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5-0003
Rev. 4

DL8 Web Data Logger for IoT

Illustrated Application Examples

- Abnormality Notification — P.6
- Remote Monitoring/ Operation — P.8
- Predictive and Preventive Maintenance — P.10
- Remaining Amount Management of Stored Liquids — P.12
- Labor-Saving Maintenance — P.14

What is IoT?

Internet of Things

IoT, in industrial applications, is a technique for remote awareness of the operational status of machines and devices by connecting them to the Internet.

DL8 Series
Web Data Logger

CE

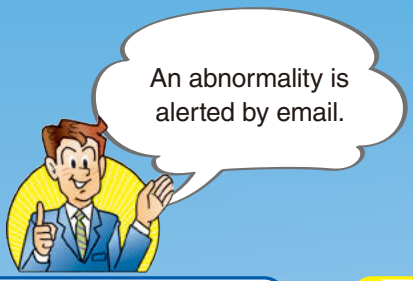
MG CO., LTD.
www.mgco.jp

Make Greener automation

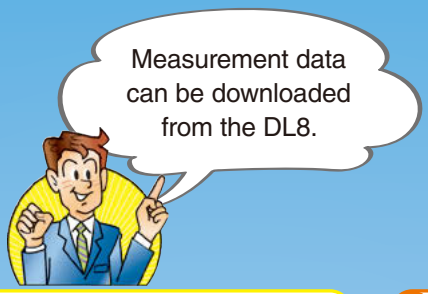
Internet of Things

IoT That Can Be Implemented Right Now

Tasks of DL8

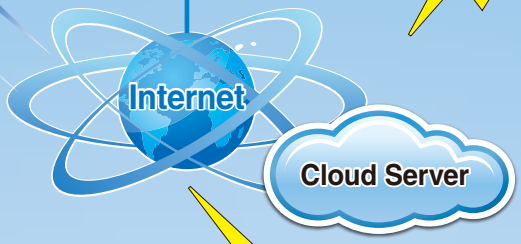


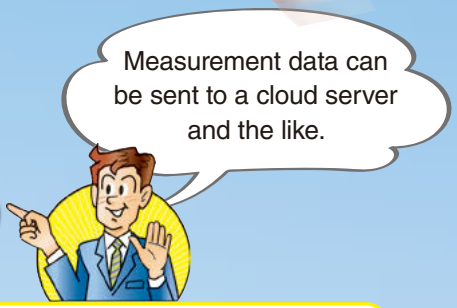
5 Reporting by email



3 Sending measurement data

2 Displaying measurement data

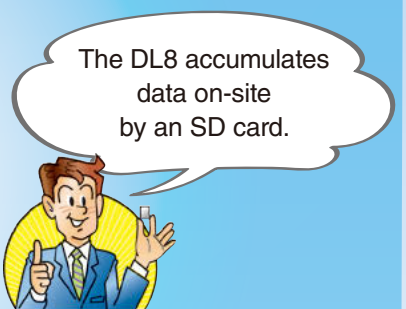




3 Sending measurement data

5 Tasks of DL8

1. Storing measurement data
2. Displaying measurement data
3. Sending measurement data
4. Enabling remote operation
5. Reporting by email



1 Storing measurement data

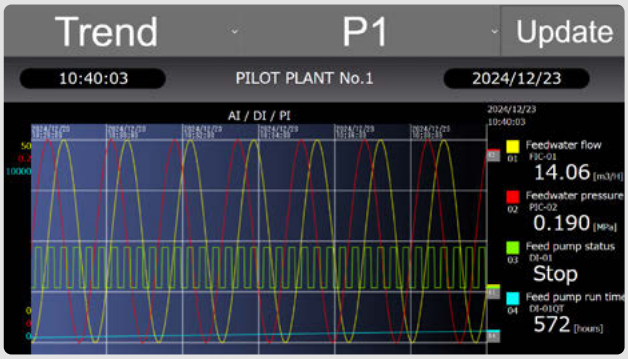
Measurement Signal

Control Signal

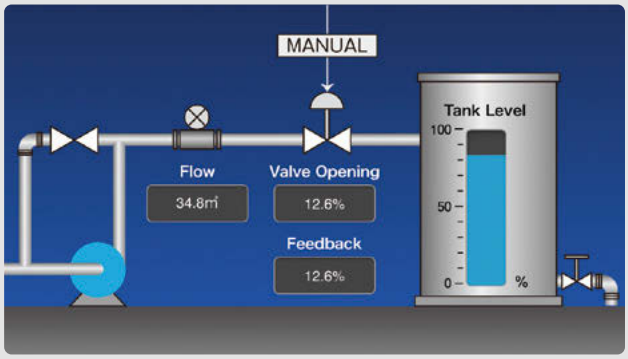
On-site measurement data can be viewed
on a smartphone anywhere, anytime.

Display Examples of PC/Smartphone

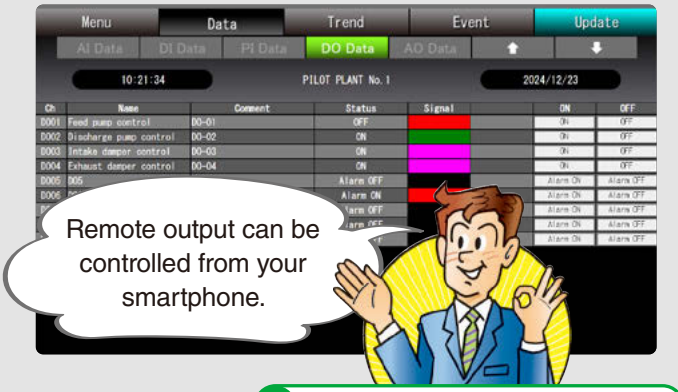
Trend view



Graphic view can be also created.



Remote operation from a PC/smartphone

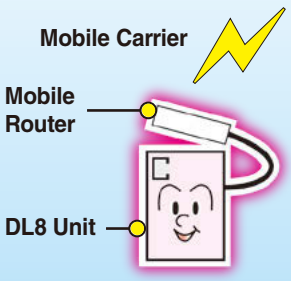


Convenient event history screen

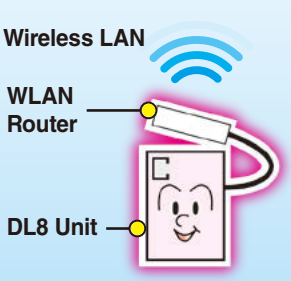
4 Enabling remote operation

In this brochure, variations of the DL8 character are introduced in combination with different types of routers.

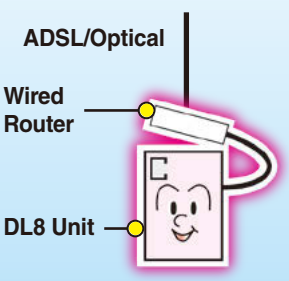
Mobile Router



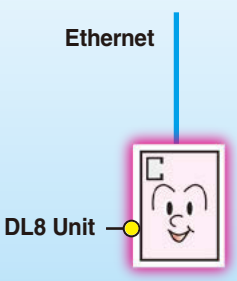
WLAN Router



Wired Router



Wired Internet LAN

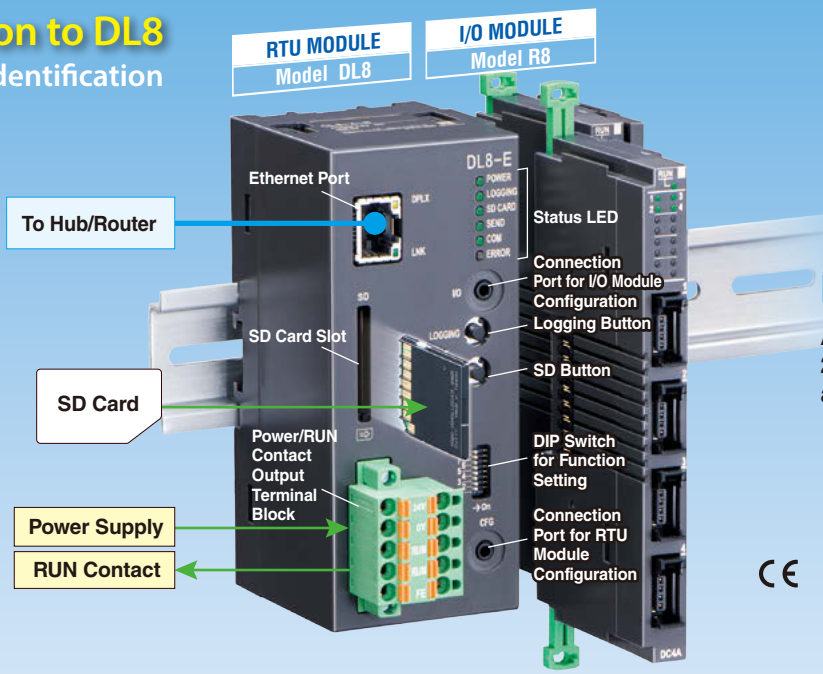


Internet of Things

IoT That Can Be Implemented Right Now

Introduction to DL8

Component Identification



I/O MODULE

A wide selection of 12-mm or 24-mm wide, slim I/O modules are available.

■ I/O MODULE

Signal Type	Max. Capacity * per module	Function	Model
Analog input	32 points	DC current input (2 points, isolated)	R8-SS2
		DC current input (4 points, non-isolated)	R8-SS4N
		DC current input (4 points, non-isolated, sensor exc.)	R8-SS4NJ
		DC current input (8 points, isolated, tension-clamp terminal block)	R8-SST8
		DC voltage input (2 points, isolated)	R8-SV2
		DC voltage input (4 points, non-isolated)	R8-SV4N
		Thermocouple input (2 points, isolated)	R8-TS2
		RTD input (4 points, non-isolated)	R8-RS4N
		DC voltage/current input (4 points, non-isolated, sensor exc., tension-clamp terminal block)	R8-FST4N
		DC voltage/current input (16 points, non-isolated, sensor exc.)	R8-FS16N
Discrete input	64 points	Contact input (4 points, NPN)	R8-DA4A
		Contact input (16 points, NPN)	R8-DAM16A
		Contact input (8 points, NPN, tension-clamp terminal block)	R8-DAT8A2
		Contact input (16 points, NPN, tension-clamp terminal block)	R8-DAT16A2
		Contact input (8 points, PNP, tension-clamp terminal block)	R8-DAT8B2
Pulse input	32 points	Totalized pulse input (4 points, NPN/PNP/voltage pulse)	R8-PA4
		High-speed totalized pulse input (4 points, NPN)	R8-PA4F
AC power input	32 points	AC current input (4 points, non-isolated, clamp-on current sensor)	R8-CT4E
Analog output	32 points	DC voltage output (4 points, non-isolated)	R8-YV4N
		DC current output (4 points, non-isolated, tension-clamp terminal block)	R8-YST4N
		DC current output (2 points, non-isolated, sensor exc.)	R8-YS2NJ
		DC current output (2 points, isolated)	R8-YS2
Discrete output	64 points	Transistor output (4 points, NPN, shortcircuit protection)	R8-DC4A
		Transistor output (4 points, NPN, voltage contact, shortcircuit protection)	R8-DC4A2
		Photo MOSFET relay output (4 points)	R8-DC4C
		Relay output (4 points, tension-clamp terminal block)	R8-DCT4D
		Transistor output (16 points, NPN, shortcircuit protection)	R8-DCM16A
		Transistor output (16 points, NPN, shortcircuit protection, full interlock)	R8-DCM16ALZ
		Transistor output (16 points, NPN, shortcircuit protection, full and individual interlock)	R8-DCM16ALK
		Transistor output (16 points, NPN, shortcircuit protection, full and partial interlock)	R8-DCM16ALH
		Transistor output (32 points, PNP, shortcircuit protection)	R8-DCM32B2
		Transistor output (8 points, NPN, shortcircuit protection, tension-clamp terminal block)	R8-DCT8A2
		Transistor output (16 points, NPN, shortcircuit protection, tension-clamp terminal block)	R8-DCT16A2
		Transistor output (8 points, PNP shortcircuit protection, tension-clamp terminal block)	R8-DCT8B2
Pulse output	32 points	Pulse output (4 points, open collector)	R8-PC4A

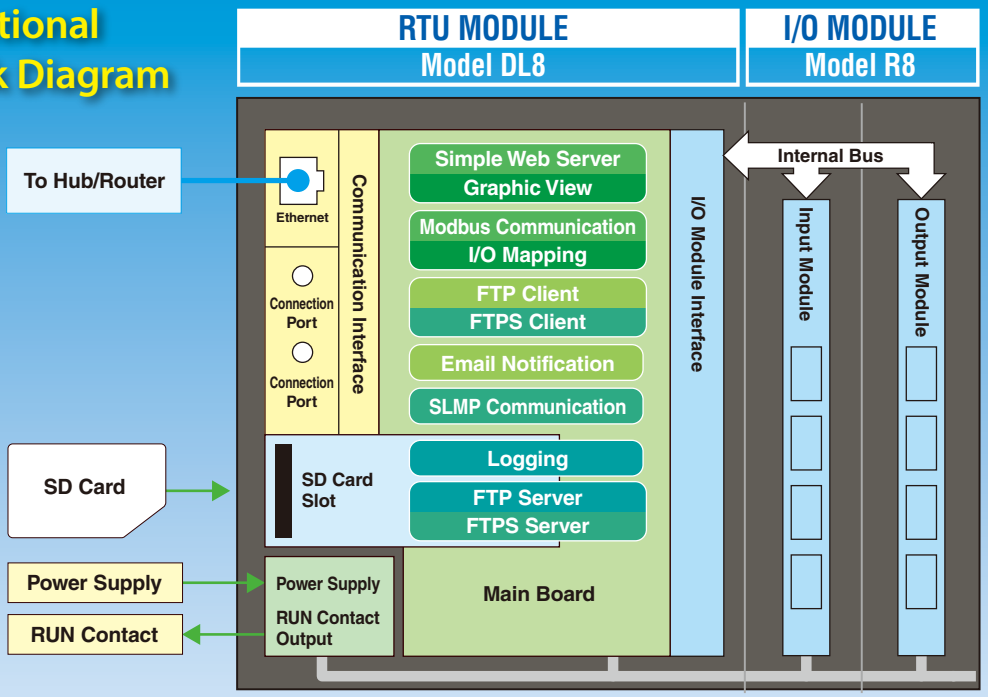
■ POWER SUPPLY MODULE

Function	Model
Power supply module for extension	R8-PS1

* Including extended remote I/Os

On-site measurement data can be viewed
on a smartphone anywhere, anytime.

Functional Block Diagram



Remote Setting

More Info in Page 19

All setting parameters except the communication setting are easily set and changed via the Internet.

RTU MODULE

Five types selectable by usable functions

DL8-Type	Browse	Report	Log	I/O Marshalling Advanced View	Advanced Communication	Model
A	○	—	—	—	—	DL8-A
B	○	○	—	—	—	DL8-B
C	○	○	○	—	—	DL8-C
D	○	○	○	○	—	DL8-D
E	○	○	○	○	○	DL8-E

Function Description of DL8

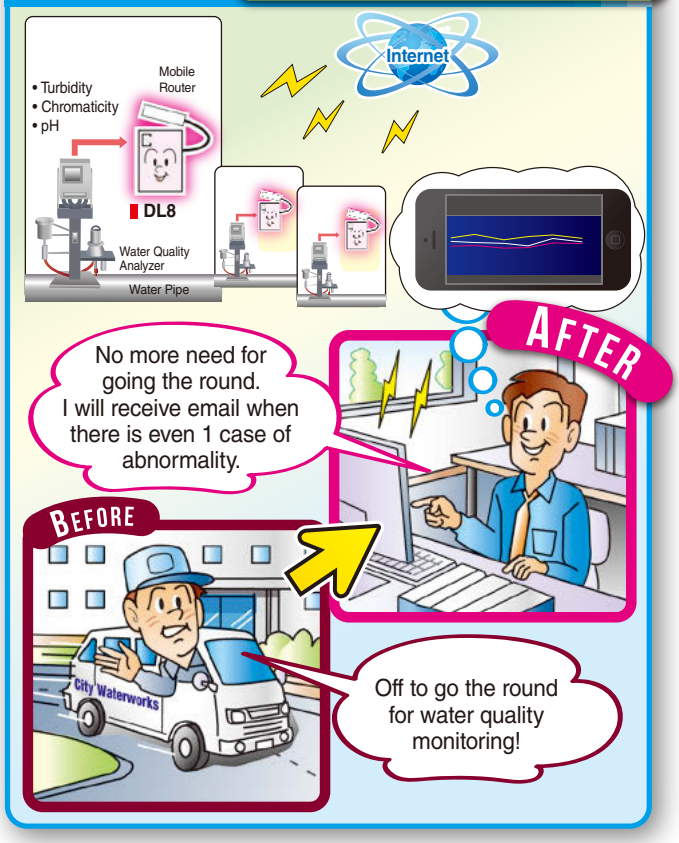
DL8-Type A	B	C	D	E	Function	Details
○	○	○	○	○	Simple Web Server	Allows data browsing and operation from the browser screen of a smartphone or PC.
○	○	○	○	○	Modbus Communication	Interfaces the I/O data of the remote I/O.
	○	○	○	○	FTP Client	Sends data to a server on the Internet.
	○	○	○	○	Email Notification	Automatically reports alarms and events by email.
		○	○	○	Logging	Stores the data collected at a constant cycle to SD card.
		○	○	○	FTP Server	Sends the data stored in the memory to FTP client over the Internet.
			○	○	Graphic View	Can provide original graphic views defined by the customer.
			○	○	I/O Mapping	Assigns Modbus/TCP signals to specific terminals of remote devices.
				○	Encrypted Communication	Performs encrypted communication by using HTTPS and FTPS protocols.
				○	SLMP Communication	Collects data from a PLC using SLMP client function.

Abnormality Notification

The abnormality notification is a function that monitors a machine or device and sends notification by email when abnormality occurs.

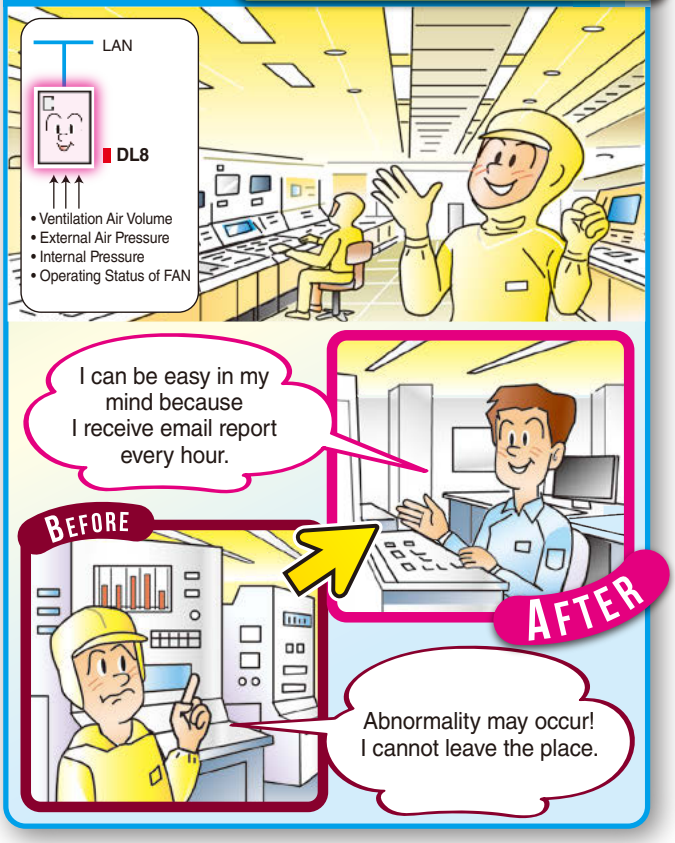
Water Quality Analyzer

System Configuration Page 16 No.2



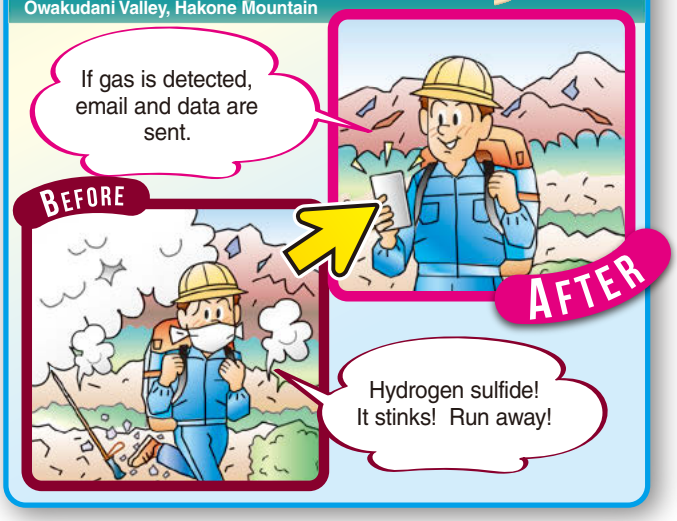
Cleanroom

System Configuration Page 17 No.6



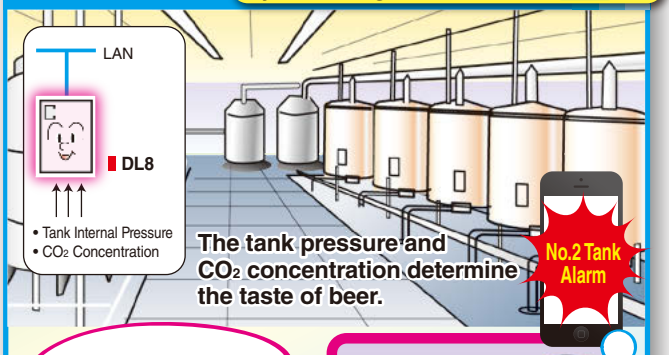
Volcanic Gas Detection

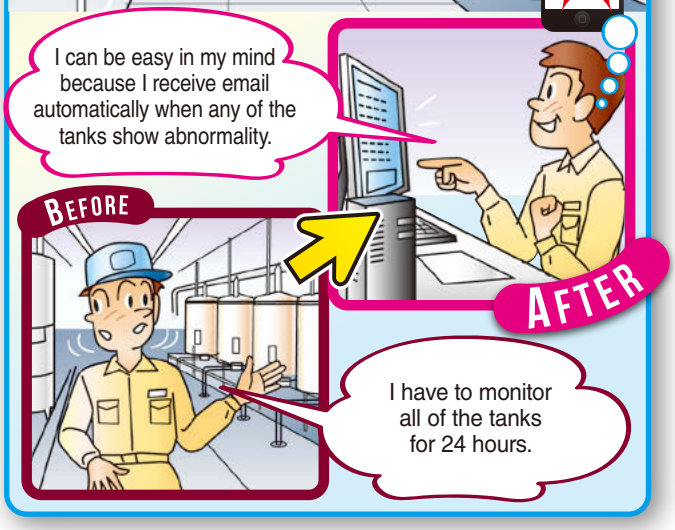
System Configuration Page16 No.1



Microbrewing

System Configuration Page17 No.6



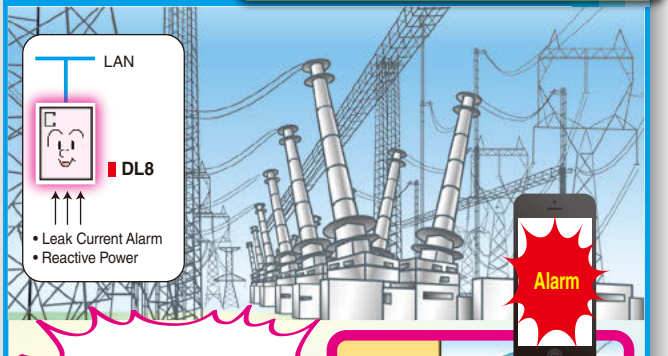


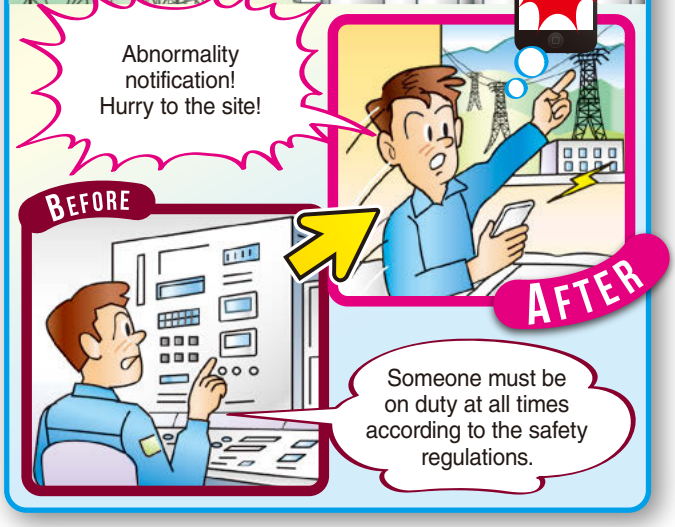
Landslide Hazard

System Configuration Page16 No.1

Extra-High Voltage Substation

System Configuration Page17 No.6



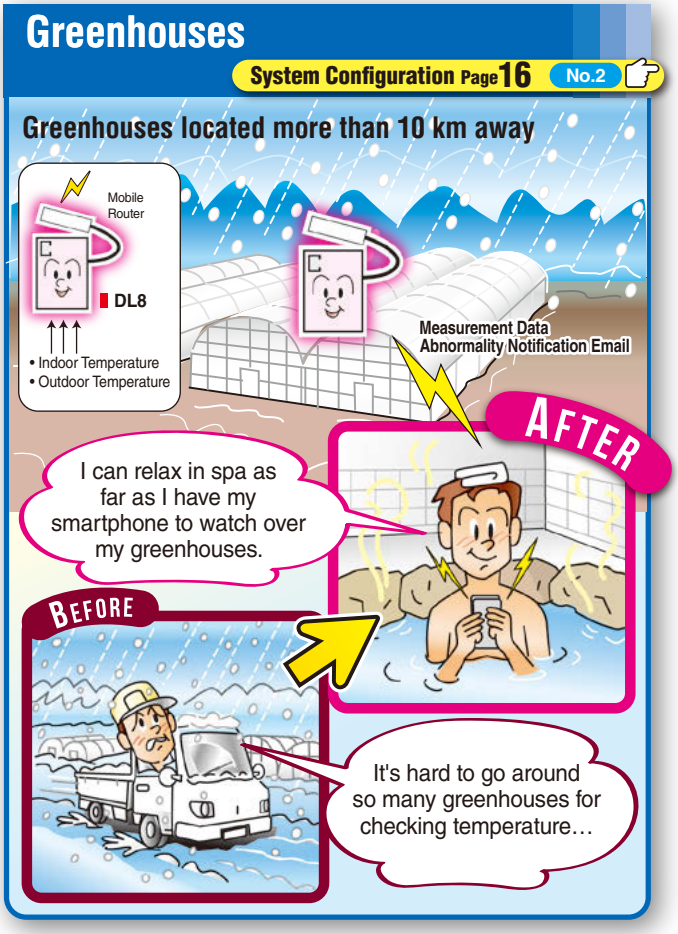


Remote Monitoring/Operation

You can monitor and operate widely distributed machines and devices on the Internet without having to go to the site.

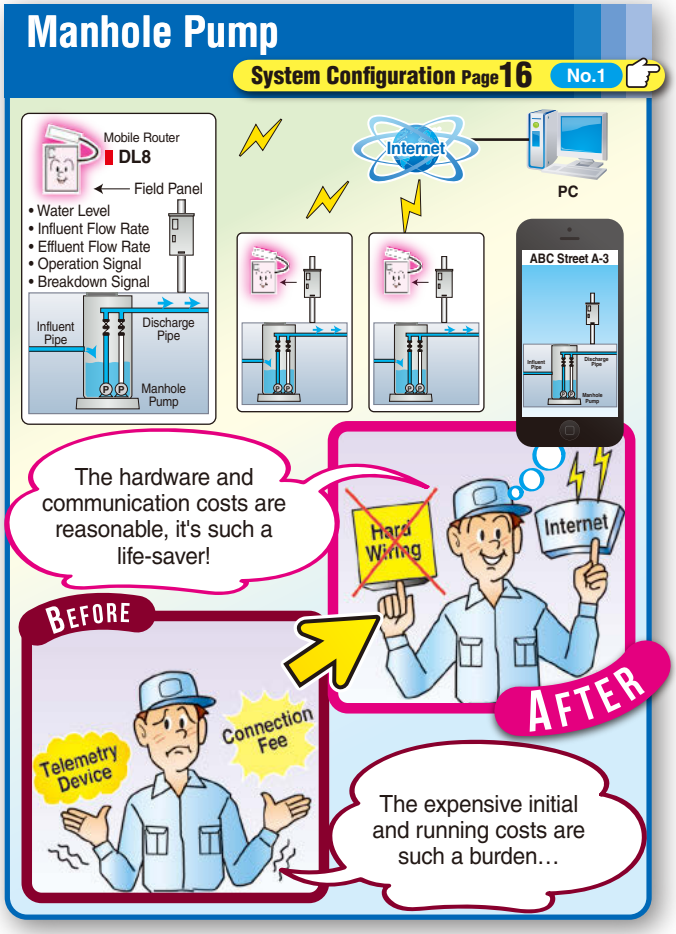
Greenhouses

System Configuration Page 16 No.2



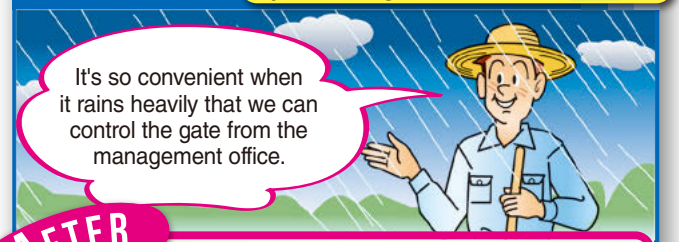
Manhole Pump

System Configuration Page 16 No.1

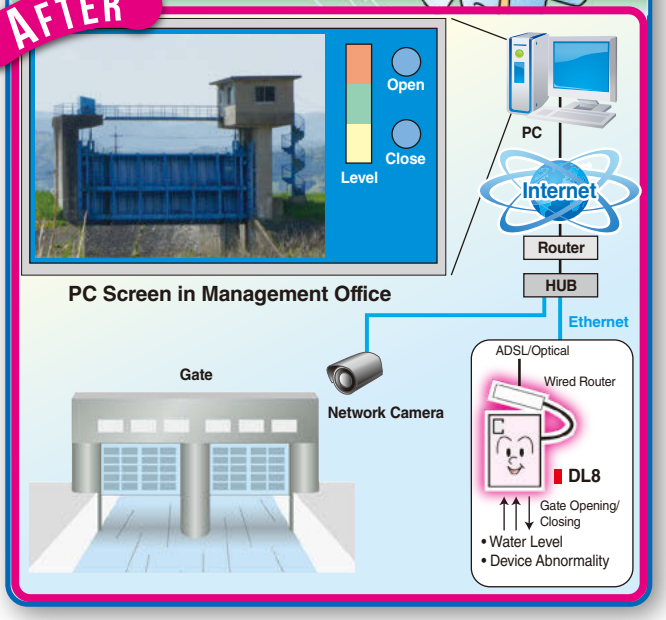


Irrigation Channel Gate

System Configuration Page16 No.3



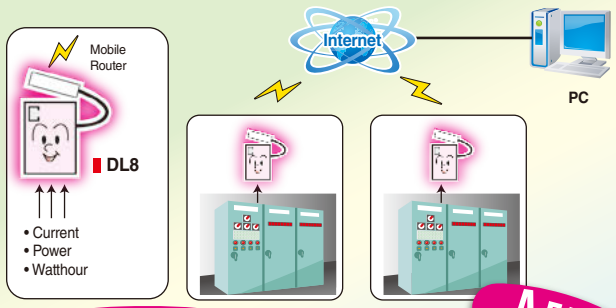
AFTER

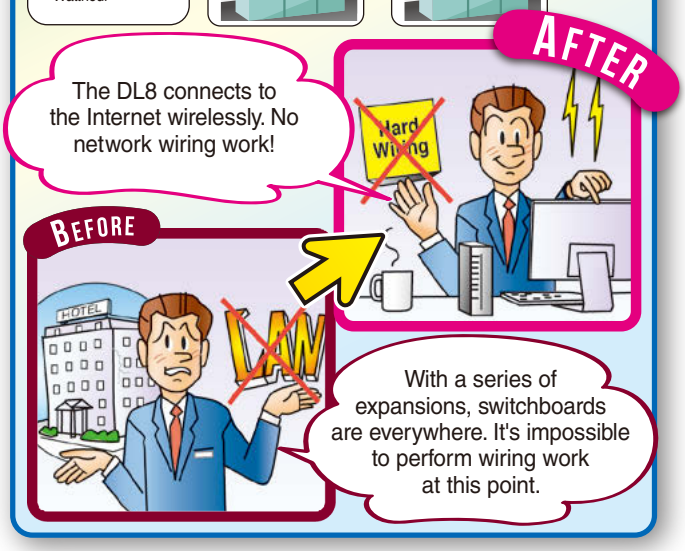


PC Screen in Management Office

Power Monitoring of Resort Hotel

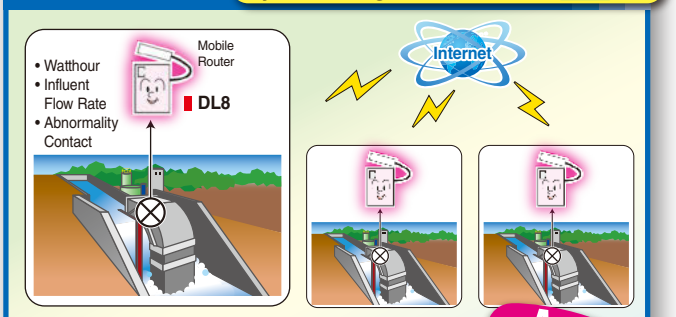
System Configuration Page16 No.1

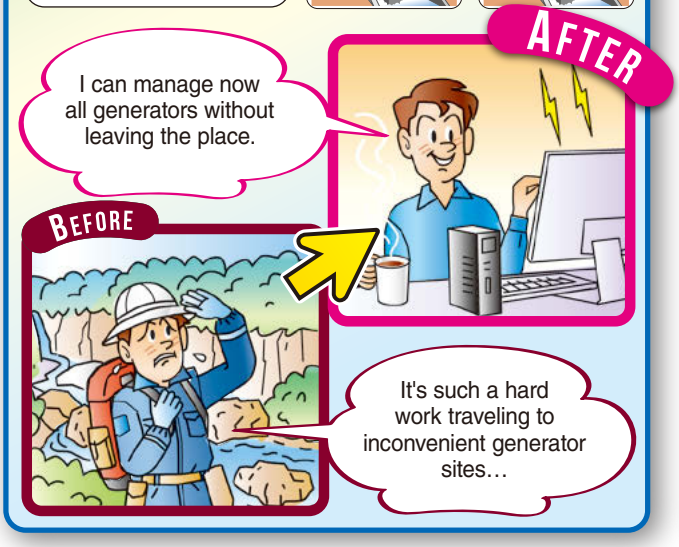




Micro Hydropower Generator

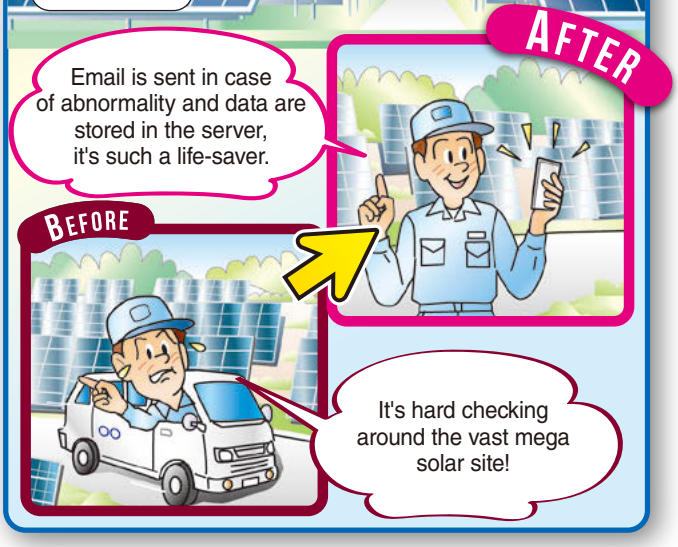
System Configuration Page16 No.1





Solar Power Generation

System Configuration Page16 No.1

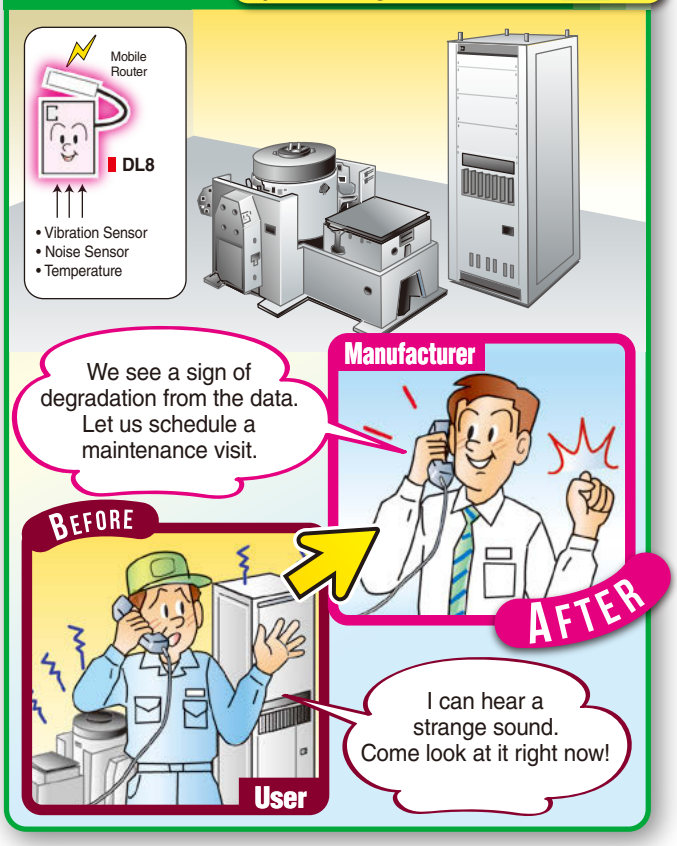


Predictive and Preventive Maintenance

Determining the degree of wear by storing the measurement data of machines and devices in the server via the Internet and LAN prevents problems in advance.

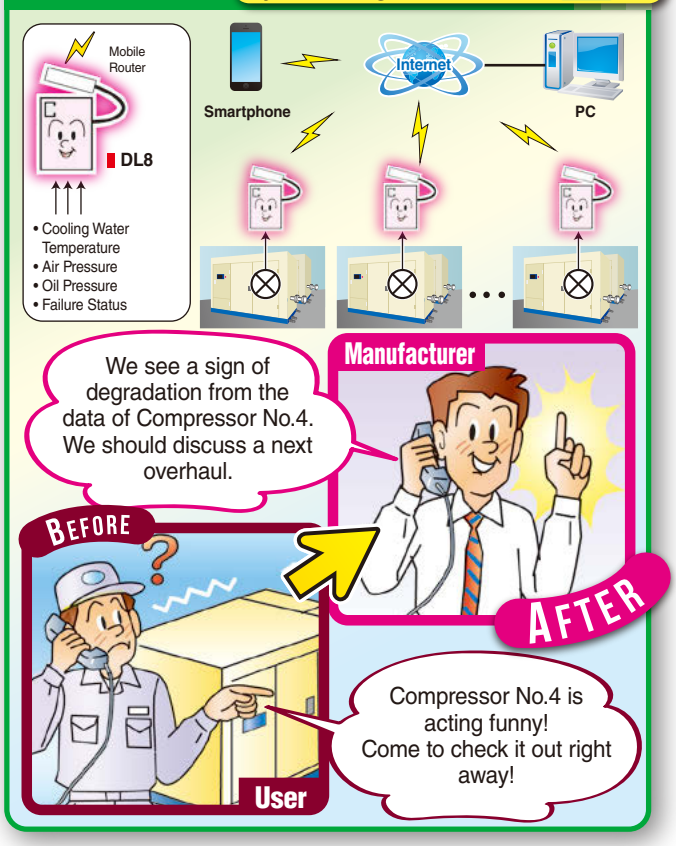
Vibration Test Systems

System Configuration Page 16 No.1



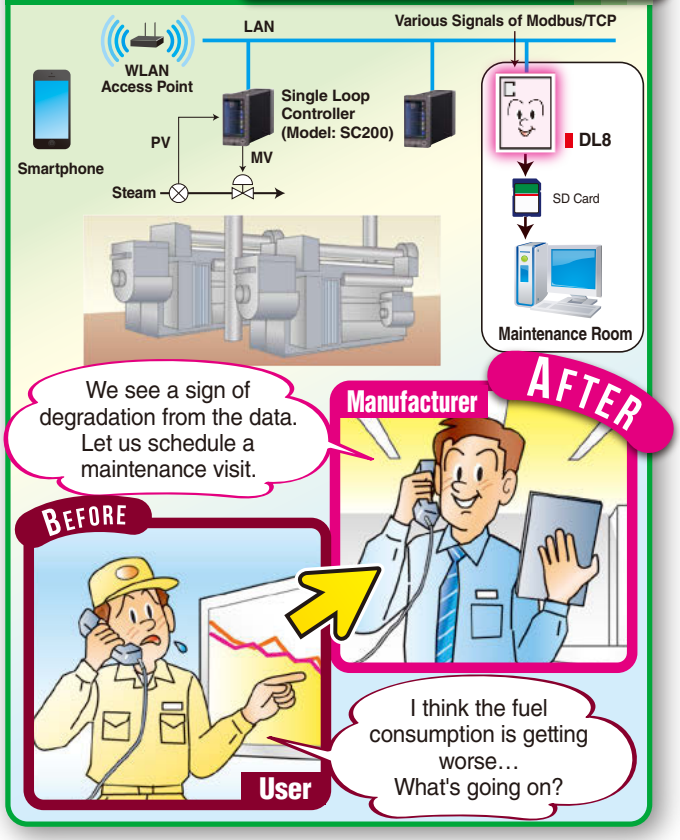
Compressors

System Configuration Page 16 No.4



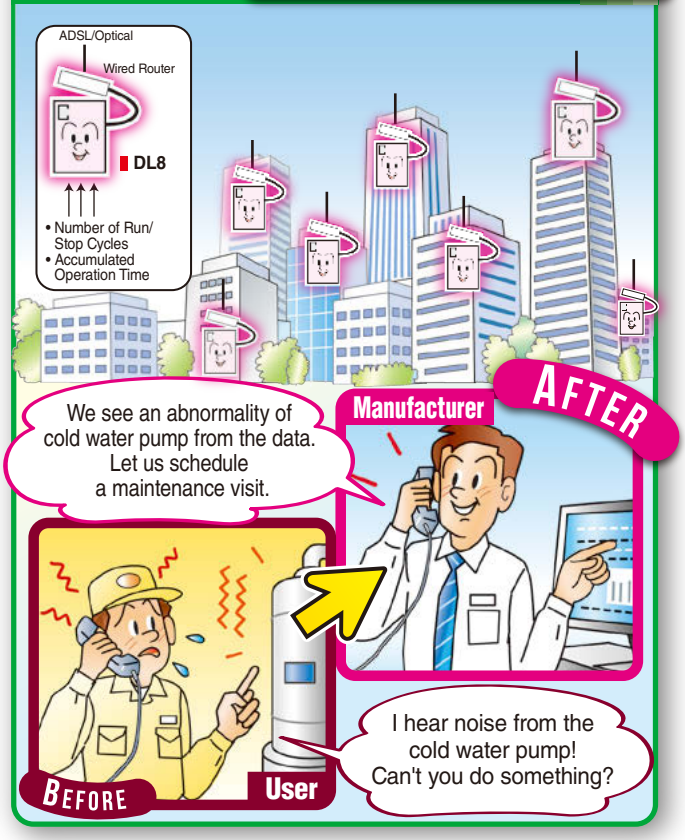
District Heating/Cooling

System Configuration Page 17 No.7



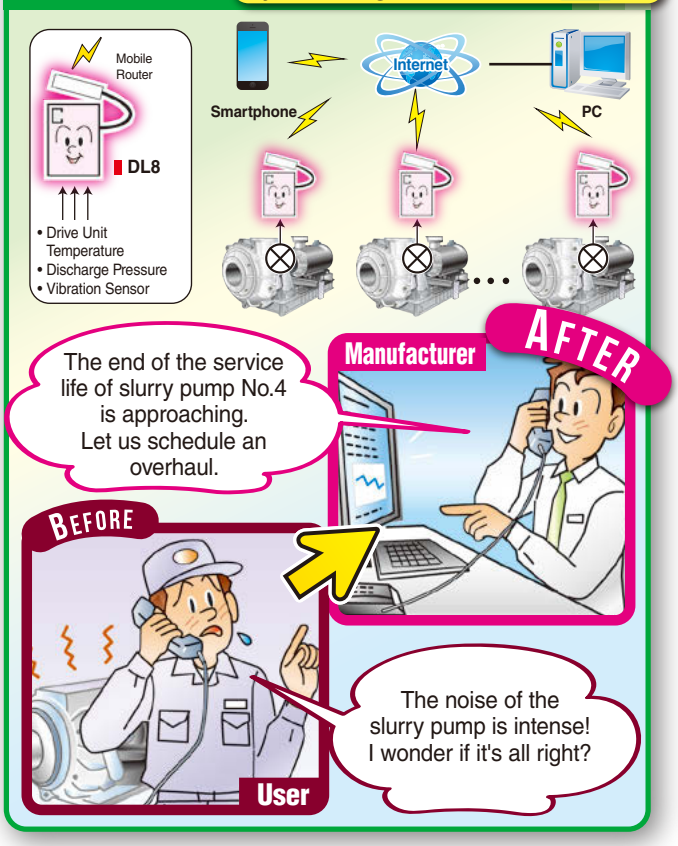
Building Maintenance

System Configuration Page 16 No.3



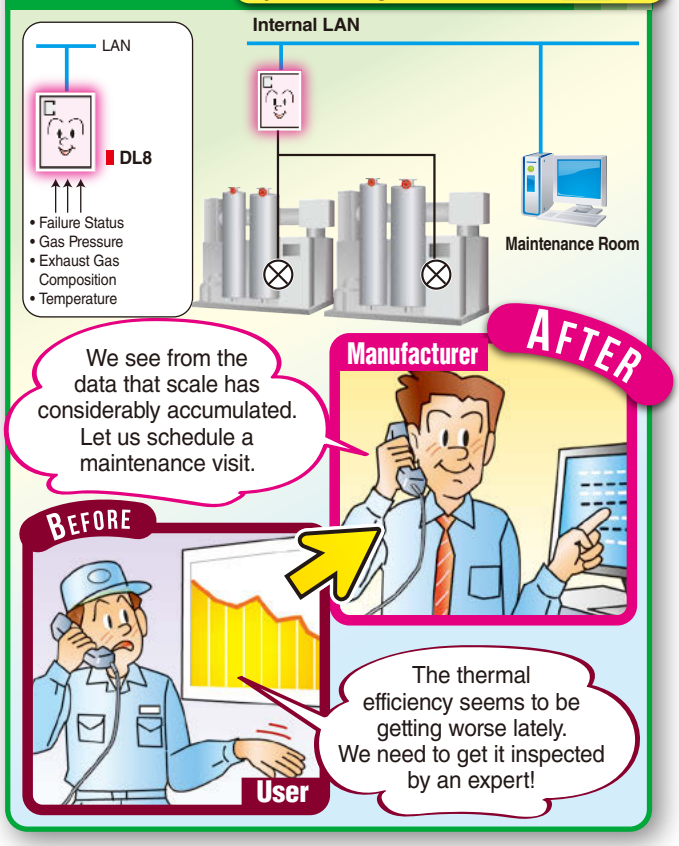
Slurry Pump

System Configuration Page 16 No.1



Boiler

System Configuration Page 17 No.6

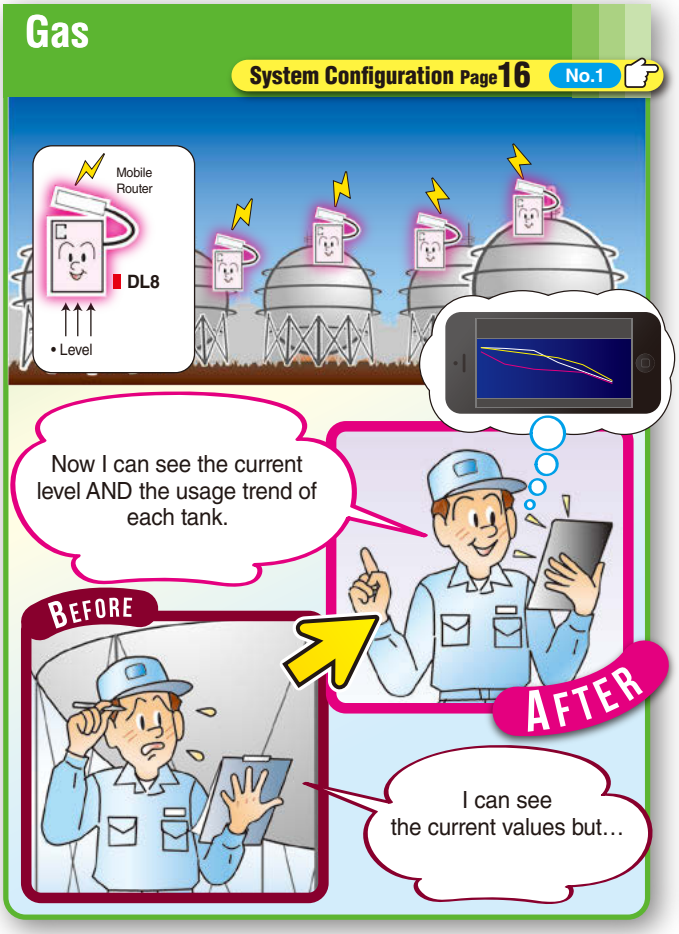


Remaining Amount Management of Stored Liquids

Managing the usage trend and remaining amount of stored liquids in hospitals and factories via the Internet or LAN can prevent raw materials from running out while enabling the delivery plan with increased efficiency.

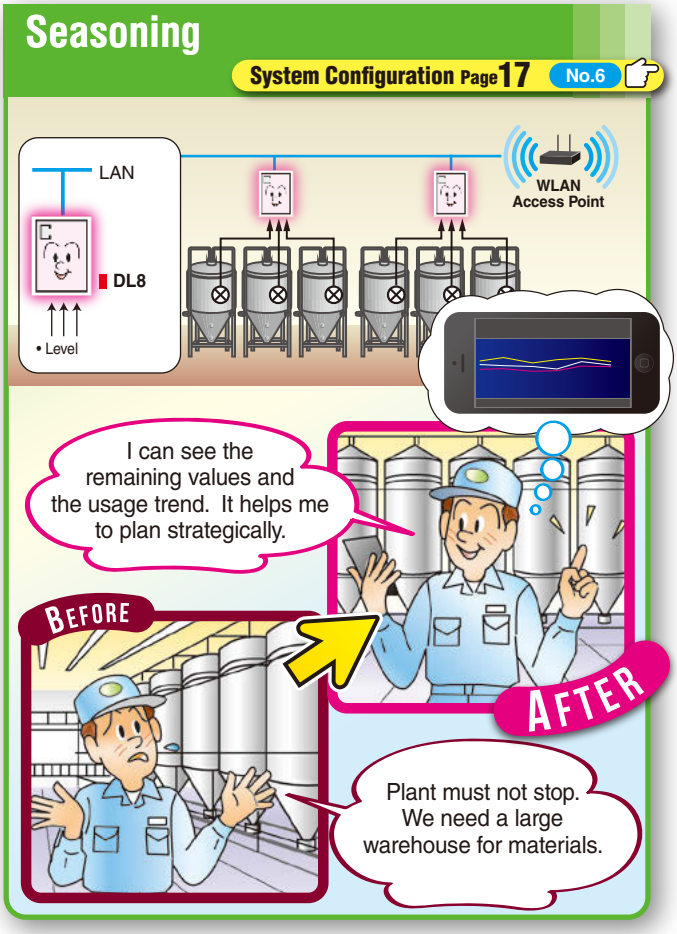
Gas

System Configuration Page 16 No.1



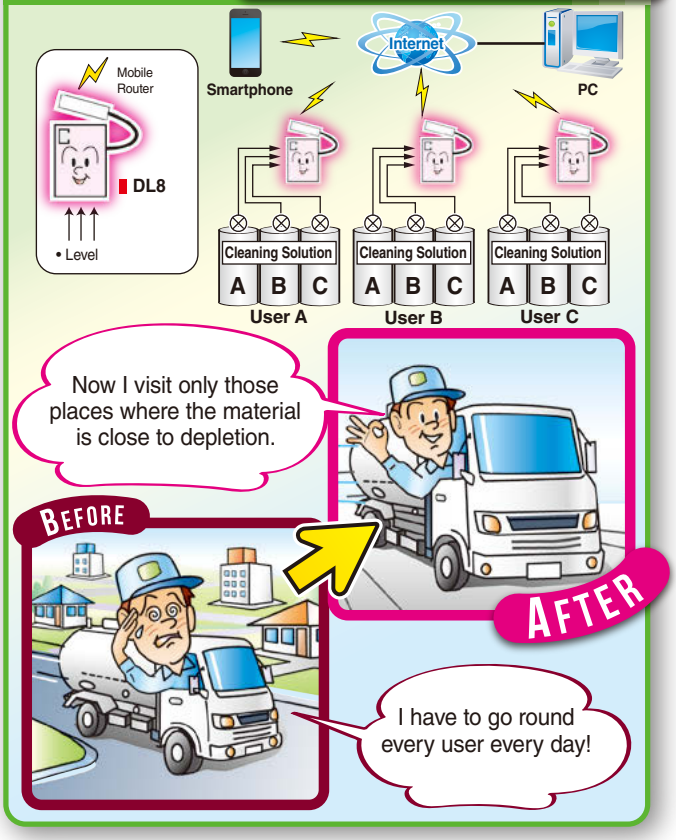
Seasoning

System Configuration Page 17 No.6



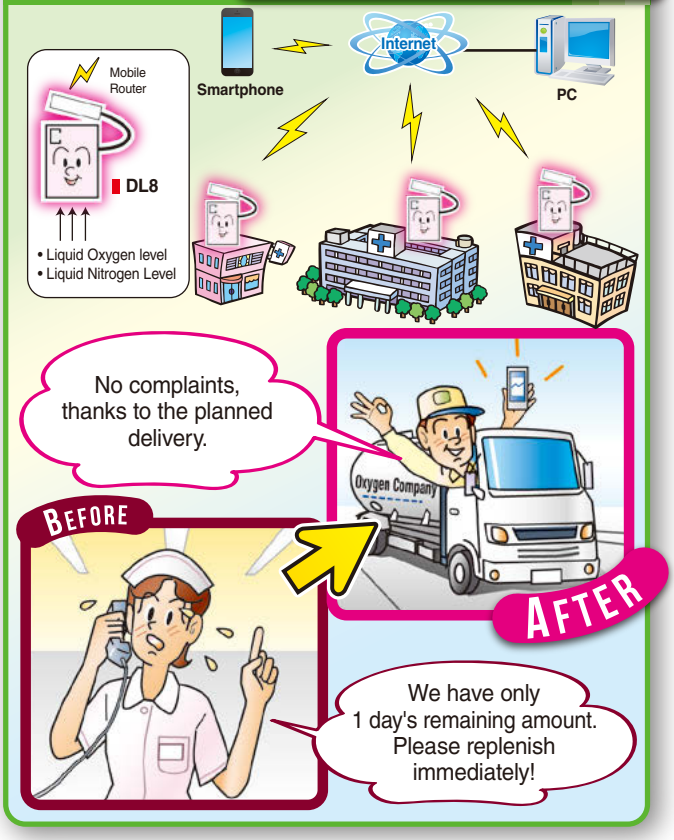
Cleaning Solution

System Configuration Page16 No.1



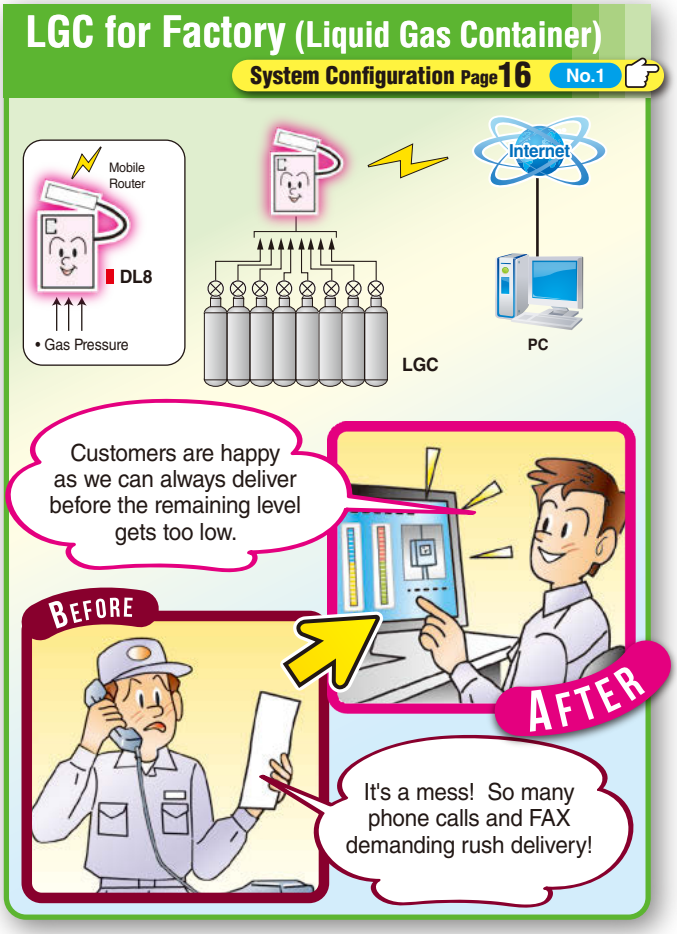
Liquid Oxygen/Nitrogen

System Configuration Page16 No.1



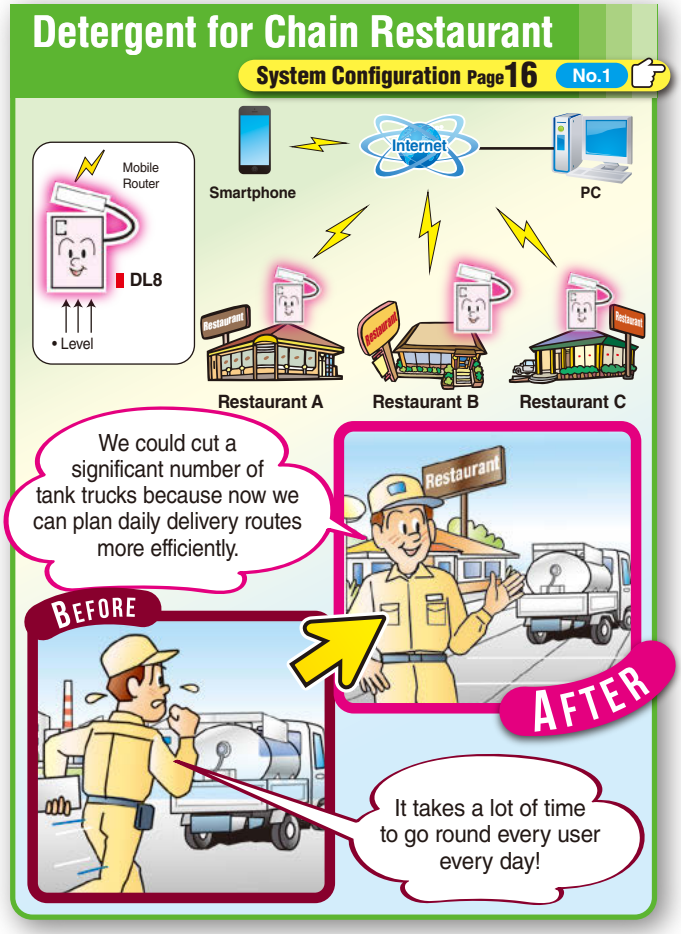
LGC for Factory (Liquid Gas Container)

System Configuration Page16 No.1



Detergent for Chain Restaurant

System Configuration Page16 No.1

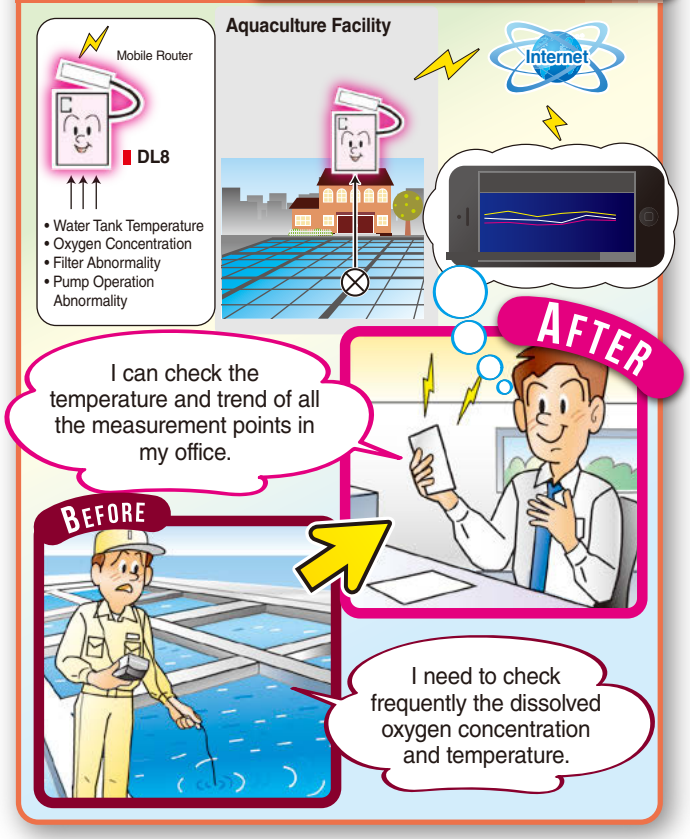


Labor-Saving Maintenance

Maintenance routines can be significantly reduced by connecting machines and devices to the Internet or LAN.

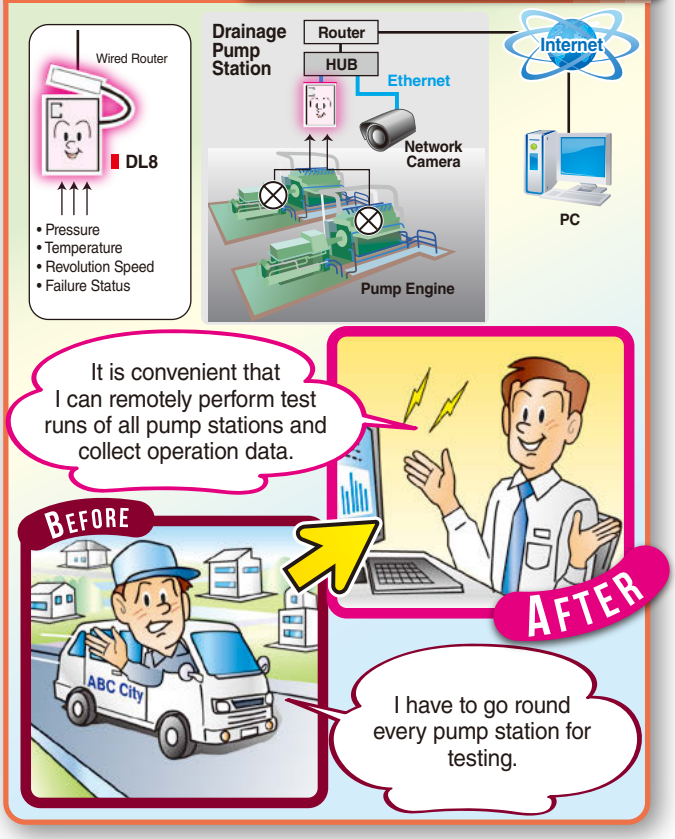
Aquaculture Facilities

System Configuration Page 16 No.1



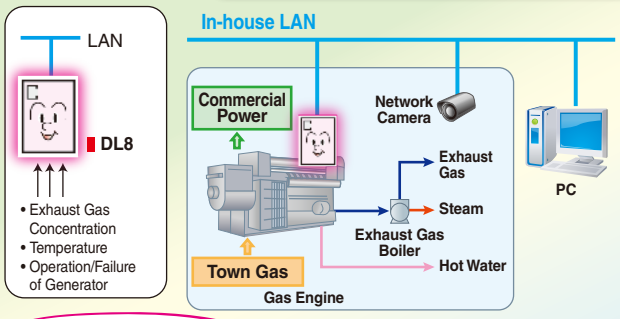
Engine

System Configuration Page 16 No.3

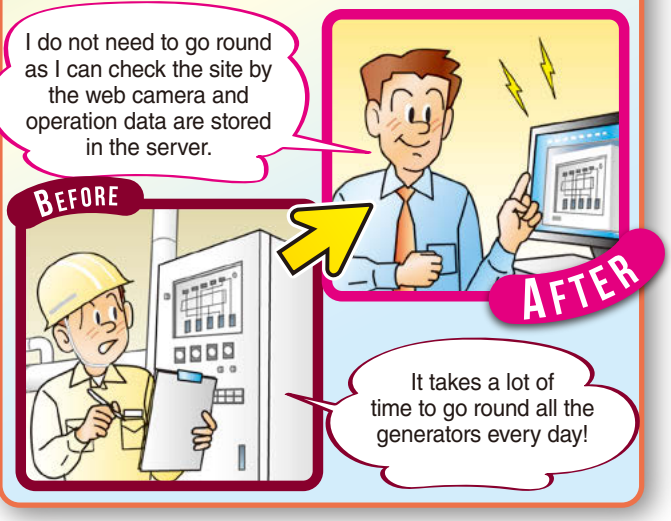


Gas generator

System Configuration Page 17 No.6



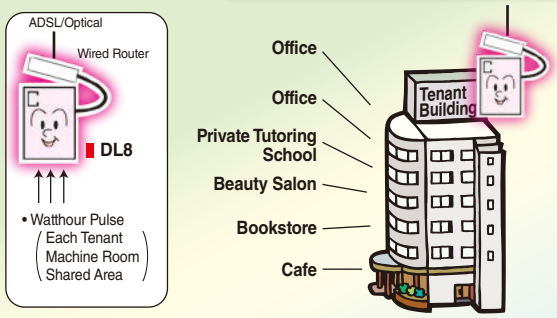
I do not need to go round as I can check the site by the web camera and operation data are stored in the server.



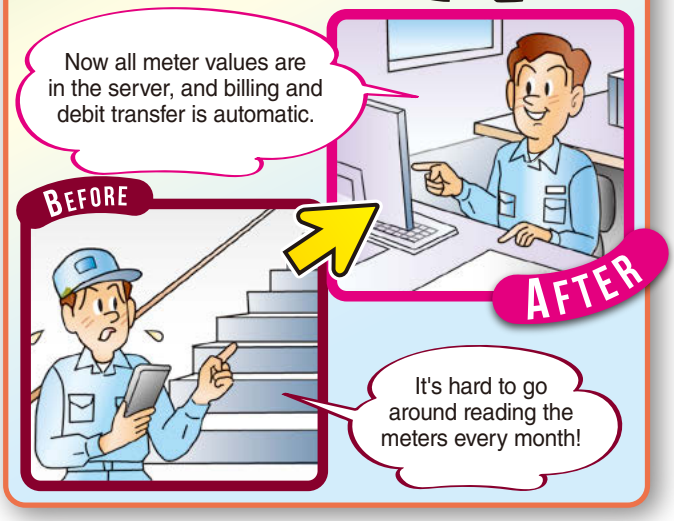
It takes a lot of time to go round all the generators every day!

Automatic Watthour Metering of Tenant Building

System Configuration Page 16 No.3



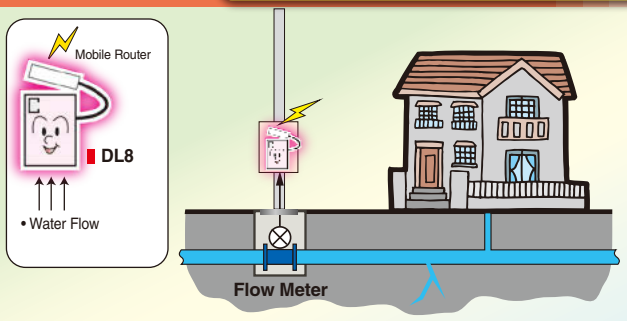
Now all meter values are in the server, and billing and debit transfer is automatic.



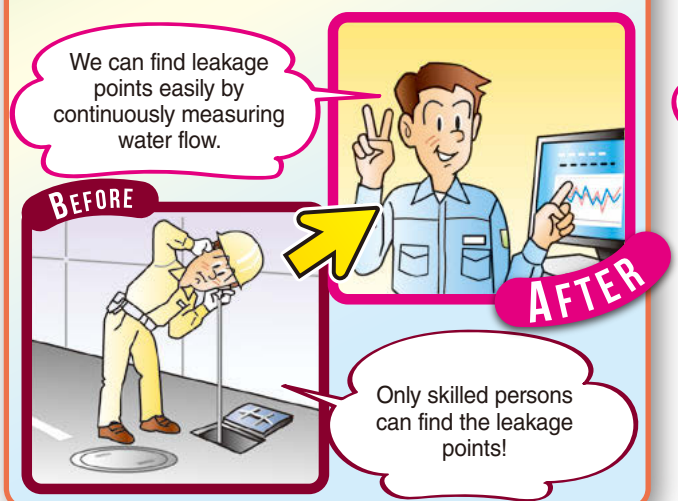
It's hard to go around reading the meters every month!

Water Leak Detection

System Configuration Page 16 No.2



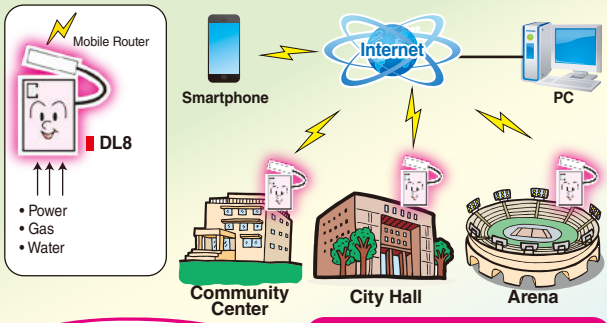
We can find leakage points easily by continuously measuring water flow.



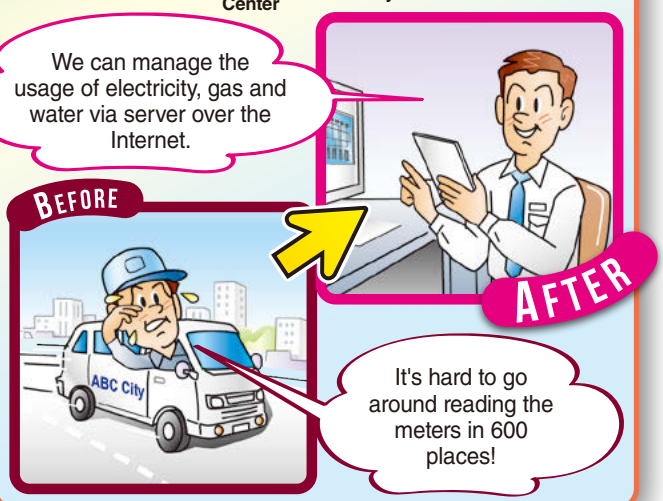
Only skilled persons can find the leakage points!

Energy Monitoring

System Configuration Page 16 No.2



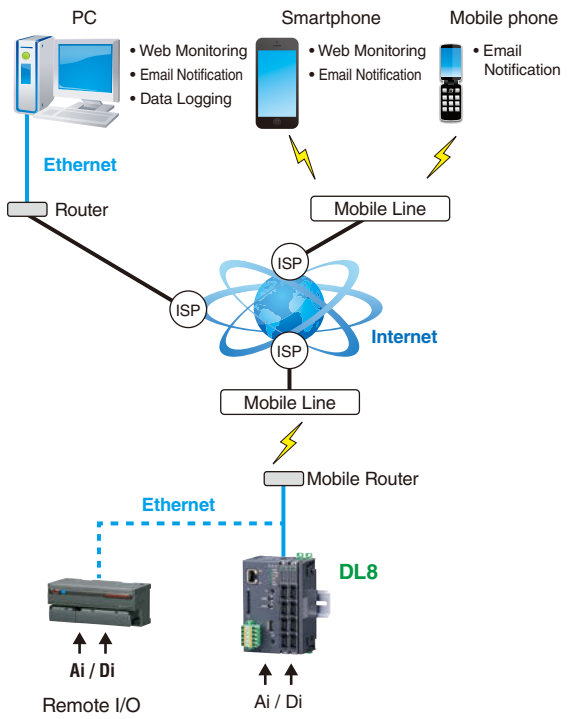
We can manage the usage of electricity, gas and water via server over the Internet.



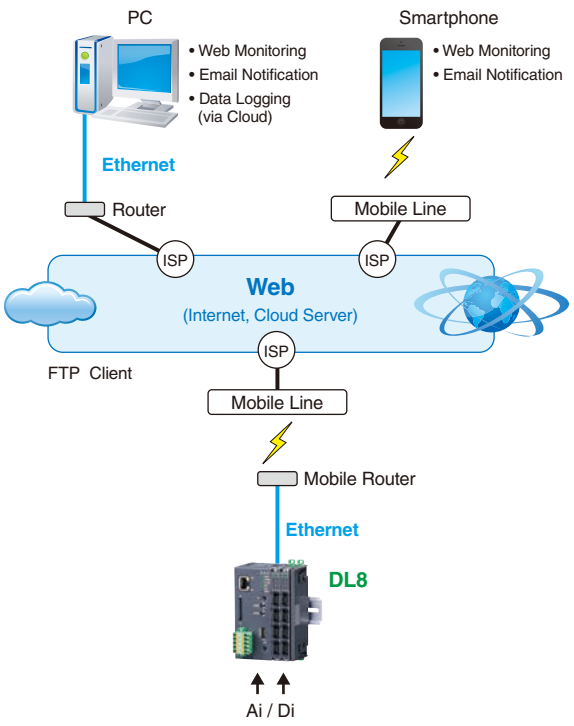
It's hard to go around reading the meters in 600 places!

System Configuration Examples

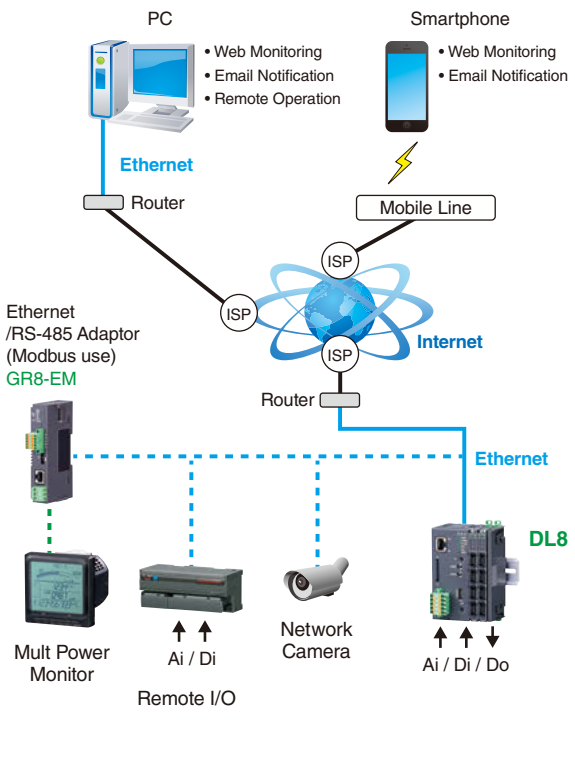
No.1



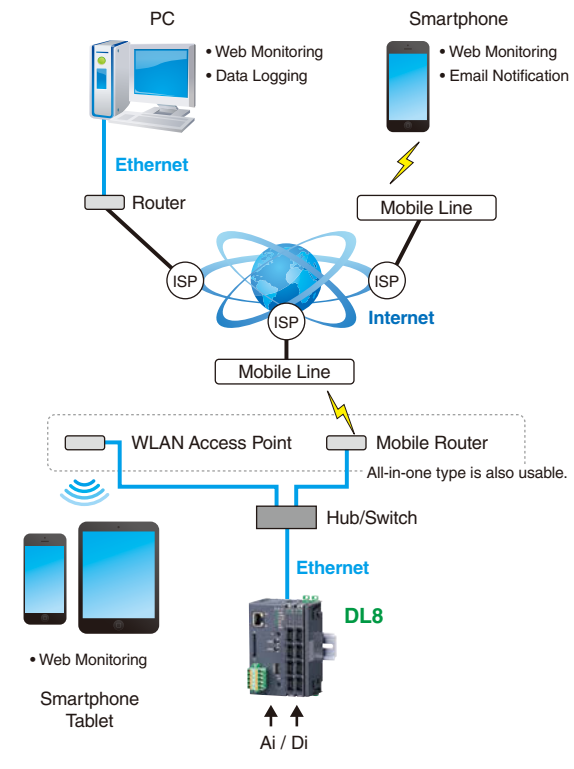
No.2



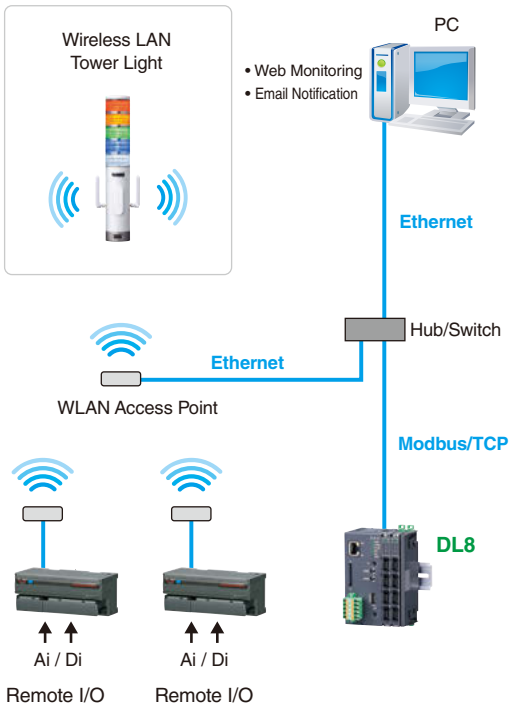
No.3



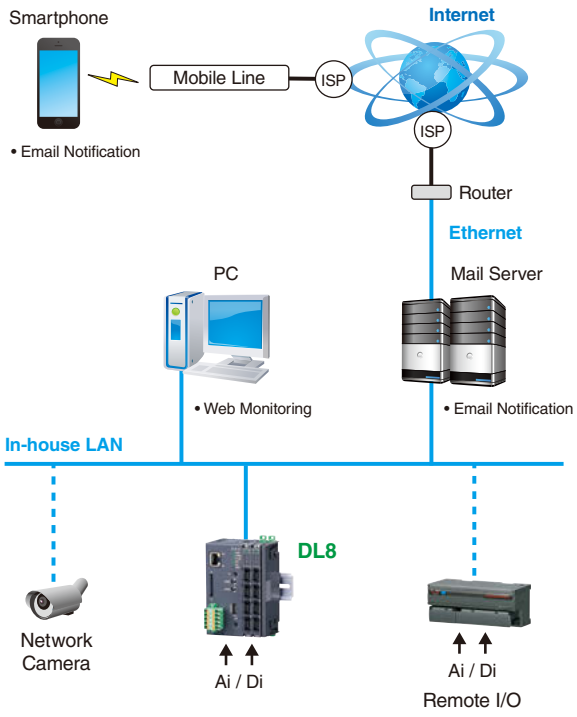
No.4



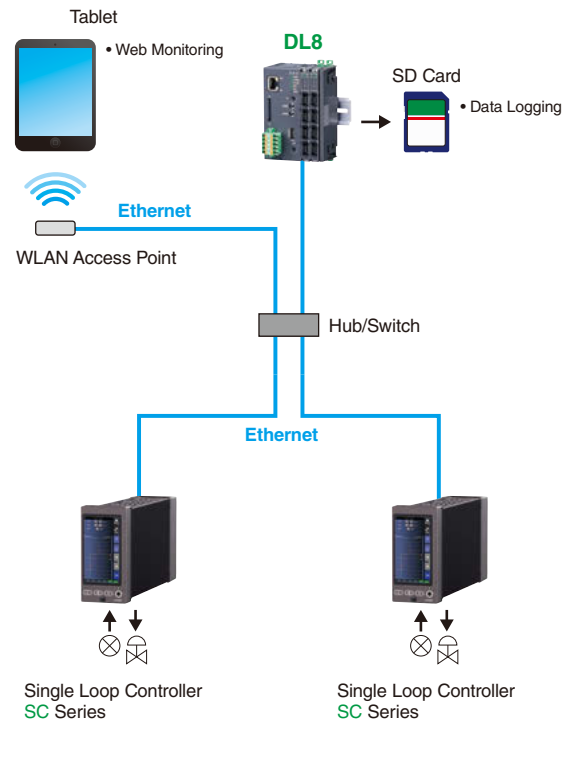
No.5


Wireless LAN
Tower Light
PC
• Web Monitoring
• Email Notification
Ethernet
Hub/Switch
Ethernet
WLAN Access Point
Modbus/TCP
DL8
Ai / Di
Remote I/O
Ai / Di
Remote I/O

No.6


Smartphone
Internet
Mobile Line
ISP
ISP
• Email Notification
Router
Ethernet
PC
Mail Server
• Web Monitoring
• Email Notification
In-house LAN
DL8
Network
Camera
Ai / Di
Ai / Di
Remote I/O

No.7


Tablet
• Web Monitoring
DL8
SD Card
• Data Logging
Ethernet
WLAN Access Point
Hub/Switch
Ethernet
Single Loop Controller
SC Series
Single Loop Controller
SC Series

RTU MODULE SPECIFICATIONS

Refer to our website for information on the I/O modules.

GENERAL SPECIFICATIONS

Max. number of I/O modules: 16
(Max. consumption current of I/O modules: 1.6 A)
Isolation: Ethernet to internal bus or internal power or power supply (exc. supply) to RUN contact output*1 to FE
Calendar clock: Year (4 digits), month, date, day, hour, minute, second
Status indicator LED: POWER, LOGGING, SD CARD, SEND, COM, ERROR
RUN contact output*1: Photo MOSFET relay (no polarity); (OFF in error detected)
*1. Run contact output is applicable for Type C with the DL8 firmware version 1.4.x or later.

ETHERNET COMMUNICATION

Communication Standard: IEEE 802.3u
Transmission: 10BASE-T, 100BASE-TX
Baud rate: 10/100 Mbps (Auto Negotiation function)
Protocol: TCP/IP, Modbus/TCP, SLMP, HTTP, HTTPS, FTP, FTPS, SMTP, SNTP
Transmission media: 10BASE-T (STP, Category 5), 100BASE-TX (STP, Category 5e)
Max. length of fieldbus segment: 100 meters
Ethernet indicator LED: DPLX, LNK
IP address: 192.168.0.1 (factory setting)

INSTALLATION

Power input: 24 V DC
Power consumption: Approx. 12 W 24 V DC @internal power max. current 1.6 A
Approx. 2 W (at single mounting)
Internal power supply (power supply for I/O module): 5 V DC, 1.6 A
Excitation supply output (excitation for I/O module): 24 V DC ±10 %, operational current 7 A
(From power supply (excitation supply) connector, via connector for internal bus, supplied to each I/O module. Power output current consumption must be under operational current.)
Operating temperature: -10 to +55°C (14 to 131°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Atmosphere: No corrosive gas or heavy dust
Mounting: DIN rail
Weight: 190 g (0.42 lb)

PERFORMANCE

Battery: Vanadium-lithium secondary battery (undetachable)
Calendar clock accuracy:
Monthly deviation 2 minutes at 25°C
Battery backup: Approx. 2 months
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute (Ethernet to internal bus or internal power or power supply (exc. supply) to RUN contact output to FE)

COMPATIBLE BROWSING DEVICE

■**Software requirement**
Functional checked environment
●**PC**
- **OS**: Windows 10 (32-bit/64-bit), Windows 11
- **Browser**: Microsoft Edge, Chrome, Firefox

●**Tablet**
- **OS**: iPad (iPadOS 17.5.1);
  Android terminal (Android 14)
- **Browser**: iOS: Safari; Android: Chrome

●**Smart phone**
- **OS**: iPhone (iOS 17.5.1);
  Android terminal (Android 14)
- **Browser**: (iOS) Safari; (Android) Chrome

COMMUNICATION

IP: DHCP client is supported. Manual setting of IP address, subnet mask, default gateway and DNS server available too.
Modbus/TCP slave:
Remote observation system via SCADA etc.
Number of connections 4
Modbus/TCP master: I/O expansion with remote I/O, e.g. R3 or R7 series, is available. Measuring points in multiple locations can be handled collectively.
SLMP Client: DL8 allows I/O expansion by connecting with the SLMP-compatible CPU unit of Mitsubishi programmable-controller MELSEC; and collectively handles data from measuring points in multiple locations.
Web server function (Direct):
This unit can be a Web server, and 'Data,' 'Trend' and 'Event Log' views are available from remote location.
Web server function (Cloud):
This unit can be an FTP client, and upload the Web files to a cloud server.
Users can browse the cloud server.
Multiple users can access it at once without extra load at the unit. (only browsing, operation not available.)
Analog input: 32 points
Discrete input: 64 points
Pulse input: 32 points
Discrete output: 64 points
Analog output: 32 points
(firmware version of the unit: 1.4.x or later)
(For pulse input, only 32 bit data is available. It is not available for the products using 16 bit data (model: R3-PA16 etc.).

ALARM OUTPUT (Type B, C, D, E)

Event can trigger an alarm contact at a discrete output module.
- Transition of analog input zone
- Transition of pulse input zone
- Status change of discrete input
- Count up of discrete input

EVENT REPORTING (Type B, C, D, E)

Reporting email function available at event or designated time.
Encrypted communication is supported. (SMTP over SSL).
The DL8 turns a designated Do ON after transmitting the report.
- Number of email attention: 32
- Number of event report text: 32
- Number of regular report text: 1
- Channel status: AI, DI, PI, DO, AO status attachable to email (DO and AO are available with firmware version of the unit 1.4.x or later)
- Output at transmitting failure: 1 point

LOGGING (Type C, D, E)

Log files in text format are stored into an SD card.
The number of logs depends on the free space of the SD card.
- Log file: System log, event log, email report log, channel log

FTP CLIENT (Type B, C, D, E)

The recorded data is uploaded to an FTP server and FTPS server (Type E) in CSV format in specified interval time.
User can define the CSV file.
- Number of channel: Max. 32 (Selectable within AI, DI, DI (counter), PI, DO, AO)
  (AO is selectable with firmware version of the unit 1.4.x or later)
- Sampling rate (Firmware version 1.6.x or later)
  1 or 2 sec (Interval time: 1 or 10 min. or 1 hr.)
  5, 10 or 30 sec. (Interval time: 10 min. or 1 hr.)
  1, 2, 5, 10, 15, 20 or 30 min. (Interval time: 1 day)
- Sampling rate (Firmware version 1.2.x or later)
  1 or 2 sec (Interval time: 1 or 10 min. or 1 hr.)
  5, 10 or 30 sec. (Interval time: 10 min. or 1 hr.)
  1, 2, 5, 10 or 30 min. (Interval time: 1 day)
- Sampling rate (Firmware version 1.1.x or earlier)
  1, 2, 5, 10 or 30 sec. (Interval time: 1 hr.)
  1, 2, 5, 10 or 30 min. (Interval time: 1 day)

To confirm the firmware version, use the configurator software, model: DLCFG. Event can trigger an alarm contact at a discrete output module.

TREND DATA STORING (Type C, D, E)

The logged data is written into the SD card in CSV format.
User can define the CSV file.
- Number of channels: Max. 32 (Selectable within AI, DI, DI (counter), PI, DO, AO)
  (DO and AO are selectable with firmware version of the unit 1.4.x or later)
- AI sampling:
  Momentary, average, peak (max.), peak (min.)
- Logging rate:
  Second: 1, 2, 5, 10, 20, 30 sec.
  Minute: 1, 2, 5, 10, 15, 20, 30 min. (15 min. is selectable with firmware version 1.5.x or later)
  On the hour: 0 to 23 o'clock (1 or more times available; specify time delay for each set time)
  Day start time and days to log are available.
- Recordable up to the SD card size.
  Automatically deleted. (Auto delete is available with firmware version of the unit 1.4.x or later)
- Recording period (as a guide):
  Approx. 180 days
  (logging rate: 1 sec, 32 channels, only trend storing)

FTP SERVER (Type C, D, E)

Reading and deleting files in the SD card by an FTP client and an FTPS client (Type E) are available.
Compatible FTP client
- FFFTP 5.6

Compatible FTPS client
- FFFTP 5.6

I/O MAPPING (Type D, E)

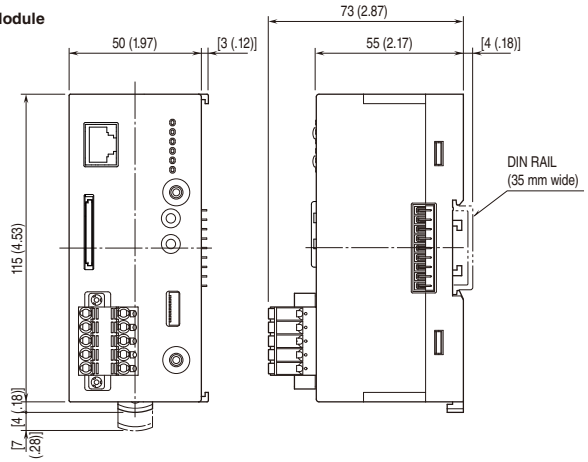
Multiplex Data Transmission for remote I/O and IP telemeter is available by registering DI-to-DO or AI-to-AO mapping information.

USER DEFINED BROWSER VIEW (Type D, E)

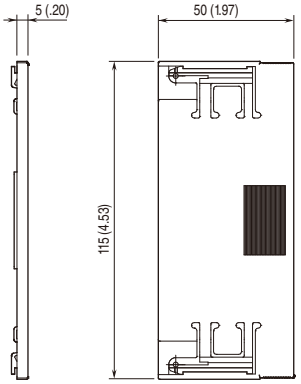
The browser view is user-definable.
Development tools for HTML file are not available by us. Provide by customer.

EXTERNAL DIMENSIONS unit: mm (inch)

■ RTU Module



■ PROTECTIVE COVER



How To Setup the DL8

Setup System Configuration

Remote Setting

For the DL8 connected to the Internet, settings can be downloaded to change from a PC where the PC Configurator Software (model: DLCFG) is installed (excluding basic setting items such as the communication parameters).

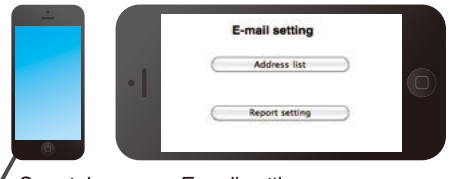
PC Configurator Software
DLCFG*

Windows PC

*Free downloading from our website.

Remote Mail Setting

Email recipients and message templates can be added or changed by accessing the “E-mail setting” screen from the browser of smartphone or PC.



Smartphone E-mail setting screen

Internet

Local Setting

PC Configurator Software
DLCFG

Special Cable

Windows PC

DL8

Complete setup is available by connecting the DL8 via Special Cable (model: COP-US, to be separately purchased) to a PC where the PC Configurator Software (model: DLCFG) is installed.

Special Cable
PC Configurator Cable
Model: COP-US

DL8 Web Data Logger for IoT

MG CO., LTD.
www.mgco.jp

Your local representative: