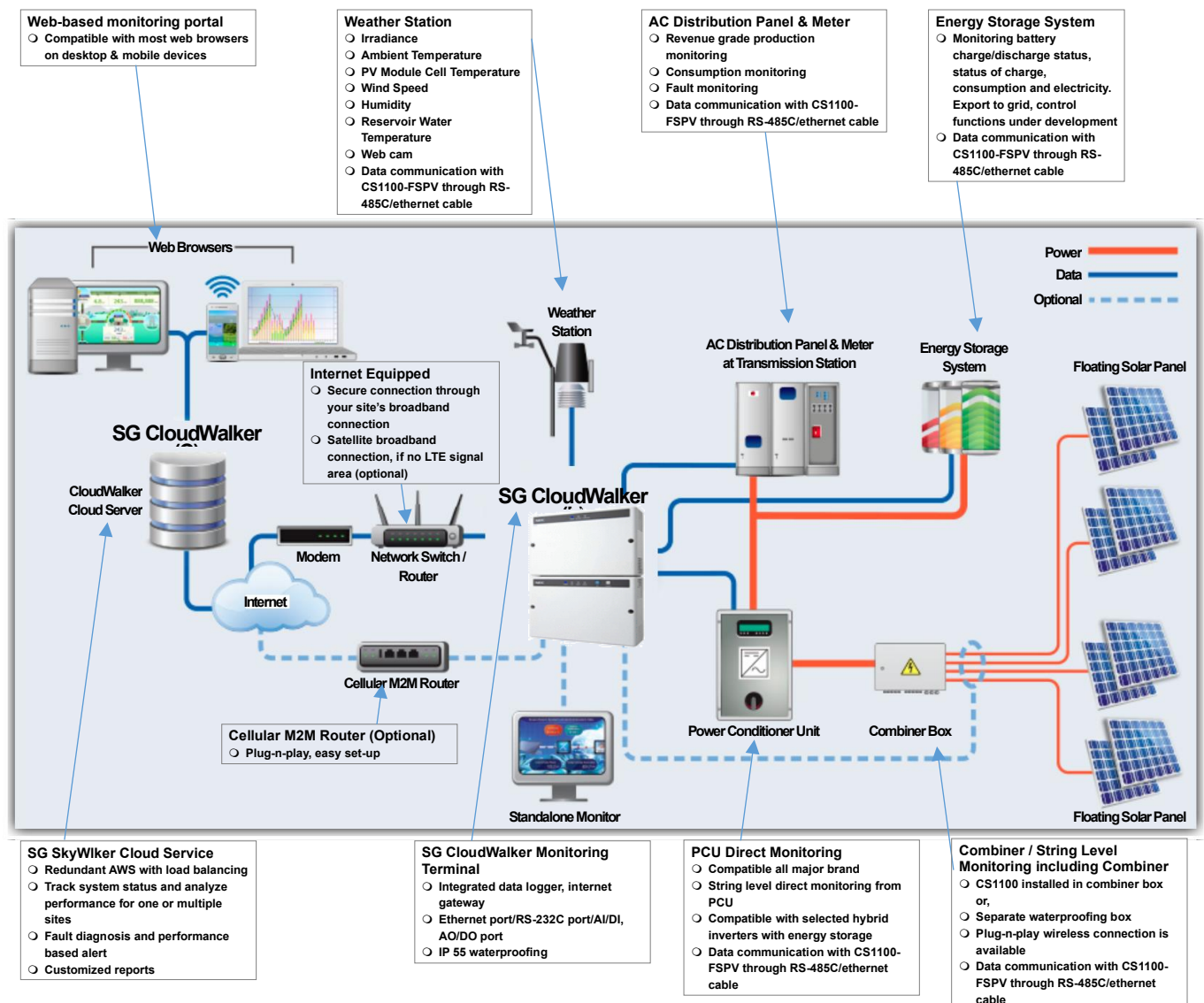# Remote Monitoring System
CloudWalker / CS1100

Integrated Remote Monitoring System for Mega Solar PV Plant

- Monitoring integrated data of Combiner, PCU, Transmission Station, Weather Station and report the plant condition to Customer.
- Remote monitoring is possible anywhere in the world and can be viewed on a web basis. (Option)
- Establishing a database on the cloud, and depending on the characteristics of each solar power plant and possible to optimize the maintenance and operation of the plant by grasping PV cluster crush, deterioration over time, seasonal fluctuation, etc. (Option)

Overview

Web-based monitoring portal
- Compatible with most web browsers on desktop & mobile devices

Weather Station
- Irradiance
- Ambient Temperature
- PV Module Cell Temperature
- Wind Speed
- Humidity
- Reservoir Water Temperature
- Web cam
- Data communication with CS1100-FSPV through RS-485C/ethernet cable

AC Distribution Panel & Meter
- Revenue grade production monitoring
- Consumption monitoring
- Fault monitoring
- Data communication with CS1100-FSPV through RS-485C/ethernet cable

Energy Storage System
- Monitoring battery charge/discharge status, status of charge, consumption and electricity. Export to grid, control functions under development
- Data communication with CS1100-FSPV through RS-485C/ethernet cable

Power
Data
Optional

Web Browsers

SG CloudWalker (C)

CloudWalker Cloud Server

Internet Equipped
- Secure connection through your site's broadband connection
- Satellite broadband connection, if no LTE signal area (optional)

Weather Station

AC Distribution Panel & Meter at Transmission Station

Energy Storage System

Floating Solar Panel

Modem

Network Switch / Router

SG CloudWalker

Internet

Cellular M2M Router

Cellular M2M Router (Optional)
- Plug-n-play, easy set-up

Power Conditioner Unit

Combiner Box

Standalone Monitor

Floating Solar Panel

SG SkyWlker Cloud Service
- Redundant AWS with load balancing
- Track system status and analyze performance for one or multiple sites
- Fault diagnosis and performance based alert
- Customized reports

SG CloudWalker Monitoring Terminal
- Integrated data logger, internet gateway
- Ethernet port/RS-232C port/AI/DI, AO/DO port
- IP 55 waterproofing

PCU Direct Monitoring
- Compatible all major brand
- String level direct monitoring from PCU
- Compatible with selected hybrid inverters with energy storage
- Data communication with CS1100-FSPV through RS-485C/ethernet cable

Combiner / String Level Monitoring including Combiner
- CS1100 installed in combiner box or,
- Separate waterproofing box
- Plug-n-play wireless connection is available
- Data communication with CS1100-FSPV through RS-485C/ethernet cable
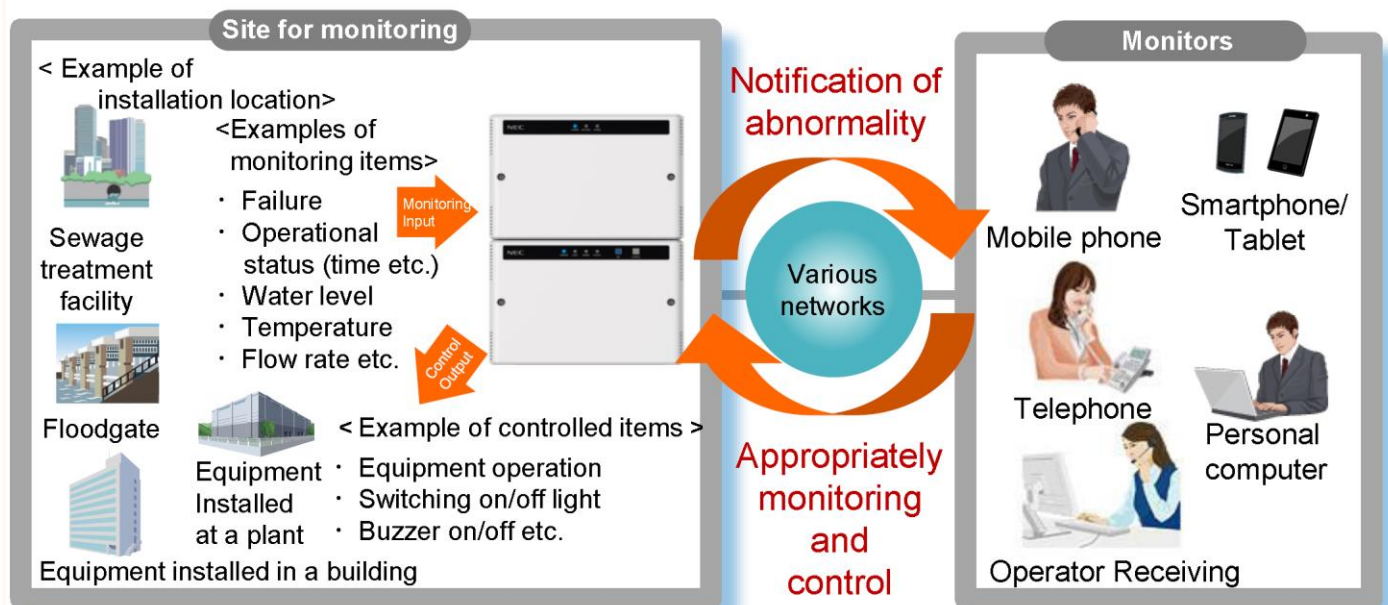
Remote Monitoring System
CS1100

Development of a one package remote monitoring server with basic functions and valuable features.

- Adopting a flexible design where the Control unit and Power unit are kept separate
- All in one package include Web server and mail client.

Overview

Features

> **Using a flexible installation**

With a structure where the Notification unit and Power unit are kept separate, it can be flexibly installed in accordance with the site. Two directions for vertical and horizontal. DIN rail mounting can also be used.

> **Universally accepted and scalable external input**

Non voltage digital input, 0-20/4-20mA current input and 0-5V/1- 5V voltage input are selectable

> **Support Text to speech**

When notified, text will change to the voice message. Messages are available in English or Chinese (Simplified or Traditional Chinese). Thereby, notification in an emergency is possible.
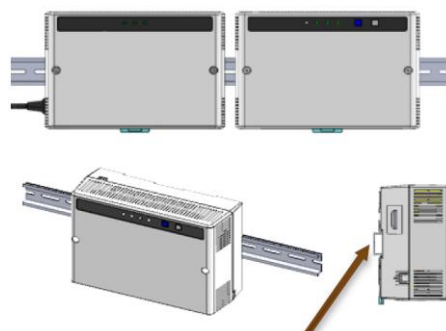
> **Enhanced Web functions**

It can also be used as a Web monitoring device as there are built-in Web server functions. By using a regular browser it is possible to browse various data, such as a notification history, operation history, as well as settings. It is also possible to browse the daily, monthly and annual reports and display trend graphs.

SUGA Web-based Monitoring Service

SUGA SG-FSPV (SUGA Floating Solar PV Remote Monitoring System) is a complete remote monitoring solution for photovoltaic power generation systems. Our Software as a Service (SaaS) model allows users to remotely collect and analyze field data. Whether it's a portfolio of Floating mega-watt Solar PV power plants in isolated rural locations, this intuitive web interface allows users to easily monitor their power generation systems without physically visiting the site. Customizable, multi-level performance alerts can be configured for effective management of your PV assets.

SG CloudWalker's primary features:

SYSTEM DASHBOARD

- Real-time remote monitoring of power generation equipment and site conditions
- Monitor multiple inverters and devices at a single site or a portfolio of many sites
- Configurable multi-level email alerts
- Inverter-direct monitoring and inverter control
- Consumption monitoring
- String-level monitoring
- Webcam
- Data download to CSV

PERFORMANCE ANALYZER

- Performance metrics and fault diagnosis
- Configurable performance thresholds and alerts

CUSTOMER DASHBOARD

- Rich and informative presentation screens
- Animated System Diagrams
- Interactive Energy Graphs
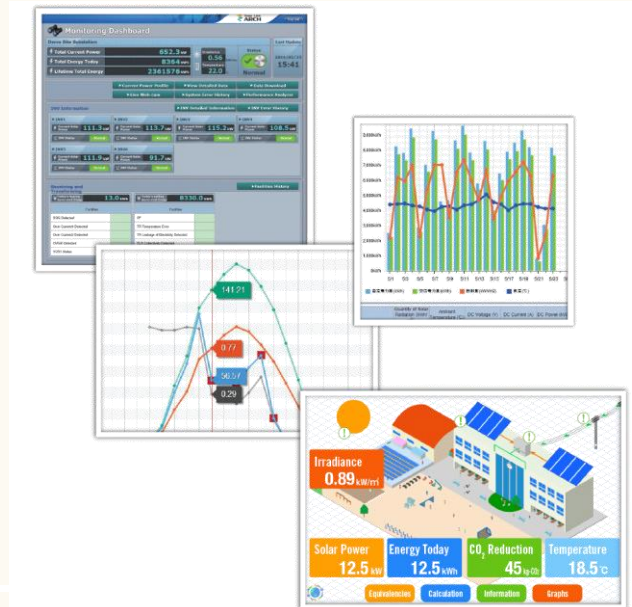
Energy Storage System Monitoring

SG CloudWalker is now fully compatible with solar installations employing energy storage systems.

### Highlights of Our ESS Monitoring System Include:

Customer Dashboard with an Animated Overview of the System Status

- Solar Generation
- Battery Charge / Discharge Status
- Grid Electricity Import & Export
- Building Current Consumption (Demand)

**Interactive Energy Profile Graphs (hourly, daily, monthly)**

- Solar Generation
- Battery Charge, Discharge, State of Charge
- Grid Energy Imported / Exported
- Building Energy Consumption

Environmental Benefits and other Customizable Screens
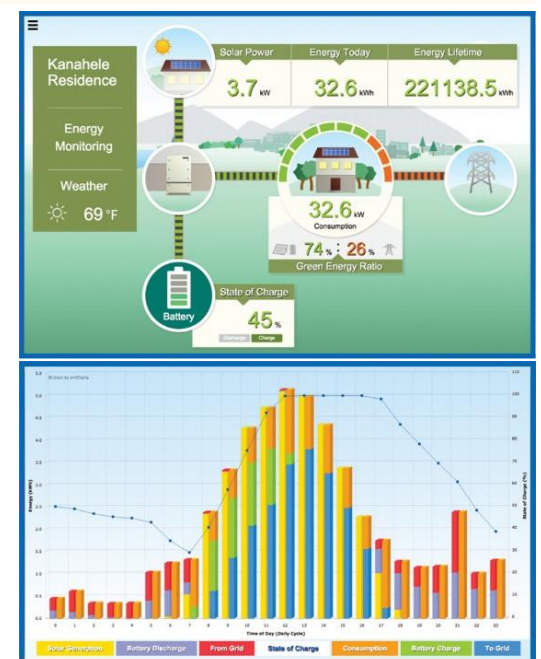
String-Level Monitoring

SG CloudWalker monitoring is compatible with leading sub-array level monitoring hardware devices. For retrofit installations with existing PV systems, we offer several mesh Wi-Fi wireless string monitoring system. Mesh Wi-Fi wireless system is a "plug-n-play" solution that seamlessly integrates into each PV string without the need to power down the array or replace/modify existing equipment.
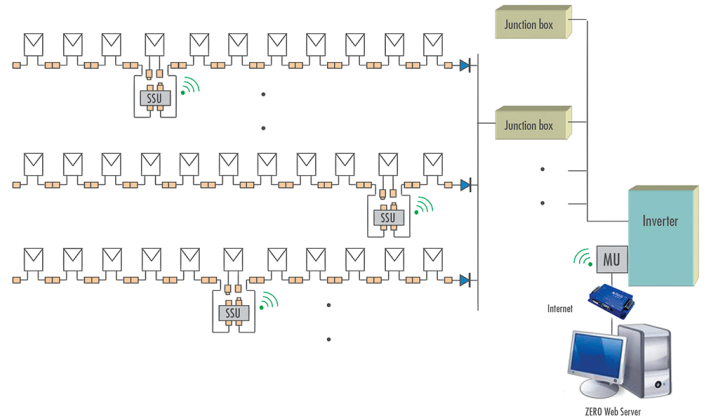
### KEY FEATURES OF STRING MONITORING SYSTEM INCLUDE:

- String Sensor Unit conveniently installs between any 2 solar modules on a string
- One Management Unit measures up to 350 strings
- 1000V DC maximum system voltage
- Low Power Consumption (SSU <500mW, MU <2000mW); No external power source required
- Wireless communication protocol

CS1100 Data-logging Monitoring Terminal

CS1100 is a renewable energy measurement and display system consisting of a compact monitoring terminal with integrated data logger, internet gateway, and web server. Powered by a CPU running Linux OS, this system is easy to install and scalable.

CS1100 Terminal can measure inverter output, battery status, revenue & consumption meters, weather stations, and other devices via two RS-485 and one RS-232C ports.

The data is then sent to Solar Link ARCH where it can be viewed remotely. CS1100 Terminal also comes video output via LAN and customizable presentation software – please ask us about our Kiosk solutions for schools and other public buildings.
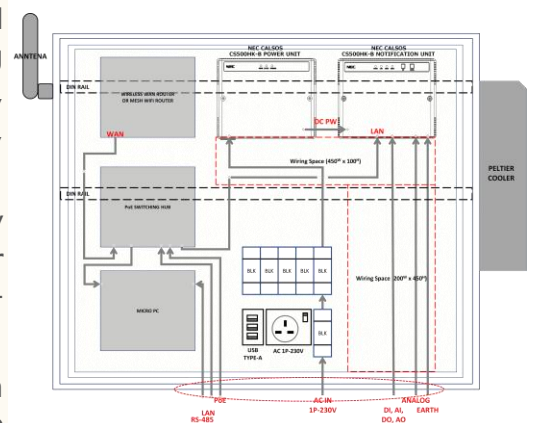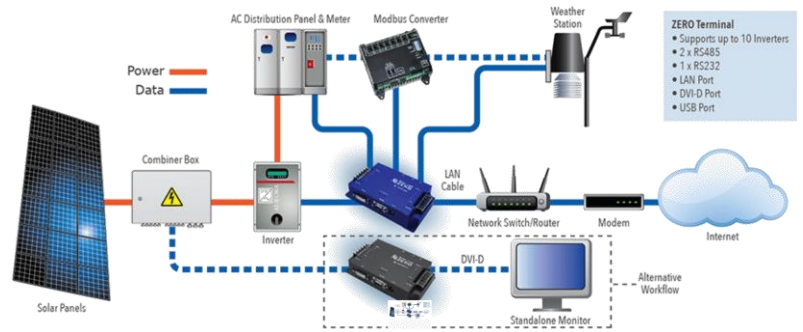

CS1100's primary features:

- Collect Inverter data (Multiple inverters per CS1100 Terminal)
- Collect String-level PV generation data
- Collect weather station, meter, and web-cam data
- Integrated data logger and internet gateway
- AI/DI, AO/DO, RS-232C serial and Ethernet ports
- Kiosk mode with customizable displays
- Display PV System performance and environmental benefits
- Detailed failure history log

Remote Monitoring and Presentation System:

SG CloudWalker is a complete remote monitoring solution for photovoltaic power generation systems. Our Application Service Provider (ASP) service allows users to remotely collect and analyze field data. Whether it's a portfolio of residential roof-top PV installations or mega-watt solar power plants in isolated locations, this intuitive web interface allows users to easily monitor their power generation systems without physically visiting the site. Highly customizable, multi-level performance alerts can be configured for effective management of your PV assets.

SG SkyWalkesr's primary features:

- Real-time remote monitoring of power generation equipment and site conditions
- Monitor multiple inverters at a single site or a portfolio of many sites
- Performance metrics and fault diagnosis
- Configurable multi-level email alerts
- Inverter direct monitoring and inverter control
- Consumption monitoring
- String-level monitoring
- Webcam
- Comprehensive monitoring dashboard
- Rich and informative presentation screens
- Customizable reports
- Download raw data to CSV
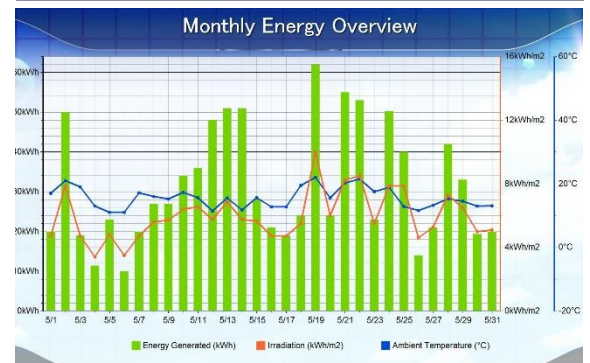
Features

➢ **Supporting various communication infrastructures**

Supporting major communication infrastructures such as general analog line and LAN. A suitable communication infrastructure can be selected according to the environment of the site, where it is to be installed. Multiple communication infrastructures can be used in combinations.

➢ **Variety of Notification patterns**

Any notification method can be chosen from Voice, Email, Data depending on the requirement. Notification site can be set for each monitoring input. Since notification methods can also be used in combination.

Activation → Notification / Various Networks → Digital Output Control
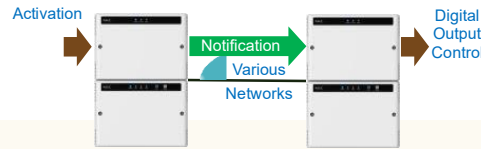
➢ **Linking functions**

This UNIT is added as a notification method. It is possible to control the digital output of separate it in remote location by activating the corresponding it at the site. Owing to IP communication, it can be used by various communication networks infrastructures.

Specification

CS1100 Specification Sheet

[Control Unit]

Items		Specification		Remarks
Network Interface		Analog/LAN		
Degital/Analog Interface (Wired)				
Input	Digital	16ch	Max. 32ch with extended IO board	If analog input is used for digital input, 16ch is the maximum number.
		Input format	Non-voltage contact input	
		Input method	Selection of event/estimated pulse /estimated time for each terminal	
		Min. detection time event	300ms/pulse, 10 ms/Operation 1s	
	Analog or Digital	4ch (None isolated)	Max. 12ch with extended IO board (non-isolated 4ch, isolated 8ch)	Can be change to Digital or Analog input for each terminal
		Input format	Selection of voltage / current input for each terminal	
		Input method Voltage	DC 0-5V / 1-5V	
		Input method Current	DC 0-20mA / 4-20mA	
		Resolution	12 bit	
Output	Digital	4ch	Max. 8ch with extended IO board	
		Output format	Transistor output	Can be returned and connected to digital input
		Output method	Selection of continuous / one-shot for each terminal	
	Analog	None	Max. 2ch with extended IO board	
		Output format	Voltage	
		Output level	DC 0-5V	
		Resolution	10 bit	
	Mainte-nance port	Output	RS-232C	
	Input Output terinal extension	Digital input	8ch	Digital input can be changed for each terminal for analog input
		Analog input (isolated)	8ch	
		Digital output	4ch	
		Analog output	2ch	
Wireless Interface				
Wireless transmission	Standard	LTE, 2G, 3G. 4G		To be discussed with local provider
	Transmission speed	128Kbps and above		
Data transmission function	Data collection function	Periodic collection, collection at the occurrence of an event, collection at the request of a higher level		
	Data processing capability	State change detection, upper and lower limit (threshold) deviation monitoring, report calculation function		
	Data storage function	Intra-unit data saving function for resending, SD card data saving function		
	Data transmission capability	Fixed-cycle transmission, event transmission, on-demand transmission, file transmission, retransmission function		
	Still image/time-lapse video function (optional)	Still image/time-lapse video acquisition and transmission, CCTV camera control, thermography, etc.		
User interface	LED	POWER / LINE / MODE / CHECK / Internal body cover: SD / LAN		
	Button	Front panel of the body: SET / CANCEL / Internal body cover: POWER_SW		
	Speaker	Built-in speaker, buzzer		
Alert function	Alert method	Voice / email / data / another notification unit		
	Maximum receivers	Voice	16 connects / Email : 32 IDs.	
		Data	AU to AU : 8 contacts	
	Alert pattern	Digital input alert (event / estimated pulse / estimated time)		
		Analog input alert (threshold)		
		Regular alert (specified time / specified interval / daily, monthly and annual reportetc.)		
		Power outage alert / mode switching alert / low battery alert etc.		

[Control Unit]

Items		Specification	Remarks
Remote control	Control method	Browser / data	
	Control detail	Current status check / daily, monthly and annual report check	
		/ trend graph / output control (digital) / various histories check	
		/ system datasetting etc.	
		Functions are restricted depending on the controlling system	
Line Interface etc.	General Phone Line	1 port	
		External telephone connection port	
		Connector: RJ11 x 2 (LINE / TEL)	
		Compatible modem : V34, V92Speakers	
	LAN (1port)	100BASE-T	
		Auto MDI / MDI-X	
		Connector : RJ45[	
Operating power supply		DC24V (9.6V to 24.6V)	
Operating environment	Temperature	-10°C to 60°C	
	Humidity	20% to 85% (non-condensing)	
External dimension		210 mm (W) x 150mm (H) × 85 mm (D)	
Weight		Approximately 0.8kg	
Mounting method		Direct mounting or DIN rail mounting	
Power outage guaranteeMain		Three Alerts, after one hour of waiting after power outage by the standard battery *Six hours by add on expansion	

[Power Unit]

Items		Specification		Remarks
Accumu-lation function	Memory	SD memory card (1Slot, 2GB memory initial implemented)		
	Accumu-lated data item	Data such as Alert history / operation history / controlhistory / daily, monthly and annual report etc.		
		Total 33,000 items		
Input power	Operating power	AC100V/240V 50/60Hz auto-identified		
	Power backup	Standard battery	NiMH battery pack (8 "AA" batteries Type)	
		Expansion battery	NiMH battery pack (12 "AA" batteries Type)	
Output power	Current application time	Rate	DC24V/630mA	
		Rate	DC9.6V / 1.7A (at the time of using standard battery)	
Power consump-tion	During	45 W		
	During	55 W		
Operating environment	Temperature	-10°C to 60°C		
	Humidity	20% to 85% (non-condensing)		
External dimension		210 mm(W)×150mm (H)×85 mm (D)		
Weight		Approximately 1.2kg (Including standard battery for power outage)		
Mounting method		Direct mounting or DIN rail mounting		

[Option]

Items	Specification		Remarks
CS1100 EXIOU	Product codeUser	PW-AJA3-01	
CS1100 extension battery	Product codeUser	PW-AJA3-02	
CS1100 standard batteryproduct	Product codeUser	PW-AJA4-01	