Energy Management System
Electrical Equipment Control & Monitoring System
Substation Automation System
Supervisory Control And Data Acquisition System
Distribution Automation System
Power Monitoring System
Power Quality Monitoring System
Automatic Meter Reading System
Power Equipment Diagnosis & Preventive System
Load Management System

Power InfoNet®

Power IT Solution

LS IS

LSIS, the leader in Industrial Electric Power and Automation, is creating a pleasant and productive industrial society by providing a Total-Solution to our clients

Established in 1974, LSIS (LSIS) is the leader in the Korean industrial electric power and automation market. We are now working towards becoming an international player in the world electrical power and automation industry.
LSIS will take the initiative in securing the future of productive industrial electric power and ease of automation by providing a Total-Solution, the core element of industrial competitiveness in the 21st Century.

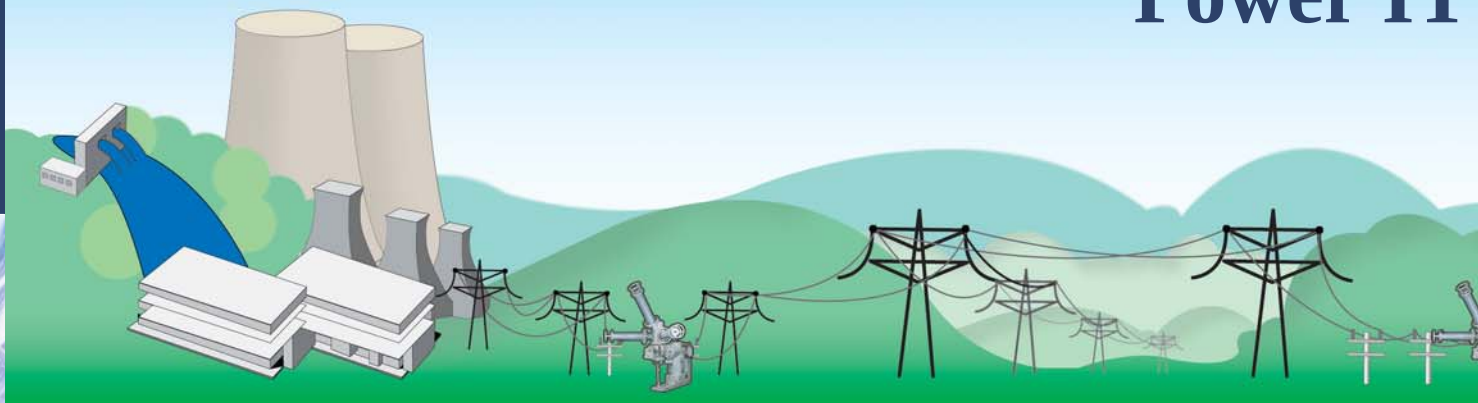
Contents

Power IT Solution

We provide a dynamic customer-oriented Power IT Solution that will transform the conventional electric industry into the newest information industry by applying integrated digital networking and new trend information technology throughout the entire field, from generation and transmission to the power distribution.

EMS
ECMS
SAS
SCADA
DAS
PMS
PQMS
AMR
PDPS
LMS

Power IT



Power Plant
ECMS

Transmission
SCADA

Subs
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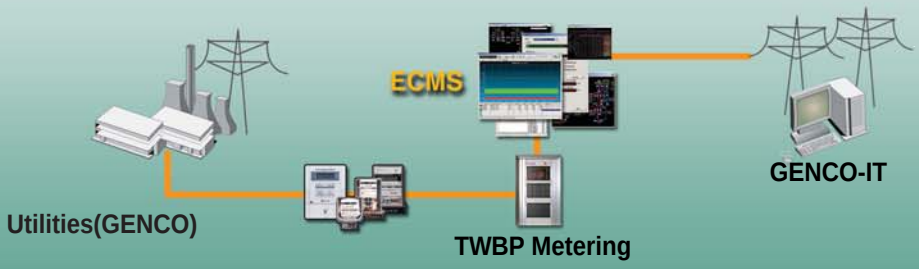


Power

Transmission Line

Distribution Line

Market Information

Load Management

Bidding & Posting

Trader

Retailer

Load
Aggregator

Optimized Energy Information

Demand Side
Management
System

Metering

AMR

LMS

Direct
Load Controller

Meters

Communication

Cable

GIS

Residential

Industry

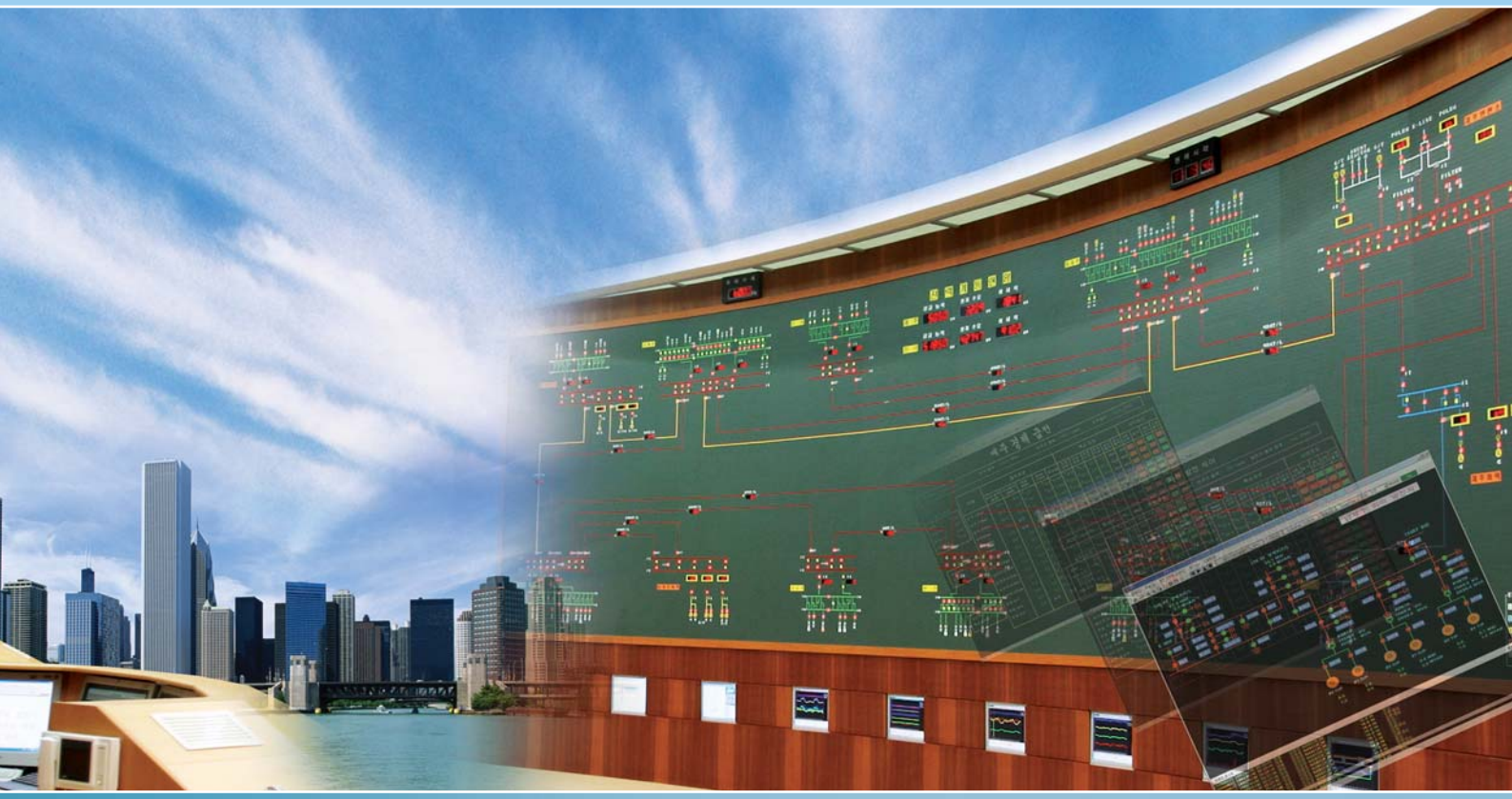
Commercial

Solution

Power InfoNet®

tation	Distribution	Customer
AS	DAS	PMS
ADA	AMR	PQMS
PS	LMS	AMR
		LMS

MOS: Market Operating System
EMS: Energy Management System
GENCO: Generation Company
TWBP: Two-way Bidding Pool
ECMS: Electrical Equipment Control & Monitoring System
SAS: Substation Automation System
SCADA: Supervisory Control And Data Acquisition System
DAS: Distribution Automation System
PMS: Power Monitoring System
PQMS: Power Quality Monitoring System
AMR: Automatic Meter Reading System
PDPS: Power Equipment Diagnosis & Preventive System
LMS: Load Management System



EMS

Energy Management System

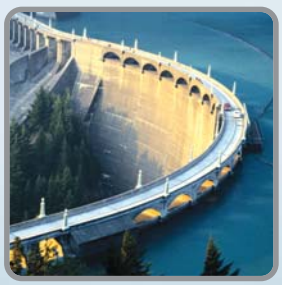
LSIS realized the efficient operation, management and economical power dispatch of a large power system by virtue of its own technological strength.

The Energy Management System (EMS) ensures optimal control of the operation of the power generation facilities with the linkage system through the normal information collection and load frequency monitoring of the overall power supply system. With the efficient management of the power system, this large-scale power control system facilitates economic energy management.

In terms of system characteristics, only one EMS system has been built to monitor an entire power system. There are two EMS systems in Korea: one is the central EMS system that controls the whole power system, the other is the Jeju EMS system that controls Jeju Island. Our company manufactured and supplied the Jeju EMS System using domestic technology with proven technological strength.

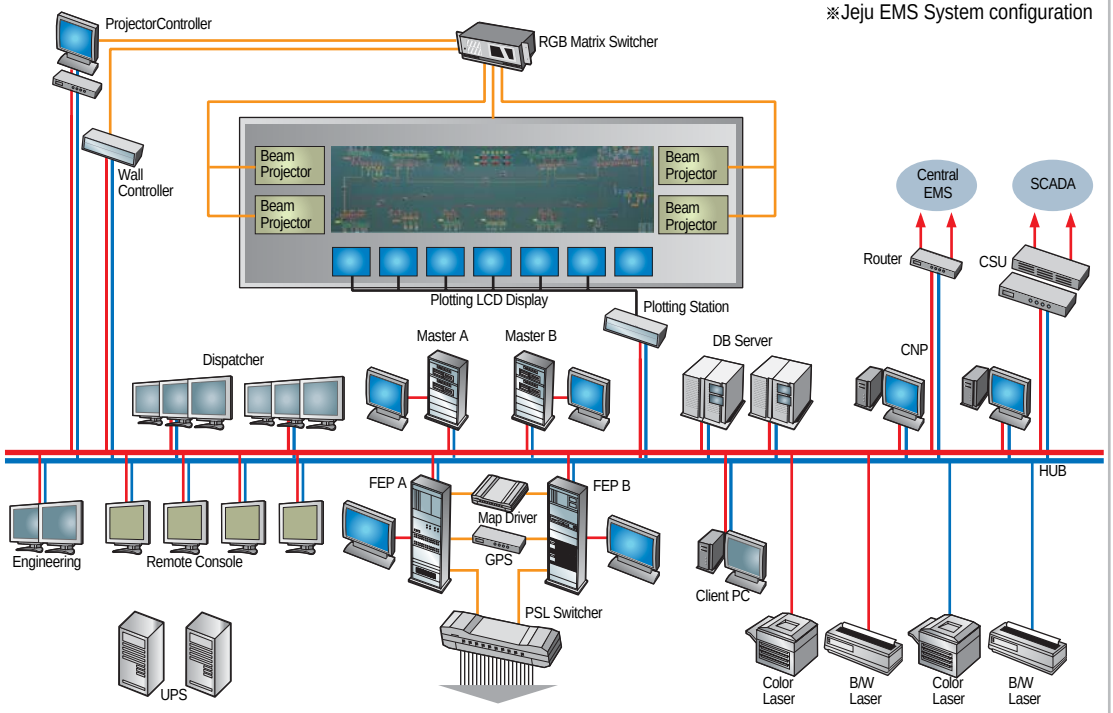
Features

- Applies Open-Architecture and a general Database (ODBC, ADO)
- Uses real time OS to process real time data
- Supports Economic Dispatch and Load Frequency Control to ensure stable power supply and operation
- Applies the Contingency Analysis program which simulates the effect of separating the power line and generator in cases of accident
- Supports scenario restructuring and accident analysis in the event of an accident.



System configuration

※Jeju EMS System configuration



Description

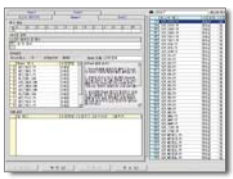
Master	• Executes total node management, application program, and DB management • Converts the acquired real data to calculation point data and alarm/event processing • Automatic load frequency control and contingency analysis
Dispatcher	• Supports various operations including screen display, alarm / event display, and printing report by using the processed information from the master.
DB Server	• Processes the acquired data from the master and stores it with a specified report form using the relational database • Manages the statistical / historical data required by the operator, executes RDBMS, and generates reports
FEP	• Communicates with field devices such as RTU for data acquisition • Transmits the commands from Master, Dispatcher and DB server to the field device in real time • Stores the booting file and real time DB of the independent node
CNP	• Links the related data from the central EMS and the Jeju EMS • Configured as a point-to-point method for the data links between each system

Function

Economic power dispatch	• In the event that the control data cannot be acquired from the central EMS due to a failure in the link between each system, the Jeju EMS will carry out the economical power dispatch function and control the generator and power line independently.
Automatic Load Frequency Control	• Function which controls automatically the power generator output level • Load frequency control using the local frequency data • Optimal distribution control, frequency control, and reserved power calculation using the bidding data of generator output.
Contingency analysis	• Assumes an accident in a specific power line or generator • Simulates a situation arising from the separation of each power line / generator from the entire power line system due to an accident

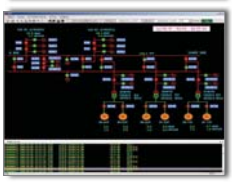
System operation screen

- Economic power dispatch
- Automatic load frequency control



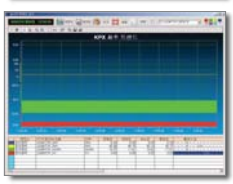
Report editor screen

- Supports hourly / daily / weekly / monthly / yearly reports
- Edits report data tag
- Supports Excel format



Contingency analysis screen

- Accident data search function
- Reproduction of the accident function
- Reproduction of accidents in a specified period



Trend viewer screen

- Zoom / partial expansion function
- Tracking function
- Property setting function
- Historical trend function

System operation information screen

- Status of system switch-over
- RTU operational status
- Process management view

Monitoring and control screen

- Navigator function
- Alarm display window
- Supports Menu bar editing

ECMS

Electrical Equipment Control and Monitoring System

LSIS completes the newest power equipment protection system connected to the multi-functional IED with the new concept of a power IT Solution.

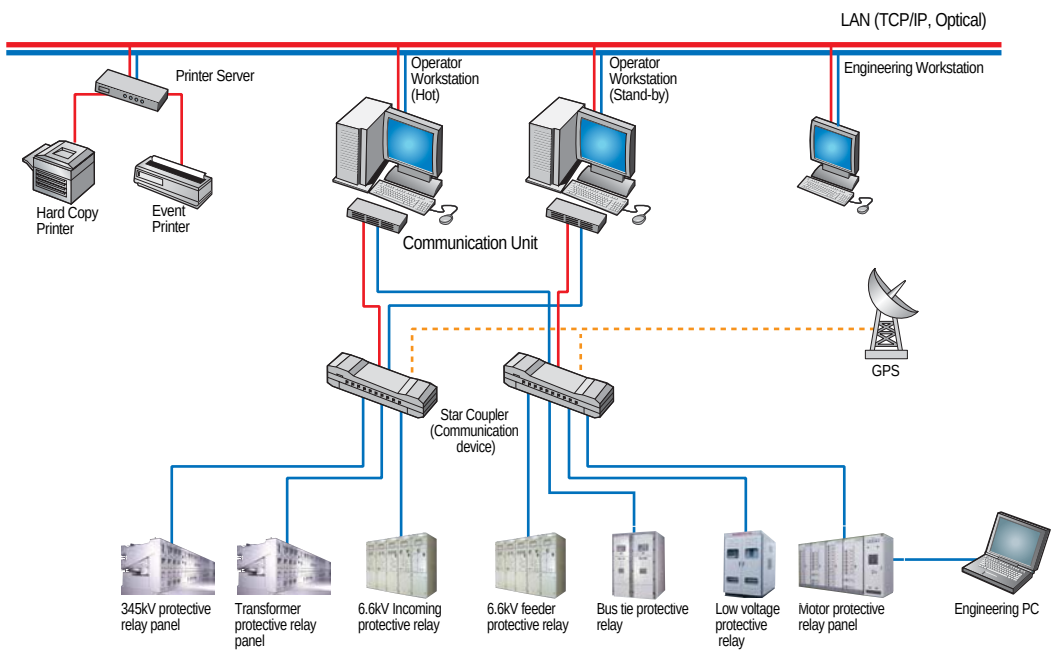
The ECMS (Electrical Equipment Control & Monitoring System) carries out generator operation, management and control by applying multi-functional integrated digital relay to the power-generating facilities and the power equipment within the power plants. In particular, multi-functional integrated digital relay has been applied to this monitoring and control system to enable the simplification and effective functioning capacity of the system.

LSIS, introduced and structured the Jeju ECMS system in 1998, the first of its kind in Korea, and ensured the reliability of the system through this experience.

Features

- Secures operational reliability by applying the dual system and dual communication
- Remote setting, harmonic/waveform capture, and analysis of the IED is enabled by the central system
- Self-diagnostic function of the system operational status (communication line and equipment status and others)
- Applies the TCP/IP communication method for large capacity/high speed communication
- By applying IED, it boasts a simple and highly functional relay panel

System configuration

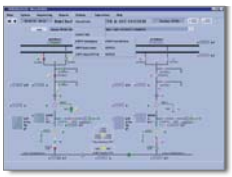


Description

OWS (Operator Workstation)	• Monitoring and remote control of power in the power plant • Real time data acquisition, processing, and calculation for DB management • IED monitoring, control, alarm / event handling, and performing report print function
EWS (Engineering Workstation)	• Remote setting of IED, harmonic / accident wave form capture, and analysis function • Managing the facility history data • Initial control of the system
Communication device	• Real time data communication between IED and OWS • Securing system stability with redundancy and supporting TCP/ IP protocol for high-speed communication
IED (Intelligent Electric Device)	• Comprehensive range of multi-protective relay for substation automation • Automatic bay / station interlocking, automatic control of incoming / feeder line, line / transformer protection • Harmonic / accident waveform capture

Function

Remote monitoring and control	• Operating status of circuit breakers / relays • Multi-level fluctuation control of the power generator		• Circuit breakers remote control
IED analysis /correction	• Relay / Logic operational status	• Relay remote setting	• Harmonic / accident waveform analysis
Protective function (IED)	• Power generator / bay and line / transformer / breaker / motor protection		
Automatic control	• Automatic interlocking • Automatic re-closing function	• Synchro-check function • Automatic bay control	• Power failure / return control



Main operation screen

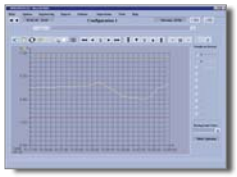
- Circuit breaker monitoring control
- Relay status monitoring
- Display the measured analog data

Graphic editing screen

- Editing of operation screen
- Tag registration
- Operation condition setting for each tag

Relay operation screen

- Relay / Logic operation status
- Relay setting condition
- Remote setting of relay parameter



Trend Viewer screen

- Real time / record monitoring function
- Data acquisition period setting

Alarm screen

- Recognition, deletion and selection view function
- Color / filter management function for each type
- Storage of relational DB

Engineering screen

- Relay Logic setting
- Harmonic capture and analysis
- Facility history management

SAS

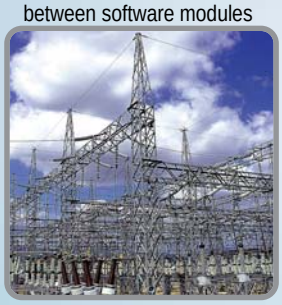
Substation Automation System

LSIS leads a new concept of digital Substation Automation System with the application of the power IT technology solution.

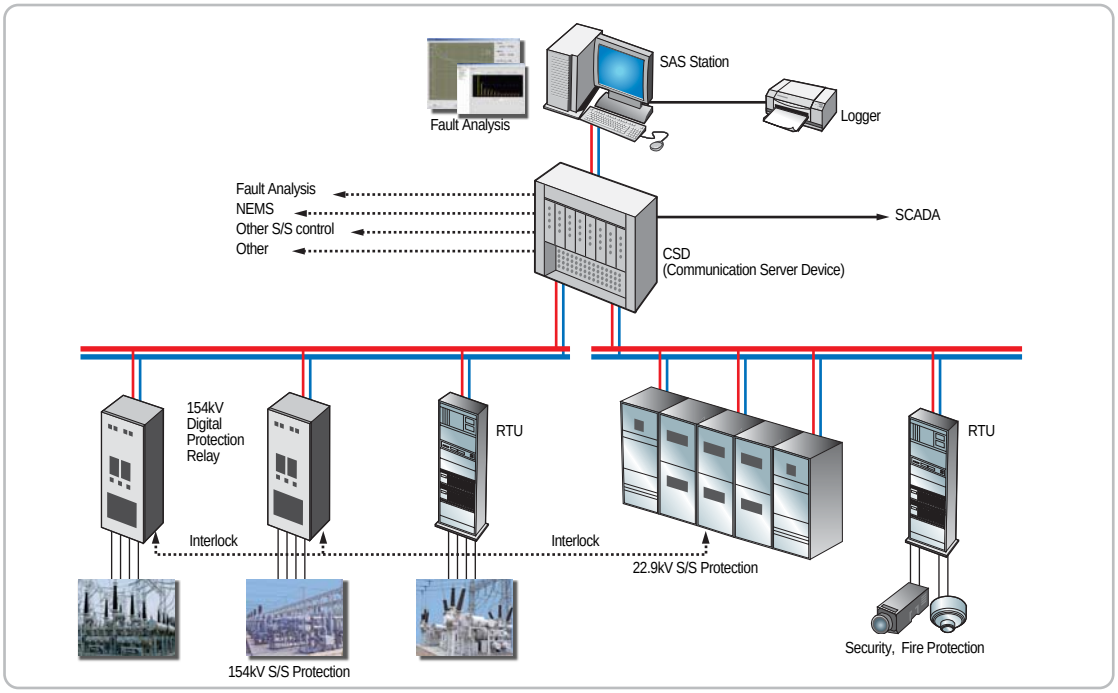
The Substation Automation Systems provide remote control and monitoring functions in real time, promptly acquiring the information of facilities for all kinds of unmanned substations ranging from distribution to extra high voltage substations, which may be applied to Intelligent Electronic Devices (IEDs) for protection and control and to the facility security devices of the unmanned substation. The SAS supports all of the higher-level remote functions such as advanced power system management and the monitoring of the condition of the equipment through the automatic operation program.

Features

- Makes possible communication with various Intelligent Electronic Devices (IEDs) and analysis of the IED relay curve and accident function
- Increases the convenience of operation through the remote setting function of the IEDs, the bay-status indicating function, and others
- Provides support for large capacity data communication in real time by applying the Real time OS and TCP / IP Protocol
- Applies object-oriented technology to secure the flexibility, efficiency and reliability of data communication between software modules



System configuration

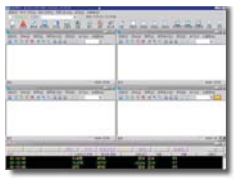


Description

SAS Station	• Collects field information through communication with CSD using TCP/IP protocol • Data acquisition and processing in real time for all substation facilities such as GIS, IEDs, TR, Security equipment, and others • Executes automatic control functions such as accident recognition, auto transfer, and power factor control in all substation facilities • Analyzes accident type and operational conditions through the operating curve data of the IEDs
CSD (Communication Server Device)	• Provides operational information on the power equipment to the upper energy management system that controls the power supply and distribution line • Control the power equipment by the order of energy management system • The communication control device is applied to the substation to acquire, analyze and process the system operation data
RTU	• Acquires the operation information of security equipment and others not equipped with IED and transmits it in CSD • The message transmitted via CSD is analyzed in order to perform the command and the result is returned in this device
Protective relay board	• By accommodating the IEDs for the protection of GIS, TR, and others in order to communicate through CSD at high-speed • Applies digital integrated relay (IED) equipped with a communication function

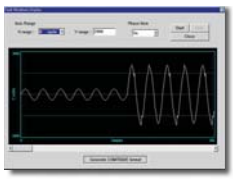
Function

Operation support	• System operation screen, acquired information display, operator/engineer support, system operation status monitoring
Automatic control	• Automatic interlocking, synchro-check, balanced voltage regulation (Tap-changer control), transformer load balance control • Automatic power failure / return control, load shedding, automatic re-closing function, power factor control
Facility protection	• Generator protection, bus protection, bay protection, transformer protection, power line protection, motor protection
Data acquisition and application	• Remote data acquisition and decision, event alarm report record, accident wavefome capture
Data Link	• Support of various communication protocols
Facility status monitoring	• GIS gal malfunction condition, circuit breaker condition, transformer condition



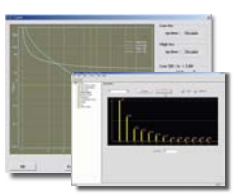
SAS operation of initial screen

- 4 view-port support
- Menu bar setting for supporting operator
- Prompt recognition through warning window



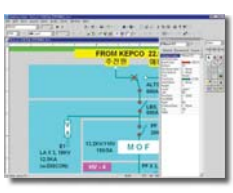
Real time trend screen

- Display the IED's analog value in real time
- Accident waveform display
- Display the comparison data in real time



Protective relay analysis screen

- Relay setting status indication
- Supports remote setting
- Accident waveform analysis

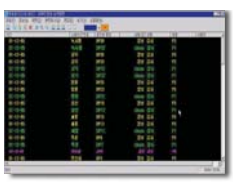


Graphic editing screen

- Editing monitoring
- control screen
- Runtime editing support
- Support of VB Script for event and action

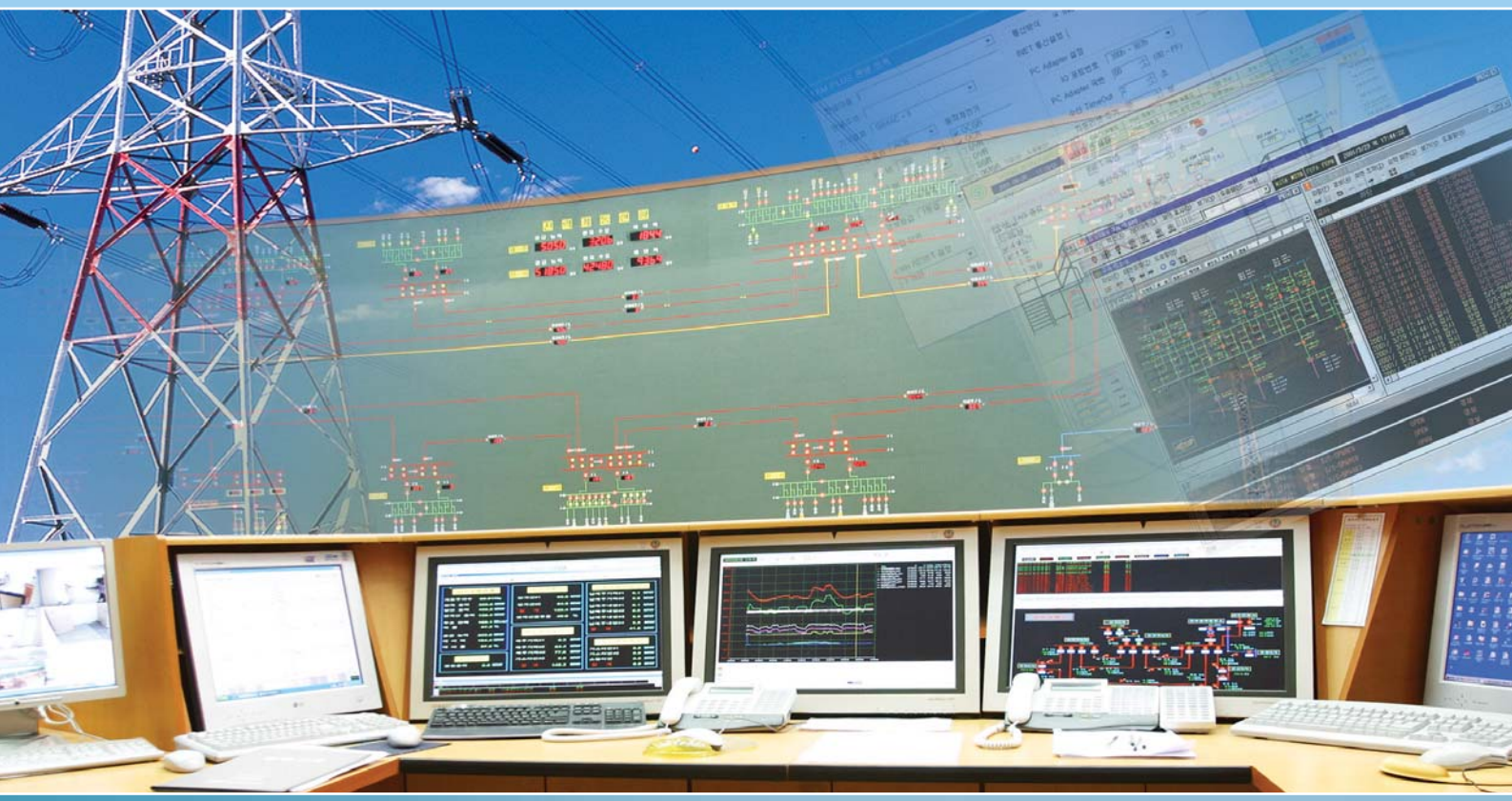
DB editor screen

- Individual / total editing function
- DB search function support
- Support EXCEL format



Alarm screen

- Support of alarm setting (7-stages)
- Alarm filtering function
- Support of recognition and deletion function



SCADA

Supervisory Control and Data Acquisition System TOPAS

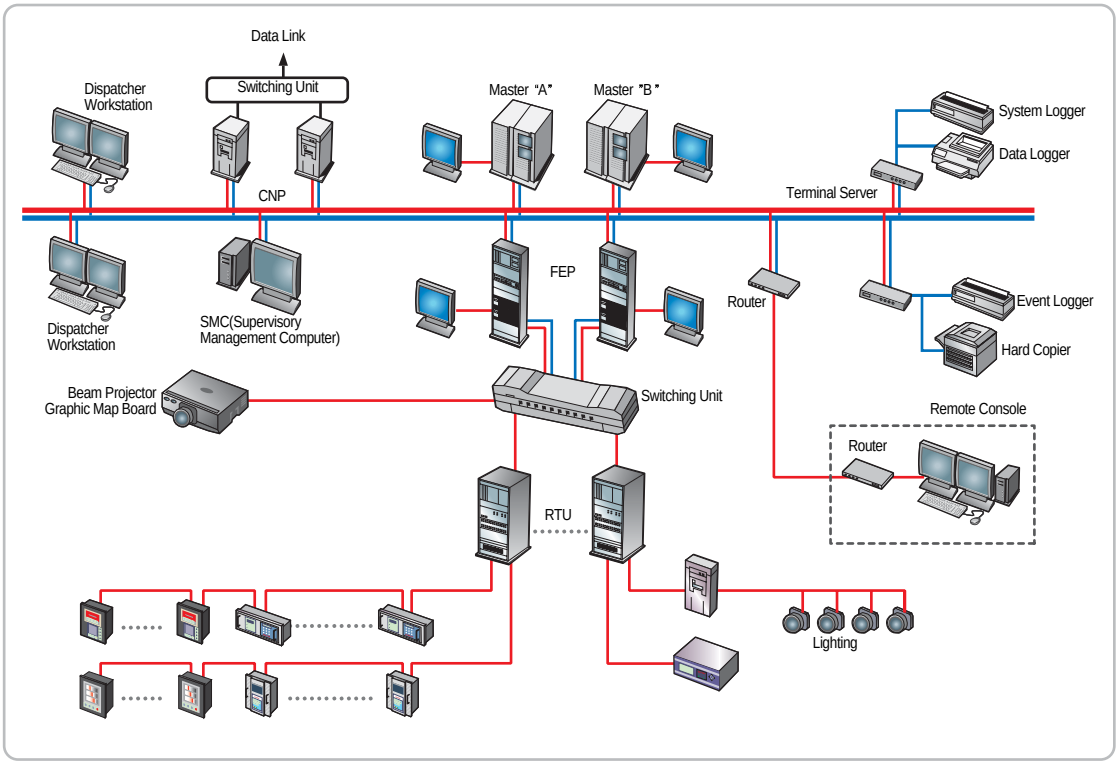
LSIS provides a highly reliable monitoring and control system for a stable power supply using accumulated technology.

SCADA (Supervisory Control and Data Acquisition System) fulfills the role of monitoring and controlling the power facility located on the distance site in on-line, which is based on the information about circuit breaker status, analog and digital data collected by the RTU (Remote Terminal Unit) and transmitted to the central computer through the line or wireless communication network.

Features

- User-oriented graphic environment with full graphic resources and working tools
- Possible to monitor and control the site in Viewport and alarm windows
- Transmits the operating information relating to I/O point in real time
- Support for making full use of IED functions through flawless communication with IEDs
- Operated through Unix and Windows 2000/XP OS
- Storage of long-term data using the relational database
- Report generation with various formats reflecting user requirements
- OTS (Operator Training System) function support (Option)
- Web monitoring function support (Option)

System configuration



Description

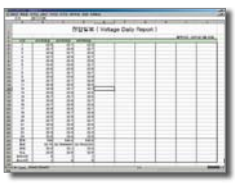
Master	• Execute basic functions of the SCADA System • Execute shared DB management, real time data acquisition and processing, automatic control, demand control, power factor control, emergency power generation control • Alarm event processing and system service function
Dispatcher	• Uses information from the master to support the operator and to supervise the power facility • Supports the dispatcher screen display, alarm indication, report generation function, etc.
SMC	• Manages the large capacity Database in real time using Oracle DB management software. • Analyzes and displays the past trend data in real time
FEP	• Communicates with field devices such as RTU for data acquisition based on real time OS • Collects various events arising from the site in real time and transmits them to Master • Command control from Master for transmission to field devices such as RTU
RTU	• Collects information from the field device and executes data processing, monitoring and control function • Transmits collected real data to the central computer through the line or wireless communication network

Function

Remote monitoring	Circuit breaker-Relay operation status, collection of SOE information
Remote control	CB control, multi-step control, demand control, power factor control, emergency power generation control
Remote measurement	Instant data like voltage and current, accumulated data like WH, acquisition of measurement value through the communication with IED
DB management	DB generation and modification, daily/monthly/yearly report generation, alarm history management, trend display

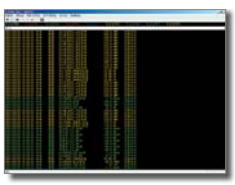
System monitoring screen

- Graphic monitoring control screen
- Analog, Digital Point monitoring control
- Providing various animation functions



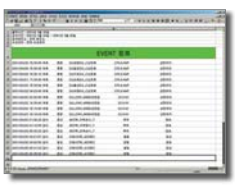
Report screen

- Daily / monthly / yearly report generation
- Report generation reflecting user requirements
- Supports MS-Excel format



Alarm screen

- Alarm and event output
- Supporting recognition, deletion and selection view functions

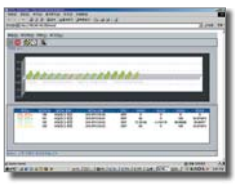


Event history screen

- Search of event arising in the past
- Store in relational DB
- Store data up to 3 months
- Support MS-Excel format

Screen viewer

- 10~1,000% Zoom function
- Opened Page History management
- Data acquisition from Web Server System
- Display with animation effect
- Data acquisition, screen changing period control function



Trend Viewer screen

- Display the appointed data with real time
- Data acquisition period control function

FEP

- FEP (Front End Processor) communicates with field devices such as RTU for data acquisition and transmits the acquired data to Master based on the 32bit Mircro processor and real time OS, and command control from Master for transmission to field devices like RTU.
- FEP supports standard international protocols including DNP Protocol, Harris, etc, and communicates with various field devices with multi-protocol at the same time. Furthermore, a redundancy communication line is available to secure reliability.

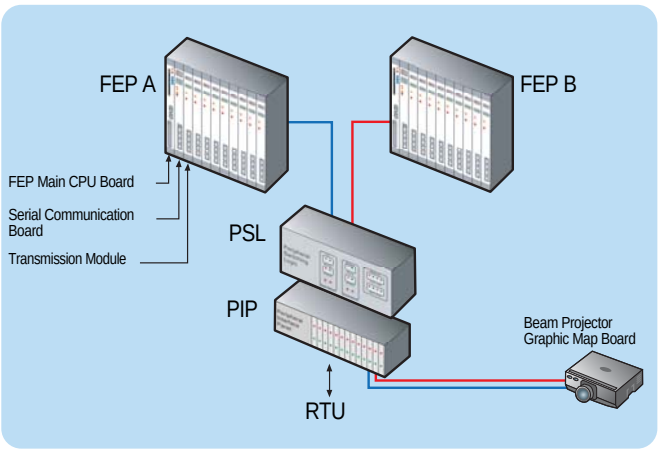
Features

- Redundancy system secure the reliability
- International standard protocol (PNP 3.0) and multiple protocol support

Specification

Hardware	**CPU Board**	MPC604 333MHz, ECC DRAM 128 MB Flash 9 MB, L2 Cache 256KB
	I/O Board	TRMC868 (RS-232)
	I/O expansion Board	PMC Span
	Transmission Module	TM / TPMC868
	PSL	Peripheral Switching Logic
Monitoring control Point	**Communication Port**	up to 80Port / Shelf
	RTU	up to 10RTU / Port
	Digital Point	up to 30,000 Point Binary Input : up to 2,048 Point / RTU Binary Output : up to 512 Point / RTU
	Analog Point	up to 20,000 Point Analog Input : up to 512 Point / RTU Analog Output : up to 64 Point / RTU Accumulation : up to 64 Point / RTU

Redundancy communication support



- **PSL(Peripheral Switching Logic)**
Monitors the FEP A,B and transfers FEP A to B automatically when FEP in operation is shut-down or undergoes abnormal operation.

- **PIP(Peripheral Interface Panel)**
Following the mode change for operation in duplication FEP(Active-Standby), this relay module switches off the external communication line

Major applications

- KEPCO RCC(Regional Control Center), LCC (Local Control Center)
- Substation monitoring control for subway
- Plant with small substation and energy management monitoring control
- For monitoring control of substation automation system, this is the equipment condition monitoring function and remote control function in connection with the substation protective control unit

RTU

- The RTU (Remote Terminal Unit) collects data from the field device (meter and sensor) and transmits it to the Master installed in the central monitoring room through the cable network or wireless communication network.
- The RTU of our company is developed to support various communication media depending on use and site condition, and is a highly functional multi-purpose RTU.

M-RTU

Rating and specification	Equipment configuration		• Main system (MPD) • Site control device (FPD) - Include DI / DO Module • Intelligent measurement device (IAPD) - Include AI / MMU Module
	CPU		MPD : 68040 MPU (25MHz), 16MB DRAM, 512KB SRAM, FPD / IAPD : MC68360 MPU, TMS320C32 DSP, 1MB DRAM
	Protocol		Host communication: DNP KEPCO 1.0, multiple Host communications Device communication Protocol: DNP 3.0, RS-485, 250kbps
	FPD	DI	32Point / Module, up to 320 Point support (FPD 1CPU each)
		DO	16Point / Module, up to 160 Point support (FPD 1CPU each)
	IAPD	AI	18Channel
		MMU	CT/ PT input with 18 Channel X 5Module
			IAPD PNL with up to 8T / L, 4MTR, 36D / L
Major applications			KEPCO substation
Features			• Flexibility in dispersed installation and intensive installation • 32Bit CPU is adopted in each board • Applying the industrial standard of 19" VME bus • Real time OS application for improved system • Object-oriented S/W technique is used in modulation program • FPD and IAPD that supplies I / O function can be increased up to 32 units • Minimize the error in measurement with the direct inputting of CT / PT • SOE function support

N-RTU

Rating and specification	CPU	MPD-68040 MPU (25MHz), 16MB DRAM, 512KB SRAM
	Protocol	Host communication: DNP 3.0, Harris-6000 Electronic distribution board Interface : DNP 3.0,Modbus, Profibus, I-Net, Bitbus
	DI	32Point / Module, up to 3,200Point support
	DO	16Point / Module, up to 3,200Point support
	AI	16Point / Module, up to 1,600Point support
Major applications		Subway, mid-to large substation, Plant
Features		• Various digital relay communication linkage supports • Application of industrial standard of 19" VME bus • Real time OS application to improve the system capability • SOE function support • Various support of protocol for upper communication

S-RTU

Rating and specification	CPU	32bit high capability RISC Processor
	Protocol	DNP 3.0, I-Net
	DI	8Point / Module, up to 48Point support
	DO	4Point / Module, up to 24Point support
	AI	8Point / Module, up to 48Point support
Major applications		Small factory, using digital relay
Features		• Composed with the dispersed type of architecture with the selection of high capacity 32bit RISC Processor • Support SBO (Select Before Operation), CBO (Check Before Operation) functions • Operation information and event information are stored and managed • Providing main equipment for communication duplication functions (DNP 3.0) • SOE function support

DAS

Distribution Automation System

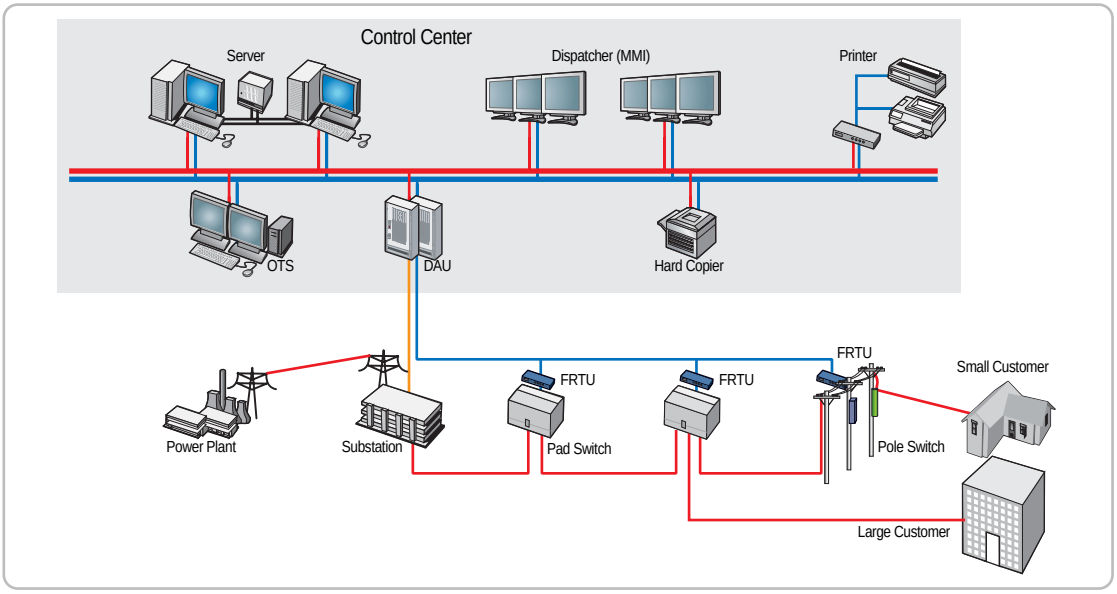
The LSIS power IT solution designed for the efficient operation of power distribution permits the convenient use of power.

The Distribution Automation System (DAS) performs prompt recovery of the distribution line automatically with a function which separates the shutdown section and recovers the normal distribution line in the event of a breakdown of the distribution line. The DAS controls the Pad-mounted or overhead switchgear and monitors its status at distance by communicating with the FRTU installed in the switchgear based on computer and communication technology. It is composed of the central system, DAU, communication device (cable / wireless), FRTU, and Pad-mounted or overhead switchgear.

Features

- Supports auto-tracing the point of accident
- Automatic decision function in breakdown mode (manual / automatic FI)
- Automatic separation and recovery support in the failed area
- Applies the SBO and CBO functions to secure the reliability of the control operation
- The composition of the hardware is designed to consider functional improvements and update functions through the downloading of the application program
- Supports various wired and wireless communication (RF, CDMA, optical communication and others) functions

System configuration



Description

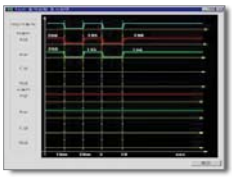
DAS Server	• Monitoring and remote control of the entire distribution line through the FRTU installed in the switchgear • When a failure occurs in the distribution line, it estimates and separates the shutdown section, recovering the normal distribution line automatically
Dispatcher	• Supports the operator to control and monitor the distribution line while displaying the power line, navigation and alarm screen. • Assists the operator in taking emergency steps to deal with a shutdown of the distribution line
OTS(Operator Training System)	• Assumes imaginary accidents in the distribution line and executes a simulation • Accident response training and dispersion effect analysis of line separation
DAU (Data Acquisition System)	• Undertakes communication with the FRTU installed in the switchgear and the RTU installed in the substation • Various events are collected in real time from on-site and sent to the host system • Communication Unit interpreting the control command of the host system and controlling the FRTU
FRTU	• Uses the input of the CT/PT of the Pad-mount/Overhead to send to the upper side by acquiring information on the operation condition and accident current • Site control unit to separate the failed area following the control command of the host system

Function

Remote monitoring and control	Distribution equipment condition monitoring, distribution line measurement, remote control of distribution equipment
Operation function	Report of breakdowns, system online breakdown diagnosis, event alarm processing, automatic re-booting function, DB management of operation information
Distribution automation operation	Estimates and separates the shutdown section, and recovers the normal distribution line automatically

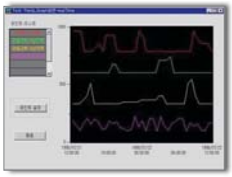
Distribution line operation screen

- Switch / FRTU status display
- Switch / FRTU remote control
- Navigation function



Breakdown situation analysis screen

- Switchgear operation information recognition
- Perpetual / momentary breakdown analysis
- Waveform display of breakdown type
- Display the Separated shutdown section

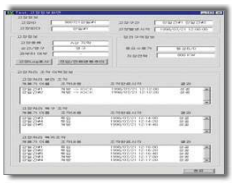


Real time trend screen

- Measurement value display for switchgears in real time
- Data acquisition period setting function
- Real time comparison point setting function

Distribution line with remote control screen

- Manual / Automatic control
- Individual / total control
- Control condition for advance setting function



Breakdown information processing screen

- Distribution condition breakdown list indication
- Breakdown processing / operation condition
- Accident waveform display

Expected loading analysis screen

- Load bearing rate analysis with changing distribution line
- Overload distribution line display
- Suggest the appropriate measure against the overload

FRTU

Features

- Classification for each circuit of line operation condition
- Securing of operation reliability by SBO, CBO
- Communication efficiency by various event data
- Measuring current, voltage and power with improved precision
- Using the large memory to store detailed information on operation and shutdown status

Rating and specifications

CPU	Dual Processor (32bit floating point DSP.32bit RISC CPU)
Protocol	DNP 3.0
DI	Pad mounted switchgear-32 Point, Pole mounted switchgear-16 Point
DO	Pad mounted switchgear-6 Point, Pole mounted switchgear- 6 Point
AI	Pad mounted switchgear-24 Point, Pole mounted switchgear- 9 Point
AO	11 Point

PMS

Power Monitoring System FAM+

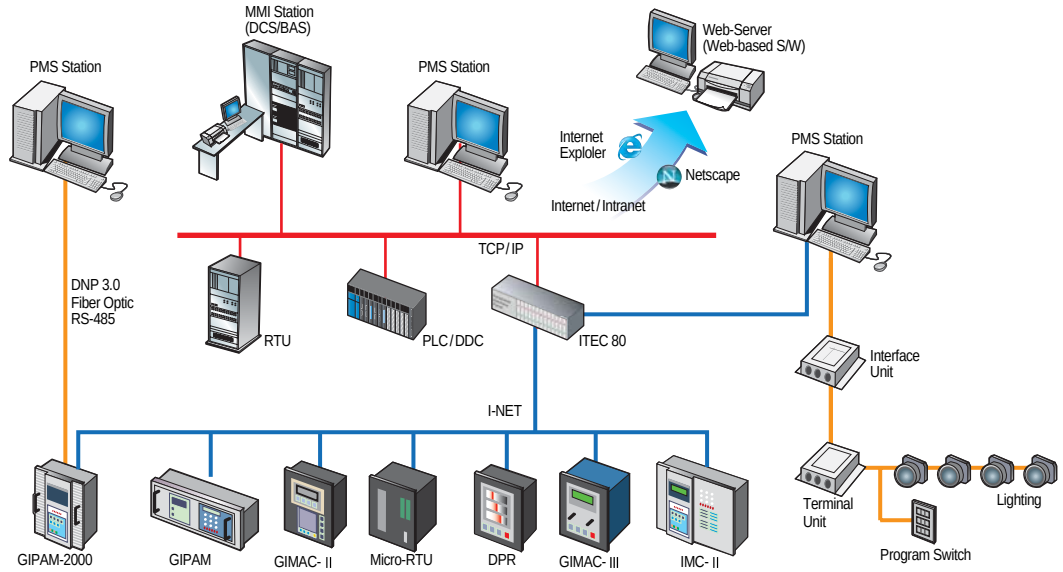
For customers striving to become top-notch companies,
the LSIS industrial IT solution will be there at every step of the way.

The PMS (Power Monitoring System) has been designed for remote monitoring and control using power equipment with digital relay or RTU for power facilities in factories, plants, buildings, and others. This monitoring and control system is equipped for application and integrated operation in various fields including lighting, remote meter reading, air conditioning and water treatment facilities, in addition to the power equipment.

Features

- Makes full use of digital relay using various items of communication equipment including ITEC-80, PCI Cards, and GVME Boards.
- Supports communication with various devices such as Digital relay, PLC, DDC, etc
- Online editing function and convenient screen editing function
- Supports system duplication and integrated monitoring system solution
- Web-based monitoring solution (Option)

System configuration



Description

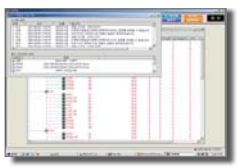
PMS Station	• Displays information on field facility to support the operator in control and monitoring functions • Composed of a PC, monitor, PMS S/W, printer, and others. Can be linked to a graphic panel or DLP
Web-Server	• With Internet, furnishes information on field facility to anyone using the web browser without any software installation. • Composed of a PC, monitor, PMS S/W Web Version
Communication Device	• Device for converting the unique Protocol of a field device into standard protocol. • Support to maintain the communication speed and function of the field device • To support multiple protocols, LSIS has developed communication devices such as: • The ITEC-80, which converts the I-NET into the TCP / IP Ethernet protocol • The GVME Board, which communicates with RS-232C, DNP, modbus.
RTU	• Collects data from a field device (meter and sensor) and transmits it to the PMS station installed on the central monitoring room through the wire or wireless communication network in real time.
Field device	• Installed in the power equipment to collect information and control it • Equipped with digital relay (GIPAM, GIMAC, DPR) and uRTU, a motor protection device (IMC-II), lighting control equipment (transmission unit, light relay, program switch), and others, it can be linked through PLC or DDC for digital relay, DCS (Distributed Control System), BAS (Building Automation System), and other systems.

Function

Remote monitoring and control	Circuit breaker · relay operation condition, SOE information collection, circuit breaker remote control, multi-stage fluctuation control
Remote distance measurement	Instant data : current, voltage,watt, Accumulate data : WH,VarH, Acquition data of IED
DB management	DB generation & change, daily/monthly report generation, event record management, trend display

System monitoring screen

- Circuit breaker monitoring · control
- Relay operation condition monitoring
- Analog measurement value monitoring
- Displays in same shape as IED and controls same operation



System operation condition indication screen

- Network condition indication
- System operating status indication
- Communication network structure screen

Trend screen

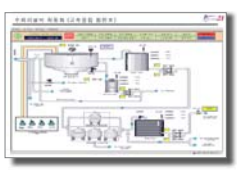
- Real time range setting indication function
- Upper and lower warning setting function
- Data recording of more than one year
- Data acquisition period adjustment

Facility Management screen

- Facility repairs history
- Circuit breaker capacity, relay setting data indication
- Supports Microsoft Excel / Word

Alarm screen

- Warning setting for each grade (8 grades)
- Warning filter function
- Past record indication (more than a year)
- Support of a recognition and deletion function



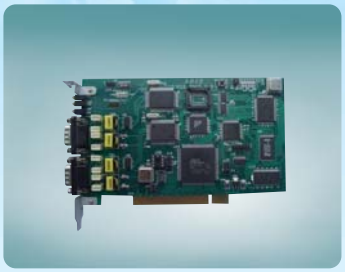
Integrated system operation support screen

- Power and lighting control screen
- Water treatment processing, air conditioning facility support
- Integrated monitoring system link support

Communi-cation device

INET-40

The INET-40 is a PCI card that is loaded onto the PCI slot on a PC to communicate digital relay with I-NET protocol and supports 2 channels of I-NET communication. This device undertakes the interface with 32 bit data width on the PCI bus and two ports for the I-NET protocol for communication up to 256kbps.



Rating and specification	CPU	• ARM7TDMI Processor (S3C3410 40MHz) • SDRAM 8MB, Flash Memory 2MB • 32bit of Data Width for PCI Interface
	Communication	I-NET: 2 channels (up to 256kbps)
Features		• Supports high-speed communication with digital relay up to 256Kbps • PCI Bus Interface support inside the PC

ITEC-80

ITEC-80 is a high speed and large capacity of communication system with the VME Bus method that it is composed of the Master CPU board and Slave I-NET Board and it supports a total of 4 channels of I-NET communication. On the VME bus, it undertakes the interface with 16 bits of Data Width, and the I-NET 4 Port is communicated up to 256kbps.

Rating and specification	CPU	• ARM7TDMI Processor (S3C4510 50MHz) • SDRAM 16MB, Flash Memory 8MB , SRAM 1MB
	Communication	• Host : 2 ports of TCP / IP or UDP channel support • Field : I-NET 4 channels (up to 256kbps)
Features		• Real time O / S (RTOS) is selected to secure reliability • Use the PGM port to monitor through ITEC-PD • Preserves user memory and system log with backup battery • Supports Ethernet communication on 100Base-T / 10Base-T • Uses the VME bus method

FIU

The FIU (Field Interface Unit), a device for interfacing with the monitoring system, is installed in the central monitoring room for information transmitted via cable or wireless lines from the RTU: the device transmits the operation message of the monitoring system to the RTU, serving as the communication relay by transmitting the transmitted data of the RTU to the main computer system (including the monitoring system).

Rating and specification	CPU	• Flash 4MB, SRAM 1,024KB, EPROM 8KB
	Communication	• Ethernet : 8 Ports • Communication speed: 10Mbps or more • Communication operation: Entire duplication
Features		• Providing multi-function User Interface • Providing self-diagnosed function and self-testing function • System expansion by the slot method • Select 3-stage protection circuit for any surge on the communication line

RTU

The RTU (Remote Terminal Unit) collects the data from the field device (meter and sensor) and transmits it to the PMS station installed on the central monitoring room through the wire or wireless communication network in real time. Our company's RTU is a high-function RTU that can be utilized as a multi-purpose device by developing various communication media depending on the installation use and conditions.

MASTER RTU-PCS

Rating and specification	Communication	• Wireless: PCS network, VSAT hub network • Cable: Exclusive line network • Communication port: RS232 / 422 / 485
	DI	8 / 16 Point / Module
	DO	8 / 16 Point / Module
	AI	4 Point / Module
	AO	4 Point / Module
Major applications		Gas pipe equipment, small- and medium-sized plant equipment
Features		Supports various communication functions

MASTER RTU-RF

Rating and specification	Communication	• Wireless: RF network, PCS network, VSAT hub network • Cable: Exclusive line network • Communication port: RS232 / 422 / 485, Ethernet
	DI	16 / 32 Point / Module
	DO	16 / 32 Point / Module
	AI	8 / 16 Point / Module
	AO	8 / 16 Point / Module
Major applications		Medium- and large-sized plant equipment
Features		• Appropriate for sites which are not supported by the civil communication network, such as mountainous and coastal areas • Variable wireless communication solution support (RF network / PCS network / VSAT hub network)

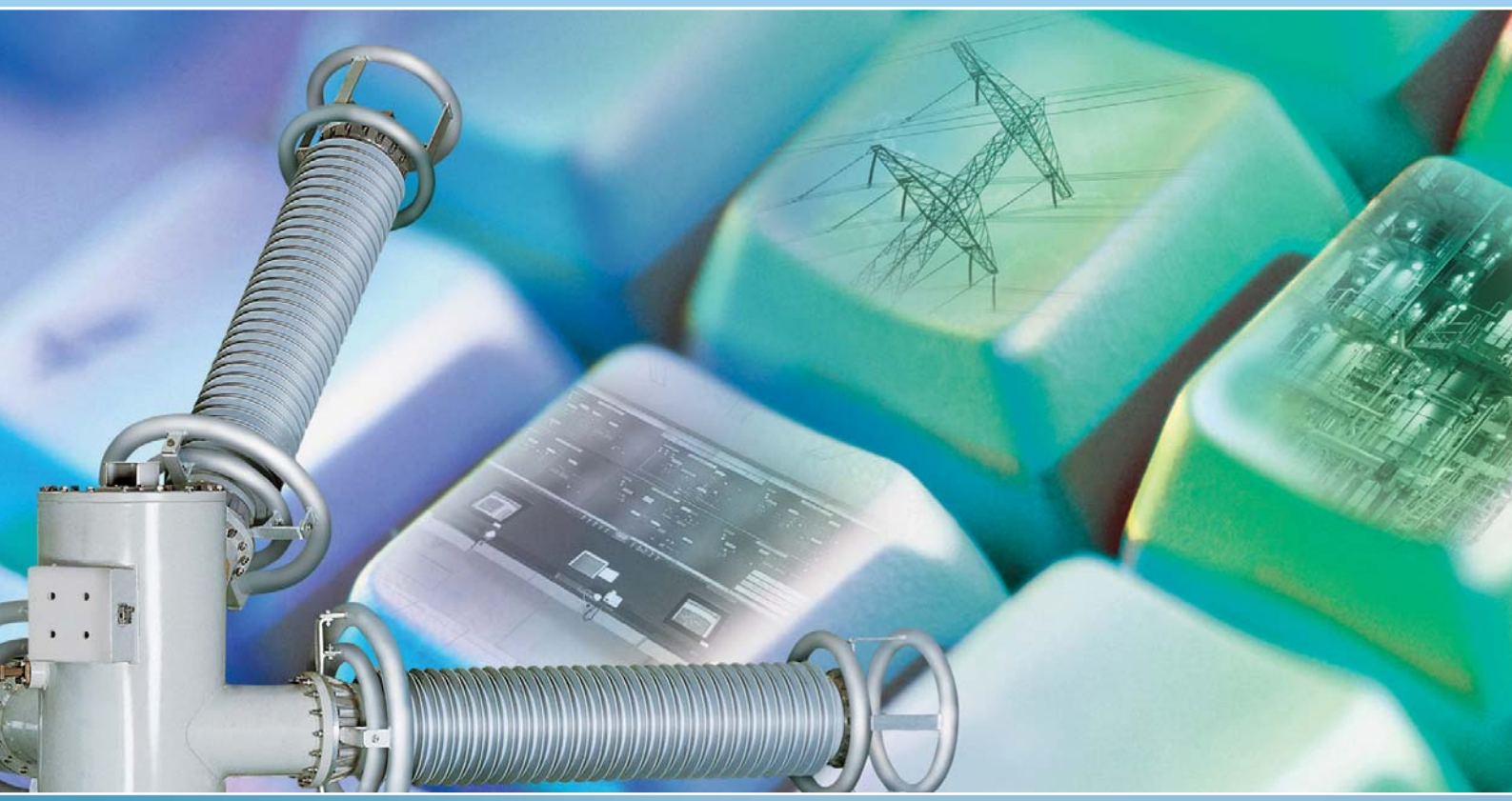
MASTER RTU-MICRO

Rating and specification	Communication	• Wireless: RF network, PCS network, VSAT hub network • Cable: Exclusive line network • Communication port: RS232 / 422 / 485
	DI	15 Point / Module
	DO	8 Point / Module
	AI	6 Point / Module
	AO	1 Point / Module
Major applications		In the case of extremely small number of input for each RTU
Features		Ultra-slim power-efficient RTU

Field device

Our company has been supplying the system that links to the on-site terminals of various kinds to satisfy the demands of the customers.

- PQ Meter
- Digital relays (GIMAC, GIPAM Series, other digital relays)
- Illumination control equipment and demand controller
- DCS (MASTER P-3000 Series)
- PLC (GLOFA Series, other companies' PLC)
- Air conditioning equipment for controlling DDC Panel
- Fire-fighting equipment
- Remote meter reading system
- E / L monitoring system



PQMS

TOPAS -PQ

Power Quality Monitoring System

LSIS provides premium power to the industrial sites and important facilities requiring stable and high quality.

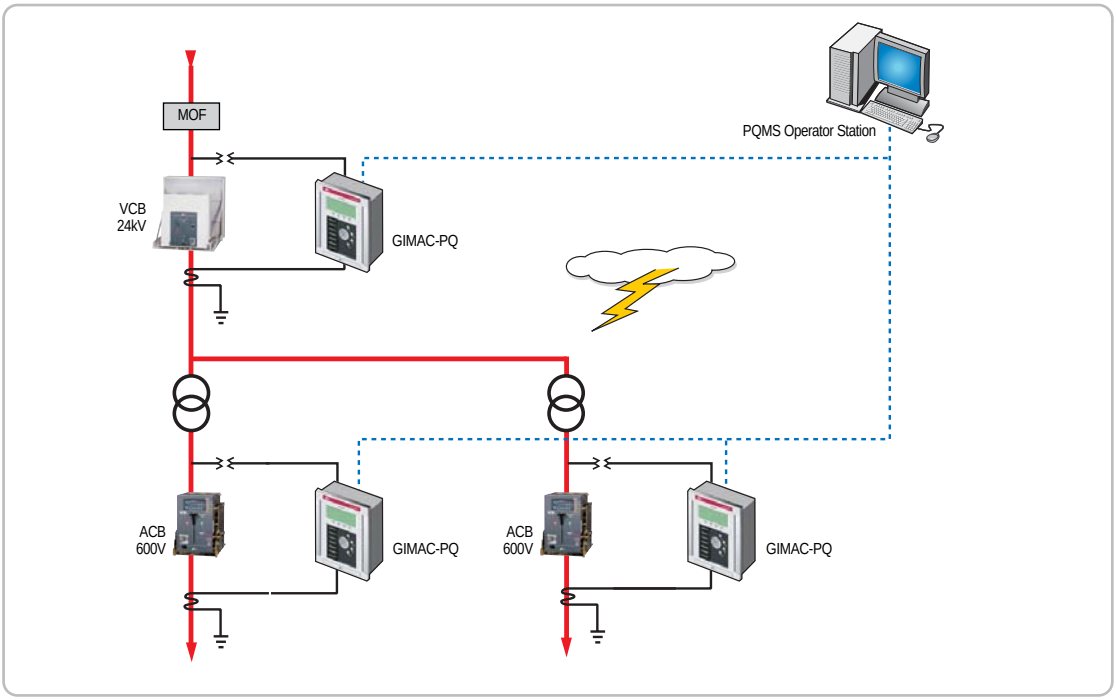
PQMS (Power Quality Monitoring System) analyzes the primary causes of power quality decline and suggests solutions for this problem by gathering power quality information from the PQ meter installed in major power facilities and analyzing the information in real time.

In particular, this is a useful system for production facility systems requiring a high quality of power.

Features

- On / Off Line electric quality analysis
- Interface including the user color-setting for each PQ event type
- Visual analysis using various charts and graphs
- Detailed analysis using various graph tools
- Real time trend (option) analysis by using the real time data and graphs
- Record trend (15 minutes up to / minimal / average value) and PQ event storage and management
- PQ event statistical report

System configuration

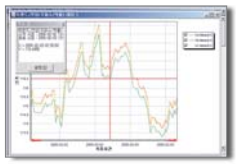


Function

Operator support	System operation screen, acquired information display, system operation condition monitoring
PQ data acquisition and application	PQ data acquisition, real time events, PQ event occurring trend analysis
PQ analysis	3-D voltage event analysis, Sag / Swell analysis, CBEMA and other statistical analysis, On / Off Line power quality analysis

Real time event screen

- Communication error / control command and other real time event monitoring
- Real time PQ event monitoring

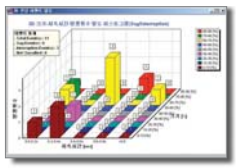


Historical trend screen

- Data export using the list of each basic element of power
- Trend analysis using the graph of period with each category on the list after setting

Real time monitoring screen

- Real time voltage / current for each meter and basic element for power of each phase for monitoring
- Real time condition information monitoring (meter, communication)
- Real time DO (Digital Output) monitoring
- Electricity quality analysis for each meter

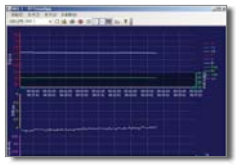


3-D voltage event density screen

- Size, sustained time, occurrence frequency for each PQ event with statistical analysis
- Size and sustained time analysis with high frequency of PQ event occurrence

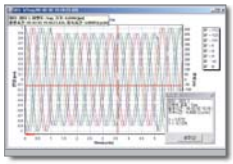
Record PQ event screen

- All PQ event record for each meter
- PQ event attributes: Meter ID, meter name, type, channel, occurrence time, continuing time, size and others
- PQ event analysis interface



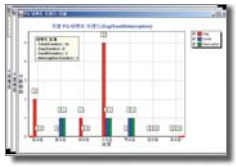
Real time trend screen

- Basic element of power with real time monitoring function
- Multi-window for meter for monitoring function



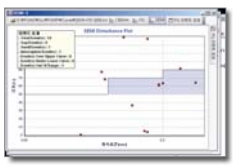
Wave analysis screen

- For certain period after the PQ event, 3-phases of voltage / current wave data analysis
- PQ event attributes: Occurring meter, type, size, occurrence time, and continuing time



PQ event occurring trend screen

- PQ event of daily / weekly / monthly trend analysis
- Simultaneous expression of sag, swell, and interruption events
- Statistics of PQ event with daily / weekly / monthly occurrence
- Clarify the causes by analyzing daily / weekly / monthly peak in analysis for each.



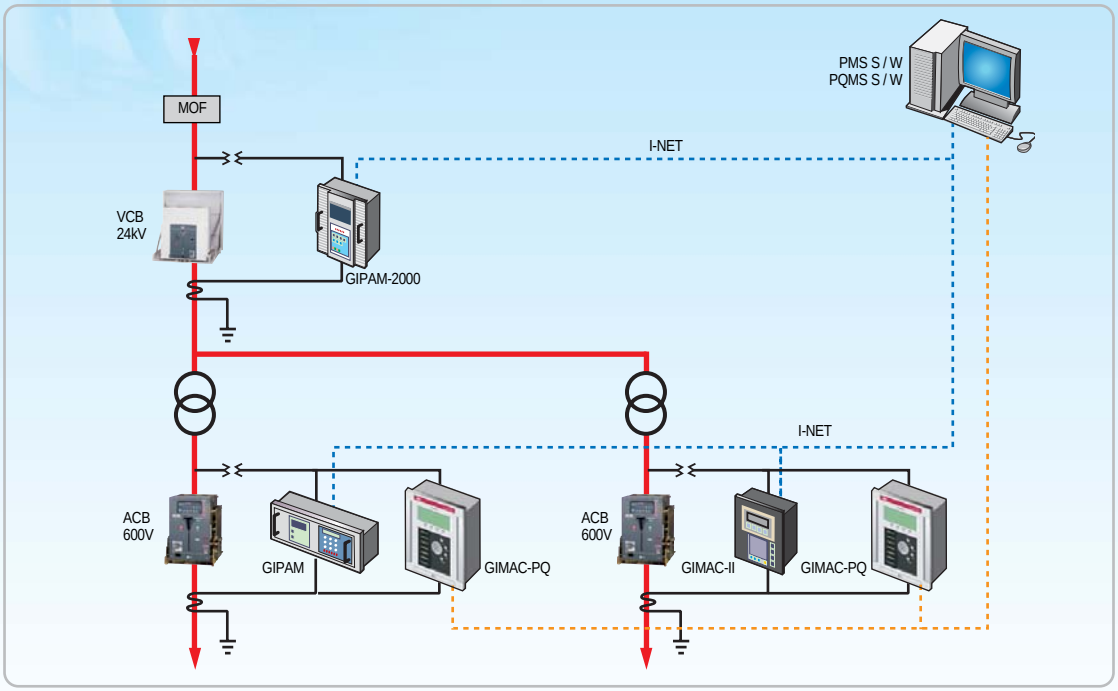
CBEMA / ITIC / SEMI analysis screen

- Time / size for each analysis of PQ event applying the standard curves
- Occurrence of PQ event statistics / PQ event for Trend / CBEMA / ITIC / SEMI analysis
- User defined standard curve editing and application
- Data tracing function
- PQ event analysis to have the influence for each of the major machines for on-site

Application of system configuration

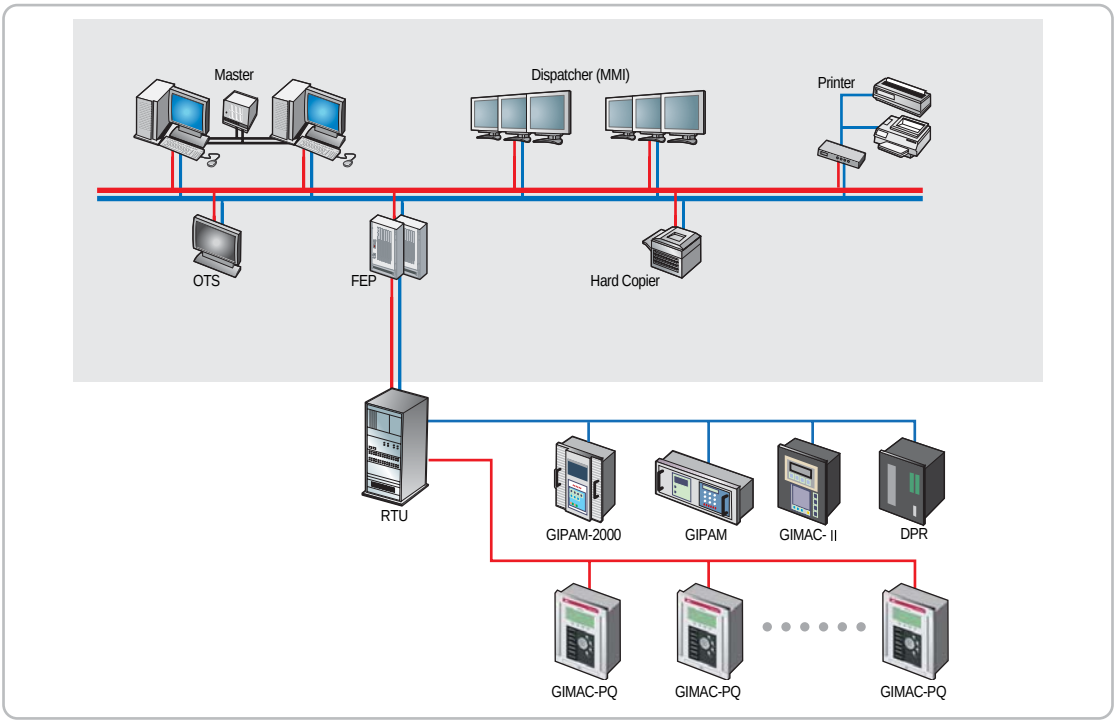
Back-up method

- Method using one central computer for monitoring S / W and PQMS S / W simultaneously
- For normal operation, MMI for power monitoring is used; the PQMS S / W is used when required for PQMS function



System integration method

- Link the digital relay and the PQ Meter through RTU
- Transmit PQ information and power information acquired from RTU to the upper system
- From the upper SCADA, this system configuration performs the PQ analysis and the power monitoring at the same time



PQ Meter

Power Quality Meter (model name: Premium GIMAC-PQ) is a device that monitors and analyzes power quality by measuring the voltage, currency, power and power quality element of the secondary load on the transformer line. This measurement equipment is used exclusively to monitor the power quality by measuring the voltage, size of current, phases, frequency, and high waves for each phase of the power system; the device records and transmits a warning if the analysis indicates insufficient power quality.

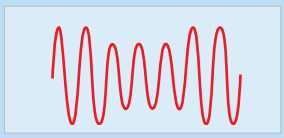
Features

- Major power quality for real time monitoring
- Providing data records when a problem with power quality arises
- High precision measuring
- Statistical processing through measurement data trend (max / min values, occurrence time, and average value)
- The equipment is managed by remote communication

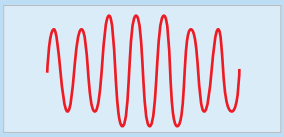
Function

- Measurement of power elements: voltage, current, valid and invalid power, vector
- Meter reading and recording for power quality elements

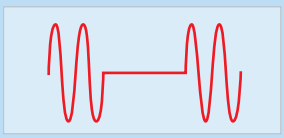
Sag
- Instantaneous
- Momentary
- Temporary



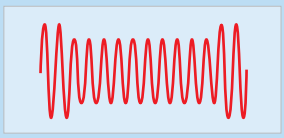
Swell
- Instantaneous
- Momentary
- Temporary



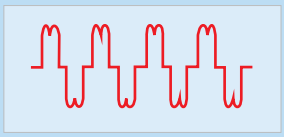
Interruption
- Momentary
- Temporary



Voltage
- Under / Over
- Unbalance



THD
Total Harmonic Distortion



TDD, K-Factor

Rating and specification

Communication	• Communication method: Modbus / RS-485 • Communication element: On-line transmission of Power Quality measurement Power Quality Event elements transmitted on / off-line Data logging element-transmitted on / off-line
Input and output	• Voltage input (20~440V) : 4 channels • Current input (250mA~6A, rated 5A) : 4 channels • Analog input (0~20mA, burden for 250Ω) : 4 channels • Analog output (4~20mA, up to loading of 600Ω) : 4 channels • Contact input (Dry Contact, input resistance of 1kΩ) : 8 channels • Contact output (Relay C Type) : 2 channels
Precision	• Voltage and current measurement precision : 0.2 rating • Power, energy and power quality element precision : 1.0 rating
Recording element	• Data logging : 250 Point • Event Recording : 256 Events • Wave Recording : 3-phase voltage / current with 12-period sag based for 170 times and up to 3-phase based with 2,048 periods

Automatic Meter Reading System

In the AMR field, LSIS resolves problems with various communication environment responses and innovative metering tasks using the Total Solution.

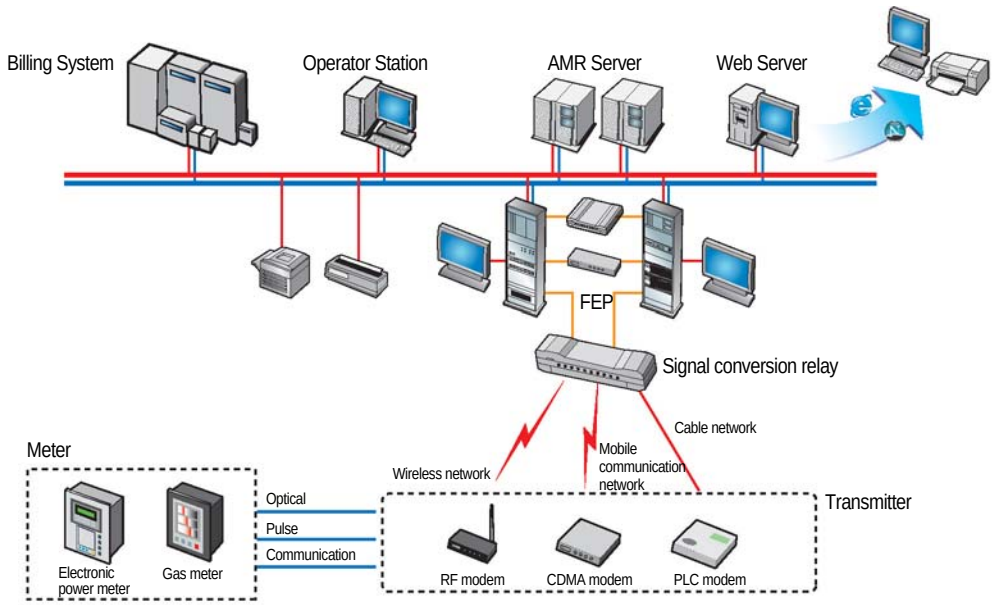
The AMR (Automatic Meter Reading System) meters power consumption in the remote user through wire or wireless communication and issues a bill of the power consumption automatically, and enables various system configurations of RF, CDMA, PLC, Handy Terminal method and others depending on the site situation.

In addition, through the automation of the meter works, the metering cost saving, the improvement of reliability for measured value and the transparent meter working are all supported. It may also be used with the data to establish an energy saving plan by analyzing consumer trends.

Features

- Supports the various communication methods depending on the site situation (RF, CDMA, PLC, Handy Terminal, and others)
- Services the power consumption data of each customer with website
- Collects data from the various remote meters (electricity, water, gas, heat meter, and others)
- Provides variety of information such as Daily/monthly reports, usage trends by graph, etc.
- Preserves data during power failures

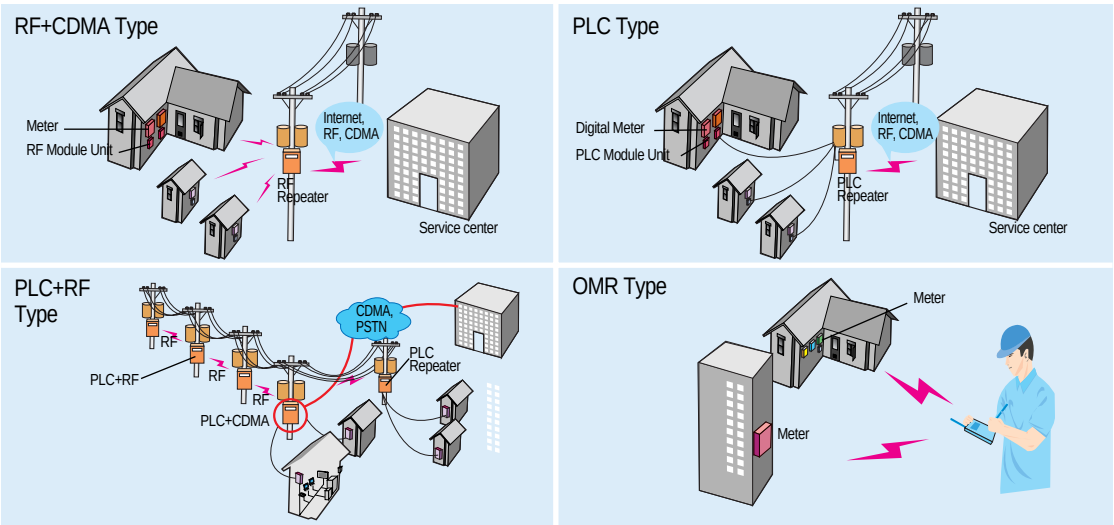
System configuration



Description

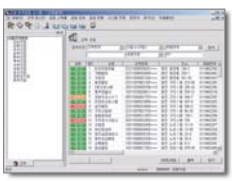
AMR Server	The information relating to the power use of each user is collected to provide the meter reading-related information to the operator for publication in the monthly report
Web Server	With Internet, furnishes information on power consumption to anyone using the web browser without any software installation.
Billing System	Issues power consumption bills to each user based on data acquired from the AMR server
FEP	Communicates with the site device and wire or wireless device through various protocols and transmits the data after converting the acquired information to the AMR Server
Communication device (transmitter)	This device collects the information from the electronic meter of each user and converts it into the appropriate protocol for sending to the AMR server
Electronic gauge meter	This device acquires the power consumption of each user and converts and transmits it as a digital signal.

AMR configuration method



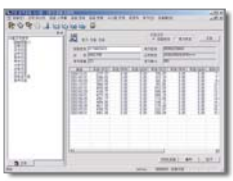
Function

- Uses the data communication equipment to store the DB of the remote meter reading data
- Detailed information inquiry and output function for customers
- Fare payment, notice issuance, and payment service function
- Added value for services by using the meter reading information
- AMR equipment resource management function



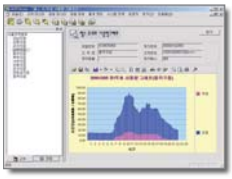
Customer information management screen

- Input of detailed information and correction for customer
- Power-related information
- Customer DB management and search



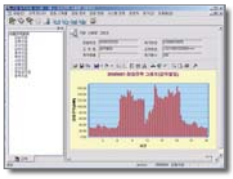
Wh report screen

- Request of monthly billing
- Integrated / individual billing issuance



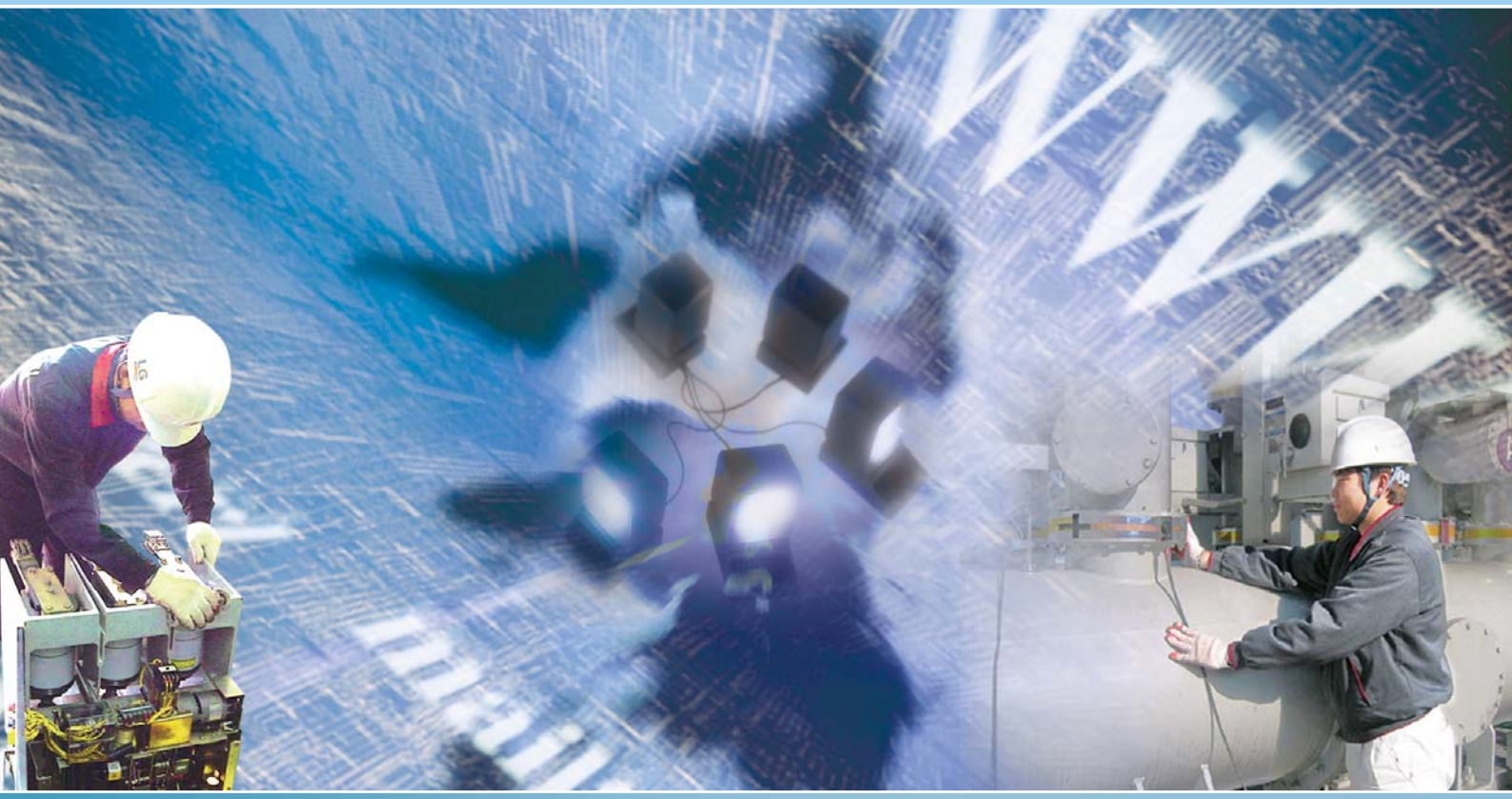
Power use graph screen

- Daily and monthly use
- Status of use for peak power



System operation status screen

- Status of remote meter reading
- Checking on communication condition



PDPS

Power Equipment Diagnosis and Preventive System

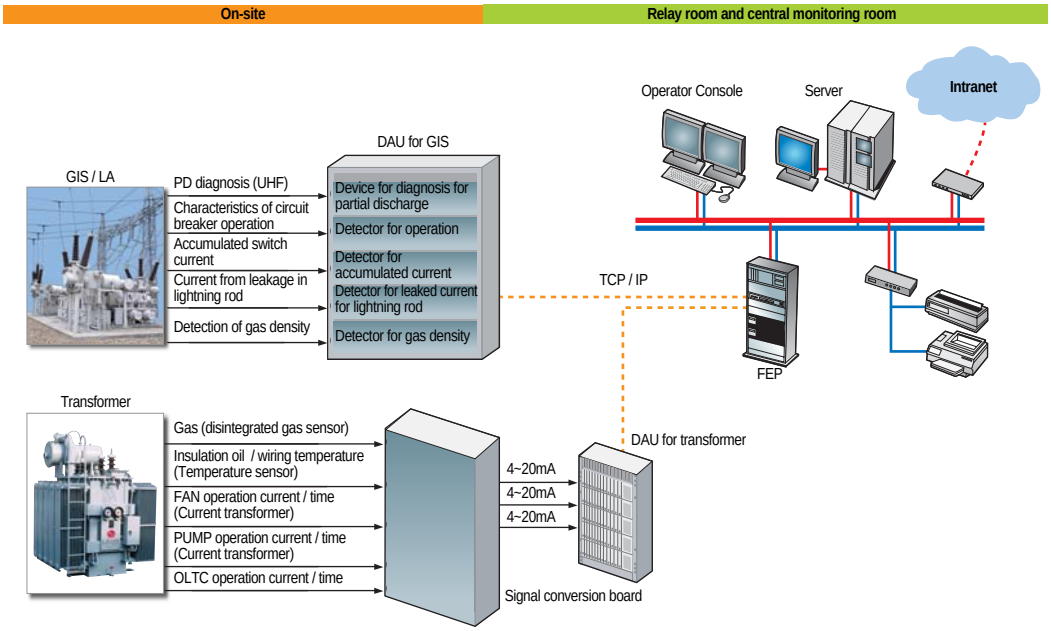
LSIS provides a wealth of practical experience and know-how about power systems through its power IT Solution.

The PDPS (Power Equipment Diagnosis and Preventive System) monitors the functions and capabilities of major power facilities to prevent breakdown and accident in advance and supports efficient power facility management through equipment records and DB management. This system consists of a sensor, DAU/CCU, and PDPS server. The sensor is applied to the power equipment to acquire the data, the DAU/CCU acquires the data from the field equipment and transmits it to the upper server, and the PDPS server supports the efficient management and accident prevention of the equipment on the basis of acquired information.

Features

- Operation of substation equipment and thermal condition monitoring diagnosis
- Provides dynamic screen for easy operation and monitoring
- Real time trend analysis using data and graphs
- Provides the results of analysis obtained from the diagnosis algorithm
- Records of trends and events are kept and managed on large-capacity DB
- Supports various reports

System configuration



Description

PDPS Station		Normal monitoring and data record management
Data acquisition unit (DAU)		Transmit the signal acquired from various sensors to the upper system
Sensors	**Partial discharge sensor**	Early detection of partial discharge signal arising within GIS
	Gas density sensor	Monitor the leakage and lowering of GIS gas density
	Leakage current for lightning rod	Analyzes the harmonic current flowing through the lightning rod and determines the deterioration
	Analysis of gas in oil	TR gas in liquid is analyzed in real time for early diagnosis
	Wiring insulation oil temperature	The TR wiring / insulation liquid temperature is compared and analyzed to determine overload and abnormality

Function

On-line monitoring diagnosis	• Indication of abnormality for each diagnosis category of TR and GIS for each Bay • Detailed information providing screen for each diagnosis category • GIS PD measurement and 2D / 3D analysis screen • Real time event and information screen indication	• Real time communication condition
Convenience of operator	• Monitoring screen editing • Filtering function for record inquiry	• Communication device On-line setting • Excel-based report preparation
Preventive diagnosis analysis	• Precise diagnosis of gas in liquid for specialized DB base • Neural Network, precise diagnosis of PD based on fuzzy algorithm	

GIS Trend screen

- GIS condition following the PD index
- Partial discharge volume and frequency
- Partial discharge volume and frequency trend

Event search screen

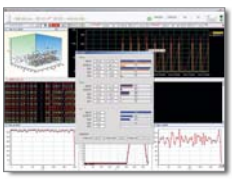
- Search period setting
- Filtering for each type of data

TR Trend screen

- Hydrogen density and TR condition
- Hourly / daily hydrogen density changes and trend

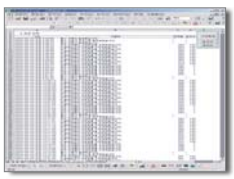
PD abnormality report screen

- Pi-Q-n 3D analysis Trend
- Pi-Q / Q-n / Pi-n 2D analysis Trend
- Statistical analysis
- Analysis result



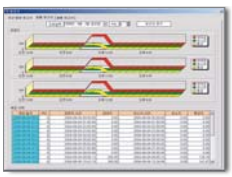
PD analysis screen

- Trend and Pi-Q-n 3D analysis
- Measurement point event indication
- GIS condition analysis with the diagnosis result
- Pi-Q / Q-n / Pi-n 2D analysis Trend



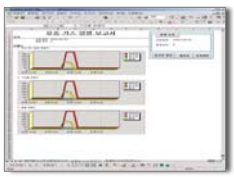
PD event report screen

- Event measurement point



TR analysis and report screen

- Report: Problem occurrence, daily and monthly
- Trend: Hydrogen density, daily and monthly
- Measurement record : Time, maximum value, minimum value and average value



TR daily trend report screen

- Daily trend for gas in liquid

LMS

Load Management System

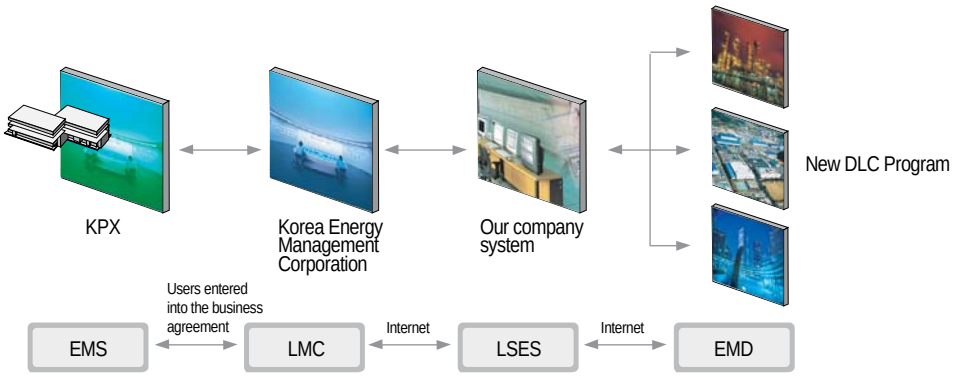
The LSIS power IT solution will be your best choice for securing a stable power supply in the power line and efficient load management

When the second stage of the power supply is required for securing reserve power during the summer loading period, the load that can be cut off is actually disconnected for a certain time. This is stipulated with the users in order to provide them with an incentive for subsidy by providing the load. The government secures the stability of power supply in this demand management program.

Incentive for participation (Korea)

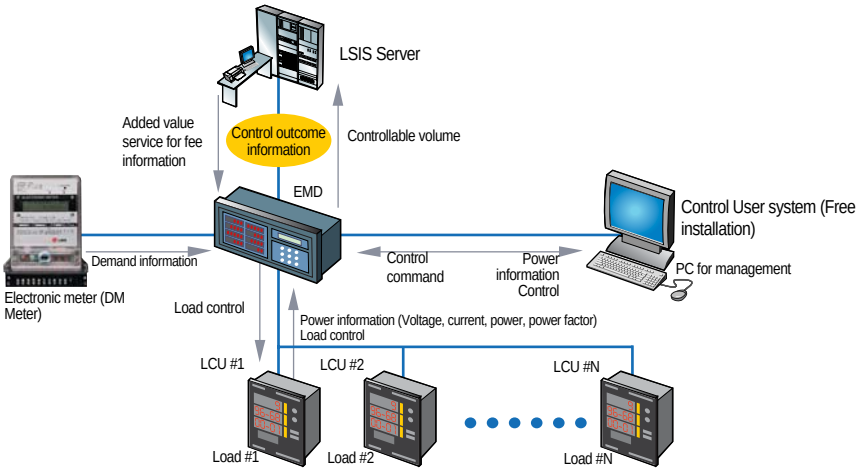
Payment of support	**Basic subsidy**	Paid 800won /kW on stipulated capacity for two months in July and August	
	Control subsidy	For the control volume	600 won/kWh (paid when notified on the previous day) 1,200 won/kWh (paid when notified on the same day) 1,800 won/kWh (paid when notified on the emergency basis)
Free installation of user system		The subsidy is paid from a power industry-based fund in order to install the system free of charge Utilized with the independent load management system (equipment monitoring and peak management)	

System configuration



주) EMS : Energy Management System
LMC : Load Management Center
LSES : Load Service Entity System
EMD : Energy Management Device

User system



Installation of equipment

EMD (Energy Mangement Device)

- Data collection of load power of LCU
- High wave analysis of user MOF
- Data storage and analysis function for power of user MOF
- Demand controller function
- MOF measurement data (3-phase voltage, 3-phase current, N current, power factor, frequency analysis, valid power, invalid power, superficial power, power volume on meter)

LCU (Load Control Unit)

- This MMI separation type can complete construction with minimal punching of the distribution board
- Modbus (RTU) protocol support
- LCU collects the power data of controlled load
- Transmit the power data on the LCU load for EMD
- LCU load of measurement data (3-phase voltage, 3-phase current, N current, power factor, frequency, valid power, invalid power, superficial power, power volume on 15 minutes)

Function

The LSIS load management system provides a special load management service for efficient operation of the system in addition to the general functions of monitoring, control, trend analysis, output of report, and others.

Energy monitoring on the main screen

- Power meter information
- EMD information
- LCU information

Power use for real time monitoring tool

- Energy use with real time monitoring
- Energy use is expressed in power volume (kWh) and electricity bills
- Provides various methods of expressing power use for the entire and individual loads

Energy record management tool

- Energy use record provided
- Analyze in various angles for the record of power consumption for overall and individual load
- Utilize in base data on power use analysis

Green Innovators of Innovation

Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance.
  Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.

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Specifications in this catalog are subject to change without notice due to continuous product development and improvement.

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