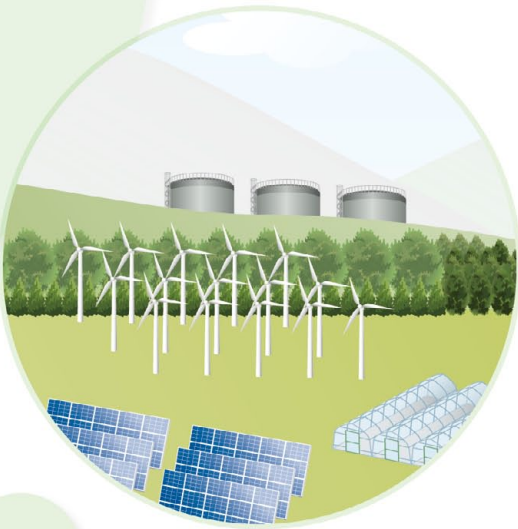
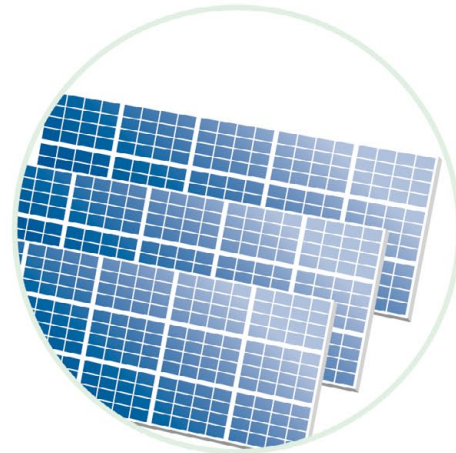
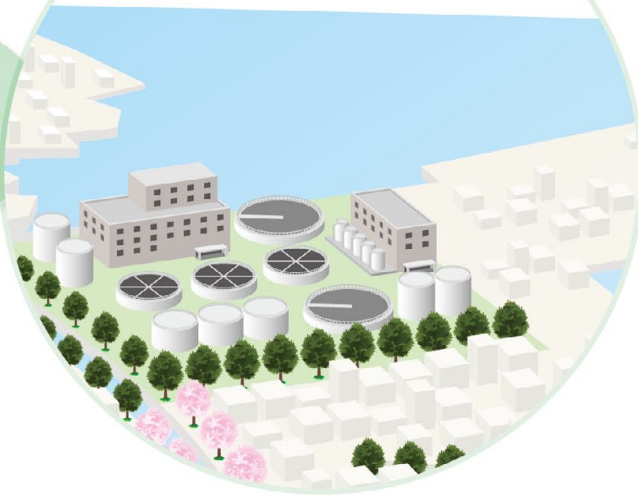
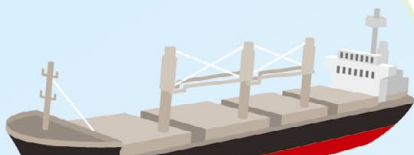


MSYSTEM

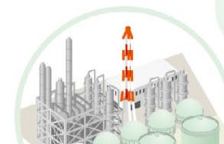
Total Components Supplier for PA / FA / BA







Application Examples









www.m-system.com


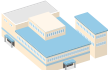






APPLICATION MAP



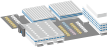



 <p>1 Photovoltaic Generation Page 7</p> <ul style="list-style-type: none"> ● Lightning Surge Protection for Photovoltaic Systems 	 <p>3 Highway Systems Page 6</p> <ul style="list-style-type: none"> ● Power Monitoring Systems for Motorway Service Stations
 <p>2 Wind Power Generation Page 6</p> <ul style="list-style-type: none"> ● Turbine Blade Angle Detection and Power Output Determination 	 <p>4 Distribution Reservoir Page 9</p> <ul style="list-style-type: none"> ● Remote Monitoring of Distribution Reservoir(s)

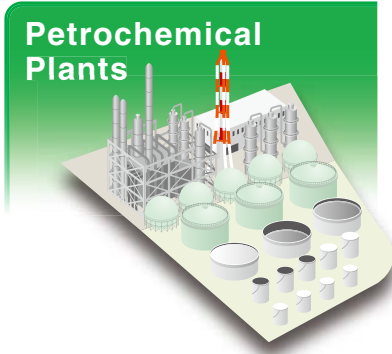


 <p>11 Business Districts Page 11</p> <ul style="list-style-type: none"> ● Signal Transmission that Requires High Reliability 	 <p>13 Wastewater Treatment Plants Page 8</p> <ul style="list-style-type: none"> ● Wide-Area Remote Monitoring of Manhole Pumps 	 <p>15 Water Purification Plants Page 9</p> <ul style="list-style-type: none"> ● Centralized Monitoring System
 <p>12 Office Buildings Page 10</p> <ul style="list-style-type: none"> ● HVAC Control System for Large Offices ● HVAC Control System for Cubicles and Window 	 <p>14 Sluice Gates Page 8</p> <ul style="list-style-type: none"> ● Sluice Gate Automation and Remote Monitoring 	 <p>16 Petrochemical Plants Page 4</p> <ul style="list-style-type: none"> ● Fluid Temperature Measurements ● On-Site Tank Liquid Level Indication ● Aperture Control of Pneumatic Control Valves

 <p>5 Greenhouses Page 13</p> <ul style="list-style-type: none"> ● Temperature Log and Monitoring of Greenhouses 	 <p>7 Food Factories Page 5</p> <ul style="list-style-type: none"> ● Sensor Signal Input to PLC 	 <p>9 Local Government Offices Page 9</p> <ul style="list-style-type: none"> ● Centralized Monitoring System
 <p>6 Railroad Systems Page 6</p> <ul style="list-style-type: none"> ● Power Monitoring Systems for Railroad Stations 	 <p>8 Chemical Plants Page 4</p> <ul style="list-style-type: none"> ● Fluid Temperature Measurements ● On-Site Tank Liquid Level Indication ● Aperture Control of Pneumatic Control 	 <p>10 Pulp and Paper Mills Page 12</p> <ul style="list-style-type: none"> ● CP Controller for Paper Machines



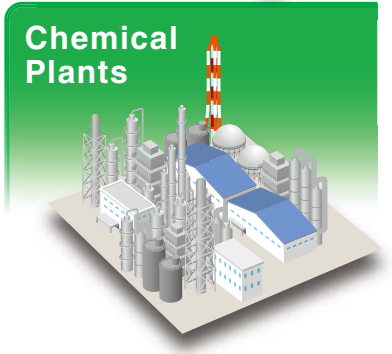
 <p>17 Semiconductor Factories Page 7</p> <ul style="list-style-type: none"> ● Semiconductor Cleaning Equipment I/O and Safety Measures 	 <p>19 Public Aquaria Page 5</p> <ul style="list-style-type: none"> ● Sea-Water Circulation System and Temperature Control 	 <p>21 Automotive Factories Page 7</p> <ul style="list-style-type: none"> ● Automotive Coating System ● High-Speed Sampling Tests of Automotive Engines
 <p>18 Fishery Harbors Page 6</p> <ul style="list-style-type: none"> ● Power Monitoring of Ice Machines and Cold Storage Warehouses 	 <p>20 Vessels Page 12</p> <ul style="list-style-type: none"> ● Cooling Control System for Marine Engines 	 <p>22 Waste Incineration Plants Page 5</p> <ul style="list-style-type: none"> ● Waste Incineration and Energy Reuse



Petrochemical Plants

Measuring Fluid Temperature

Protection tubes like thermowell or sheath are commonly used to provide isolation between temperature sensors (thermocouple, RTD) and the environment. [Head-mounted 2-wire signal conditioners](#) are mounted in the connection head of protector tube, converting input from the sensor into a 4-20 mA DC signal. Transmitting with 4-20 mA current signal provides for the measurement accuracy without needing to invest for expensive extension wires.



Chemical Plants

Displaying Tank Liquid Level in Hazardous Area

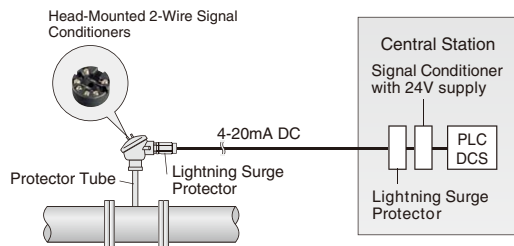
In a hazardous area that must "eliminate conditions to induce explosions caused by electric energy", it is avoided to use an indicator that requires high-energy consumption. The [6DV-B Loop Powered Indicator](#) requiring only low energy from the current loop provides a bright display in hazardous locations.

Controlling Pneumatic Valves Opening

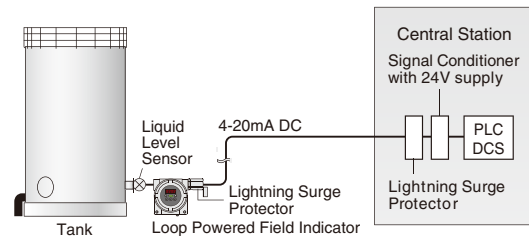
In places like oil or chemical plants, many control valves are installed in the premise to control the liquid flow volume. The [SC100/200 Series Multi-function PID Controller](#) controls the valve opening by the PID control based on the measured values from the flowmeter. Actuators for pneumatic control valves have two different types of input (control signal): pneumatic pressure signal and electric signal. For the pneumatic pressure signal, an [I/P transducer](#) is used to convert electric signal of the [multi-function PID controller](#) into pneumatic pressure signal.

Head-Mounted 2-Wire Signal Conditioners, Loop Powered Field Indicator, Lightning Surge Protector

Measuring Fluid Temperature



Displaying Tank Liquid Level in Hazardous Area (explosion-proof area)



Head-mounted 2-wire Signal Conditioner
27RS



Loop Powered Field Indicator
6DV-B/6DVI-B



Signal Conditioner with 24V supply
M2DY



Lightning Surge Protector for Standard Signal Line & Pulse Use
MDP-24-1

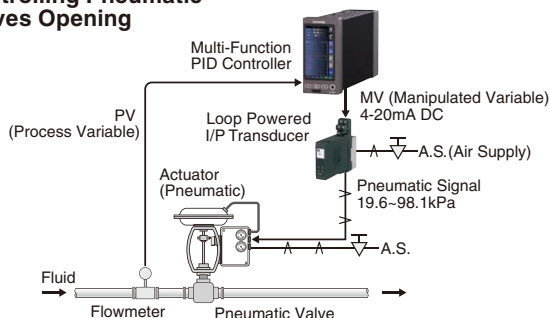


Lightning Surge Protector for Standard Signal Line & Pulse Use (Conduit Mount, Weather-proof, 24 V DC Line Voltage)
MD6N-24



Multi-Function PID Controller & I/P Transducer

Controlling Pneumatic Valves Opening



Multi-Function PID Controller
SC Series



Loop Powered I/P Transducer
HVPN

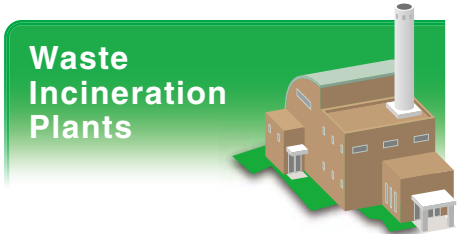




Food Factories

Sensor Signal Input to PLC

Signal conditioners are used to process measured signals at the front end of PLC system. Typically they convert sensor specific signals into standard instrumentation signals, provide limit alarm contact outputs, or apply simple math functions such as ratio calculation.



Waste Incineration Plants

Waste Incineration and Energy Reuse

At waste incineration plant, there are a wide range of control and monitoring processes for combustion control, flue gas treatment, waste heat utilization by cogeneration, for which signal conditioners and limit alarms are utilized in various areas.



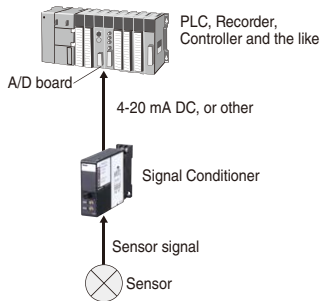
Public Aquaria

Sea-Water Circulation System and Temperature Control

In an aquarium where a large volume of seawater must be circulated and controlled at adequate temperature, there are many points of flow control and temperature monitoring. That also consumes a large amount of energy, for which power transducers and power monitoring systems are used.

Signal Conditioner, Power Transducer, Limit Alarm

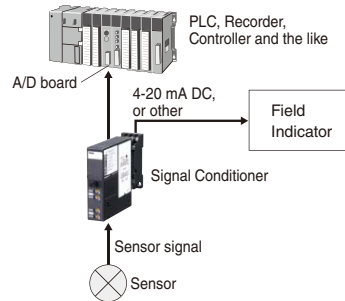
■ **Converts Sensor Outputs into Signals for PLCs and Recorders**



Compact Plug-in Signal Conditioners Mini-M Series



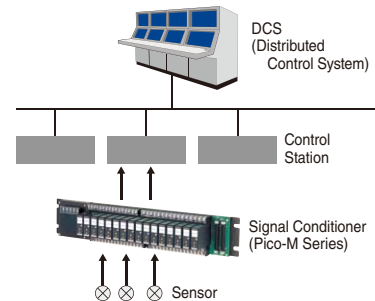
■ **Outputs Digital Signals for Field Indicators in addition to PLCs or Recorders**



Compact Plug-in Signal Splitters Mini-MW Series



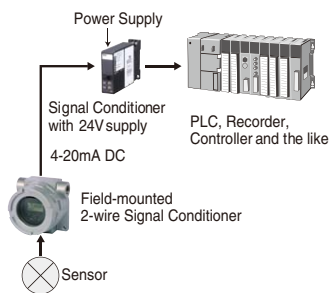
■ **For Replacement of Existing Field DCS**



Dual Output Super-mini Signal Conditioners Pico-M Series



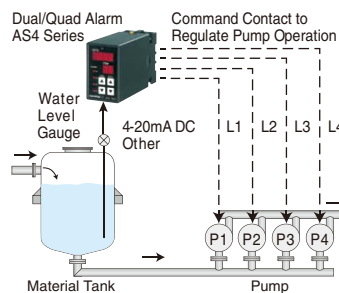
■ **2-Wire System Converts and Transmits On-site Sensor Signals**



Field-mounted 2-wire Signal Conditioners B6-UNIT Series



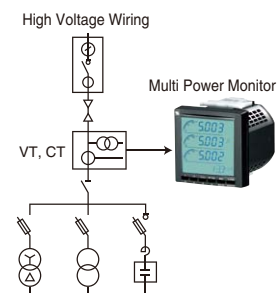
■ **4-point Alarm System Optimizes the Number of Pumps being Operated**



Digital Adjustments Dual/Quad Alarms AS4 Series

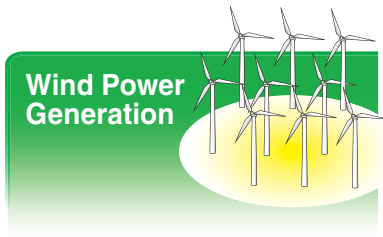


■ **Power Monitoring System**



Multi Power Monitors 53U Series

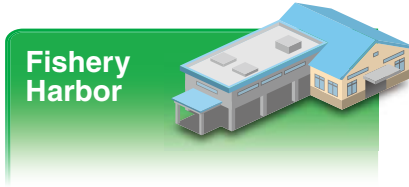




Wind Power Generation

Turbine Blade Angle Detection and Power Output Determination

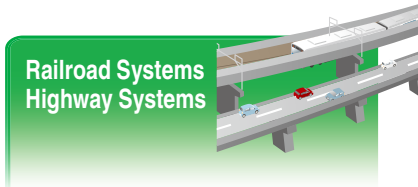
2-wire potentiometer transmitters are used to detect wind turbine blade angles so that they are controlled depending upon the wind force for optimal operations of a wind power generation system. Multi power monitors and transducers are used to measure generated electric power.



Fishery Harbor

Power Monitoring of Ice Machines and Cold Storage Warehouses

Equipment such as deep-freezers or ice machines are indispensable for fish and seafood processing facilities or storages in a fishery harbor. These facilities implement systems to control temperature and monitor power consumption, utilizing a wide range of signal conditioners and multi power monitors.



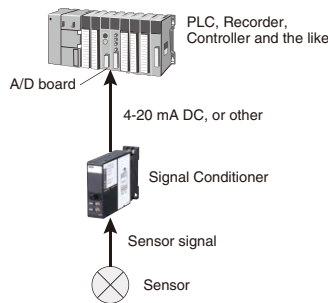
Railroad Systems Highway Systems

Power Monitoring Systems for Railroad Stations or Motorway Service Stations

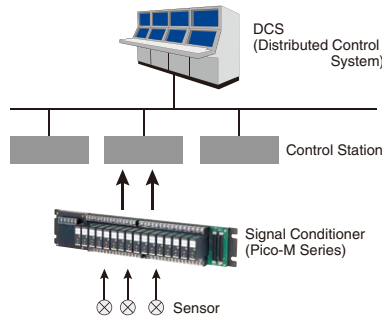
Power monitoring systems are implemented for efficient use of energy in railroad stations and motorway service stations, where power transducers and multi power monitors are used.

Signal Conditioner, Power Transducer, Limit Alarm

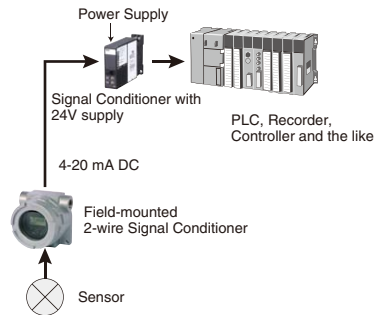
■ Converts Sensor Outputs into Signals for PLCs and Recorders



■ For Replacement of Existing Field DCS



■ 2-wire System Converts and Transmits On-site Sensor Signals

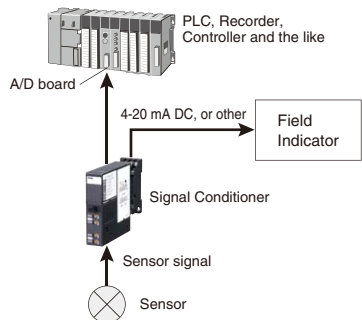


Compact Plug-in Signal Conditioners
Mini-M Series

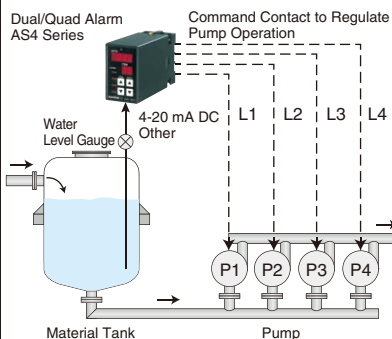
Dual Output Super-mini Signal Conditioners
Pico-M Series

Field-mounted 2-wire Signal Conditioners
B6-UNIT Series

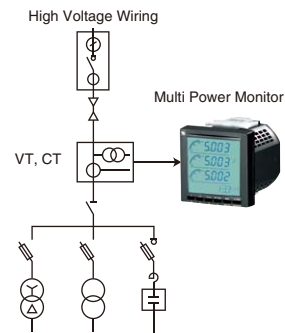
■ Outputs Digital Signals for Field Indicators in addition to PLCs or Recorders



■ 4-point Alarm System Optimizes the Number of Pumps being Operated



■ Power Monitoring System

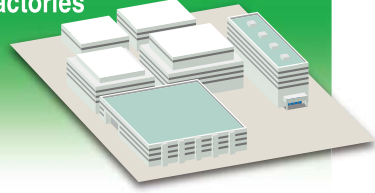


Compact Plug-in Signal Splitters
Mini-MW Series

Digital Adjustments Dual/Quad Alarms
AS4 Series

Multi Power Monitors
53U Series

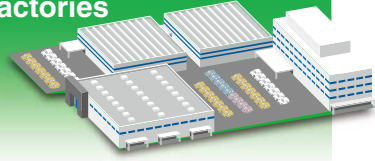
**Semiconductor
Factories**



Semiconductor Cleaning Equipment I/O and Safety Measures

Various [signal conditioners](#) are used in semiconductor related manufacturing processes. In addition, we introduce here an application of the [R8 Series Remote I/O modules with interlocking function](#), which have been developed by a customer's requirement for cleaning equipment. In normal conditions, I/O signals are processed via network (EtherCAT). However, in an event of malfunction, specific or all output signals can be turned off by an interlocking command contact input. The equipment can be halted by direct local control without using the communication network.

**Automotive
Factories**



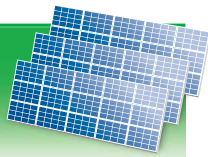
Automotive Coating System

Coatings applied to automotive parts or components require sophisticated technologies. The [remote I/O system that supports HLS](#), ultra high-speed, high-reliability field network, is adopted in coating processes as a solution to provide high-speed and high-accuracy control of multiple coating spray nozzles.

High-Speed Sampling Tests of Automotive Engines

[High-speed isolation amplifiers](#) are adopted for the development of high-speed voltage input boards for the automotive engine testing equipment.

**Photovoltaic
Generation**

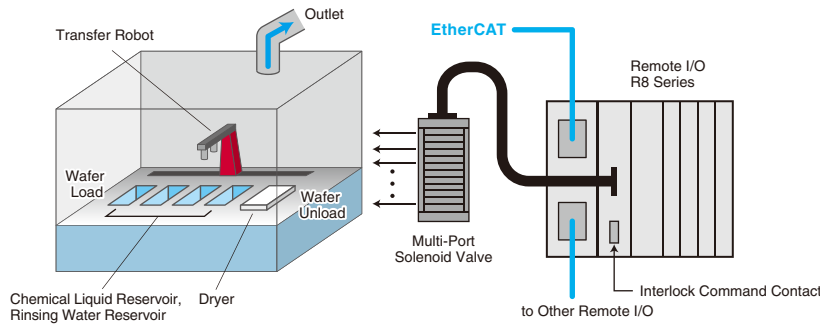


Lightning Surge Protection for Photovoltaic Systems

Tidily aligned photovoltaic modules and their wiring installed in a vast site are highly susceptible to induced lightning. [Lightning surge protectors](#) protect photovoltaic modules and power conditioners used in solar generation systems.

Remote I/O

■ Remote I/O for Semiconductor Cleaning Equipment

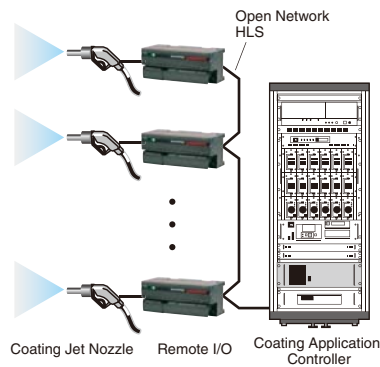


**Slice Type, Mixed Signal Remote I/O
R8 Series**



Remote I/O

■ Automotive Coating System

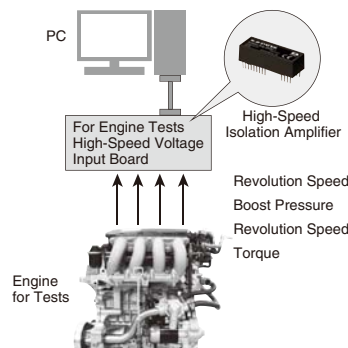


**Compact Remote I/O
for HLS
R7HL Series**



Isolation Amplifier

■ Tests and Measurements of
Automotive Engine Performance

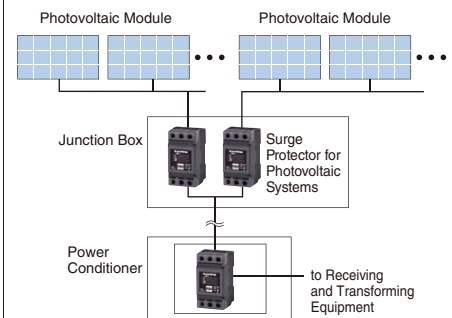


**High-Speed
Isolation Amplifier
20VF**



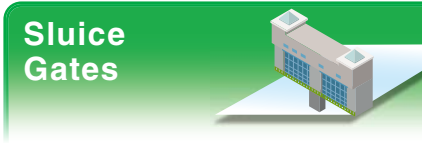
Lightning Surge Protector

■ Lightning Protection for
Photovoltaic Systems



**Surge Protector for
Photovoltaic Systems
MATP**





Sluice Gate Automation and Remote Monitoring

Sluices are built at river confluences where tributaries flow into the main stream. To prevent flowback of water into feeder streams, sluices are closed when the water level of a river rises high. Though most sluices are unmanned except at such times, once a rapid water level rise is observed, the gates require immediate operation. The **DL8 Series Web Data Loggers** provide a systematic solution for monitoring and recording of river water levels, and for opening/closing water gates automatically if an abnormality is detected.



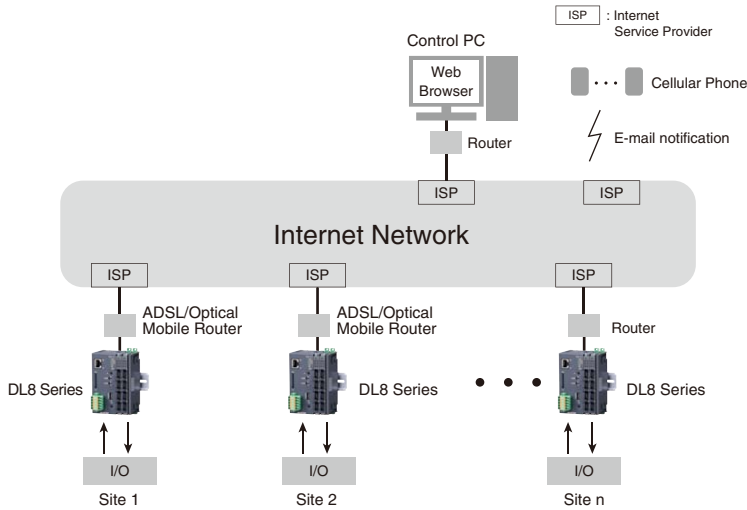
Wide-Area Remote Monitoring of Manhole Pumps

Sewers are generally gravity powered, though pumps may be used when necessary; for instance, where pressurized force is needed to convey water through undulating land or over long distances. A manhole pump lifts up sewer water to a higher elevation and then discharges the water to another gravity sewer. Terrain conditions in some areas require many pumps, however, which need time-consuming routine maintenance work. The **DL8 Series Web Data Loggers** provide an unmanned monitoring and reporting system to cover a number of manholes installed in a wide area.

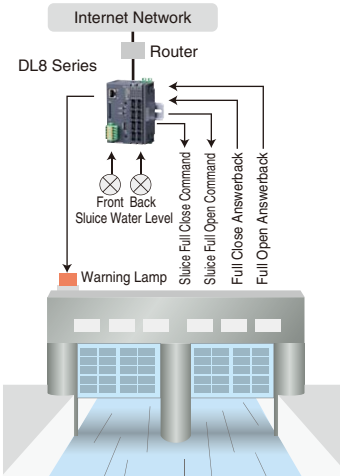
Web Data Logger, Remote I/O

Wide-Area, Remote Monitoring

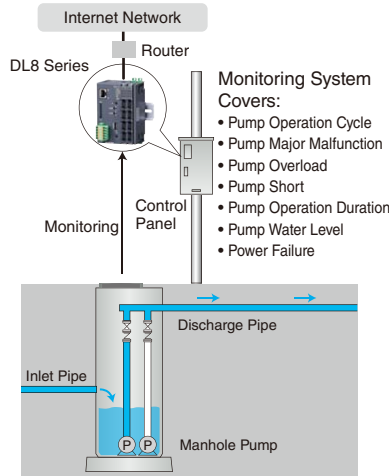
DL8 Series Web Data Logger with web server function monitors sites and provides data logging and event alerts. Operators only need internet access to grasp real-time water levels.



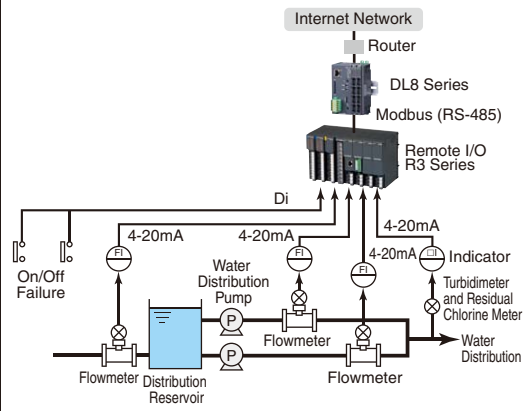
Remote Monitoring and Control of Sluice Gates



Remote Monitoring of Manhole Pumps



Remote Monitoring of Distribution Reservoir(s)



Web Data Loggers DL8 Series



Multi-channel, Mixed Signal Remote I/O R3 Series





Distribution Reservoir

Remote Monitoring of Distribution Reservoir(s)

Service water filtered at a water purification plant is typically lifted up to a distribution reservoir, then re-distributed downstream by gravity power for domestic use.

The DL8 Series Web Data Loggers provide a monitoring system for distribution reservoirs, most of which are unmanned during operation.



Water Purification Plants

Local Government Offices

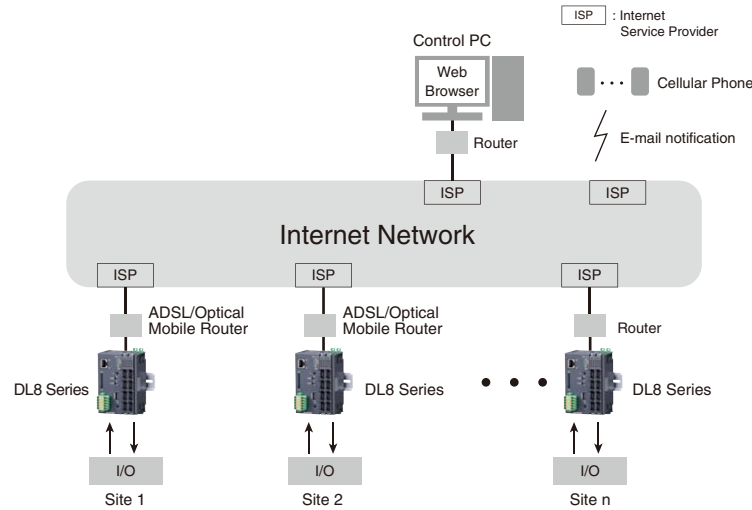
Centralized Monitoring System

Data collected from sluices and distribution reservoirs, as well as local water purification plants or pumping stations, is centrally monitored at water purification plants or local government offices.

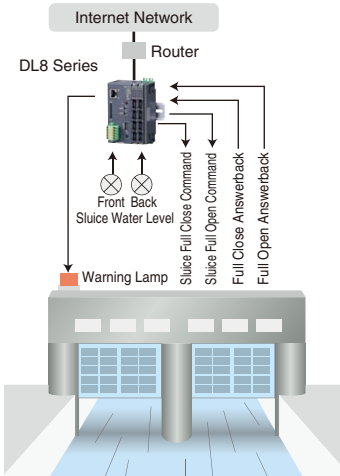
Web Data Logger, Remote I/O

Wide-Area, Remote Monitoring

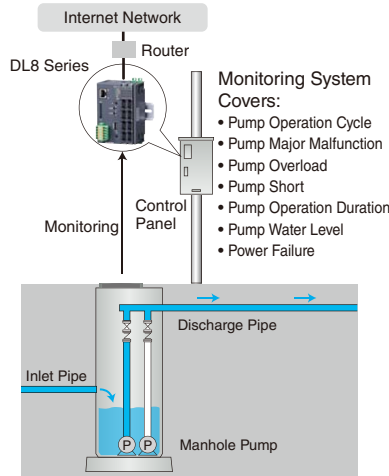
DL8 Series Web Data Logger with web server function monitors sites and provides data logging and event alerts. Operators only need internet access to grasp real-time water levels.



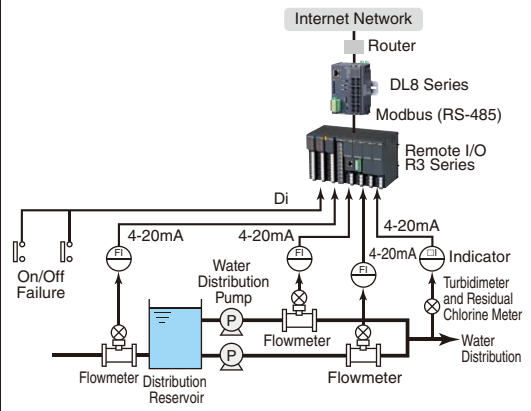
Remote Monitoring and Control of Sluice Gates



Remote Monitoring of Manhole Pumps



Remote Monitoring of Distribution Reservoir(s)



Web Data Loggers DL8 Series



Multi-channel, Mixed Signal Remote I/O R3 Series



Office Buildings



Air Conditioning Control for Large Offices

In large buildings, heat source equipment such as boilers and freezers are commonly installed in machine rooms to provide overall air-conditioning. Each story has an air handling unit (AHU) that distributes cooled (or heated) air to the floor. The air flow from the AHU is increased or reduced at a damper motor that is controlled by a **variable air volume (VAV) controller**. It receives the readout on the wind sensor and the temperature setting on the remote controller, and adjusts the aperture of the damper to keep room temperature as close to the preset one as possible.

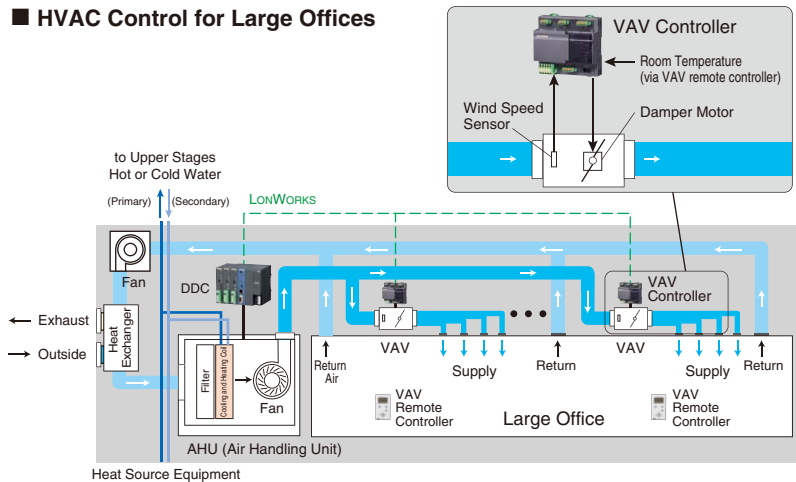
Air Conditioning Control for Small Rooms and Window Perimeter

In small office rooms or places where temperature conditions vary due to exposure to sunlight, fan coil units (FCU) are in common use. Heat source (hot and/or cold water) is supplied per unit to control temperatures of individual rooms. The **FCU controller** provides control of hot and/or cold water valves and a fan of the FCU in the room so that the room temperature is stabilized at as close to the preset one as possible.

Applications introduced in this page are only available in Japanese market or for limited example outside Japan.

BA Controller

■ HVAC Control for Large Offices



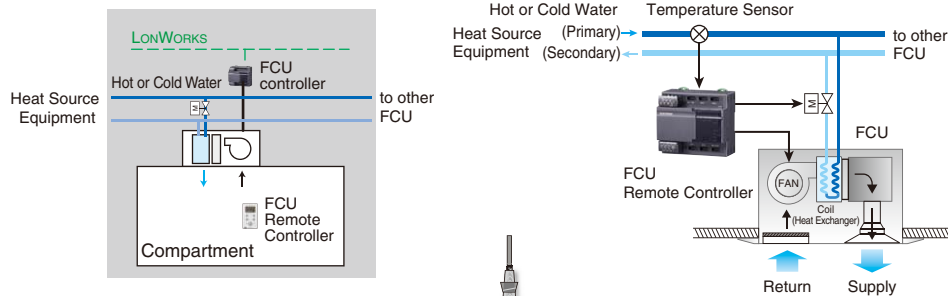
VAV Controller
BA9-VAV



FCU Controller
BA9-FCU

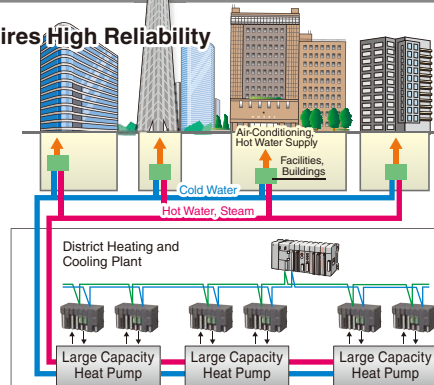


■ HVAC Control System for Cubicles and Window Areas



Remote I/O

■ Signal Transmission that Requires High Reliability



Multi-channel, Mixed Signal Remote I/O
R3 Series



Business Districts



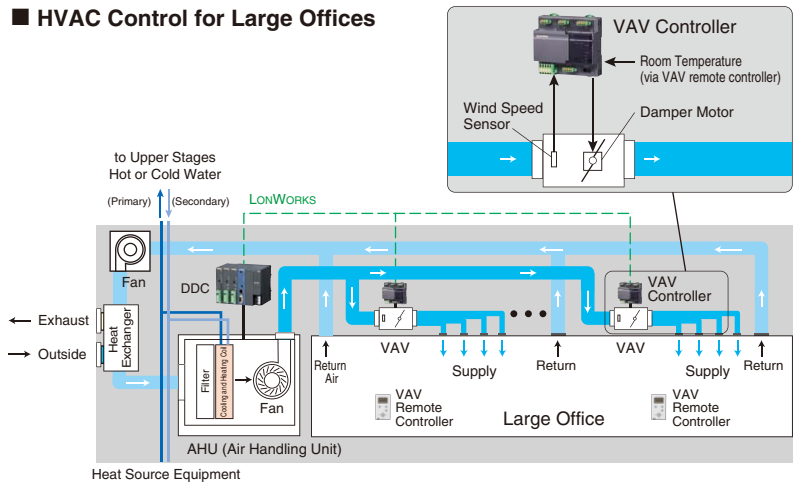
Signal Transmission that Requires High Reliability

District Heating & Cooling (DHC) is a system for distributing cool/hot water or steam generated in one or more heat generator plants via local piping network to residential and commercial locations within its supply area for cooling, heating and/or water heating. For heat generator plant operation, reliability counts more than anything. Its nature also requires temperature measurements with excellent accuracy as well as versatile compatibility to support various signal types. The R3 Series Remote I/O supports communication redundancy and offers a wide range of input module types including high accuracy temperature input, all of that contributing to widespread use among many DHCs.

Applications introduced in this page are only available in Japanese market or for limited example outside Japan.

BA Controller

■ HVAC Control for Large Offices



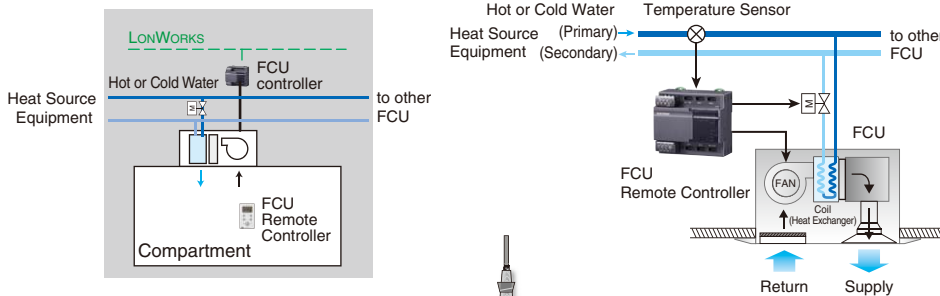
**VAV Controller
BA9-VAV**



**FCU Controller
BA9-FCU**

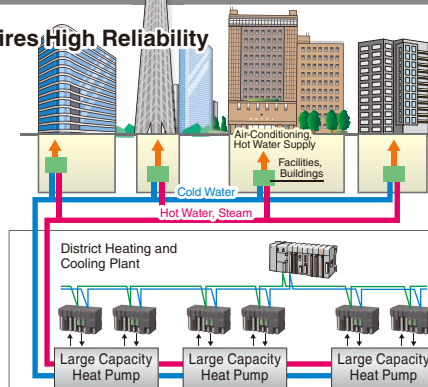


■ HVAC Control System for Cubicles and Window Areas



Remote I/O

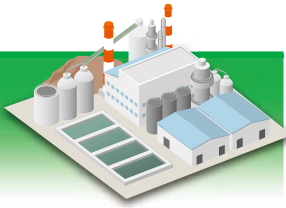
■ Signal Transmission that Requires High Reliability



**Multi-channel, Mixed Signal
Remote I/O
R3 Series**



Pulp and Paper Mills



CP Controller of Paper Machines

A CP controller is a device that provides systematic control for uniformized distribution of paper weight in gsm^{*1} . To the controller, a large number of dilution water lines are connected, and each line has a control valve attached to it. Accurate control of these control valves enables fine adjustment of the dilution water flow passing through each line, consequently producing a uniform transverse weight of paper per unit area. The **MSP Series Electric Actuators** are in use as electric actuator for the control valves. Typically, one CP controller needs 50-100 control valves. The **MSP Series** with communication function allows all network wiring to be allocated in series reducing wiring work.

*1: weight of paper per unit area

Vessels

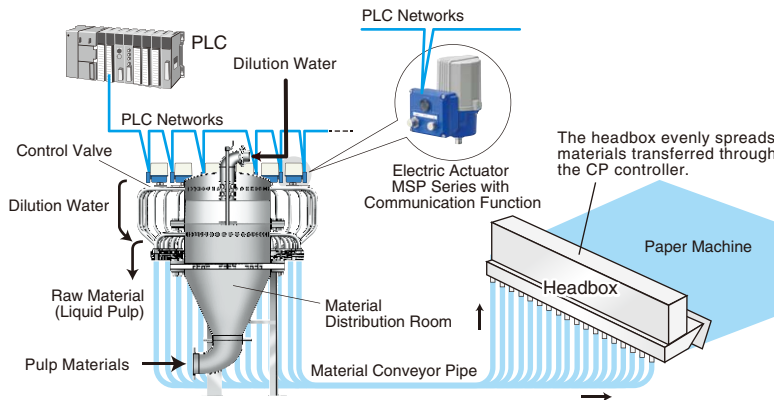


Cooling Control System for Marine Engines

Rotary motion electric actuators are in use for cooling systems of marine diesel engines. They control pure water temperatures to cool diesel engines, as well as 3-way valve apertures that maintain adequate sea-water temperatures for cooling air. For marine use, equipment must endure harsher conditions than those for onshore equipment so as to assure safe navigation of the vessels. Approval certificates of classification societies are granted for electric devices or equipment that can endure such conditions. The **PRP Rotary Motion Electric Actuator** has been accredited by Lloyd's Register Marine classification, the certification of longest standing among the international classification societies.

Electric Actuator

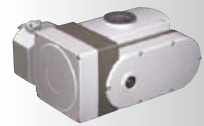
■ **CP Control System of Paper Machines**



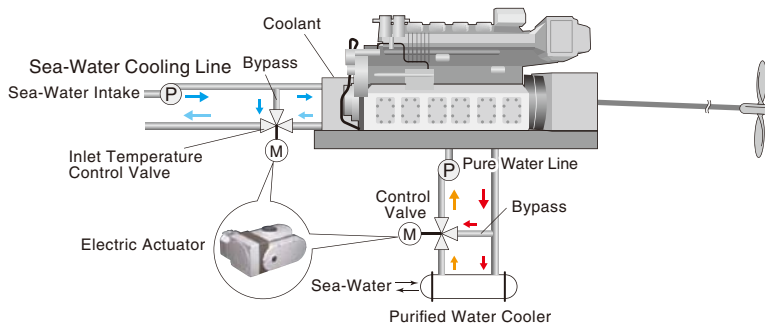
Open Network Capable Linear / Rotary Motion Electric Actuators
MSP/ MRP Series



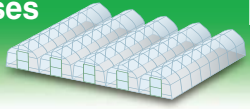
Electric Actuator PRP Series
(rotary type; max. torque 200 N·m, Lloyd's Register type approved)



■ **Cooling Control System for Marine Engines**



Greenhouses

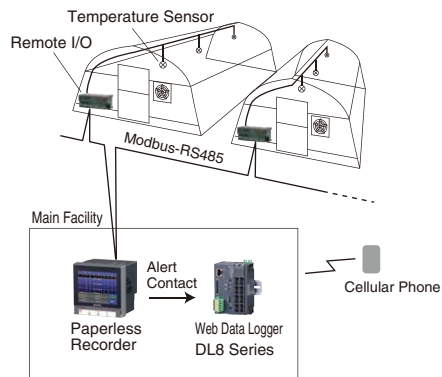


Temperature Log and Monitoring of Greenhouses

Sophisticated agricultural management for greenhouse cultivation requires good control of temperature monitoring and recording. Paperless recorders that support network connection provide an economical solution that cover multi-point temperature logs in large greenhouses. The DL8 Series Web Data Logger sends out e-mail notification to cellular phones when it detects high temperature in a greenhouse.

Paperless Recorder, Web Data Logger

■ Temperature Log and Monitoring of Greenhouses

Paperless Recorder
73VR1100Web Data Logger
DL8 Series

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Application Examples_R1_150311