MASTER RTU System
Wired/Wireless Telemeter Telecontrol System

LSIS

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LS Industrial Systems, a global maker in the industrial electronics industry, offers the total solution system for wired and wireless remote monitor/control network based on Master RTU

LSIS Master RTU System has a range of products line up considering installation scale, communication channel and field conditions in order to meet customers' various needs.

SCADA

SCADA(Supervisory Control and Data Acquisition) is a central monitor/control station that operates a system and manages data through the remote control by system operators in a central operation room. SCADA of Master RTU System can run on either a control system developed by LS Industrial System(DCS, Distributed Control System) and InfoU, a general-purpose HMI(Human Machine Interface) Package. In addition, on customer's demand, HMI systems of other companies can be applied to our products.

Category	Major Feature	Applicable size
MASTER P-5000 CCS	• High-performance centralized HMI for controlling of large-scale process and remote monitor/control systems • High-speed alarm, Trend function, Web-based monitoring • Offering various visual data about plant, system status, alarms and etc.	Large Scale system
MASTER P-3000AT CCS	• HMI for control of mid to large-size process and remote monitoring systems • Offering various visual data about plant, system status, alarms and etc.	Medium to large Scale system
InfoU	• General-purpose HMI Package that can be applied to various areas such as PA and FA • Open ended system, various controllers and RTUs applicable • Web-based real-time monitoring	Small to medium Scale system

FIU

FIU(Field Interface Unit) is a communication relay system that collects data from RTUs on remote field points through wired and wireless channels and communicates data through interfaces with the remote monitor/control system in a central monitoring center.
FIU of Master RTU System can be selectively constructed and applied to fields according to the type of RTU and communication method.

Category	Major Feature	Applicable communication
MASTER RTU-WIGS	• Supportable communication : CDMA, HSDPA, WiBro, xDSL • Supports xDSL of dynamic IP Protocol • Supports 100 channels per station	HSDPA WiBro xDSL
MASTER RTU-FIU	• Supportable communication : dedicated network, CDMA • Supports 64-channel dedicated network modem per station : Expandable on slot	dedicated CDMA

RTU

RTU(Remote Terminal Unit) is an equipment on remote point which collects data from instruments and sensors on field. It also sends data through FIU to SCADA in a central monitoring center through wired or wireless channels, and implements control instruction from SCADA on the online real-time basis.
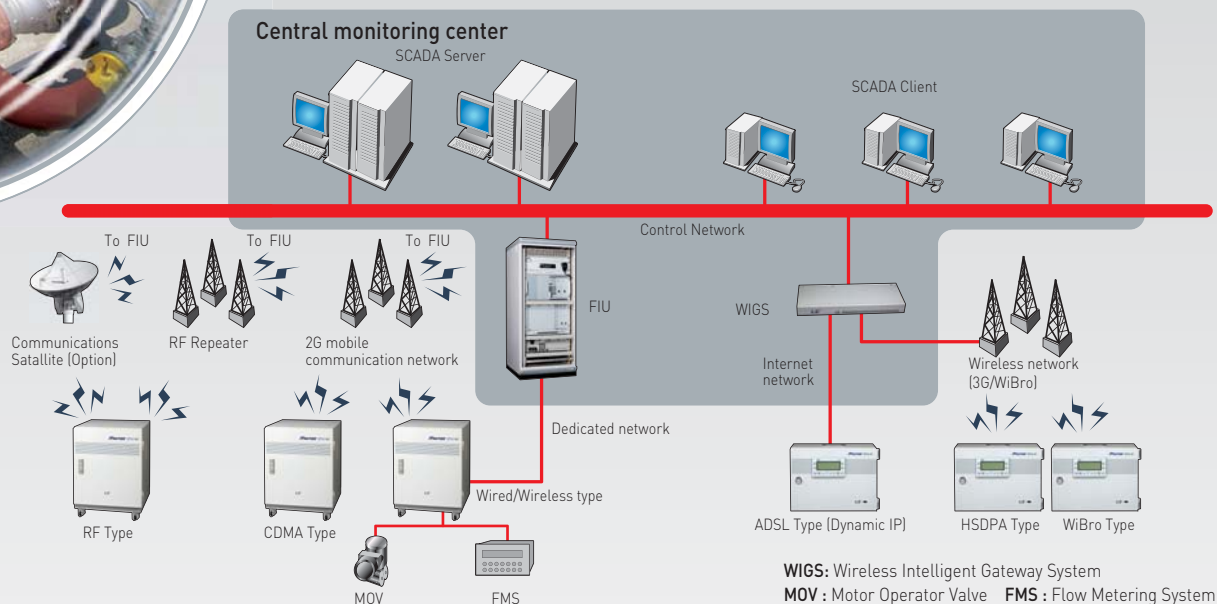
Category	Major Feature	Applicable area
MASTER RTU-IP	• Supportable communication : dedicated network, CDMA, HSDPA, WiBro, xDSL • Maximum input & output points : 256	Backbone network
MASTER RTU-PCS	• Supportable communication : dedicated network, CDMA • Maximum input & output points : 192	Backbone network
MASTER RTU-RF	• Supportable communication : dedicated network, RF • Maximum input & output points : 6,144	Backbone network

Category	Wired		Wireless			
	Private network	ADSL	CDMA	HSDPA	WiBro	RF
Communication speed	Mostly below 9.6 kbps	512 kbps ~ 6 Mbps	153.6 kbps	8 ~ 10 Mbps	1 ~ 4 Mbps	1200~9600 bps
Bandwidth	-	-	1.25MHz	5MHz	2.3GHz	146~174MHz(VHF) 403~470MHz(UHF)
Equipment	DSU	ADSL Modem	CDMA Modem	HSDPA Modem	WiBro-only terminal	RF Radio
Advantage	Stable	High speed Low cost	Stable communication, Easy maintenance	High speed	Wide coverage	Applicable in the place where backbone network is not available
Others			2G Mobile Communication	3.5G Mobile Communication	Wireless nternet	VHF / UHF

*WiBro (Wireless Broadband) is a wireless broadband internet technology developed by the South Korean telecoms industry
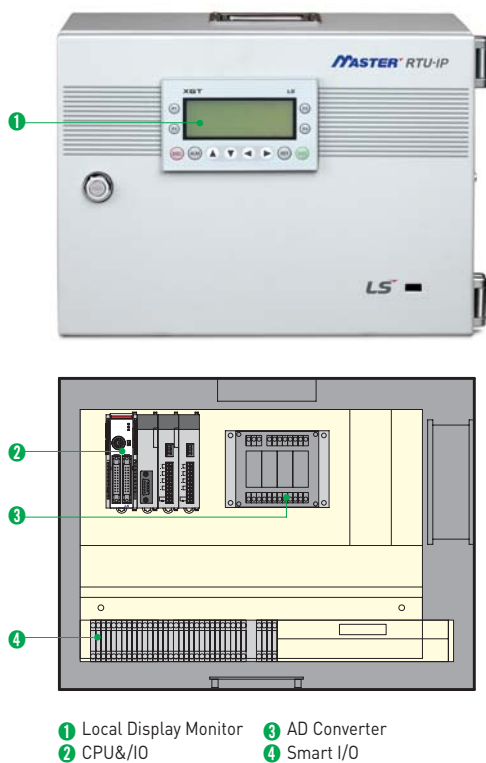
System Configuration (example)

Central monitoring center
SCADA Server

SCADA Client

Control Network

To FIU

To FIU

To FIU

Communications Satallite (Option)

RF Repeater

2G mobile communication network

FIU

WIGS

Internet network

Wireless network (3G/WiBro)

Dedicated network

Wired/Wireless type

RF Type

CDMA Type

MOV

FMS

ADSL Type (Dynamic IP)

HSDPA Type

WiBro Type

WIGS: Wireless Intelligent Gateway System
MOV : Motor Operator Valve   **FMS :** Flow Metering System

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RTU

Master RTU-IP is a new product of LS Industrial Systems' Master RTU line-up. The performance and stability of Master RTU-IP have been fully tested and verified in various fields over the past decade. Its hardware was recently updated to a more powerful system. It is also produced in a compact size, which makes it much easier to install in any environment. Master RTU-IP supports a variety of new communication technologies such as HSDPA, WiBro and ADSL.

Feature
• Industrial system tolerant to environmental changes
• Support various communications : dedicated network, CDMA, HSDPA, ADSL, WiBro
• Search digital/analog data through display panel on outside cover
• Micro size : W400/H300/D170mm
• Expandable on slot
• Have functions of PID control, high-speed counter and positioning
• Support various standard protocols and edit protocol
• Non-interrupting operation through UPS (optional)

Function
• Collect and assess field data
• Perform arithmetic and control functions
• Send control signals to field equipments
• Communicate with upper-level systems (SCADA, HMI, DCS, PLC and etc.)
• Self-diagnosis
• Send alarm signals on problem according to preset conditions
  (process alarm, system alarm)
• Support wired and wireless common networks and private network
  (equipped with wired/wireless modem converter)
• Non-interrupting operation through UPS

❶ Local Display Monitor ❸ AD Converter
❷ CPU&IO ❹ Smart I/O

Specification

Category			Standards
CPU	Operation system		repetitive/constant/interrupt operation, fixed scan
	Program language		Ladder Diagram, Instruction List
	Operation speed		0.16μs/Step
	Maximum input & output point		256
Input & output	Standard	Digital input	8, 16, 32 points / module, DC 24V
		Digital output	Relay 8, 16 points / module, transistor 8, 16, 32 points / module
		Analog input	8 channels / module, 0~10V, 4~20㎃, 0~20㎃
	Optional	Analog output	4 channels / module, DC 0~10V, 4~20㎃, 0~20㎃
Communication	Program port		RS-232C / USB
	Wired		RS 232C / RS-422/485, Ethernet(dedicated network, xDSL)
	Wireless		HSDPA, CDMA
Non-interrupting power equipment	Optional	Power supply on blackout	Supply for 2 hours

Recommended Environment

Category	Standards		
Ambient temperature	0℃~+60℃		
Storage temperature	-25℃~+70℃		
Ambient humidity	5~95%RH, Non-condensing		
Storage humidity	5~95%RH, Non-condensing		
Vibration resistance	On intermittent vibration		-
	Frequency	Acceleration	Amplitude
	10≤f<57Hz	-	0.075mm
	57≤f<150Hz	9.8m/s^2	-
	On continuous vibration		10 times in each direction of X, Y, Z
	Frequency	Acceleration	Amplitude
	10≤f<57Hz	-	0.035mm
	57≤f<150Hz	4.9m/s^2(0.5G)	-

Category	Standards	
Shock resistance	Maximum shock acceleration : 147m/s^2(15G) Approved time : 11ms Pulse waveform : Half sine pulse (3 times in each direction of X, Y, Z)	
Noise resistance	Square wave impulse noise	±1,500V
	Static electricity noise	Voltage : 4kV(discharge on contact)
	Radiating electronic noise	80 ~ 1,000MHz, 10 V/m
	Fast transient/ Burst noise	Power module : 2kV
		Input & output/communication I/F : 1kV
Attitude	2000m or lower	
Cooling	Air-cooling	

MASTER RTU-RF

Master RTU-RF is widely used in areas that are not covered by common communication carriers for the purpose of remote monitor and control of agricultural water facilities and etc.

Feature
- Voice communication
- Industrial system tolerant to environmental changes
- Support wired/wireless/wired & wireless communications
- Control processes such as PID control and etc.
- Self-diagnosis, registry of errors & malfunctions, simulation performance
- Expandable on slot
- Support various standard protocols
- Provide international standard program language (IEC1131-3)
- Monitor and modify programs from remote locations.
- Non-interrupting operation through back-up system
- 3-step protective network in response to lightning strikes on communication line

Function
- Collect, assess, control and compute field data
- Send control signals to field equipments
- Communicate with upper-level systems (SCADA, HMI, DCS, PLC and etc.)
- Mutual communication between RTUs
- Use double communication channels (RF+wired, RF+VSAT, wired+VSAT)
- Self-diagnosis, registry of system data
- Switch circuit or send alarm signals on communication or management problem according to preset conditions
- Support private, public and wireless networks (equipped with wired/wireless modem)
- Non-interrupting operation through built in UPS

Specification

Category		Standards
CPU	Processing speed	28 ns/step
	Memory	6MB
	Max. input/output points	6,144
Input & output	Digital input	8, 16, 32, 64 points / module, DC 24V
	Digital output	Relay 8, 16 points / module, Transistor 16, 32, 64 points / module
	Analog input	4, 8, 16 channels / module DC 1~5V, DC 0~5V, DC 0~10V, DC -10~10, DC 4~20mA, DC 0~20mA
	Analogue output	4, 8 channels / module DC 1~5V, DC 0~5V, DC 0~10V, DC -10~10, DC 4~20mA, DC 0~20mA
Communication	Communication port	RS-232 1 Port (for programming), USB 1 Port (for programming) Ethernet 1Port, RS-232/422/485 4 Port
	Wired	Dedicated network
	Wireless	RF dedicated network, CDMA public network, Satellite communications(Optional)
Non-interrupting power equipment	Power supply on blackout	Optional

MASTER RTU-PCS

Master RTU-PCS is widely used in gas pressure stabilizers, water and sewage facilities, marine and road infrastructures, power and other supply systems, gas/oil pipe lines and etc. The performance and stability were tested and verified in various situations.
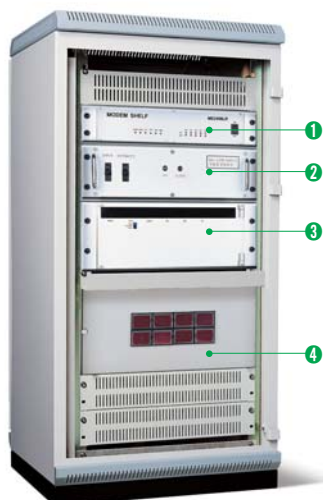
- ❶ Modem
- ❷ UPS
- ❸ CPU & I/O
- ❹ Alarm Display

Feature
- Industrial system tolerant to environmental changes
- Support wired/wireless/wired & wireless communications
- Have functions of PID control, flow addition and arithmetic calculation
- Self-diagnosis, registry of errors & malfunctions, simulation performance
- Expandable on slot
- Support various standard protocols
- Provide international standard program language (IEC1131-3)
- Non-interrupting operation through back-up system
- 3-step protective network in response to lightning strikes on communication line

Function
- Collect and assess field data
- Perform arithmetic and control functions
- Send control signals to field equipments
- Communicate with upper-level systems (SCADA, HMI, DCS, PLC and etc.)
- Self-diagnosis
- Send alarm signals on problem according to preset conditions (process alarm, system alarm)
- Support dedicated , public and wireless networks (equipped with wired/wireless modem)
- Non-interrupting operation through built in UPS

Specification

Category		Standards
CPU	Maximum input & output point	192
Input & output	Digital input	8, 16 points / module, DC 12~24V
	Digital output	8, 16 points / module, relay, open collector
	Analog input	4 channels / module, DC 4~20mA, DC 1~5V, DC 0~20V
	Analog output	4 channels / module, DC 4~20mA, DC -10~10V
Communication	Communication port	RS-232/422/485 : 2 Port
	Wired	dedicated network
	Wireless	CDMA public network
Non-interrupting power equipment	Power supply on blackout	Supply for 2 hours (4 hours optional)

FIU

>>> **MASTER RTU-WIGS**

① LAN ② Debugging ③ Power
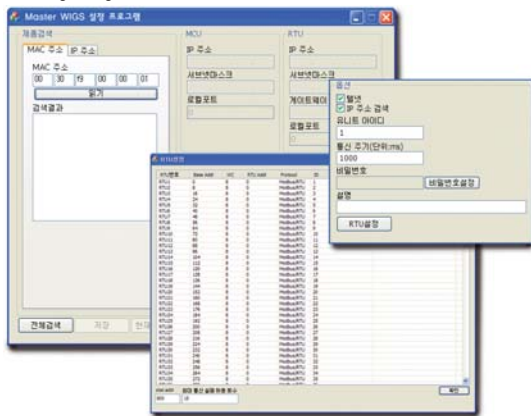
Setting Program

Master RTU-WIGS is a product developed to support a variety of new communication technologies as the communication infrastructure is fast developing lately. This product supports CDMA, 3G mobile communication HSDPA, WiBro, ADSL on dynamic IP and etc.

↘ Feature

• Provide wired/wireless access to data of equipments on remote points
• Support various communication systems
 - HSDPA, ADSL, WiBro
 - Support dynamic IP when ADSL is applied
• Communication with 100 remote equipments per station
• Monitor communication status of each line through front LED display
• Made in a compact size of 19-inch rack type that is easy to install
• Standard redundancy
• Automatic switching when redundant communication channels are applied
• Stronger security and stability with embedded OS
• Easy engineering through Windows-based set-up programs
 - Search WIGS equipments within the network automatically
 - Set up network environment for WIGS equipments
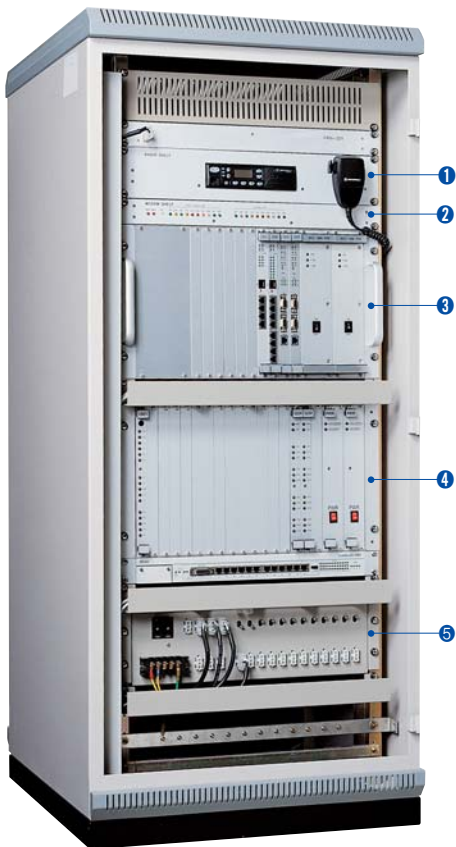 - Set up remote equipments on communication network

↘ Function

• Collect field data and control event
• Use double power source
• Communicate with computer in a central monitoring center
  (SCADA, HMI, RTU, DCS, PLC and etc.)
• Operate on wired/wireless internet communication, correct errors on wireless networks
• Communicate on double main/preliminary lines between central computer
  and remote equipments
• Automatic switching on emergency under the system of double equipments
• Maintenance by computer in a central monitoring center
• Monitor alarms and status of pressure stabilizer through front LED display

↘ Specification

Category	Standards
Size	482.6mm x 171.5mm x 44mm, 19-inch rack (1U)
Input power	AC85V~AC264V (50Hz~60Hz) x 2
Network	10/100Base-T (RJ-45), Auto MDI/MIDX, 1000VAC isolation
Serial Port	RS232 x 2 (for debugging), DB9M Connector, 115200bps/8bit/1stopbit/no-parity
Pilot lamp	Power, Run, Link, Modbus/TCP, LED_CON1, LED_CON2, RTU 100 RTU pilot lamps
Processor	ARM7 / Atmega64L
Communication protocol	TCP, UDP, IP, ICMP, ARP, Telnet, TFTP, Modbus/RTU, Modbus/TCP
Temperature for use	0℃ ~ 55℃
Temperature for storage	-50℃ ~ 85℃

⟫⟫ MASTER RTU-FIU

Master RTU-FIU is a product developed to control communication with all RTU products of LS Industrial Systems and integrate and manage data. It can also set up an interface with RTU products of other companies by editing protocols.

◹ Feature

• Industrial system tolerant to environmental changes
• Provide various user protocol interfaces
• Control through communication
 - Collect data from remote equipments
 - Provide wired/wireless communication networks
 - Use dual serial ports such as RS-232
 - Memory back-up
 - Monitor transmission and reception protocols on real-time basis
• Self-diagnosis
• Optional redundant system
• Establish redundant structures of CPU, network and power source
• Expandable on slot
• 3-step protective network in response to lightning strikes on
  communication line

◹ Function

• Collect field data and control event
• Use double power source
• Communicate with computer in a central monitoring center
  (SCADA, HMI, RTU, DCS, PLC and etc.)
• Communication between FIUs
• Switch and send event on communication errors according to preset conditions
• Operate on wired/wireless internet communication, correct errors on
  wireless networks
• Communicate on dual main/preliminary lines between central computer
  and remote equipments
• Maintenance by computer in a central monitoring center
• Partial maintenance thanks to separate power control by each equipment of FIU

❶ Radio(Option : RF)
❷ Modem(Option : RF)
❸ MCU(Main Control Unit)
❹ CCU(Central Control Unit)
❺ PDU(Power Distribution Unit)

◹ Specification

Category	Standards
Size	600mm x 1700mm x 450mm: for standard model
Input power	AC110/220V (50Hz~60Hz) X 2
Power capacity	5V/15A, +12V/1.5A, -12V/1.5A
Program memory	2MB
Internal memory (preserved during power failure)	512KB(256KB)
Serial port	Optional between RS232C and RS422 (64CH)
Temperature for use	-10℃ ~ 60℃
Temperature for storage	-25℃ ~ 70℃

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.

LS IS Co., Ltd.

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MAR. 2011 | ※ The specification of this product is subject to change without notice. Please be sure to check at the time of purchase | MASTER RTU System(E) 2011. 03/(01) 2011. 03 Human Power