Application Examples

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APPLICATION EXAMPLES

**Measuring Fluid Temperature**
Temperature sensors like thermocouples and RTDs are normally used by being contained in the protector tube (shell). Head-mounted 2-wire signal conditioners are used by being stored in the head area of the protector tube. Since they accept direct input from an RTD and provide a standard 4-20 mA DC signal, there will be no margin of error caused by the lead resistance and no need to purchase expensive compensating lead area.

**Displaying Tank Liquid Level in Hazardous Area**
A high-saving instrument that consumes relatively high amount of energy doesn’t need to be used in a hazardous area that must “eliminate conditions to induce explosions caused by electric energy.” The Loop Powered Field Indicator by M-System can be installed in a hazardous area because the panel lights up to display the measured data using the low energy of a current signal. We also have intrinsic safety models available.

**Controlling Pneumatic Valves Opening**
In places like oil or chemical plants, many adjustment valves are installed in the premise to control the liquid flow volume. The Multi-Function PID Controller adjusts the valve opening by the PID control based on the measured data from the flowmeter. The actuators with the pneumatic pressure valve control 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 the 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**
  - Central Station Signal Conditioner with 24V supply
- **Displaying Tank Liquid Level in Hazardous Area**
  - Central Station Signal Conditioner with 24V supply
- **Controlling Pneumatic Valves Opening**
  - Multi-Function PID Controller & I/P Transducer

**Food Factories**

**Waste Incineration Plants**

**Public Aquaria**

**Sea-Water Circulation System and Temperature Control**
Public aquarium tanks hold millions of liters of water and require sea-water circulation systems and temperature controls involving a large number of temperature monitoring and flow control points. Because of these requirements, a large amount of energy is consumed, and various power monitoring systems and power transducers have been adopted.

**Signal Conditioner, Power Transducer, Limit Alarm**
- **For Replacement of Existing Field DCS**
  - Compact Plug-in Signal Conditioners Mini-M Series
  - Compact Plug-in Signal Splitters Mini-M Series

**Number of Pumps being Operated**

**Power Monitoring System**

Specifications are subject to change without notice. When ordering, use the latest data sheets available at M-System web site.
Turbine Blade Angle Detection and Power Output Determination

Optimal wind turbine blade angles vary depending on wind force. In wind power generation, 2-wire Potentiometer Transmitters provide detection of optimal blade angles, and multipliers and multi-transducers are in use to measure power output.

Power Monitoring of Ice Machines and Cold Storage Warehouses

Equipment such as deep-freezers or ice machines are indispensable for a fishery harbor equipped with fish and seafood processing facilities or storages. These facilities implement systems to control temperature and monitor power distribution, utilizing a wide range of signal conditioners and Multi Power Monitors.

Power Monitoring Systems for Railroad Stations or Service Areas

For efficient use of energy, railroad stations and service areas implement power monitoring systems supported by a variety of power transducers and Multi Power Monitors.

Signal Conditioner, Power Transducer, Limit Alarm

- Converts Sensor Outputs into Signals for PLC’s and Recorders
- For Replacement of Existing Field DCS
- 2-wire System Converts and Transmits On-site Sensor Signals

Semiconductor Cleaning Equipment I/O and Safety Measures

Among various signal conditioners in use at many semiconductor manufacturing processes, we have introduced our remote I/O for cleaning equipment. Contact I/O card of Remote I/O R8 Series normally processes input and output data via network (EtherCAT); however, in the event of malfunction, it turns off all or specified points in accordance with interlock command contact input. It has been implemented in response to customers’ need for an application that allows for halting equipment directly at site without connecting to the network in the event of an emergency.

Automotive Coating System

Coatings applied to automotive parts or components require sophisticated technologies as well. Our Remote I/O systems that support HLS, ultra high-speed, ultra high-reliable open field network have been adopted in coating processes as a solution to provide accurate control of multiple coating spray nozzles.

High-Speed Sampling Tests of Automotive Engines

M-System’s high-speed isolation amplifiers have been adopted for the development of high-speed voltage input boards for the automotive engine testing equipment.

High-Voltage DC Lightning Surge Protectors (Arresters) for Photovoltaic Systems

Tidily aligned photovoltaic modules and their wiring installed in a vast site are highly susceptible to inductive lightning. M-System’s lightning surge protectors (arresters) protect such photovoltaic modules and power conditioners used in solar generation systems.
APPLICATION EXAMPLES

Sluice Gate Automation and Remote Monitoring

Sluices are built at confluences where feeders tributaries flow into the main stream. To prevent flow-back 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. DL8 Series Web Data Loggers provide a systematic solution for monitoring and recording of river water levels, and open/closes 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. DL8 Series Web Data Loggers provide an unmanned monitoring and reporting system to cover a number of manholes installed in a wide area.

Remote Monitoring of Distribution Reservoirs

Service water lifted at a water purification plant is typically lifted up to a distribution reservoir, then re-distributed downstream by gravity power for domestic use. Our DL8 Series Web Data Loggers provide a monitoring system for distribution reservoirs, most of which are unmanned during operation.

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

- Remote Monitoring of Distribution Reservoir(s)

- Remote Monitoring of Distribution Reservoir(s)

- Remote Monitoring of Distribution Reservoir(s)

- Remote Monitoring of Distribution Reservoir(s)

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APPLICATION EXAMPLES

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 System for Cubicles and Window Areas
In hospital 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. Our FCU controller provides control of hot and/or cold water valves and a fan as well as 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.

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. Our Remote I/O R3 Series supports reliable duplex communication, offers a wide range of input card types including high accuracy temperature input card, and enjoys the reputation of exceptional cost performance, all of that contributing to widespread use among many DHCs.

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**APPLICATION EXAMPLES**

**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 interwoven weight of paper per unit area. Our MSP Series Electric Actuators are in use as electric actuators for the control valves. Typically, one CP controller needs 50-100 control valves. M-System’s MSP Series Electric Actuators with communication function allow 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 cross 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. M-System’s Rotary Motion Electric Actuator PRP 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
- 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. M-System’s Web Data Logger DL8 Series sends out email notification to your cellular phone when it detects excessively high temperature in a greenhouse.

**Paperless Recorder, Web Data Logger**

- MSP Series with Communication Function
- Paperless Recorder
- Web Data Logger

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