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SEIKO POWER CONTROL SYSTEM



**SEIKO
ELECTRIC**

For stable electric power supply through the latest control technology.

In the electric power system business, our company takes care of products such as supervision and control systems, digitalization control systems, and the supply of electric power equipments that supports stable electric power supplies. In recent years we have met customer needs by constructing high-quality, reliable systems with RFID technology, next generation system operations, and automatic management systems of power distribution lines.

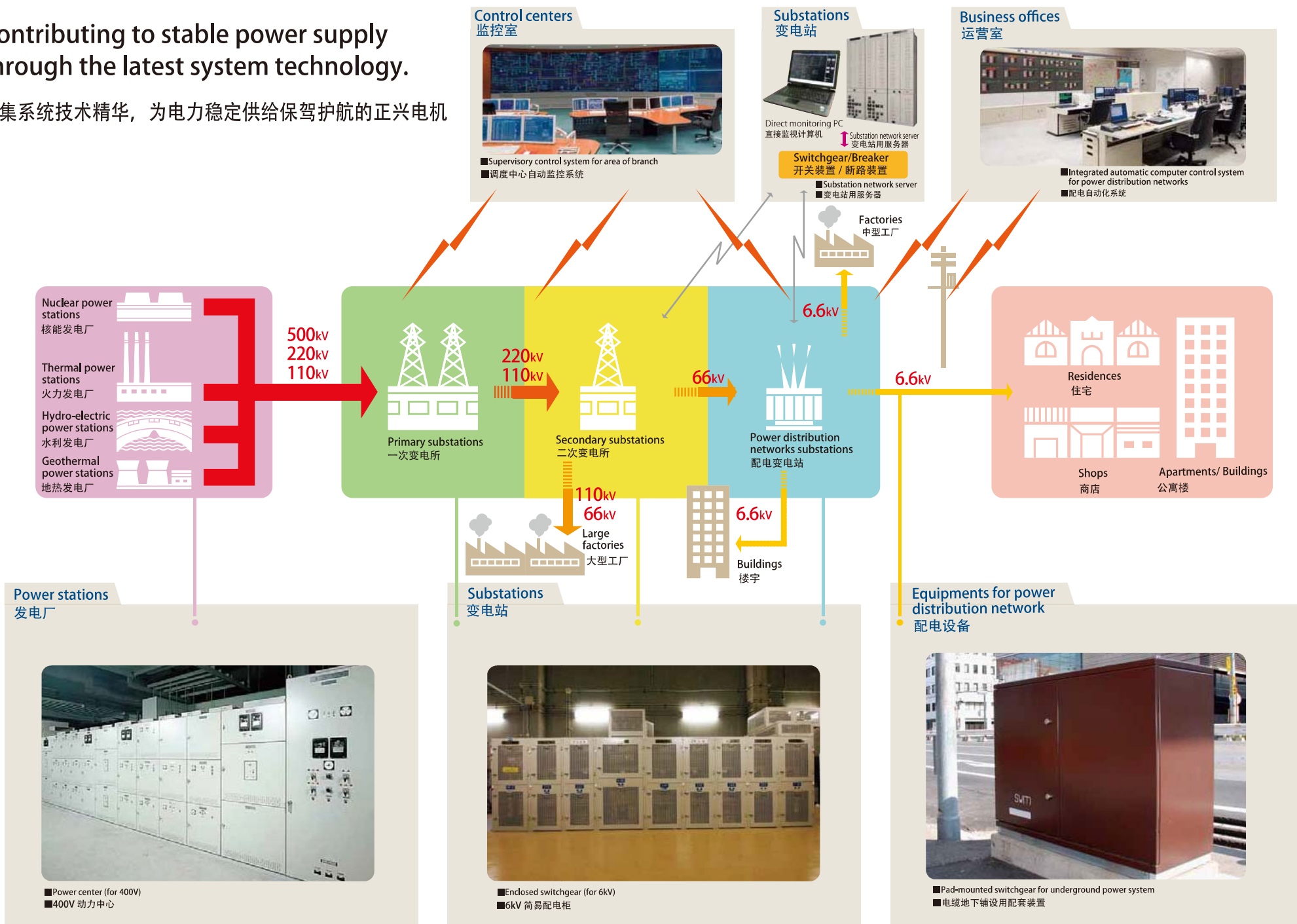
依托先进的 控制技术，为实现电力的稳定供给做出贡献。

产品包括支持电力稳定供给的监控系统及数字化控制系统、配电设备等。
近年来，公司致力于采用 RFID 技术的系统，以及下一代的配电网络运用系统、配电线路自动化系统的研发，构筑可靠性强大的系统，满足用户需求。



Contributing to stable power supply through the latest system technology.

汇集系统技术精华，为电力稳定供给保驾护航的正兴电机



Supervisory control systems

We provide cutting-edge power system operation technology and supervisory control by using automatic control technology for power distribution lines.

监控系统

借助最先进的系统运用技术及配电线路自动控制技术，为电力系统的监控做贡献。

Integrated control system(for area of branch)

Surveying the conditions of electric power system and the weather, and remotely control the devices in the substation or power lines.In case of emergency, restoration of a stable electric power supply.

调度中心自动监控系统

监视电力系统状况及气象状况，对变电站中设置的设备实施远程控制及输电线等操作。万一发生事故，立即发出复位指令，实现电力的稳定供给。



We improve system performance by adopting distributed processing, and compactification by using a blade server. To improve the visibility of the electric power system, we arranged 16 big display screen from the display board.

采用分散处理方式，致力于提升系统性能。而且，还采用了刀锋服务器，实现了系统的紧凑化（小型化）。系统盘由 16 个大画面显示器组合而成，大幅提升了电力系统的可视化。

Functions

Monitoring	Surveying breaker, switch, flow, voltage and frequency. If malfunctions occur, it produces an alarm and display messages. It also displays the charge/outage conditions.
Control	Controlling ON/OFF for the breaker and switch. UP/DOWN for the transformer. It prevents incorrect operation.
Record	Record the condition of power system (flow, voltage, frequency and electric energy) and output the form.
System management	Distribute functions to the several servers. If a server breaks down, switches to the sound server immediately.
Training	Training for sorting accidents out using board and console. You can experience the training simulation like if it were real.
Support	Detect the fault section and analyze the cause of accident. Automatically proceeds to correct it.
Local VQC	Automatically control voltage and the reactive power for electric power system under the integrated control center.
Operating support	Make operational paper and operate automatically. Also make load forecasting, voltage/flow analysis and generation forecasting of hydroelectric power station.

系统的主要功能

监视	监视断路器、开关器、潮流、电压、频率等电力系统的状态，发生故障及偏差时发出警报，同时以提示信息的形式显示故障内容。此外，显示充电、停电状态及供电系统。
控制	远程控制断路器的开/闭、开关器的开/闭、变压器分接开关的上升/下降等。具备防误操作功能。
记录	保存电力系统的状态（潮流、电压、频率、电量等），输出传票。
系统管理	将功能分散到多个服务器的系统，当在线运行的服务器发生故障时立即自动切换到健全服务器上。
故障处理训练	使用训练用系统盘、操作台，进行工作人员事故处置训练的功能。可以进行与实际事故发生时相同临场感的训练。
故障处理支持	发生事故时检测事故点及判定事故原因，自动生成事故复位程序书。
本地 VQC	针对调度中心自动监控系统管辖的系统自动调整电压及无效电力。
运用支持	操作指令传票的自动生成、检查、打印。此外，自动生成预计负荷、电压、潮流计算、水力发电厂的发电预定。

Automatic control system for power distribution lines

Surveying and controlling equipment for power distribution lines. If the power failed, detect faulty sections automatically. This makes outage time shorter.

配电线路自动控制系统

实时监视配电线路的状态，对电线杆上等设置的配电设备实施远程控制。发生停电时，自动检测事故分段，自动恢复畅通，缩短停电时间。



We use UNIX server as a supervisory control server and control each business office by virtualization technology. Adapting a PC server incorporates space saving and low cost performance.

监控服务器采用 UNIX 系统的通用服务器，利用虚拟化技术对各营业厅实施监控。此外，操作方面采用了 PC 服务器，既节省了空间，又实现了低价格化。

Functions

Monitoring	Surveying condition of distribution network based on information of substation and distribution lines. If malfunctions occur, alarm will be displayed /outputted via operating station or warning system.
Situations	Monitor the condition of distribution line and detect outage from breakers or switches.
Measures in the event of accidents	If bank fault or distribution line accidents occur, detects faulty sections and transmit electricity to power failure section automatically.
Maintenance	Maintenance equipment data and distribution line route map.
Task planning	Make procedure manual in advance to work without affecting customers when bank stop or distribution line work is needed.
High voltage single line diagram	Preparation of high voltage single line diagram and print it by using street map data and power distribution equipment data.

主要功能

监视	根据从 SV・TM 装置及开关器 TC 装置接收到的信息，对配电线路系统的状态及通信情况进行实时监视，发生异常时通过操作终端及警报装置发出警报的功能。
状态掌握	根据变电站断路器及开关器的开断状态等信息，掌握停电事故的检测及配电线路区间的充停电状态。
事故时操作	发生放电事故及配电线路事故时，通过该事故信息及事故区段划分操作等来确定事故区段，同时通过自动控制向停电区间间供电的功能。
维护	对系统持有的设备数据及配电线路图数据进行维护的功能。
作业计划	需实施放炮停止作业及配电线路作业时，为了不让对象系统对用户产生影响，能够事先制定不停电切换操作程序的功能。
高压单线图	使用系统保有的街道图数据及配电设备数据，绘制及打印高压单线图的功能。

※SV/TM 装置：对变电站以及输电线路的设备和负荷状态等进行远方监视、远方计测的设备

※TC 装置：对一动作过程通过 ON-OFF 开关状态实施自动查表

Business support systems

With combination of IT technology, control technology and RFID technology, we contribute to working efficiently, security measure and prevention of the human errors.

业务支持系统

将 IT 技术、控制技术、RFID 技术组合起来，为用户的业务高效化以及安全对策、防止人为错误提供支持服务。

RFID Solutions

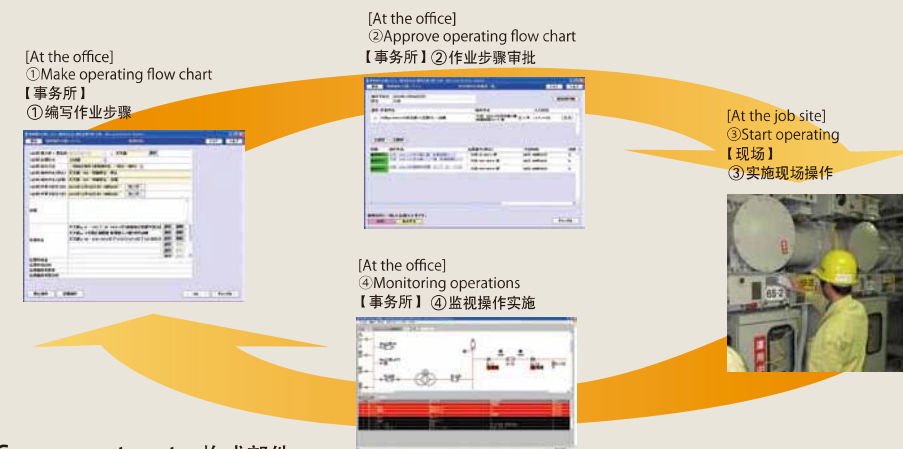
Using RFID technology, we prevent the human errors in equipment maintenances.

RFID 解决方案

在成套设备等维护业务方面，运用 RFID 技术预防出现人为错误。

■Example; Systems for transforming equipment in substation

■引进事例：针对电力公司变电设备的系统



Component parts 构成部件

Products

We provide products of various materials and shapes to meet customers needs.

产品

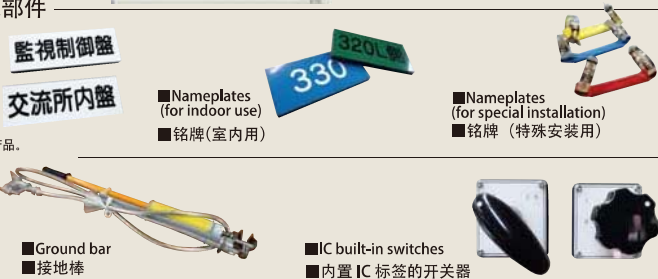
提供与工作环境相适应的、在原材料及形状等方面满足用户各种需求的产品。

Installation

Installing IC to the products enables you to dispatch information.

嵌入加工

将 IC 芯片嵌入已有产品，可以发送与使用场景相符的信息。



[Features]

By collating recorded code information on RFID tags and the computerized procedure manual, efficiency and safety are improved and human errors; such as procedure mistakes and leak checks is prevented.

[特点]

在成套产品等的保养作业时，利用便携终端核实电子化的步骤单和现场设备上安装的 RFID 标签中记录的代码信息，防止步骤错误、漏检等人为错误，提升安全性、效率性。

[Effectiveness]

- Prevention of choosing wrong equipment
- Prevention of skipping operations and performing wrong procedures
- Choosing the work tools and prevention of leaving them at the job site
- Check switches before/after operation

[引进效果]

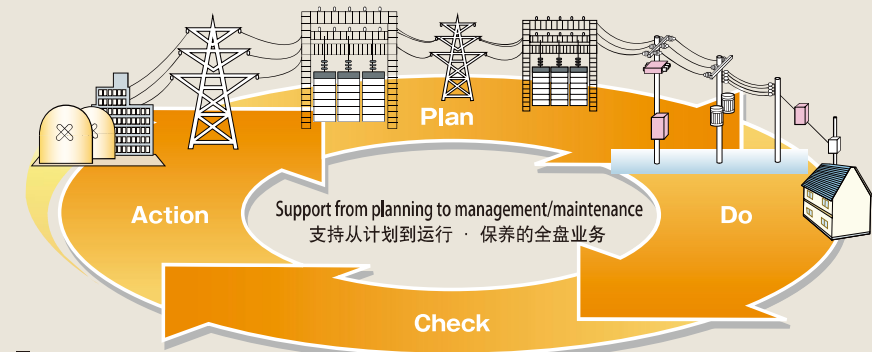
- 防止对象设备出错
- 防止作业步骤的跳漏、错误
- 防止作业工具的错选及遗忘现场
- 确认作业前后的开关状态

Systems developing solutions for power companies

From proposal to management: A total solution service, provided by our system engineers who knowledgeable in the electric power transmission field (power generation, power supply, power transmission and power distribution).

针对电力公司的业务系统开发解决方案

正兴电机精通与电力输送（发电·送电·变电·配电）相关的业务，提供从立案到开发，再到运用流程的整体解决方案服务。



■Solutions

- Providing system services in electrical power transmission work
- Providing entrance management system services for power stations and substations
- In distribution work, we provide support services – from planning to management.
- Developing information/control system products with supervisory control system and Ry panels

■解决方案概要

- 提供与电力输送和工程业务相关的系统构筑服务
- 提供与变电站及控制所等相关的进出管理系统构筑·工程服务
- 提供与配电工程相关的工程计划·设计到运用业务的支持系统构筑服务
- 通过将本公司的监控系统及继电器盘等组合起来，开发信息×控制系统产品

Map information system solutions

Providing suitable and inexpensive map information system to meet customers needs

地图信息系统构筑解决方案

利用市场上销售的地图，提供满足用户需求的最佳且便宜的地图信息系统。



■Solutions

- Searching map information on the web using internet data center
- Offering an analysis function by locating and displaying symbols in different colours based on customers' information
- Providing GPS and displaying workers' location on the map by connecting mobile terminals

■解决方案概要

- 利用 Internet data center (互联网数据中心)，提供 Web 上的各种地图信息检索
- 基于客户资产的各种信息，提供基于地图中的符号配置及颜色替换显示的分析功能
- 通过与移动终端组合，提供在地图上显示现场操作人员当前位置的功能

Panels for substations (Protective Ry panels, Digital supervisory control systems)

We contribute to stable power supply by using protective equipments that protects devices and power lines in substations and substation network server that sends devices conditions at work site to integrated control center.

变电站用配电盘（继电保护盘、数字监控系统等）

利用对变电站的设备及输电线路等实施保护的数字型保护装置及将现场机器的状况发送给上游管理部门的变电站用服务器，保证电力的稳定供给。

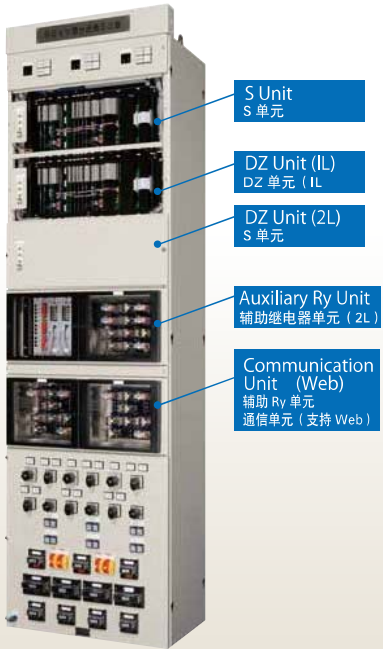
Substation network server
变电站用服务器

The latest panel for substations with functions of Supervisory control panel + Telecommunication + Auxiliary relay panel.
监视控制盘 + 遥控 + 辅助继电器盘功能的最新变电站用配电盘



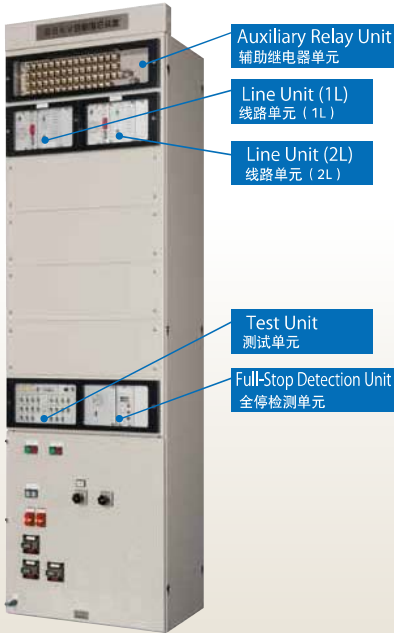
Protective relay panel (Type S+DZ)
S+DZ 型继电保护盘

Protect 66kV, 110kV transmission lines. It also works as line select and distance relay.
对 66kV、110kV 的输电线路实施保护。
安装线路选择 (S) 功能和距离继电器 (DZ) 功能。



Transmissions automatic reclosing panel (for 110kV or less)
110kV 以下数字型自动复位装置

If a line accident occurs under 110kV, restoration is automatic. It makes shorter outage times.
110kV 以下的线路发生事故等时，自动执行复位操作。
复位操作自动化处理能够缩短供电故障时间。



From the integrated control center, work site can be monitored for working conditions, information of faults and remote supervision control is possible. An optional local terminal can also be used.

通过将变电站范围内的运行状态及故障信息发送到调度中心，或者将调度中心发出的控制信号传送到现场设备，可以实现远程监视、控制。还可以使用附带的现场终端在现场进行监视、控制。



Local terminal 现场终端

Application system	Voltage class	110 k V, 66 k V
	Line form	2-terminal or 3-terminal 2 parallel transmission lines
	Fault current	Short-circuit current Maximum 31.5A Breaker rated breaking current Earth fault current Maximum 500A Minimum 100A
Protection system	Line select relaying system (S)	Main: Short-circuit, Earth fault FD: Short-circuit, Earth fault
	Distance relay system (DZ)	Main: Short-circuit, Overload, Earth fault FD: Short-circuit, Earth fault

适用系统	电压等级	110 k V, 66 k V
	线路形态	2 端子或 3 端子的平行双线路输电线路
	事故电流	短路电流 最大 31.5 A (相当于断路器额定断路电流) 接地电流 最大 500 A 最小 100 A
保护方式	线路选择继电器方式 (S)	主: 短路、接地 FD: 短路、接地
	距离继电器方式 (DZ)	主: 短路、过载、接地、 FD: 短路、接地

Dimension	W700 × H2300(except Nameplate 110) × D450	
Rating	Control power supply	DC110V
	Colour	5Y7/1
Built-in device	Re-break Unit	(Type A) 10 lines (Type B) 6 lines
	Test Unit	Type A Type B
	Others	Type B: Built-in fault detection device Re-break Unit contains breaker for full stop

外形尺寸	宽 700 × 高 2,300 (不包括铭牌 110) × 深 450	
额定	控制电源	DC110V
	涂装	5Y7/1
内置机器	重开路单元	(A 机型) 10 条线、(B 机型) 6 条线
	测试单元	A 机型、B 机型 各 1 台
	其它	· B 机型: 内置场内故障检测装置 · 在重开路单元中安装全停断路功能

Switchgears

We supply many varieties of switchgears from 6kV to 22kV power transmission.

配电盘开关装置

可以向用户提供 6KV 到 22KV 型直接供电开关装置

6kV enclosed switchgear
6kV 简易配电柜



22kV enclosed switchgear (for outdoor use)
22kV 简易配电柜 (室外)



6kV vacuum circuit breaker
6kV 真空断路器



Panels for thermal and nuclear power stations

Switchgears which power-supply for power and utility thermo power stations or nuclear power stations are 100V to 22kV.

面向火力发电厂 · 核能发电厂的产品

可以向火力发电厂及核能发电厂提供 100V 到 22KV 的动力及公共用电开关装置。

Metal-enclosed switchgear 金属铠装式高压开关柜



Metal-enclosed switchgear		
Configuration	Indoor stand-alone enclosed type	
Rating	Rated voltage	AC7200V
	Operating circuit voltage	DC110V
	Rated isolating voltage	40kA
	Rated bus current	4000A
		VCB 4000A、2000A、1200A、600A

金属铠装式高压开关柜		
保护构造	室内独立封闭型	
额定	额定电压	AC7200V
	操作回路电压	DC110V
	额定断路电流	40kA
	额定母线电流	4,000A
		VCB 4000A、2000A、1200A、600A

Power center 动力中心



Power center		
Configuration	Indoor stand-alone enclosed type	
Rating	Rated working voltage	AC460V
	Operating circuit voltage	DC110V
	Rated isolating voltage	50kA
	Rated bus current	3000A
		ACB 3000A、2000A、1200A

动力中心		
保护构造	室内独立封闭型	
额定	额定电压	AC460V
	操作回路电压	DC110V
	额定断路电流	50kA
	额定母线电流	3000A
		ACB 3000A、2000A、1200A

Control center 控制中心



Control center		
Configuration	Indoor stand-alone enclosed type	
Rating	Rated working voltage	AC440V
	Operating circuit voltage	AC100V/110V
	Rated isolating voltage	50kA
	Rated bus current	Rated isolating voltage 1200A Rated bus current 600A

控制中心		
保护构造	室内独立封闭型	
额定	额定电压	AC440V
	操作回路电压	AC100V/110V
	额定断路电流	50kA
	额定母线电流	水平母线 1200A 垂直母线 600A

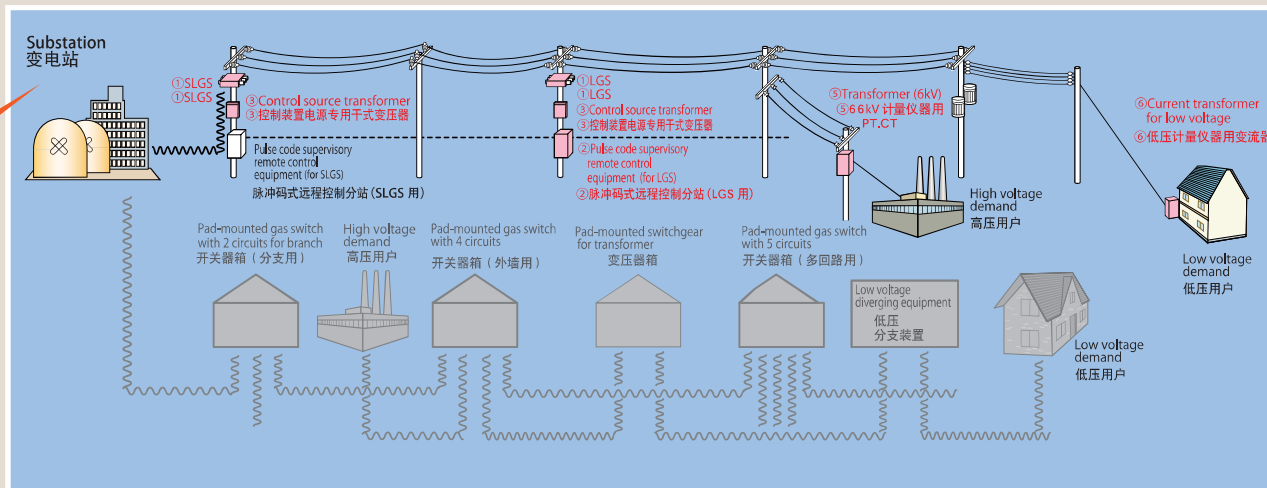
Equipments for power distribution network (Overhead)

Taking the environment and public safety into consideration, we provide stable power.

配电设备（架空系统）

采用与城市环境相和谐且可以保护公众安全的高性能紧凑型配电设备，保证“稳定电力”供应。

Power distribution network control room
配电指令室



⑤ Transformer (6kV)

Mould transformer which measures power for households that demand high voltage with integrator. Attached to the demand and supply point and transform high voltage and current to low.

⑤ 6 kV 计量仪器用 PT.CT

安装在高压用户的需求点，将高压电压、电流变成低压。
利用累计电表计量高压用户交易电量的浇注变压器。

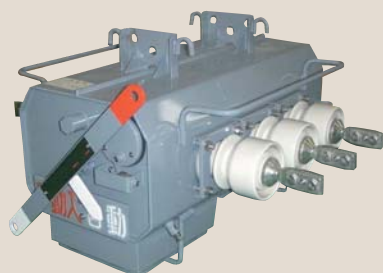


⑥ Current transformer for low voltage

Mould converter which measures power for the households that demand low voltage with integrator. Attached to the demand and supply point and transform current.

⑥ 低压计量仪器用变流器

安装在低压用户的需求点，对电流进行变流，
利用累计电表计量低压用户交易电量的浇注变流器。



① Automatic gas switch (LGS, SLGS) (general type, built-in sensor type)

Automatic divisions switch for 6kV power line which is used in controlling the power line. Also a built-in sensor type can measure voltage, current, power factor and accident information etc.

① 弹簧锁式SF6气体自动开关 (LGS、SLGS) (普通型、传感器内置型)

是将控制箱及远程控制分站组合起来，配电线自动控制使用的 6kV 配电线用自动分类开关器。此外，传感器内置型能够测量电压、电流、功率、事故信息等。



② Pulse code supervisory remote control equipment (for LGS)

Automatic controlling ON/OFF of 6kV gas latching switch and monitoring its condition by communicating with distribution lines via remote control and pulse code signal. Since using built in micro computer, it is small size and high performance, also providing high reliability by making relay point double.

② 脉冲码式远程控制分站 (LGS用)

利用脉冲码信号与配电线远程监视主站进行通信，执行 6 kV 配电线的弹簧锁式自动开关器的开断控制及状态监视的装置。
内置微电脑，实现了小型高性能。
基于继电器触点双重化的高可靠性。



③ Control source transformer

The mold transformer to control the automatic switch, improved for the environment, oilless and the reliability for modernized distribution lines.

③ 控制装置电源专用干式变压器

是顺应城市配电线路现代化，提升环境和谐、无油化、可靠性的电杆上自动开关器的控制电源用浇注变压器。



④ Switchgear for transformer

High voltage air-break switch using for uninterruptible work of 6kV distribution line

④ 变压器用开关器

使用于 6 kV 配电线路不停电施工的变压器用高压空气开关器。

Equipments for power distribution network (Underground)

Taking the environment and public safety into consideration, we provide stable power.

配电设备（地下系统）

采用与城市环境相和谐且可以保护公众安全的高性能紧凑型配电设备，保证“稳定电力”供应。



⑤ Low voltage diverging equipment (for underground)

Plug-in style. Installing in the handhole, branching from underground transmission line to supply for low voltage demand households

⑤ 低压分支装置（地下用）

从低压地下电线的干线分支出来向低压用户供电时，安装在检修井中的埋入式装置。



⑥ Low voltage diverging equipment (for overground, built-in pole)

Low voltage diverging equipment for overground on the handhole, branching from underground transmission line to supply for low voltage demand households (possible to set in the street light pole). Transmission line fuse attachable to the branch circuit. *There is also a built-in type for underground street light pole.

⑥ 低压分支装置（地上用·杆体内置型）

从低压地下电线的干线分支出来向低压用户供电时，安装在检修井上的地面设置型低压分支装置（也可设置到路灯杆中）。分支回路可安装电线保险丝。
※还提供电线入地的路灯杆内置型



④ Pad-mounted switchgear for transformer with harmonized environment

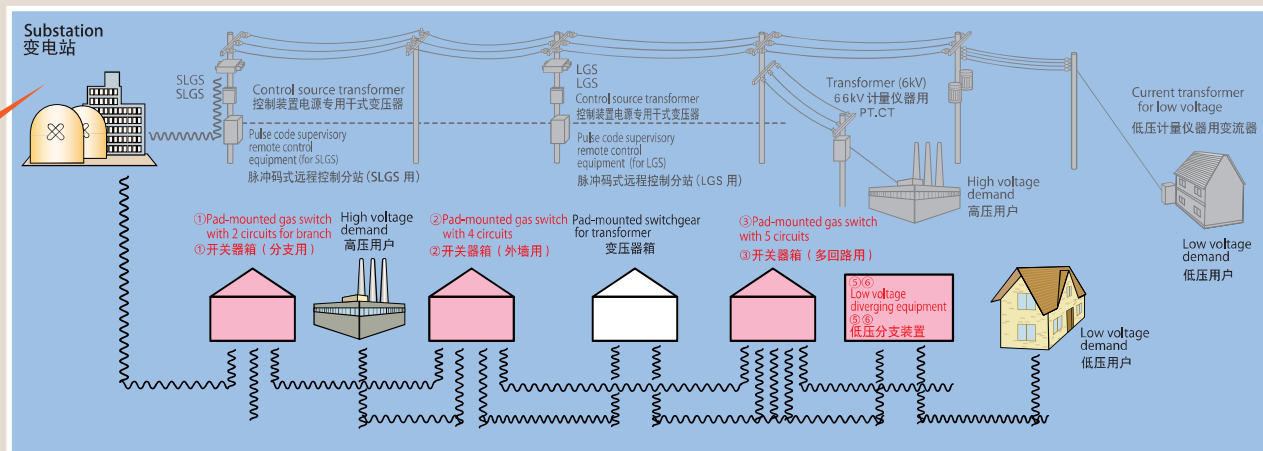
A Transformer for underground distribution system from 6kV distribution line to low voltage demand households. It is installed on the ground so as to be harmonious with city environment.

[Switch capacity] 300A
[Transformer capacity] single phase 50kVA, single phase 100kVA
[Supply] single phase 3 lines, 3phase 3 lines (V connection)
[Supply voltage] 210/105V, 210V

④ 环境和谐用变压器箱

为了与城市环境相和谐，通过地下管线从 6kV 配电线路向用户供电时，进行地面设置，电杆上自动开关器及电杆上变压器安装在地面设置变压器箱。
【开闭器容量】300A
【变压器容量】单相 50kVA、单相 100kVA
【供电形态】单相 3 线、3 相 3 线（V 连接）
【供电电压】210/105V、210V

Power distribution network control room
配电指令室



① Pad-mounted gas switch with 2 circuits for branch

6kV pad-mounted switchgear for underground power system. It has an automatic switch, remote control equipment, power supply transformer and communication terminal box, etc.

[Rated voltage] 7.2kV
[Rated current] 400A × 2 circuits
[Components] Gas switch (400A × 2),
Disconnecting switch × 3,
Remote control equipment (built-in No.1, No.2),
Operating power source transformer (5kV),
Communication terminal box

① 开关器箱（分支用）

6kV 配电线地下配电时使用的地面设置型开关器箱，是将以前安装在电杆上的自动开关器、远程控制分站、电源变压器、通信端子箱等紧凑地内置在一起的装置。

【额定电压】7.2kV
【额定电流】400A × 2 个回路
【构成部件】SF6 气体自动开关（400A × 2 台）
接地断路器 × 3 台
远程控制分站（No.1、No.2 内置一体型）
操作电源变压器（5kV）
通信用连接端子箱



② Pad-mounted gas switch with 4 circuits

6kV pad-mounted switchgear for underground power system. It has an automatic switch, remote control equipment and communication terminal box, etc.

[Rated voltage] 7.2kV
[Rated current] 400A × 2 circuits, 400A × 2 circuits
[Components] Gas switch (400A × 2, 400A × 2),
Disconnecting switch × 2,
Remote control equipment (main circuit, non-utility),
Communication terminal box

② 开关器箱（外适用）

6kV 配电线地下配电时使用的地面设置型开关器箱，是将以前安装在电杆上的自动开关器、远程控制分站、通信端子箱等紧凑地内置在一起的装置。

【额定电压】7.2kV
【额定电流】400A × 2 个回路、200A × 2 个回路
【构成部件】SF6 气体自动开关（400A × 2 台、200A × 2 台）
接地断路器 × 2 台
远程控制分站（主回路、自家内置一体型）
通信用连接端子箱



③ Pad-mounted gas switch with 5 circuits

6kV pad-mounted switchgear for underground power system. It has an automatic latching switch, remote control equipment and communication terminal box, etc.

[Rated voltage] 7.2kV
[Rated current] 300A × 2 circuits, 200A × 3 circuits
[Components] Latch style gas switch (300A × 2, 200A × 3),
Disconnecting switch × 2 (with interlock),
Operating power source transformer,
Remote control equipment (built-in No.1, No.2),
Communication terminal box

③ 开关器箱（多回路用）

6kV 配电线地下配电时使用的地面设置型开关器箱，是将弹簧锁式自动开关器、远程控制分站、通信端子箱等紧凑地内置在一起的装置。

【额定电压】7.2kV
【额定电流】300A × 2 个回路、200A × 3 个回路
【构成部件】弹簧锁式 SF6 气体自动开关（300A × 2 台、200A × 3 台）
接地断路器 × 2 台（带联锁）
操作电源变压器（0.5kVA × 3 台）
远程控制分站（No.1、No.2 内置一体型）
通信用连接端子箱

Other products

We design/develop control devices such as electronic parts, control switches and terminal blocks.

其它产品

产品所使用的电子应用部件及 CS（控制开关）· TB（端子排）等控制机器由集团公司负责设计 · 开发。

Control device

控制机器



Technologies

We design/develop boards and our power electronics technology which are adapted to the environment. We can suggest products to meet the needs of our customers.

技术介绍

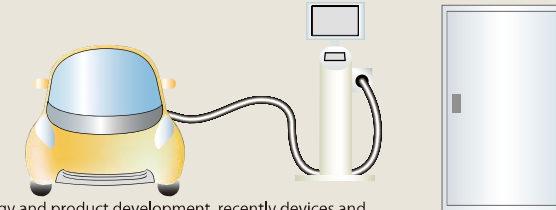
本公司还拥有电路板开发 · 设计技术以及电力电子技术等环保技术，可根据用户需求提出产品方案。

■ Power Electronics technology

We have developed / produced electric storage systems by using power conversion / control with power semiconductors and control devices, improving its own technology. Recently we have developed electric storage systems and DC power supply of quick charge with renewable energy to spread EV for low carbon society.

■ 电力电子技术介绍

本公司使用被称为电子学基干的功率半导体和控制单元，通过电力转换和控制，期待提高电力电子技术的应用，已着手以蓄电系统为中心的开发和制造，以应对客户需求。近年来公司致力于包括可再生能源在内的蓄电系统以及普及电动汽车所必需的快速充电器用直流电源装置的研发等，为实现低碳社会做出贡献。



■ Board technology

Through long term technology and product development, recently devices and systems were digitized and networked. Like vehicles, electronics and software technologies are essential.

- Electronics – Fast/Advanced micro computer application, FPGA, Circuit simulation
- Software – Embedded OS for micro computer
- Product evaluation – Noise, Temperature/Humidity, Circuit simulation

■ 电路板技术介绍

以汽车为代表，近年来装置及系统的内部构成正朝着“数字化”、“网络化”发展。其基本要素是电力电子技术、软件技术，但本公司通过多年的产品研发已掌握了这些技术。

- 电子 ———— 高速 · 高性能微电脑应用、FPGA、回路模拟
- 软件 ———— 嵌入微机用操作系统
- 产品评估 ———— 噪声评估、温湿度评估、回路模拟



■ Manufacturing/Coating technology

Koga factory which is Seiko groups' manufacturing base produces parts and products from manufacturing to coating by adopting advanced equipments. We pursue high quality and reliability by improving our works.

■ 壳体制造 · 涂装技术

作为正兴集团各公司产品制造据点的古贺工厂引进了高性能设备，构筑了从壳体制造到涂装的生产线，实现了产品外壳 · 部件的内部制作。而且，通过落实品质提升及作业改进活动，追求更强的可靠性和生产性。

■ Manufacturing process

■ 壳体制造工序



■ Coating process

■ 涂装工序

