50/65/100	20/25/35
S7S1600/S7H1600/S7L1250	1600		50/65/100	20/25/35

3、Tmax 系列塑壳式高分断型断路器

Tmax Series Moulded Case High Breaking Capacity Circuit Breaker

型号Model	额定电流 Rated Current	脱扣器额定电流 (A) Rated Current of Release	极限分断能力 (kA) Ultimate Breaking Capacity	
			400V	690V
T1B160/T1C160/T1N160	160	16、20、25、32、40、50、63、80、100、125、160	16/25/36	3/4/6
T2N160/T2S160/T2H160/T2L160	160	32、40、50、63、80、100、125、160	36/50/70/85	6/7/8/10
T3N250/T3S250	250	63、80、100、125、160、200、250	36/50	5/8
T4N320/T4V320	320	250、320	36/200	20/80
T5N630/T5V630	630	400、500、630	36/220	20/80

CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

4、TA系列热继电器 TA Series Thermal Relay

型号Model	电流调节范围(A)Current Regulation Range	配套接触器型号 Associated Contactors Model
TA25DU	0.16、0.25、0.4、0.63、1.0、1.4、1.8、2.4、3.1、4.0、5.0、6.5、8.5、11、14、19、25、32	A9、A12、A16、A26、A30、A40
TA42DU	25、32、42	A30、A40
TA75DU	25、32、42、52、63、80	A50、A60、A75
TA80DU	42、52、63、80	A95、A110
TA110DU	90、110	A95、A110
TA200DU	110、135、150、175、200	EH145、EH175、EH210
TA450DU	185、235、310	EH175、EH210、EH260、EH300、EH370
T450DU	400	Eh370
T900DU	375、500、650、850	EH370、EH550、EH700、EH800

5、BH系列电流互感器 BH Series Current Transformer

型号Model	一次侧额定电流 (A)Rated Current of Primary Side	二次侧额定电流 (A) Rated Current of Secondary Side
BH-0.66	15、20、25、30、40、50、60、75、100、150、200、250、300	5：1
BH-0.66	30、40、60、75、100、150、200、250、300、400、500、600、800	5：1
BH-0.66	200、250、300、400、500、600、800、1000、1200、1600	5：1
BH-0.66	300、400、500、600、800、1000、1500、2000	5：1
BH-0.66	600、800、1000、1500、2000、3000	5：1
BH-0.66	1500、2000、2500、3000、4000	5：1
BH-0.66	1500、2000、2500、3000、4000、5000	5：1
BH-0.66	1500、2000、2500、3000、4000、5000	5：1

6、A系列交流接触器 A series AC Contactor

型号Model	额定发热电流 (A) Rated Thermal Current	Ac3时额定工作电流 Rated Current at AC3		AC3时电动机最大功率 (KW) Max.Motor Power at AC3	
		380V	690V	380V	690V
EB9	26	9	6	4	4
EB12	28	12	8	5.5	5.5
EB16	28	16	8	7.5	5.5
EB18	36	25	9	7.5	7.5
EB26	45	30	13	11	11
EB25	45	37	13	11	11
EB30	65	30	18	11	15
EB40	80	37	25	15	22
A50	125	50	35	18.5	30
A63	125	65	43	22	37
A75	125	75	46	30	40

CMD190 低压成套开关设备

CMD190 Low Voltage Switchgear

A80	145	80	50	37	45
A90	160	96	65	40	59
A95	160	96	65	45	55
A100	200	120	120	45	110
A110	200	120	82	55	75
A145	230	145	120	75	110
A175	355	185	170	90	132
A210	355	210	210	110	160
A260	500	260	220	140	200
A300	500	305	280	160	250
EH370	630	400	370	200	355
EH500	800	550	550	280	500
EH700	1000	700	700	370	600
EH800	1000	750	720	400	650

7、MS325 电机起动器 MS325 Motor Starter

型 号Model	设定范围 Setting Range	380VAC (COSΦ=0.25) 额定短路分断能力 Rated Short Circuit Breaking Capacity	额定短路分断能力690VAC Rated Short Circuit Breaking Capacity	
			Lcu (KA)	后备熔芯Spare Fuse
MS325-0.16	0.1-0.6	100kA		50kA
MS325-0.25	0.16-0.25			50kA
MS325-0.4	0.25-4			50kA
MS325-0.63	0.4-0.63			50kA
MS325-1	0.63-1			50kA
MS325-1.6	1-1.6			50kA
MS325-2.5	1.6-2.5	50kA	40	25
MS325-4	2.5-4		10	40
MS325-6.3	4-6.3		7	40
MS325-9	6.3-9		5	50
MS325-12.5	9-12.5		4.5	50
MS325-16	12.5-16		4	50
MS325-20	16-20		3.5	50
MS325-25	20-25		3	50

如Icu>Icu所需熔芯的最大额定电流，增加后备熔芯额定短路分断能力可达50看KA
e.g. Max. rated current of fuse required by Icu>Icu, increasing spare fuses can increase rated short circuit breaking Capacity to 50kA.
Icu: 额定极限短路能力
Rated Ultimate Short Circuit Capacity
Icc: 预期短路电流
Prospective Short Circuit Current

8. CMD190低压智能开关柜可配装电器元件

Applicable Electric Components for CMD190 Switchgear

如客户需要配西门子、施耐德、默勒、百利、精益等国内外公司的低压元器件，其占用空间可参照一次回路方案，有特殊问题请与我公司技术中心协商解决。
If customer requires low voltage components manufactured by Siemens, Schneider, Moeller, Changshu, Tianjin Benefo, etc, it can refer to primary circuit scheme for their space usage. If there’s any problem, please consult with our technical department.

9. CMD190智能型低压开关柜

CMD190 Intelligent Type Low Voltage Switchgear

完全满足MNS、SIVACON 8BT、GCS、GCK等固定式或抽出式开关柜尺寸、柜内元件安装尺寸及相关性能和特点要求。
Totally meet requirements on dimensions of the fixed or drawer type switchboards, like MNS, SIVACON 8BT, GCS and GCK, and on mounting sizes, relevant performances and characteristic requirements of the components inside these switchboards.

CMD190 低压成套开关设备

CMD190 Low Voltage Switchgear

• 操作与安装 Operation and Installation

运输和安装 Transportation and Installation

开关柜在全部装配、接线并经检验合格后，方可装箱运输。装箱分单台、二台、三台和四台4种运输方式，运输单元最长为3000mm，应尽可能避免单独装箱，以减少主母线之间的连接点。

Only after being completely assembled, connected, inspected to be qualified, can the switchgear be packed and transported. They can be transported in 1, 2, 3, or 4 set(s). Since max transport unit is 3000mm, individual package should be avoided as possible to reduce busbar connecting joints.

当产品运抵目的地后，首先应检查装箱是否完整。若开关柜不是立即使用，应存放在干燥、清洁处。

When equipment arrives at destination, firstly to check package for completeness. If not to use immediately, the switchgear shall be stored in a dry and clean place.

开关柜应按照框架尺寸图安装，基础槽钢由用户自备。如需电缆出线，还必须开安装电缆沟。安装时应根据图纸做主母线连接，对母线表面做好清洁处理，然后用螺栓紧固，并进行电缆或架空布线工作。

Switchgears shall be mounted in accordance with frame dimension diagram, and the foundation channel steel shall be provided by user. If cable outgoing is required, the cable trench shall be prepared. Main busbar connection shall be performed according to drawings, and busbars’ surface shall be cleaned, and they shall be bolted, and then perform cable and overhead wiring.

配电室空间要求

Requirement for Space of Distribution Room

安装尺寸 Installation Dimensions

开关柜在配电室内必须竖直安装。若靠墙安装，为满足散热要求，应保证：与墙壁距离最小为S1≥80mm，与天花板的最小距离为S2≥500mm。

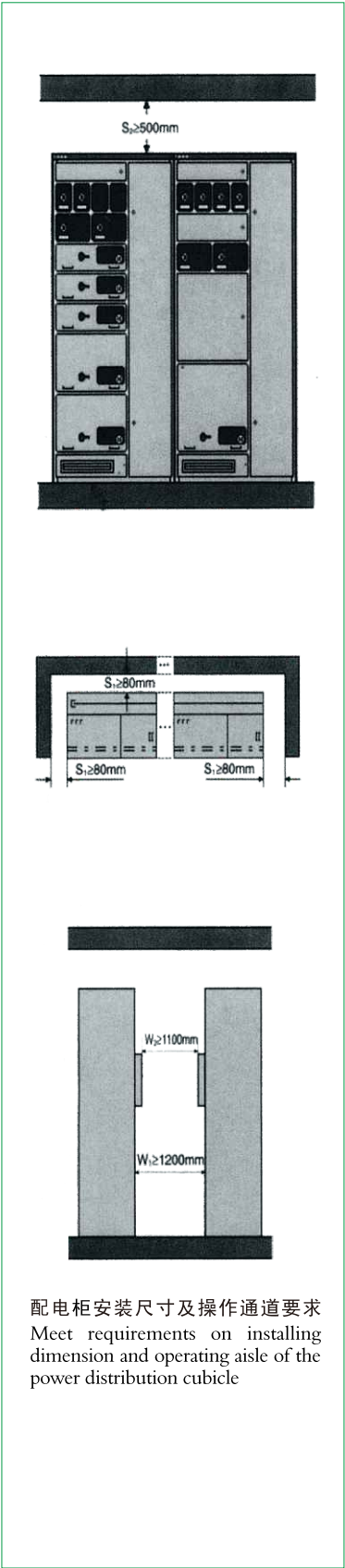
The switchgears must be mounted vertically in the distribution room, when switchgear is mounted against wall, for heat radiating purpose, the distance to wall shall be min S1≥80mm, and the distance to ceil shall be min S2≥500mm .

运行前检验 Inspection Prior to Operation

开关柜在安装或检修后，在投入运行前必须进行下列检查和试验（检修后的检查可视其检修性质而定）：

After installation and overhaul, following inspections and tests shall be performed before putting into service:

- 检查开关柜内部电器设备和接线是否符合图纸要求，线段是否有编号，接线是否整齐牢固
- To check if the electric devices and wiring in cubicle are in conformity with diagram, if wiring sections are properly numbered and if wiring is complete and fixed
- 检查所安装的电器设备接触是否良好，是否符合本身技术要求



CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

- To check if the fitted electric devices contact well, if it is in accordance with relative technical requirement
- 检查机械联锁和电气联锁的可靠性
- To check reliability of mechanical interlocking and electric interlocking
- 检查抽出式组件动作是否灵活，接触是否良好
- To check the flexibility of drawer unit, and to check if them contact well
- 检查并试验开关柜的接地装置是否牢固，有无明显标志，并作接地电阻测试
- To check and test if the switchgear’ s earthing device is fixed, if there’ s visible marks, and to perform earthing resistance test
- 检查并试验所有表计及继电器动作是否正确
- Check and test if all the metering instruments and relays operate in normal state

产品的成套性The Completeness of Product

产品的成套性 开关柜附有装箱单、产品合格证、产品使用说明书及必要的图纸，随机附件有门钥匙以及根据配套清单所提供的备品备件。

The switchgears shall be attached with packing list, certificate of conformity, operation manual, and relevant drawings, and accessories provided with switchgear include door keys and spare parts specified on equipment list.

订货须知Note for Order

订货须知 用户提供下列资料：
Customer shall provide the following data:

主电路方案单线系统图
Single line drawing for main circuit scheme

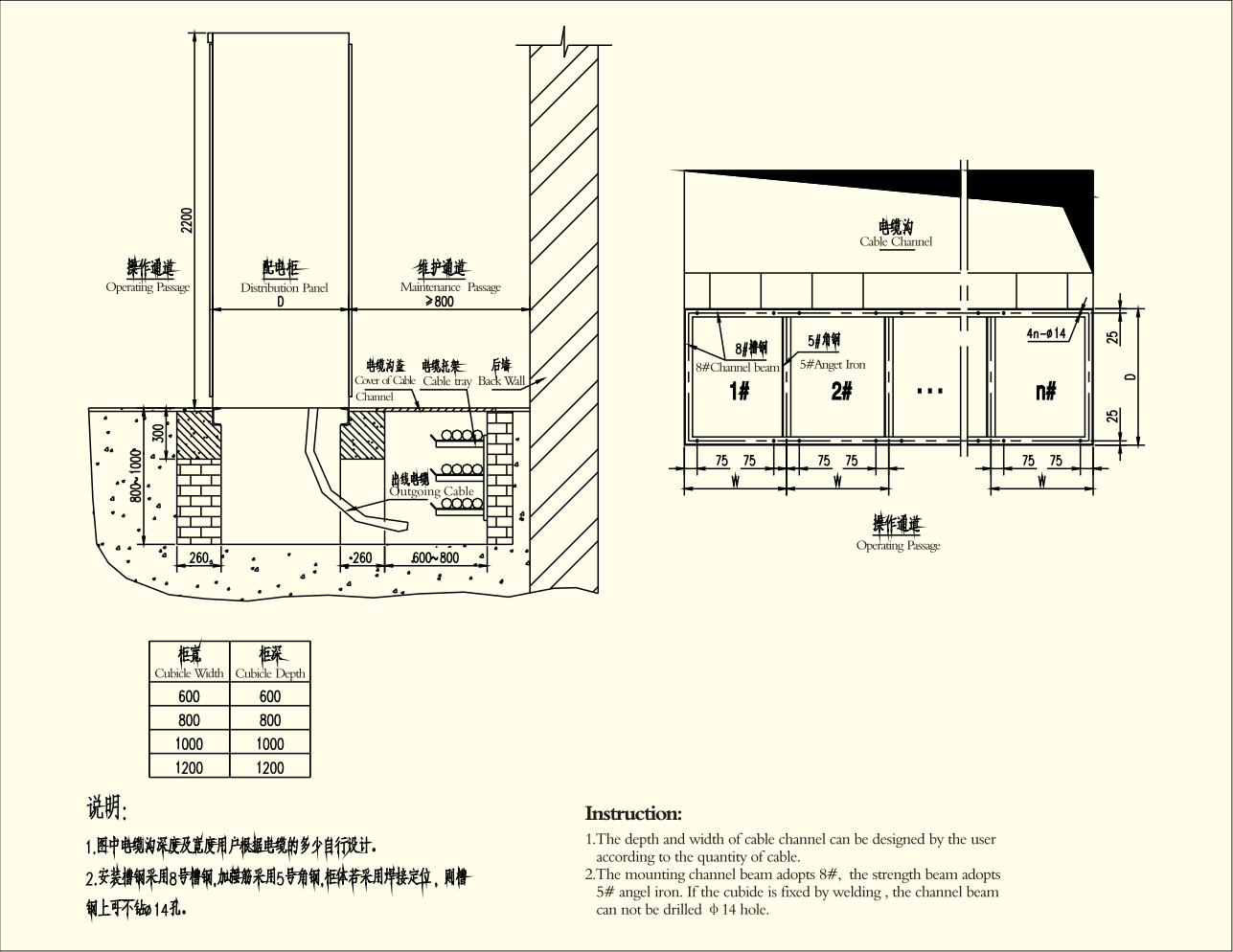
辅助电气原理图或原理接线图
The auxiliary electric schematics or wiring diagrams

开关柜的排列及组合，平面布置图
The switchgears’ arrangement and combination diagram, and general layout plan.

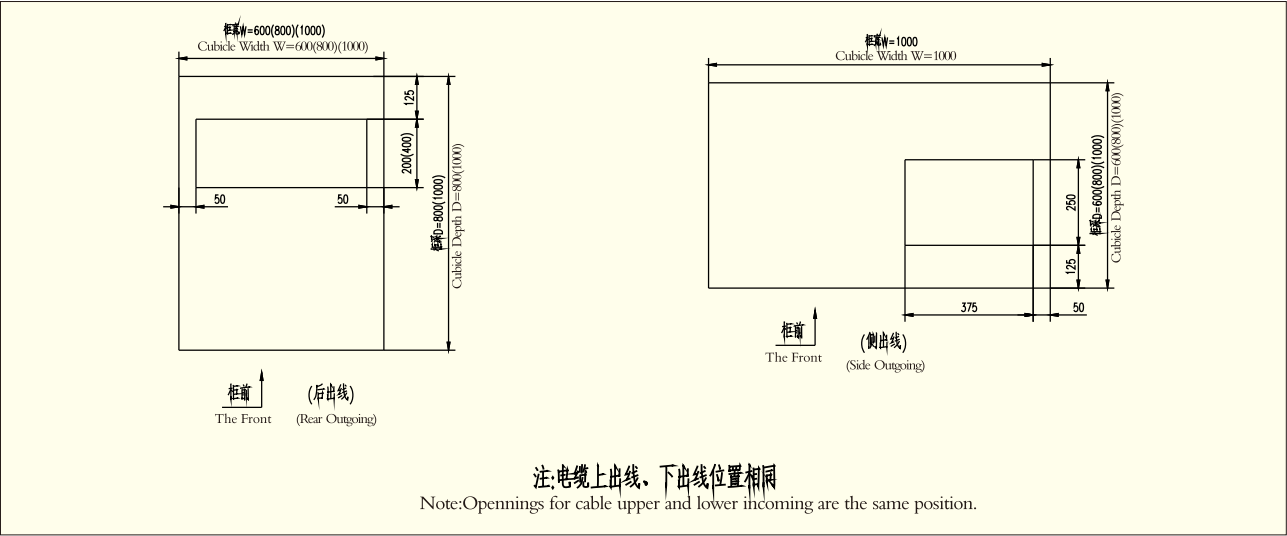
CMD190 低压成套开关设备

CMD190 Low Voltage Swithgear

安装基础图 Installation Foundation Diagram



电缆进出线开孔图 Opening Diagram for Cable Incoming & Outgoing





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服务方针 Principles of Service

以卓越的产品和服务，满足客户的要求和期望；
与客户、供应商紧密结合，建立合作伙伴关系，实现共同发展；
分布于国内各主要城市的服务网络，以及我们拥有的各种资源，是我们响应客户要求，赢得客户信任的关键。

Electric has meeting needs of clients with products of good quality and considerate services, and established partnership with clients and suppliers for common dev
Electric has providing services to clients through service networks in cities of China, gaining trust of clients.

营销网络 → → →
Marketing Network

