

# I/O SOLUTION PRODUCTS

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500543

# CATEGORY INDEX

## PC / DCS / PLC



## Sensors / Transmitters

M-System does not provide mobile terminals (smart phones, tablets) or mobile network operator services.

SCADA Software  
Limited to Japanese Market




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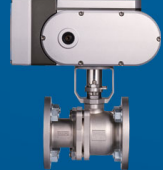

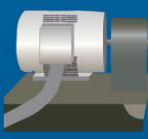

**Remote I/O**  
Page 18-25

- Mixed Signal Remote I/O
- All-in-One Style Remote I/O
- Compact Remote I/O for FA Control Equipment




**Final Control Elements**


# SIGNAL CONDITIONERS



## Signal Conditioners

### Signal Conditioners

#### Signal Conditioners Selection Guide

#### Function Modules & Retrofit Products

Limit Alarms

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A signal conditioner is used to condition and convert a field sensor signal suitable for processing with the PLC/DCS in a wide variety of process plants and factories. Typical applications are:

- ✓ **Signal conversion**
- ✓ **Signal isolation to stop ground loops**
- ✓ **Signal boosting to increase load drive capability**

M-System signal conditioners are available with wide combinations of process signal I/O, power input and mounting configuration. Additionally, M-System offers the broadest line of signal splitters available.

### Choose by Housing and Terminal Access Styles

- Plug-in base socket mounted
- Terminal block style
- Euro terminal block style
- Ultra-slim housing
- Installation base mounted
- Rack mounted
- Field enclosure mounted
- Sensor head mounted
- PCB mounted
- Connector output

### Choose by I/O Signal Types

- Universal input
- DC mV, V, mA
- Two-wire transmitter
- Temperature
- Potentiometer
- Strain gauge
- CT & VT
- Frequency and pulse
- Pneumatic
- AC power
- And others

### Choose by Functions

- Isolation / Amplification
- Conversion / Transmission
- Signal splitting
- Limit alarm
- Filtering
- Math / Process function
- Linearization

### Choose by Power Supply

- AC line powered (4-wire)
- DC line powered (4-wire)
- Output loop powered (2-wire)
- Input loop powered (self powered)

## ISOLATOR APPLICATIONS 1

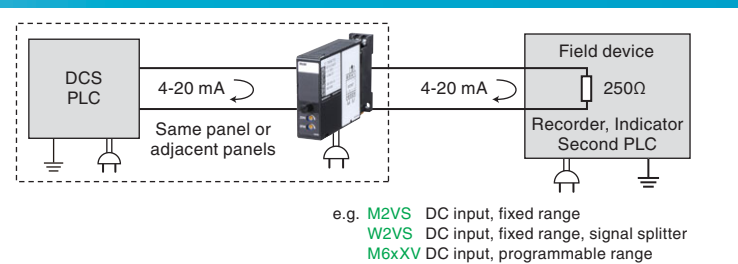
Isolator is installed between a transmitter (i.e. sensor) and a receiver to galvanically isolate DC signals.

Breaking the path between a field instrument and a control room device minimizes various influences coming from the field site to the control room.

In addition, each instrument separated by galvanic isolation can choose its own ground point independently from other ones, avoiding the 'ground loop' problem.

Lastly, the isolator can provide impedance conversion to beat loop impedance constraints, and signal level conversion (e.g. from 10-50 mA to 4-20 mA) function.

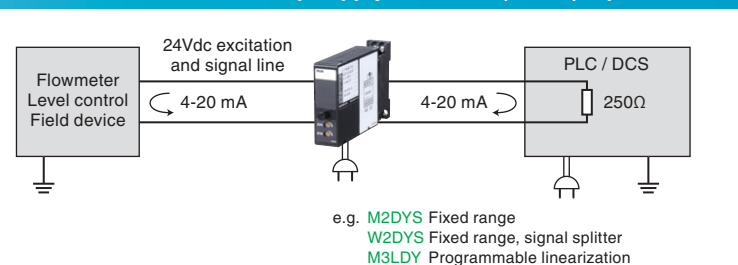
### 4-wire isolator : 4-20 mA (passive) input / 4-20 mA output / Line powered



Designed primarily for front-ending PLC/DCS systems which are mounted within the same panel or adjacent to it. The isolator module is powered from terminals separate from signal lines.

- Test and measurement applications
- Manufacturing cells
- Monitoring systems located in-line with the manufacturing process

### 4-wire isolator / current loop supply : 4-20 mA (active) input / 4-20 mA output / Line powered



Basic isolator designed to interface a PLC and DCS system with a field instrument. The isolator module supplies 24 Vdc power to the field device and provides a linearized output signal if necessary.

- Remote field signal monitored by control system
- Water/wastewater treatment
- Petrochemical, tank farms, large manufacturing sites



# Compact Plug-in Signal Conditioners

## M2 Series



CE cRUUS

## M2E Series



CE

## W2 Series



CE cRUUS

- **M2/W2 Series** (Mini-M and Mini-MW) features wide selection of input/output ranges and functions
- **M2E Series** with bright, high-contrast OEL (Organic Electroluminescence) display for setting and process monitor
- **W2 Series** (Mini-MW) provides a second isolated output of independent range
- DIN rail or surface mounting
- 2000 Vac isolation
- Base socket included with the modules

# Low-profile Signal Conditioners

## M5 Series



CE

## B5 Series



CE

## W5 Series



CE

- Only 41 mm (1.61 in) deep, terminal block style modules can be installed anywhere, even behind the panel cover.
- **M5/W5 Series**: Line powered type (4-wire)
- **B5 Series**: Loop powered type (2-wire)
- **W5 Series** provides a second isolated output of independent range
- DIN rail mounting
- 2000 Vac isolation

# Thin-profile Signal Conditioners

## M3S Series

- Space-saving modules with separable terminal blocks
- Universal AC/DC power input available



CE

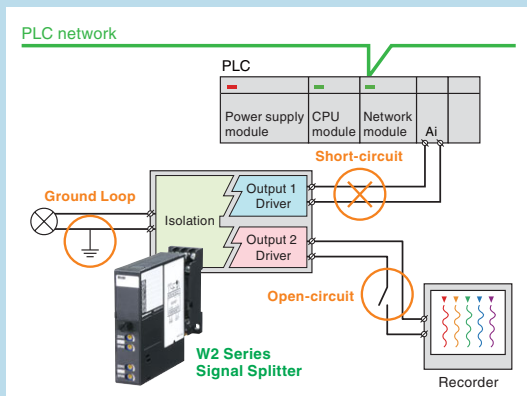
## M6 Series

- Ultra-slim design
- Selectable connection styles: Tension-clamp, screw terminal or euro terminal
- Low power consumption, high load drive capability
- 2000 Vac isolation



CE cRUUS

## Why Isolate the Second Output?



## Channel-to-channel Isolation Enhances the Overall System Reliability

Whenever you want to add another device such as a recorder to a sensor signal loop connected to PLC's analog input module, a signal splitter that can output two isolated signals is recommended.

The loop's load capacity may allow to connect one more load in series to (4-20 mA current signal) or in parallel to (1-5 V voltage signal) an existing receiving instrument. However, in such a configuration, short-circuit, open-circuit or ground loop at one part of the loop could affect the entire system.

Galvanically separating each part of the loop is beneficial to contain any damage to the limited section in case of an accident, thus to making troubleshooting easier, minimizing the system downtime.

### Signal Conditioners

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- Function Modules & Retrofit Products

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# Programmable Signal Conditioners

Signal Conditioners

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## M3L Series

"One-Step Cal" Configuration without PC

- Enhanced PC configurator software is also available
- Universal I/O specifications ideal for spare parts stock reduction programs
- DIN rail mounting
- 1500 Vac isolation



CE cULus

## B3 Series

DIP Switch Configurable

- Input type and range selectable with the internal DIP switches and fine calibration using the front potentiometers
- Wide supply voltage range 12-45 Vdc
- 1500 Vac isolation between input and output



CE cULus

# Field-mount Signal Conditioners

## B6U / B6U-B

Universal HART Temperature Transmitters

- Plug-in two-line LCD display
- HART programmable
- User's own temperature calibration tables can be used
- IP66 / IP67 field enclosure; Stainless steel optional



B6U-B  
IP66/IP67



B6U

CE Ex FM APPROVED IECEx

## 27 / 26 Series

Programmable Head-mount Transmitters

- 27 Series: HART or PC programmable type available
- 26 Series: Fixed range
- Function monitor LED optional for 27 Series RTD and potentiometer input



26 Series

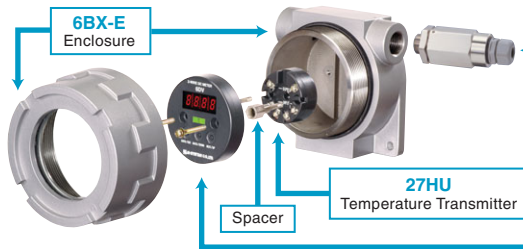


27 Series

CE Ex FM APPROVED

CE Ex

## FIELD-MOUNT ACCESSORIES



## MD6 Series Surge Protectors

CE Ex FM APPROVED



## 6DV / 6DV-B 4-digit Loop Powered Indicator

6DV

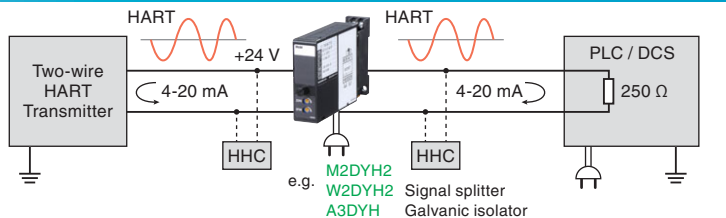
6DV-B

CE Ex FM APPROVED



## ISOLATOR APPLICATIONS 2

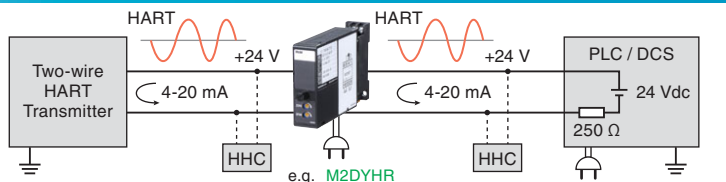
4-wire isolator / current loop supply : 4-20 mA (active) input / 4-20 mA output (source) / Line powered



Designed to interface a PLC and DCS system with a field HART transmitter. The isolator module supplies 24 Vdc power to the field device.

It also allows the HART signal to pass when a technician needs to access the transmitter's process and diagnostic information via the HART signal using a HART hand-held communicator (HHC), from any termination point of the loop at both sides of the isolator.

When the receiver powers the isolator's output loop (sink)



- Remote field signal monitored by control system
- Water/wastewater treatment
- Petrochemical, tank farms, large manufacturing sites

# Other Signal Conditioners

These products which were released in the market decades ago are still maintained today as M-System products lineup to serve our customers maintaining the performance of existing process control systems.

Please visit M-System web site to confirm specs of specific models.

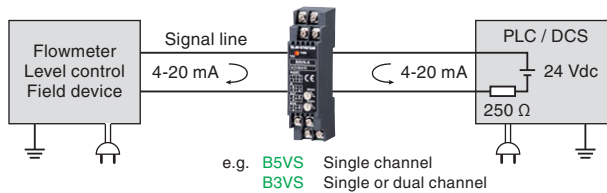
<p><b>M-UNIT Series</b> Plug-in Signal Conditioners</p> 	<p><b>MX-UNIT Series</b> Front-Configurable Signal Conditioners</p> 	<p><b>K-UNIT Series</b> Plug-in Signal Conditioners</p> 
<p><b>W-UNIT Series</b> Plug-in Signal Splitters</p> 	<p><b>H-UNIT Series</b> Space-saving Signal Conditioners</p> 	<p><b>M8 (Pico-M) Series</b> Dual Output Super-mini Signal Conditioners</p> 
<p><b>10-RACK Series</b> High-density Signal Conditioners</p> 	<p><b>18-RACK Series</b> DCS Signal Conditioners</p> 	<p><b>38-RACK Series</b> Interposing Relays</p> 

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## ISOLATOR APPLICATIONS 3

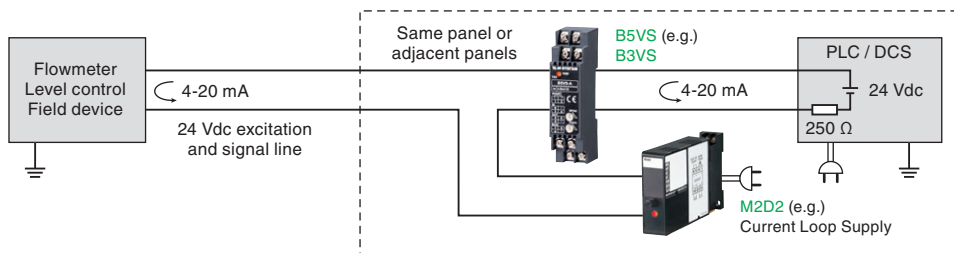
### 2-wire isolator : 4-20 mA input / 4-20 mA output (loop powered)



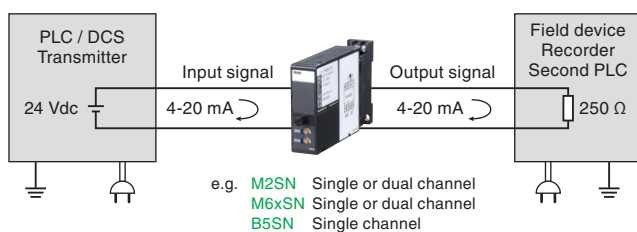
Basic isolator designed to interface a PLC and DCS system that provides a 24 Vdc power supply with a 4-20 mA input.

- Remote field signal monitored by control system
- Water/wastewater treatment
- Petrochemical, tank farms, large manufacturing sites

### With the excitation supply to the field device



### 2-wire isolator : 4-20 mA input (loop powered) / 4-20 mA output



Mainly used to retrofit existing 4-20 mA process loops that need to add another instrument to the loop while maintaining isolation.

- Chart recorder or another PLC
- Backup monitoring system

# Signal Conditioners Selection Guide

Only typical signal conditioner models and specs are mentioned in this table.  
Please visit M-System web site to confirm availability and specs of specific models.



SERIES		M2 / M2E	W2	M5 / B5	W5	
Enclosure / Mounting Type		Plug-in base socket, DIN rail or surface mount		41 mm deep housing, DIN rail mount		
Range Availability		Specified when ordering or PC/One-step Cal programming (M2E: PC / Front display setting)		Specified when ordering or DIP switch programming (W5FV)		
Dual Output		-	Yes	-	Yes	
Power Input		AC/DC		AC/DC		
Isolation		2000V AC		2000V AC (except M5/AC powered type: 1500V AC)		
Operating Temperature		-5 to +55°C (23 to 131°F)		M5/W5: -5 to +55°C (23 to 131°F) B5: -40 to +80°C (-40 to +176°F)		
Standards & Approval		CE / UL / C-UL		CE		
4-wire Signal Conditioners	Universal input	DC output	M2XU, M2XUM			
	DC mV, Voltage & Current	Fixed range	M2VS	W2VS	M5VS, M5MV	W5VS
		Fixed range, high speed response	M2VF, M2VF2, M2VF3	W2VF	M5VF, M5VF2	
		Configurable	M2XV2, M2LV, M2FV, M2EXV			W5FV
		Dual isolated output		W2VS		W5VS
	Thermocouple	Fixed range	M2TS, M2TT	W2TS	M5TS	W5TS
		Configurable	M2XT2, M2EXT	W2XT		
	RTD	Fixed range	M2RS, M2RS1, M2RT, M2RR	W2RS, W2RS1	M5RS	W5RS
		Configurable	M2XR2, M2LR, M2EXR	W2XR		
	Potentiometer	Fixed range	M2MS	W2MS	M5MS	W5MS
		Configurable	M2XM2, M2LPM, M2EXM	W2XM		
	Strain gauge	Fixed range	M2LCS			W5LCS
		Configurable				
	AC voltage & current	AC voltage & current	M2AC, M2TG	W2AC, W2TG		
		Voltage transformer	M2PE, M2PA	W2PE, W2PA	M5PT	
		Current transformer	M2CE, M2CA, M2CEC	W2CE, W2CA	M5CT, M5CTC	
	Current loop supply (2-wire transmitter excitation supply)	Fixed range	M2D(2), M2DYS, M2DY, M2DL, M2DYH, M2DNY, M2DU	W2DYS, W2DNY	M5DY	W5DY
		Configurable	M2EXDY			
		HART compatible	M2DYH2, M2DYHR	W2DYH2		
	Pulse to analog	Fixed range	M2SP	W2SP	M5PA	W5PA
		Configurable	M2XPA3			
		Encoder input, configurable	M2XRP2			
	Analog to pulse	Fixed range	M2AP	W2AP		
		Configurable				
	Pulse scaling	Configurable	M2PRU			
		Fixed range	M2PP	W2PP		
	Pulse isolation	Configurable				
		Configurable				
Pneumatic input	19.6-98.1 kPa	M2PV	W2PV			
Function modules		» See Page 10				
2-wire Signal Conditioners	Input loop powered isolator	1 channel	M2SN-1		B5SN	
		2 channels	M2SN-2			
	Output loop powered isolator	1 channel			B5VS	
		2 channels				
	DC mV, Voltage & Current	Fixed range			B5VS	
		Configurable				
		Configurable, IS			B5TS	
	Thermocouple	Fixed range			B5RS	
		Fixed range, IS				
		Configurable				
		Configurable, IS				
	RTD	Fixed range			B5MS	
		Fixed range, IS				
		Configurable				
	Potentiometer	Fixed range				
		Configurable				
Pulse to analog	Fixed range					
	Configurable					
Universal input	Configurable, IS					
	4-20 mA output, HART, IS					
	PROFIBUS					
Limit alarms		» See Page 11				

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						SERIES
18 mm wide housing, DIN rail mount	12 mm wide housing, DIN rail mount	Ultra-slim housing, DIN rail mount	Field mount enclosure	DIN type B head mount		Enclosure / Mounting Type
Specified when ordering or PC/One-step Cal programming	Specified when ordering or PC programming	Specified when ordering or PC programming	HART (PC) programming	PC or HART programming	Specified when ordering	Range availability
–	–	Selected models	–	–	–	Dual Output
AC/DC	AC/DC	DC	Output loop powered	Output loop powered		Power Input
2000V AC (DC powered)	2000V AC	2000V AC	1500V AC	1500V AC		Isolation
M3: -25 to +65°C B3: -40 to +85°C	-10 to +55°C (14 to 131°F)	-20 to +55°C (-4 to +131°F)	-40 to +85°C (-40 to +185°F)	-40 to +85°C (-40 to +185°F)		Operating Temperature
CE / UL / C-UL / ATEX / FM	CE	CE / UL / C-UL	CE / ATEX / FM	CE / ATEX / FM	CE / ATEX	Standards & Approval
M3LU2		M6xXU				Universal input
	M3SYV, M3SVS	M6xYV, M6xVS				DC mV, Voltage & Current
		M6xVF				
M3LV	M3SXV M3SWVS	M6xXV M6xWVS				Thermocouple
M3LT	M3SXT M3SRS	M6xXT				RTD
M3LR	M3SXR	M6xXR				
	M3SMS					Potentiometer
M3LM	M3SXM	M6xXM				Strain gauge
M3LLC						
						AC voltage & current
		M6xCTC				
M3DY	M3SDY	M6xDY				Current loop supply (2-wire transmitter excitation supply)
M3LDY A3DYH (IS)						
		M6xPA				Pulse to analog
M3LPA2						
						Analog to pulse
		M6xXAP				
						Pulse scaling
		M6xPP				
						Pulse isolation
						Pneumatic input
		» See Page 10				Function modules
		M6xSN-1				Input loop powered isolator
		M6xSN-2				
B3VS/1						Output loop powered isolator
B3VS/2						
B3VS						DC mV, Voltage & Current
B3FV						
					26TS1	Thermocouple
B3FT				27TS		
				27TS		RTD
					26R1, 26RS 26REX	
B3FR				27R, 27RS 27R, 27RS		Potentiometer
				27PM		
B3FP						Pulse to analog
				27U		
B3HU, B3HU2			B6U, B6U-B, 27HU-B	27HU		Universal input
B3PU						
						Limit alarms

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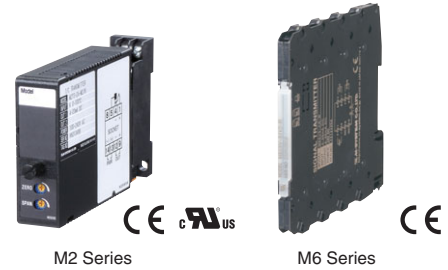
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# Function Modules & Retrofit Products

## Function Modules

- Math functions
- Process functions
- Filters
- Unique functions to ensure stable process operations and to solve problems in system upgrading



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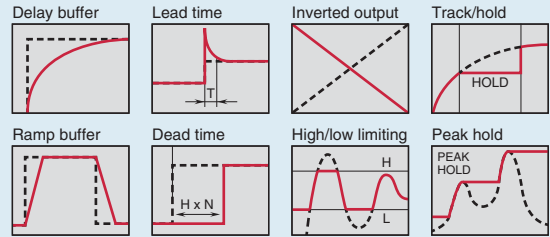
Lightning Surge Protectors

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- Temp/pressure compensation
- Addition / Subtraction
- Multiplication / Division
- Ratio / Bias
- Delay buffer / Ramp buffer
- Moving average
- Lead time / Dead time
- Linearization
- Square root extraction
- Palmer-Borlus flume / Parshall flume
- Triangular/v-notch/rectangular weir
- Inverted output
- High / Low limiting
- Track / Hold
- Peak / Valley hold
- High / Low selecting
- Channel switching
- Parameter generator

### I/O CHARACTERISTICS EXAMPLES



## Self-Synch Transmitter

### M2EXS / MXS

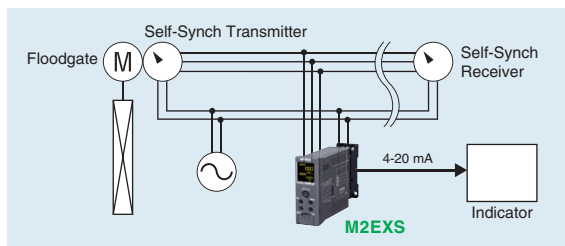
- Converting position signals from a self-synchronizing motor into a DC signal proportional to the rotating shaft position
- Position indication using self-synch, tank gauge, sounding level meter



## High Current Output Transmitters

### VA / SVA / 99SVA

- 200 mA, 1 A output to drive actuators used in turbines, speed governors, hydraulic machinery
- Retrofitting 10-50 mA loop



## Potentiometer Output

### CVR1

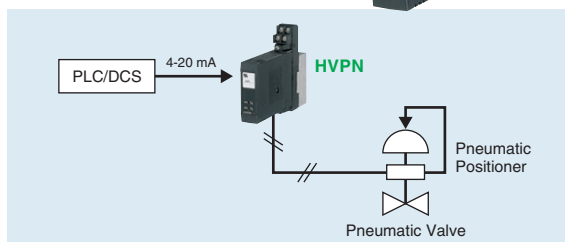
- Remote setting for dampers, inverters, motors and other devices with potentiometer settings
- DC voltage/current input
- 135 Ω, 1k Ω and other outputs



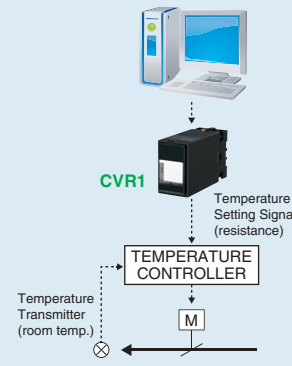
## I/P Transducer

### HVP / HVPN

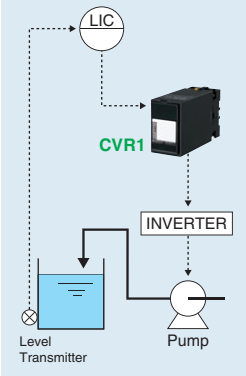
- Semiconductor pressure sensor in the feedback circuit
- Max. air capacity 60 NI /minute



### Damper Operation for Air Conditioning



### Motor Speed Setting



# LIMIT ALARMS



A limit alarm is used to provide one or more relay/contact outputs when a monitored process signal goes out of preselected high or low limits. Typical applications are:

- ✓ **Trouble warning (annunciators)**
- ✓ **Emergency shutdown**
- ✓ **ON/OFF control**

M-System limit alarms are available with wide combinations of process signal I/O and power input, featuring also various setpoint access means.

Programmable alarms feature enhanced programmable functions such as failsafe operation, deadband, delay time, latching relay and others, while analog alarms feature basic but easy setting.

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## Programmable Alarms

### AS4 Series

#### Dual/Quad Alarms with LED Display

- ▮ Simple configuration via the front Up/Down buttons with a help of two displays, by calling parameters' ID numbers (ITEM) and choosing values (DATA)
- ▮ Direct sensor input: DC, temperature, potentiometer, strain gauge and CT
- ▮ Field selectable sensor type and range
- ▮ Dual SPDT or quad NO or NC output
- ▮ Process monitor



### M2EA / M7E Series

#### Compact Alarms with OEL/LCD Display

- ▮ Multi-line display showing parameters and selection in text; intuitive, easy programming just like operating a cell phone
- ▮ Dual SPDT or quad NO or NC output
- ▮ PC configuration is also available



M2EA Series CE M7E Series CE

### KS2V2 / KS2TR2

#### Panel Surface Mount

- ▮ 1/16 DIN size (48 mm square) panel cutout
- ▮ 1-5 Vdc input (KS2V2) or temperature (T/C or RTD) input (KS2TR2)
- ▮ Dual SPDT output



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## Analog Alarms

- ▮ Various setting methods are available:
  - Dial setting
  - Thumwheel switch setting
  - Rotary switch setting
  - Potentiometer setting
- ▮ Direct sensor input type
- ▮ Extra DC transmitter output



KSE-2



ASD1



KSED



M2AVS



AL-UNIT Series



AE-UNIT Series



A-UNIT Series

# INDICATORS



Signal Conditioners

Limit Alarms

Indicators

Digital Panel Meters

Ultra-slim Digital Panel Meters

Bargraph Indicators

Field Indicators

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A panel installed meter, digital or bargraph, provides not only process signal indication but also a combination of signal conditioning, limit alarm and control functions. Basic and extended applications are:

- ✓ **Signal indication by LED or LCD display**
- ✓ **Signal conversion by transmitter output**
- ✓ **Alarm and emergency shutdown by relay outputs**
- ✓ **ON/OFF control by relay outputs**

A field indicator is used for local indication for operators' convenience while signals from sensors and transmitters installed throughout a large installation of tanks and pipelines are typically transmitted to a control/monitoring station via 4-20 mA current line. The loop powered indicator is simple to install and wire, and reliable and durable in an explosive/corrosive environment.

## Digital Panel Meters

### Bright, Colorful LED 47L Series

- 1/8 DIN size (96 x 48 mm)
- Red, Orange, Green, Bluegreen, Blue and White LED selectable
- 4 or 4 1/2 digit display
- Alarm and/or transmitter output optional
- IP66 front panel
- Separable terminal block



### High Performance LCD Display 47D Series

- 1/8 DIN size (96 x 48 mm)
- 5 1/2 digit display plus small 20 segment bargraph
- Main display color can be changed from green to red in alarm
- Alarm and/or transmitter output optional
- 12 V or 24 Vdc sensor excitation
- RS-485 Modbus-RTU interface optional
- IP66 front panel
- Separable terminal block



### Large 0.8" High LED Display 40 Series

- 1/8 DIN size (96 x 48 mm)
- 3 1/2 or 4 digit display
- Display hold function



### 1/32 DIN Size Meters 43 Series

- 1/32 DIN size (48 x 24 mm)
- Easy-to-wire tension clamp connecting
- 24 Vdc powered or loop powered (no external power supply required)



## Loop Powered Type: No external power supply required



40DN



43AL1



47NLN



47NLNT



# Ultra-slim Digital Panel Meters

Flat Rear Surface Stuck to the Panel with a Magnet

## 47NL Series

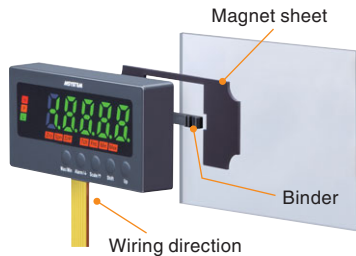
- 1/8 DIN size (96 x 48 mm)
- 4 or 4 1/2 digit display
- Large 16 mm-high LED display: Bright and colorful
- Mountable on standard 30 mm round panel cutout
- IP 66 (except for magnet mounting)
- Moving average function to suppress display flickering
- High/low alarm trips
- Short-depth flat type



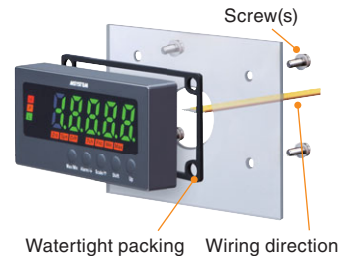
### TENSION-CLAMP TERMINAL BLOCK TYPE



### MAGNET MOUNTING



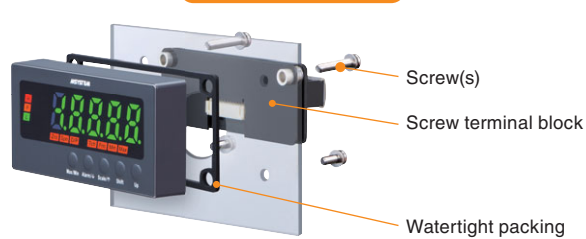
### SCREW MOUNTING



### SCREW TERMINAL BLOCK TYPE



### SCREW MOUNTING



FUNCTION	47L	47D	40	43	47NL
DC input, input loop powered	---	---	Y	Y	Y
DC input	Y	Y	Y	Y	Y
Thermocouple input	Y	Y	Y	---	---
RTD input	Y	Y	Y	---	Y
Potentiometer input	Y	Y	---	---	---
2-wire transmitter input (with excitation)	---	---	---	---	Y
Strain gauge input	Y	---	---	---	---
AC current / voltage input	Y	Y	---	---	---
PT input	Y	---	Y	---	---
CT input	Y	---	Y	---	---
Frequency input (AC line voltage)	Y	---	---	---	---
Frequency input	Y	---	---	---	---
Pulse input totalizer (6 digits)	Y	---	---	---	---

- Signal Conditioners
- Limit Alarms
- Indicators
- Digital Panel Meters
  - Ultra-slim Digital Panel Meters
- Bargraph Indicators
- Field Indicators
- Tower Lights
- Power Transducers
- Remote I/O
- Paperless Recording System
- Web Data Loggers
- PID Control Components
- Temperature Controllers
- Final Control Components
- Lightning Surge Protectors
- Focused New Products for Japan
- M-System Company

# Bargraph Indicators

## 48N Series Bargraph Indicators

IP65

- 9/64 DIN size (36 x 144 mm)
- 101-segment, 3 mm wide LED
- Red, amber, green and blue colors
- Alarm and/or transmitter output optional
- Vertical or horizontal mounting
- Custom scale with no extra cost
- IP65 front panel
- Separable terminal block



**48NV**  
• Single or dual bars



**48NA Series**  
• Single bar  
• Dual/quad alarm



**48ND Series**  
• Single bar  
• Dual/quad alarm  
• 4-digit digital display

## 48SV2 Series Bargraph Indicators

- 18 x 72 mm size
- 51-segment LED
- Red, amber, green and blue colors
- Vertical or horizontal mounting
- Custom scale with no extra cost
- Zero & span adjustments at the front panel
- Separable terminal block optional



**48SV2**

FUNCTION	48NV	48NA	48ND
DC input, single channel	Y	Y	Y
DC input, dual channel	Y	---	---
DC input, transmitter output	---	Y	Y
4-20 mA input, excitation supply	---	Y	Y
Thermocouple input	---	Y	Y
RTD input	---	Y	Y
Potentiometer input	---	Y	Y

# Field Indicators

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

- 4-20 mA input loop powered
- No external power source required
- Scaling & linearization selectable via the front control buttons
- IP66 / IP67 field enclosure, aluminium or stainless steel
- ATEX Zone 0, FM Class I, II, III, Division 1 approvals



6DV

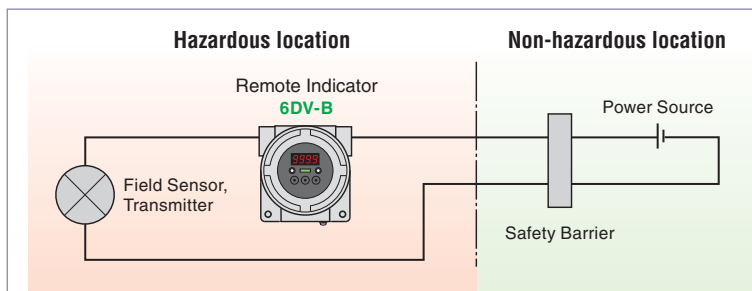


6DV-B

IP66/IP67



## 2-WIRE LOOP APPLICATION EXAMPLE



The indicator is powered from a two-wire current loop (4-20 mA), requiring no external power source. The maximum voltage drop caused by inserting the 6DV into the loop is only 4.0 V at 20 mA. It is ideal for use as a remote indicator added to a current loop between a field sensor / transmitter and a monitoring / control room, without worrying about needing a power source or about loaded impedance on the loop.

# TOWER LIGHTS



## IT Series Open Network Capable Tower Lights

- Energy saving, maintenance free LED lights
- Direct Modbus/TCP and CC-Link control saves wiring and cost
- Wireless LAN access point and infrastructure mode (IEEE 802.11b/g/n, 2.4 GHz)
- Bright and even illumination thanks to M-System's original reflection system
- Number and color of LED modules can be freely combined
- Rugged IP65 construction is ideal for harsh industrial applications

Modbus/TCP CC-Link

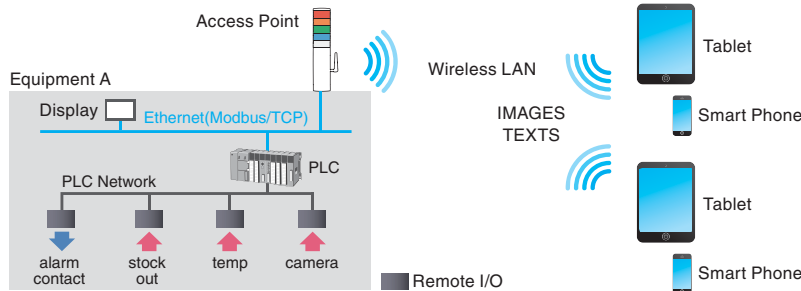


WLAN access point type

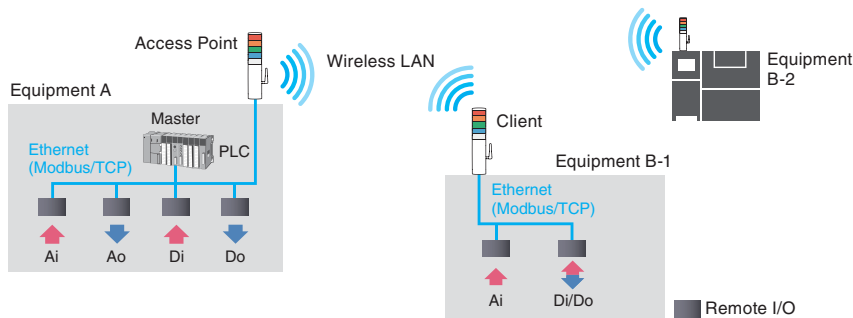
- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights**
- Power Transducers
- Remote I/O
- Paperless Recording System
- Web Data Loggers
- PID Control Components
- Temperature Controllers
- Final Control Components
- Lightning Surge Protectors

### TOWER LIGHT APPLICATIONS

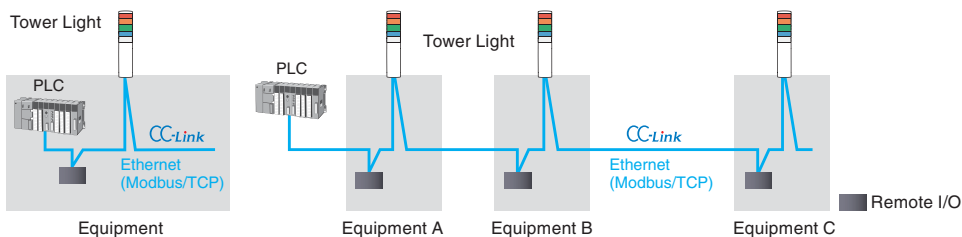
#### Remote monitoring and control of an equipment using mobile interface



#### No hardwiring between multiple sets of equipment to monitor and control by a single master PLC



#### The network capable tower lights can save a great part of parallel wiring between sensors, PLC and lights.



# POWER TRANSDUCERS



Signal Conditioners

Limit Alarms

Indicators

Tower Lights

Power Transducers

Remote I/O

Paperless Recording System

Web Data Loggers

PID Control Components

Temperature Controllers

Final Control Components

Lightning Surge Protectors

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Transducers for electrical measurement are an essential part of any monitoring, measuring, or controlling system where electrical quantities are involved. For example, a power transducer monitors both AC current and voltage to measure/ calculate true electrical power delivered to a load and converts it to a DC voltage or current signal proportional to the measured power.

Multi power monitors are capable of open network interface such as Modbus-RTU, Modbus TCP/IP, CC-Link and LONWORKS, which are commonly used for modern energy measurement and management systems to achieve energy saving.

## 53U / 54U Series

### Multi Power Monitor and Transducer

- Single-phase 2-wire and 3-wire, three-phase 3-wire and 4-wire systems
- IP50 front panel (53U, 54U)
- Various network communication and Ao/Do combinations selectable
- Up to 31st harmonic distortion measurement
- Software lock



CE

**L53U**

DIN rail mounted

**Modbus**



CE  
UL US LISTED  
IP50

**53U**

1/4 DIN (96-mm square) panel size

**Modbus**



IP50

**54U / 54UC / 54UL**

110-mm square panel size

**Modbus LONWORKS CC-Link**

## LT-UNIT Series Power Transducer

- True RMS sensing
- M4 screw terminal
- Max. 550 Vac input
- Conforming to IEC 60688
- DIN rail or surface mounting



CE

## LSMT4 Multi Power Transducer

- Measuring AC current, voltage, active/reactive/apparent power and power factor
- 10 x DC voltage/mA outputs plus 2 x Do
- Parameters are freely programmable with the front control buttons or by PC
- DIN rail mounted



CE

## L-UNIT Series

- Average or RMS sensing
- Economical dual channel type available
- DIN rail or surface mounting



## K-UNIT Series

- Average or RMS sensing
- Plug-in socket mounted
- DIN rail or surface mounting





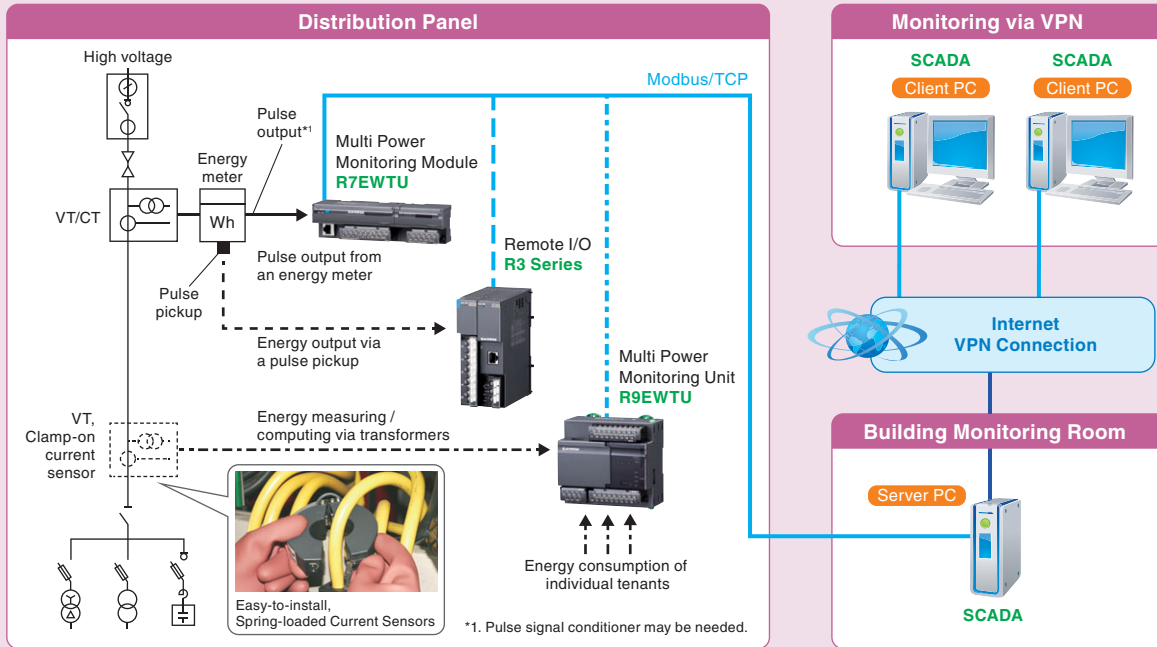
# Start Your Energy Saving Program with a Minimum Time & Cost

## Remote I/O for Energy Consumption Monitoring

- Data from power distribution panels scattered throughout a building/industrial installation can be monitored using local area Ethernet data network.
- Minimum down time by using clamp-on current sensors
- Three energy sensing ways selectable for easy application: energy computation via VT/CT, pulse output from energy meters, and pulse pickup at energy meters
- Integration of utility and process monitoring (e.g. flow, temperature, discrete signal) by mixing other sensor input modules on the R3 base

- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
- Remote I/O
- Paperless Recording System
- Web Data Loggers
- PID Control Components
- Temperature Controllers
- Final Control Components
- Lightning Surge Protectors

### Three Energy Sensing Ways: System Configuration Example with a Commercial Building



- Focused New Products for Japan
- M-System Company

### R7MWTU / R7EWTU / R7CWTU / R7LWTU

- Clamp-on current sensor use: easy installation
- 2 systems input

CC-Link Modbus  
Modbus/TCP LONWORKS



### R3 Series Remote I/O

- 4-point totalized pulse input module for pulse pickups
- Other heavy current system input modules: AC voltage/current, zero-phase current, wattage
- Temperature, DC and other sensor signal inputs are also available

CC-Link CC-Link IE Field  
DeviceNet PROFIBUS  
Modbus Modbus/TCP  
EtherNet/IP LONWORKS  
MECHATROLINK TLink FL-net



### R9MWTU / R9EWTU / R9CWTU / R9LWTU

- Clamp-on current sensor use: easy installation
- Up to 8 systems input
- Time stamped data logging in SD card

CC-Link Modbus  
Modbus/TCP LONWORKS



# REMOTE I/O



- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers

## Remote I/O

Remote I/O Applications

Mixed Signal Remote I/O

All-in-One Style Remote I/O

Compact Remote I/O for FA Control Equipment

Paperless Recording System

Web Data Loggers

PID Control Components

Temperature Controllers

Final Control Components

Lightning Surge Protectors

Focused New Products for Japan

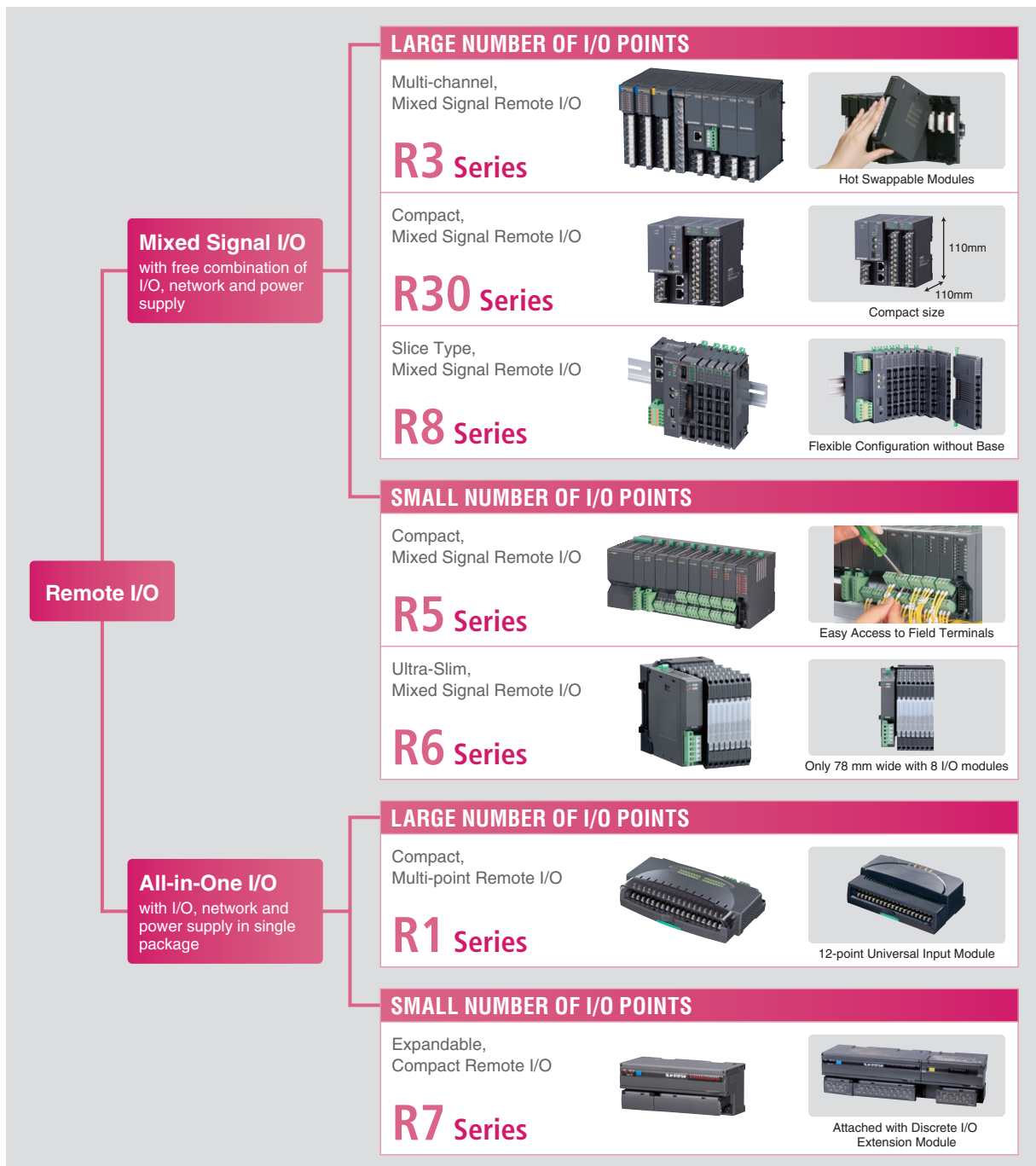
M-System Company

Remote I/O supports DCS/PLC systems by expanding I/O flexibility in addition to providing all full channel-to-channel isolation. It communicates directly to the PLC and DCS via industry standard open-protocol networks.

Remote I/O can be also used as stand-alone distributed I/O communicating with popular HMI software. It can be located remotely in the field, or within an instrumentation cabinet such as test stands.

The flexibility and scalability of M-System's Remote I/O supports future system upgrades with full isolation between power-communication-I/O and between analog channels. Economical non-isolated analog modules are also selectable.

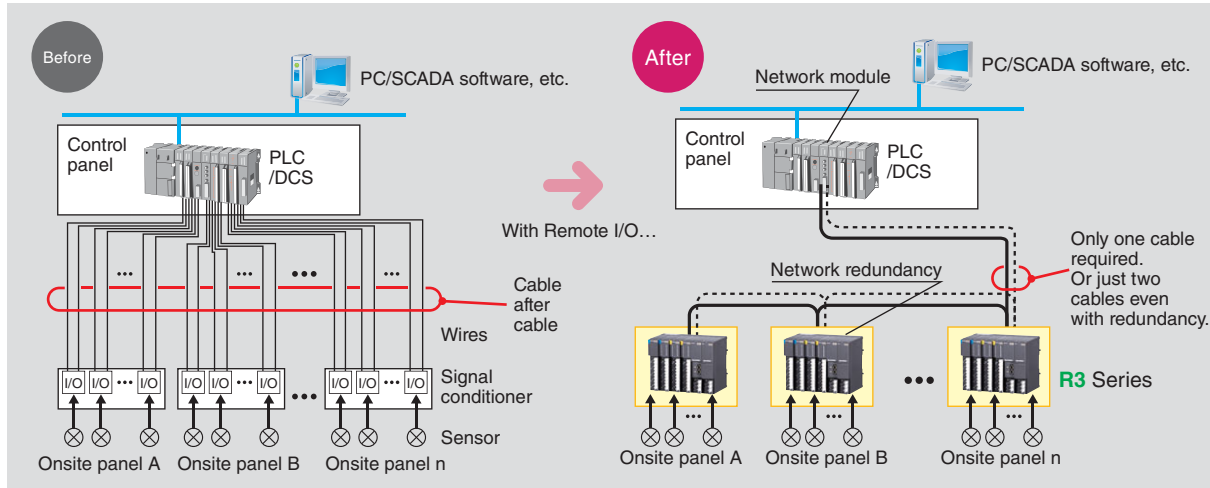
Applications include: signal concentrator, data collection in flow and level monitoring, injection molding monitoring and control, test stands and prototyping, glass furnace temperature control, paint booth environment reporting, pharmaceutical processes, and assembly line discrete ON/OFF.



# Remote I/O Applications

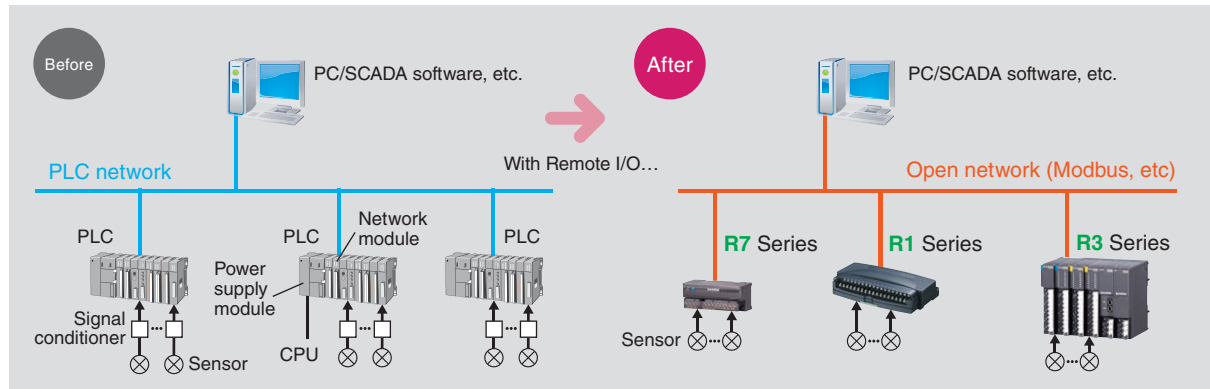
## 1. Replacing I/O modules of PLC and DCS

- Flexible combinations of I/O modules
- Eliminating point-to-point wires for each input



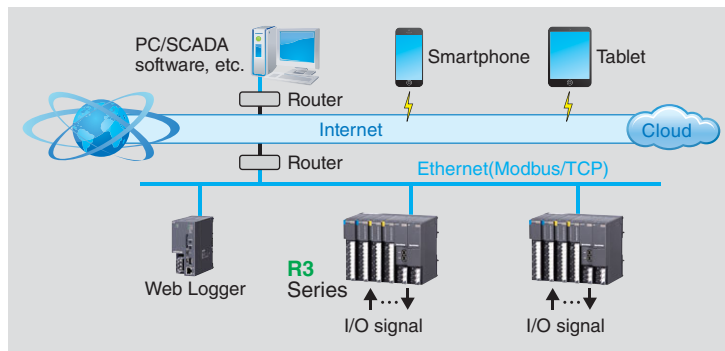
## 2. I/O for PC based SCADA systems

- No PLC ladder programming required
- Easy system expansion



## 3. I/O solution for IoT terminals

- Free combinations of I/O modules
- Concentrating remote signals to a single network connection point



- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
- Remote I/O**
- Remote I/O Applications
- Mixed Signal Remote I/O
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- Compact Remote I/O for FA Control Equipment
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# Mixed Signal Remote I/O

## R3 Series

### Multi-channel, Mixed Signal Remote I/O

- Wide selection of I/O modules including DC, AC, temperature, strain gauge, pulse trains, AC power, etc.
- 4 isolated to 16 non-isolated analog inputs per module
- Max. 64 discrete I/O per module
- Selections of AC power, CT and VT modules suitable for energy monitoring applications
- Dual redundant communication networks and power supplies
- 1500 Vac isolation



CE



M3 screw terminal block is used for I/O modules. The removable terminal block is convenient for maintenance.

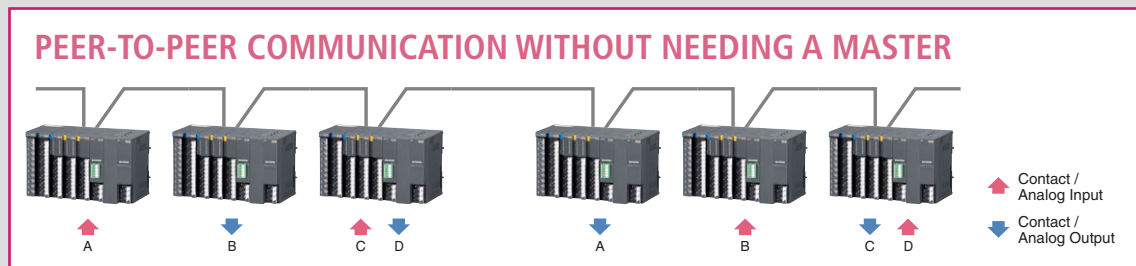
Network Module and Power Supply Module can be in one housing.

One I/O module plus one Network Module with power supply is the minimum unit. Space-saving and economical solution.

## D3 Series

### Multiplex Transmission System

- Max. 10 km (6.21 mi) transmission via twisted-pair cable
- No software programming required
- Interfacing field signals to the host PLC via Modbus-RTU or Modbus TCP/IP
- Free combination of I/O signals



- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
- Remote I/O**
- Remote I/O Applications
- Mixed Signal Remote I/O
- All-in-One Style Remote I/O
- Compact Remote I/O for FA Control Equipment
- Paperless Recording System
- Web Data Loggers
- PID Control Components
- Temperature Controllers
- Final Control Components
- Lightning Surge Protectors
- Focused New Products for Japan
- M-System Company



## R30 Series

### Compact, Mixed Signal Remote I/O

- Ethernet based network protocols
- High-speed internal bus
- 2 or 4 fully-isolated analog I/O per module
- 16 discrete I/O per module
- R3 Series I/O modules can be added by using a special connecting base
- Dual redundant communication networks and power supplies
- 1500 Vac isolation



\* Under development



Signal Conditioners  
Limit Alarms  
Indicators  
Tower Lights  
Power Transducers

#### Remote I/O

Remote I/O Applications

Mixed Signal Remote I/O

All-in-One Style Remote I/O

Compact Remote I/O for FA Control Equipment

Paperless Recording System

Web Data Loggers

PID Control Components

Temperature Controllers

Final Control Components

Lightning Surge Protectors

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## R8 Series

### Slice Type, Mixed Signal Remote I/O

- 'Slice type' modules can be freely added by necessary number of I/O points, saving installation space to the minimum
- Only 55 mm deep modules (except connector)
- Easy I/O terminal access via e-CON (mini-clamp) connector, MIL connector, or Tension-clamp terminal block



CE

## R6 Series Ultra-Slim, Mixed Signal Remote I/O

- Only 78 mm (3.07 in) wide with the minimum system of 8 modules
- Extension by 8 module units — Max. 31 I/O modules
- 2 fully-isolated analog I/O per module
- 4-point discrete I/O per module
- Low power consumption
- 1500 Vac isolation



CE

## R5 Series Compact, Mixed Signal Remote I/O

- 2 fully-isolated analog I/O per module
- Re-transmitted output modules suitable for extra field monitoring
- Dual redundant communication networks and power supplies
- 1500 Vac isolation



## I/O Selection Guide

FUNCTION	R3 Series	R30 Series	R5 Series	R6 Series	R8 Series
<b>Analog Input Module (Isolated)</b>					
Universal input	4 ch	2 / 4 ch	---	---	---
DC voltage input	4 / 8 ch	2 / 4 ch	1 / 2 ch	2 ch	2 ch
DC voltage input (non-isolated)	16 ch	---	---	---	4 / 16 ch
DC current input	4 / 8 ch	2 / 4 ch	1 / 2 ch	2 ch	2 / 8 ch
DC current input (non-isolated)	16 ch	---	---	---	4 / 16 ch
Thermocouple input	4 / 8 ch	4 ch	1 / 2 ch	2 ch	2 ch
RTD input	4 / 8 ch	4 ch	1 / 2 ch	2 ch	---
RTD input (non-isolated)	---	---	---	---	4 ch
Potentiometer input	4 / 8 ch	4 ch	1 / 2 ch	---	---
4-20mA input with excitation	4 ch	---	1 / 2 ch	1 ch	---
4-20mA input with excitation (non-isolated)	8 ch	---	---	---	4 ch
Strain gauge input	2 ch	---	---	---	---
CT input	4 ch	---	1 / 2 ch	---	---
Zero-phase current input	4 ch	---	---	---	---
AC current input (clamp-on current sensor)	4 / 8 ch	4 ch	1 / 2 ch	---	---
AC current input (clamp-on current sensor) (non-isolated)	---	---	---	---	4 ch
AC voltage input	4 ch	---	1 / 2 ch	---	---
AC power input	4 circuits	---	---	---	---
AC power input (clamp-on current sensor)	4 circuits	---	---	---	---
Multi power input	1 system	---	---	---	---
Multi power input (clamp-on current sensor)	1 / 2 systems	---	---	---	---
<b>Temperature Control Module</b>					
Temperature Control	2 loops	---	---	---	2 loops
<b>Analog Output Module (isolated)</b>					
DC voltage output	4 / 8 ch	4 ch	1 / 2 ch	2 ch	---
DC voltage output (non-isolated)	---	---	---	---	4 ch
DC current output	4 ch	4 ch	1 / 2 ch	2 ch	2 ch
DC current output (non-isolated)	---	---	---	---	2 / 4 ch
<b>Pulse I/O Module</b>					
Totalized pulse input	Pi 4 / 8 / 16	---	Pi 2	---	Pi 4
High speed pulse input	Pi 4	---	---	---	---
Encoder input	Pi 2	---	---	---	---
Pulse output	Po 16	---	Po 2	---	---
<b>Analog Input Module with Transmitter Output (isolated)</b>					
DC voltage / current input	---	---	1 ch	---	---
Thermocouple input	---	---	1 ch	---	---
RTD input	---	---	1 ch	---	---
Potentiometer input	---	---	1 ch	---	---
4-20mA input with excitation	---	---	1 ch	---	---
<b>Alarm Module (isolated)</b>					
DC voltage / current input	4 / 8 ch	---	---	---	---
Thermocouple input	4 ch	---	---	---	---
RTD input	4 ch	---	---	---	---
4-20mA input with excitation	4 ch	---	---	---	---
<b>Discrete I/O Module</b>					
Discrete input	Di 16	---	Di 4 / 16	Di 4	Di 4 / 16
Discrete input with excitation supply	Di 8 / 16 / 32 / 64	Di 16	---	---	---
AC contact input	Di 16	---	---	---	---
Discrete input / output	Di 8, Do 8	---	---	---	---
Relay contact output	Do 8 / 16	---	Do 4	---	---
Open collector output (NPN)	Do 16 / 32 / 64	Do 16	Do 16	Do 4	Do 4 / 16
Open collector output (PNP)	Do 16 / 32 / 64	Do 16	---	Do 4	Do 32
Triac output	Do 16	---	---	---	---
One-shot pulse output	Do 16	---	---	---	---
Remote control relay control	Do 8	---	---	---	---
Photo MOSFET relay	Do 8	---	---	---	Do 4
<b>BCD Code I/O Module</b>					
BCD code input / output	7-digit BCD	---	---	---	---

# All-in-One Style Remote I/O

## R7 Series

### Expandable, Compact Remote I/O

- Palm-top size compact module can handle 4 analog input, 2 analog output or 16 discrete signals.
- 8 or 16 discrete input/output module can be attached to the base module.
- 1500 Vac isolation



- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers

- Remote I/O
  - Remote I/O Applications
  - Mixed Signal Remote I/O
  - All-in-One Style Remote I/O
  - Compact Remote I/O for FA Control Equipment

- Paperless Recording System
- Web Data Loggers
- PID Control Components
- Temperature Controllers
- Final Control Components
- Lightning Surge Protectors

- Focused New Products for Japan
- M-System Company

FUNCTION		R7M	R7E	R7D	R7C	R7L
<b>Basic Module</b>		<b>Modbus</b>	<b>Modbus/TCP</b>	<b>DeviceNet</b>	<b>CC-Link</b>	<b>LONWORKS</b>
Discrete input	Di 16	Y	Y	Y	Y	Y
Transistor output	Do 16	Y	Y	Y	Y	Y
Relay contact output	Do 8	Y	---	Y	Y	---
Discrete I/O	Di 8 + Do 8	Y	---	---	---	Y
DC voltage / current input	4 ch	Y	Y	Y	Y	Y
Thermocouple input	4 ch	Y	Y	Y	Y	Y
RTD input	4 ch	Y	Y	Y	Y	Y
Thermistor input	4 ch	---	---	---	Y	---
Potentiometer input	4 ch	Y	Y	Y	Y	---
AC current input	4 ch	Y	Y	Y	Y	---
DC voltage output	2 ch	Y	Y	Y	Y	Y
DC voltage output	4 ch	---	---	---	Y	---
DC current output	2 ch	Y	Y	Y	Y	Y
DC current output	4 ch	---	---	---	Y	---
Totalized pulse input	8 ch	Y	---	Y	Y	---
Remote control relay control output	4 / 8 ch	Y	---	Y	Y	Y
<b>Extension Module</b>						
Discrete input	Di 8 / 16	Y	Y	Y	Y	Y
Transistor output	Do 8 / 16	Y	Y	Y	Y	Y
Relay contact output	Do 8	Y	---	---	Y	---

## R1 Series Compact, Multi-point Remote I/O

- Economical all-in-one module for Modbus, CC-Link and DeviceNet
- Trigger contact input and alarm contact output

FUNCTION		Modbus
Universal input	12 ch	Y
Thermocouple & DC input	8 / 16 ch	Y
RTD & potentiometer input	8 ch	Y
Totalized counter input & contact I/O	Pi 4 + Di 8 + Do 8	Y
Contact input	32 ch	Y
Contact output	32 ch	Y



# Compact Remote I/O for FA Control Equipment

## R7 Series Compact Remote I/O for MECHATROLINK-I, -II, -III

- Motion and I/O networks can be on single MECHATROLINK line to save wires and cost
- High speed AD conversion and isolation of sensor signals
- Compact, terminal block style, all-in-one modules



R7ML



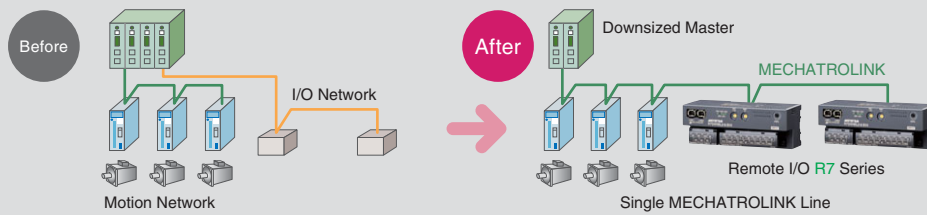
R7K4FML



R7G4HML3

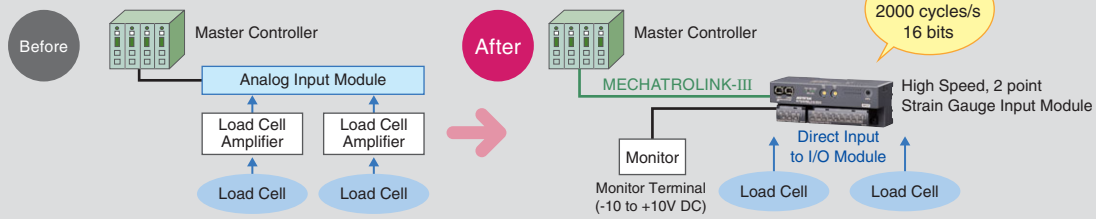


### I/O network signals introduced into MECHATROLINK network



Motion and I/O networks can be on single MECHATROLINK line to dramatically save wires and cost; needless to say the cost of I/O network master module.

### High speed AD conversion of tension/pressure/weight measurement



- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers

#### Remote I/O

#### Remote I/O Applications

#### Mixed Signal Remote I/O

#### All-in-One Style Remote I/O

#### Compact Remote I/O for FA Control Equipment

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#### Focused New Products for Japan

#### M-System Company

## R7 Series Compact Remote I/O for HLS



- Remote I/O modules for HLS (Hi-speed Link System) proposed by StepTechnica Co., Ltd.
- Compact, terminal block style, all-in-one modules
- Four connection styles are selectable to fit with various sensors and devices: e-CON (mini-clamp) connector, MIL connector, spring cage (tension-clamp) terminal and screw terminal



R7HL



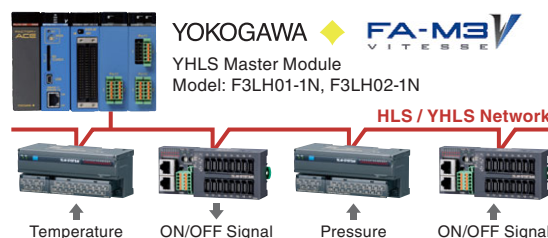
R7F4DH



R7K4DH



## APPLICATION EXAMPLE WITH YOKOGAWA FA-M3 YHLS MASTER MODULE












- Chip shooter machines
- Injection molding machines
- LCD panel manufacturing equipment/carrier devices
- Automatic carrier robots
- Electrical discharge machines
- Semiconductor manufacturing equipment
- Large printers
- Welding machines
- Warehouse management systems

YHLS (Yokogawa Hi-speed Link System) adopts a HLS-compliant open protocol, enhanced to allow easy monitoring of transmission line quality during development and operation of IT machine systems.








YHLS and HLS network devices are compatible.

## I/O Selection Guide

MECHATROLINK-III			I/O VARIATIONS, NUMBER OF CHANNELS				
SERIES	TERMINAL STYLE	DI	DO	DIO	AI	AO	
R7K4JML3	 Tension clamp terminal			32 each			
R7K4FML3	 M3 screw terminal	32	32	16 each			
R7F4HML3	 I/O : MIL connector Power : Tension clamp terminal			16 each			
R7G4FML3	 M3 screw terminal	16	16				
R7G4HML3	 M3 screw terminal				4 x DC voltage/current 4 x T/C 2 x Strain gauge 2 x NIRECO tension sensor 1 x Encoder 1 x Self synch + 1 x DC output	4 x DC voltage 4 x DC current	

MECHATROLINK-I, -II			I/O VARIATIONS, NUMBER OF CHANNELS				
SERIES	TERMINAL STYLE	DI	DO	DIO	AI	AO	
R7K4FML	 M3 screw terminal	32	32	16 each			
R7K4DML	 I/O : Mini-clamp (e-CON) connector Power : Tension clamp terminal	32		16 each			
R7G4HML	 M3 screw terminal				4 x DC voltage/current	4 x DC voltage	
R7ML*	 M3 screw terminal	16	16		4 x DC voltage/current 4 x T/C 4 x RTD 2 x Strain gauge	2 x DC voltage 2 x DC current	

\* 8-pt or 16-pt discrete I/O extension module can be added.

HLS			I/O VARIATIONS, NUMBER OF CHANNELS				
SERIES	TERMINAL STYLE	DI	DO	DIO	AI	AO	
R7F4DH-1	 I/O : Mini-clamp (e-CON) connector Power : Tension clamp terminal	16	16	8 each			
R7F4DH-2	 I/O : MIL connector Power : Tension clamp terminal	16	16	8 each			
R7F4DH-3	 I/O : MIL connector Power : Tension clamp terminal			16 each			
R7F4DH-4	 Tension clamp terminal	16	16	8 each			
R7K4DH	 I/O : Mini-clamp (e-CON) connector Power : Tension clamp terminal			16 each			
R7G4HH	 M3 screw terminal				4 x DC voltage/current	4 x DC voltage	
R7HL	 M3 screw terminal	16	16 or 8	8 each	8 x DC voltage 4 x DC voltage/current 4 x T/C 4 x RTD 4 x Totalized pulse 2 x Strain gauge 2 x Encoder	4 x DC voltage 2 x DC voltage 2 x DC current	

Signal Conditioners
Limit Alarms
Indicators
Tower Lights
Power Transducers
Remote I/O
Remote I/O Applications
Mixed Signal Remote I/O
All-in-One Style Remote I/O
Compact Remote I/O for FA Control Equipment
Paperless Recording System
Web Data Loggers
PID Control Components
Temperature Controllers
Final Control Components
Lightning Surge Protectors

Focused New Products for Japan  
M-System Company



# PAPERLESS RECORDING SYSTEM

## TR30-G Tablet Recorder Web-enabled DAQ System

- Compact package
- No need of dedicated application software other than a web browser
- Flexible built-in I/O modules plus extended Modbus slave I/O
- Large main memory plus auxiliary SD card
- Regular and event e-mailing
- FTP server and client
- Modbus/TCP master and slave
- SNMP client
- User's original browser view



M-System's model TR30-G is a web-based data acquisition system enabling users to view and access stored data via an internet browser. Freed from a dedicated display screen, accessibility and portability of the data is greatly enhanced.

In addition, users can receive free benefit of ever-evolving state-of-the-art user interface and apps provided by tablet terminals: i.g. ultra-high resolution screen, intuitive touch panel operations, entering comments by dictation or hand-writing, capturing a screen shot and e-mailing, etc.

At the maximum of 64 analog inputs (16-bit data), 64 discrete inputs, 64 discrete outputs, 32 pulse inputs (32-bit data) plus 32 function inputs (mathematical, logic, filter, etc.) are usable. At the maximum of 120 channels can be plotted on the charts and stored at the storing cycle of 1 minute. The fastest storing cycle is 5 milliseconds for 16 channels, 100 milliseconds for 32 channels.

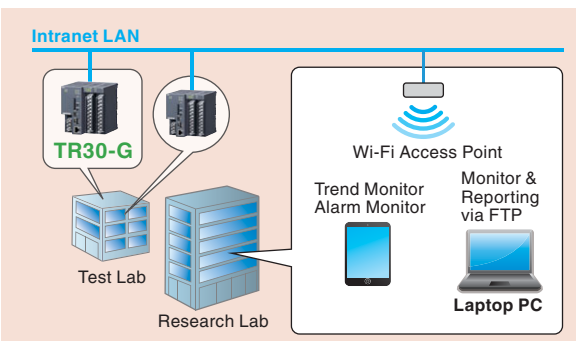
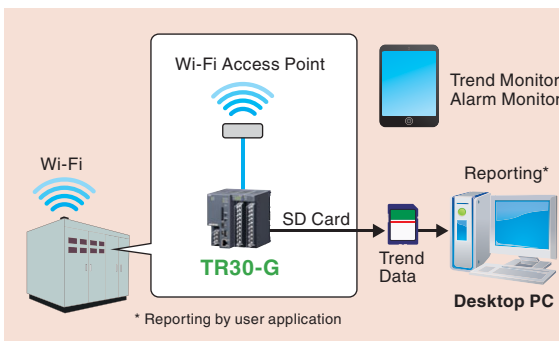
### Freedom from dedicated display screen - Enhanced data accessibility and portability

#### PLANT FIELD MAINTENANCE

Operators can bring in tablets and smart phones to access trend data while freely walking around the site. Data can be transferred to PC via FTP or via SD card.

#### TEST AND RESEARCH

Researchers can access data logged at a test lab in a remote building while working in their own office.



- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
- Remote I/O
- Paperless Recording System
- Web Data Loggers
- PID Control Components
- Temperature Controllers
- Final Control Components
- Lightning Surge Protectors
- Focused New Products for Japan
- M-System Company

# Browser Views

**Trend (vertical)**

**Trend (horizontal)**

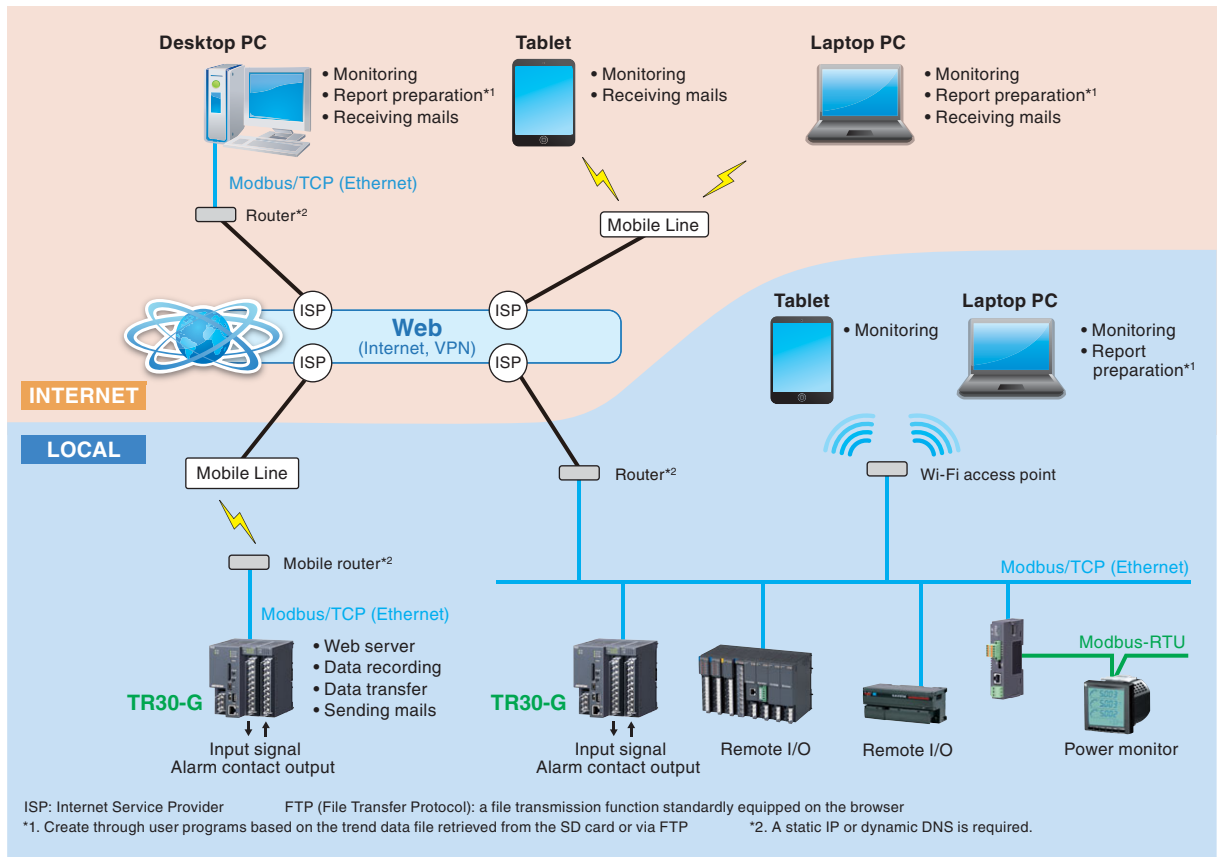
**Event Summary**

**Overview**

**Comment Summary**

- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
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- Paperless Recording System
- Web Data Loggers
- PID Control Components
- Temperature Controllers
- Final Control Components
- Lightning Surge Protectors

# System Configuration



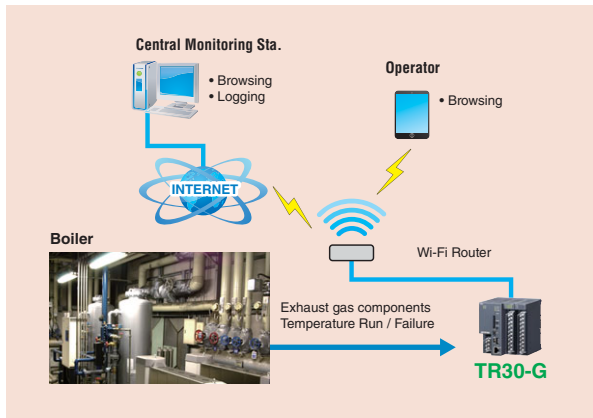
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# TR30-G Tablet Recorder Application Examples

- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
- Remote I/O
- Paperless Recording System**
- Web Data Loggers
- PID Control Components
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- Final Control Components
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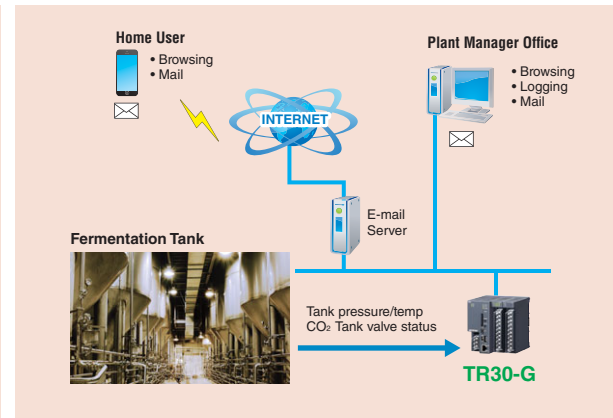
## Machinery & Equipment Test Run Monitoring

"Mobile" solution needs only a minimum space



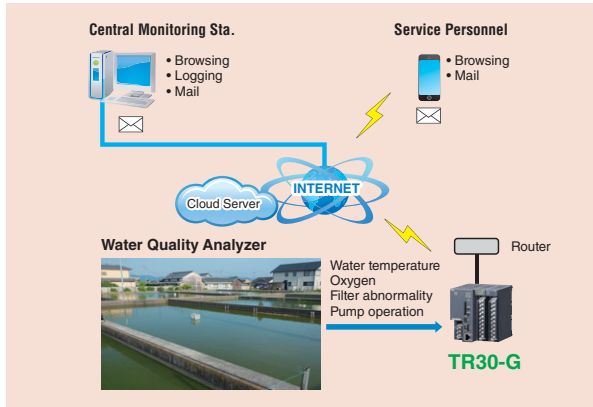
## Microbrewery & Small Scale Fermentation Plants

Economical solution using existing in-house LAN and e-mail server



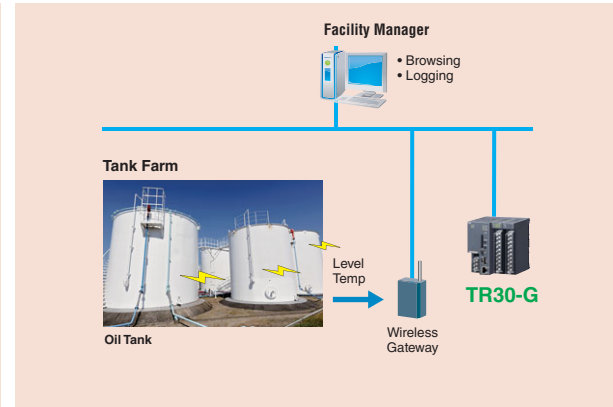
## Remote Monitoring of Fish Farms

Also applicable to greenhouses, hydroponic farms



## Wireless Monitoring of Tank Level

Also applicable to utilities / infrastructure monitoring



## IoT Solution for Predictive and Preventive Maintenance

### Plants and assembly processing factories



Beverage-filling machine

- Heat exchangers
- Curing tanks
- Lime kilns
- Electric furnaces
- Packaging machines
- Conveying equipment
- Robots
- Injection molding machines

### Machine tools



NC equipment

- Press equipment
- Forges
- Machining centers
- Turning centers
- Grinders/polishers
- Electron beam welders
- Vacuum coating
- Electro-discharge machining
- Laser machining

### Utility



Power receiving equipment

- Compressors
- Freezers
- Transformers
- Cogeneration
- Water purification
- Seawater desalination
- Wastewater processing
- Heat pumps
- PSA equipment
- Desulfurization and denitration

### Others



Brewing equipment

- Small-scale water supply
- Weather observation
- Wind-power generators
- Greenhouses
- Poultry farms
- Aquaculture farms
- Park facilities



# 73VR Series Paperless Recorder

- Touch panel operated 5.5 inch TFT color LCD display
- 144 mm square DIN standard panel size
- Data can be transferred in real time to the host PC via Ethernet, viewed and stored on the MSR128 PC Recorder program.
- IP65 front panel

IP65



Model	CE	Max. Inputs	Features
73VR1100: Remote I/O acquisition	CE	128 points	Installation flexibility, fitting in the tight space of a control panel or machinery chassis
73VR2100: Built-in universal input	CE	12 points	Universal input; independent input type and range selectable per channel
73VR3100: Selectable I/O modules	-	64 points	Compatible with various open networks to communicate with major PLC

- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
- Remote I/O

## Paperless Recording System

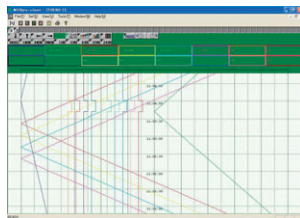
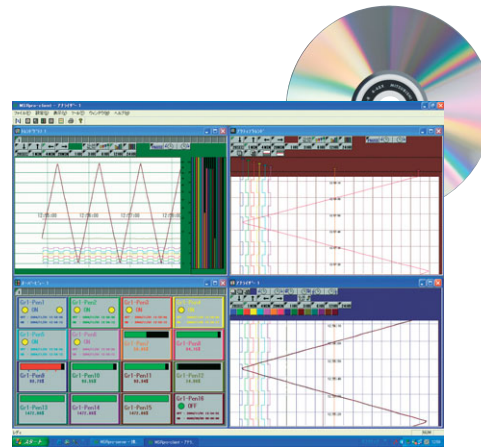
- Web Data Loggers
- PID Control Components
- Temperature Controllers
- Final Control Components
- Lightning Surge Protectors

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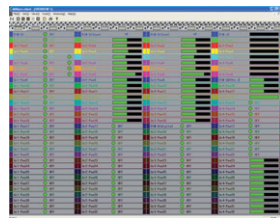
# MSRpro Client/Server System High Performance PC Recorder

## MSRpro

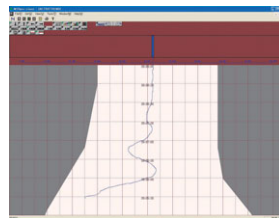
- Max. 2048 points
- High speed 100 msec. mode up to 256 points
- Active trend view to compare in real time past and present data overlapped on each other
- Arithmetic and logic functions, including the ones performed between channels
- Alarm history and data search functions



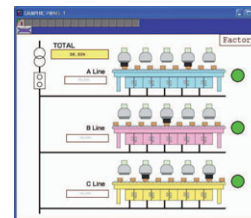
Trend View



Overview

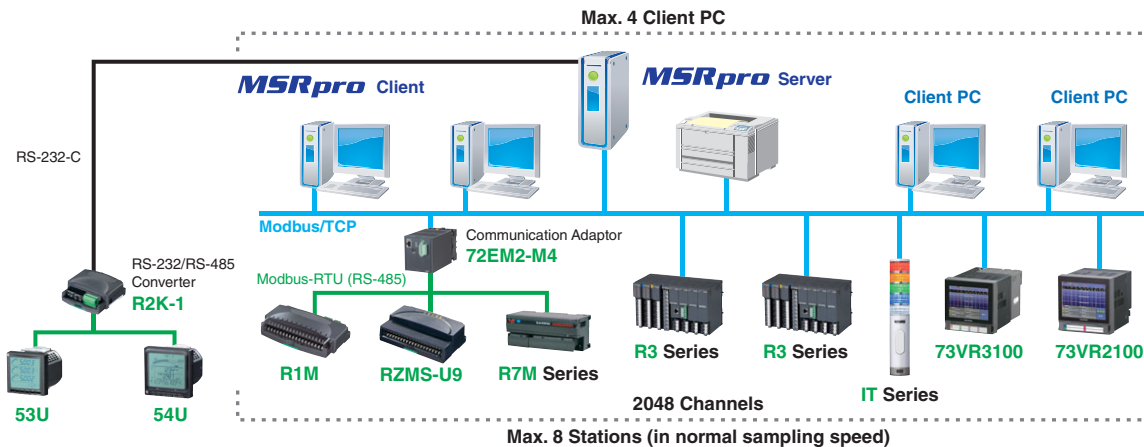


Active Trend



Graphic

## SYSTEM CONFIGURATION EXAMPLES



# WEB DATA LOGGERS



- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
- Remote I/O
- Paperless Recording System
- Web Data Loggers**
- PID Control Components
- Temperature Controllers
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## DL8 Series

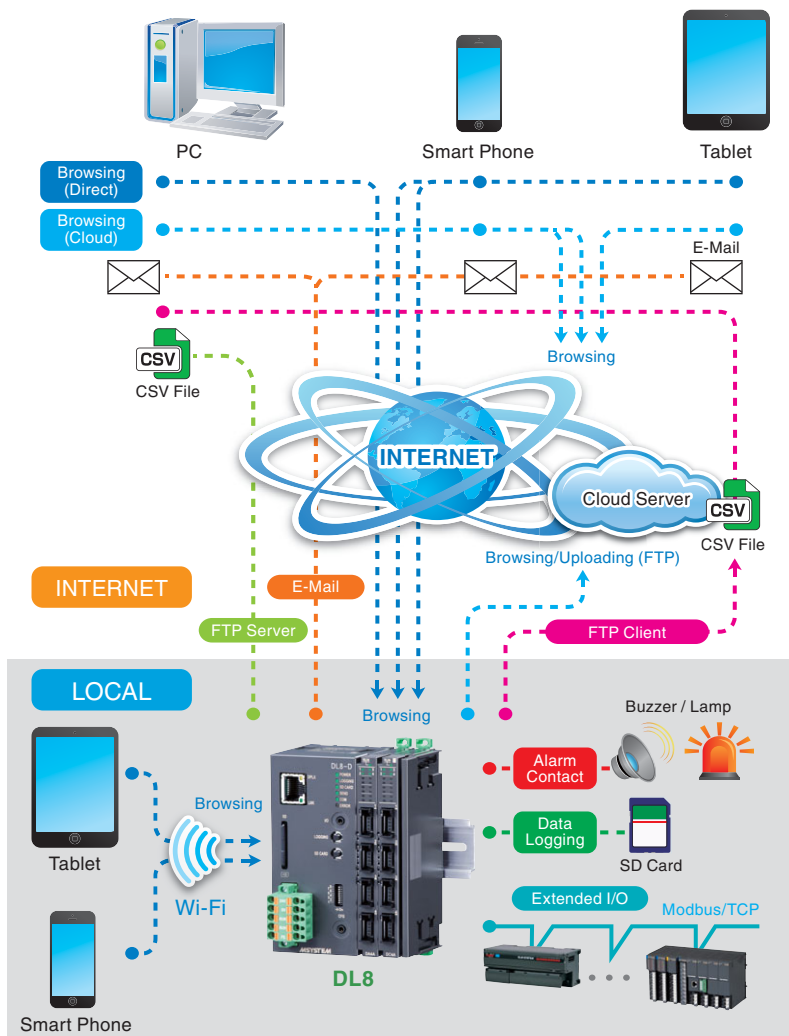
### Web Enabled Remote Terminal Unit

### Use Internet and Your Own Smart Phone To Build Up Remote Monitoring System

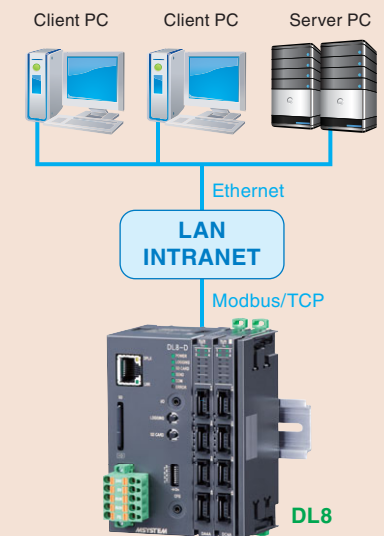
- Simple remote monitoring via internet without needing to build up a complex PC based system
- Pre-installed user-friendly browser view for remote data access through smart phones or tablets
- Reporting by e-mails
- Local data stored in an SD card memory
- Various network protocols are usable: TCP/IP, SMTP client, HTTP server, FTP client and server, Modbus/TCP master and slave
- R8 Series remote I/O modules available to accept a wide variety of field signals



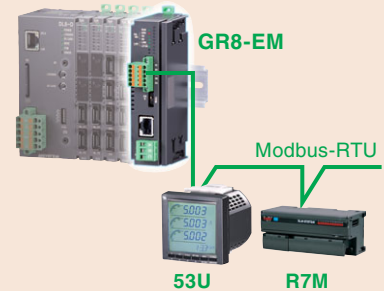
### Enhanced Functions with Flexible Configurations



### LAN / INTRANET SYSTEM CONFIGURATION

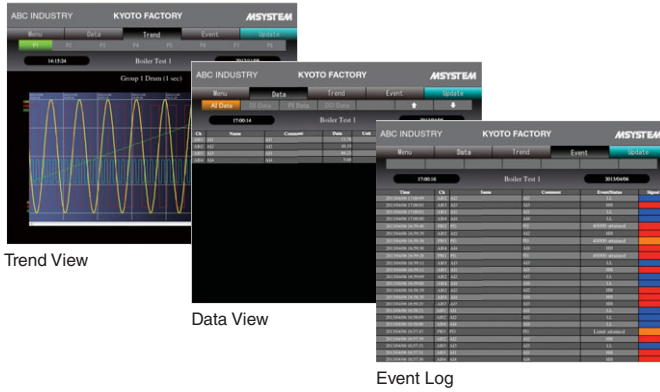


### GR8-EM ETHERNET ADAPTOR for Modbus-RTU extension





# Web Browsed Views Designed for Mobiles



- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
- Remote I/O
- Paperless Recording System
- Web Data Loggers
- PID Control Components
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- Lightning Surge Protectors

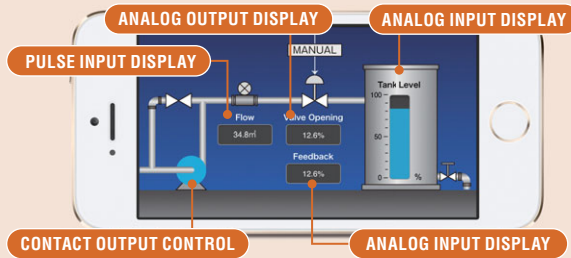
## Customized Web Browser Views DL8-D OPTION

### DATA VIEW BY HTML Example using the DL8 original tags



• Composite Picture

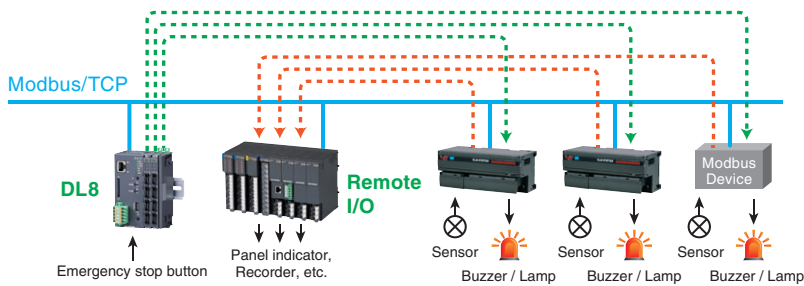
### GRAPHIC VIEW Example using JavaScript



• Composite Picture

## I/O Mapping by Modbus/TCP Master Function DL8-D OPTION

- ▮ Peer-to-peer connection between Modbus/TCP slaves
- ▮ Di/Do and Ai/Ao signal marshaling is easily set up on the DL8
- ▮ Remote multiplex transmission on IP network



• Do/Ao assigned for I/O mapping cannot be controlled via Modbus/TCP or web browser view.

### EASY SETUP

Simply choose input and output on the list.

CH	AI CH name
AO01	Feedwater flow IND
AO02	Feedwater pressure IND
AO03	Tank water level IND
AO04	Tank water temperature I
AO05	Disable
AO06	Disable
AO07	Disable
AO08	Disable
AO09	Disable
AO10	Disable
AO11	Disable
AO12	Disable
AO13	Disable
AO14	Disable
AO15	Disable
AO16	Disable
AO17	Disable

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## TYPICAL APPLICATIONS

- Event alert
- Remote monitoring and operation
- Labor-saving maintenance
- Material refilling schedule management
- Predictive and preventive maintenance



# PID CONTROL COMPONENTS

- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
- Remote I/O
- Paperless Recording System
- Web Data Loggers

- Temperature Controllers
- Final Control Components
- Lightning Surge Protectors

## SC100/SC200 Series

### Multi-Function PID Controller

### Highly Visible Color Graphic LCD Intuitive Touch Panel Operation

- Two loops of PID control
- 2 x universal inputs, 4 x analog inputs, 5 x contact or pulse inputs, 1 x high speed pulse input
- DCS in instrument format
- Auto tuning function
- Ideal for replacing existing instruments
- High reliability for demanding process use – Built-in manual loader with enhanced security features
- Host communication via Modbus Ethernet TCP/IP or RS-485 RTU
- Peer-to-peer communication via NestBus to expand number of I/Os
- IP55 front panel



CE IP55

FUNCTION	MODEL
Basic version	SC100
Modbus/NestBus extension version	SC200
Basic version with manual loader	SC110
Modbus/NestBus extension version with manual loader	SC210

## Operation and Engineering Views

### OPERATION VIEWS



### ENGINEERING VIEWS

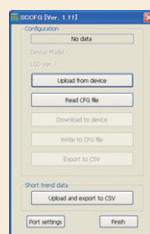


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## Powerful Engineering Tools

### PC Configuration Software SCCFG

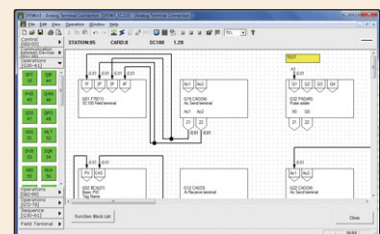
Used to configure display setting.



SCCFG

### Loop Configuration Builder Software SFEW3E

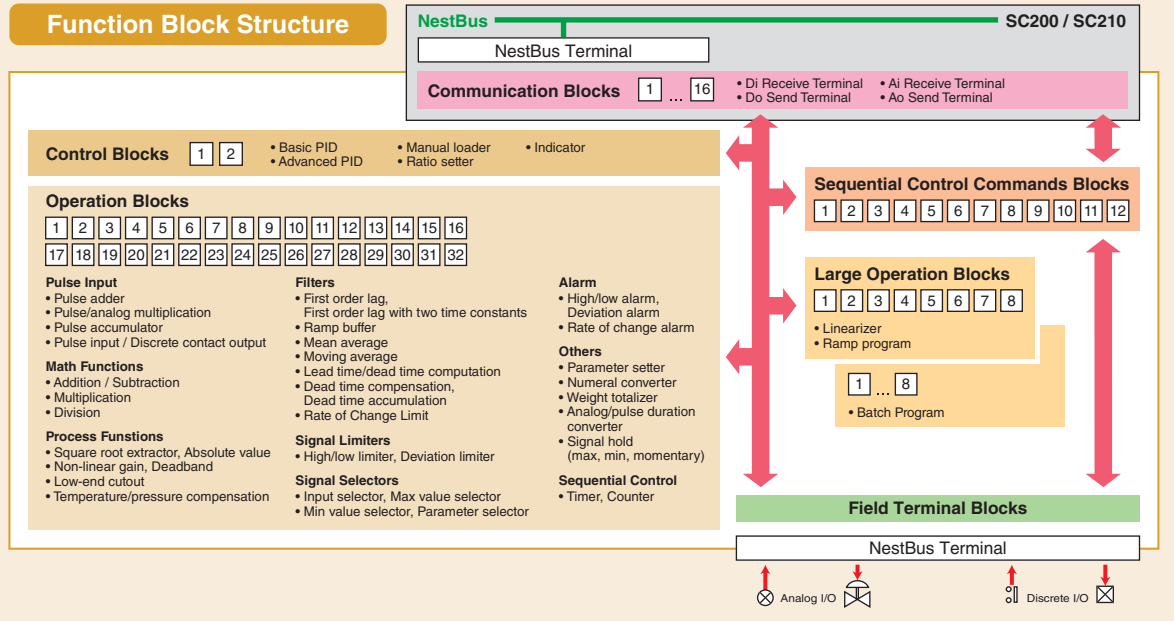
Used to program advanced computation and sequential control function block setting.



SFEW3E

## DCS IN INSTRUMENT FORMAT – Advanced Computation and Sequential Control Functions

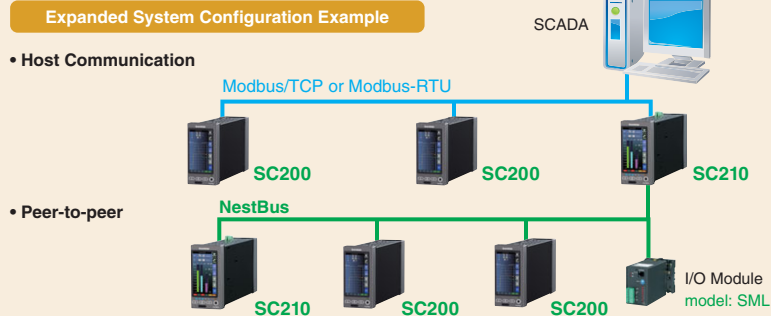
The control and computation functions are achieved by combining a wide variety of basic to advanced function blocks, which are normally found only in DCS systems, 2 PID blocks, 48 computation blocks and 12 sequential control blocks (1068 commands) are available for all versions of the SC Series, applicable to a wide range of application fields.



## EXCELLENT EXPANDABILITY – Peer-to-peer and Host Communication

The SC200/SC210 has Modbus (Ethernet TCP/IP or RS-485 RTU) which enables easy connection to logging or SCADA systems on a host PC for supervising and controlling the local I/O data.

In addition, the RS-485 'NestBus' enables peer-to-peer communication with other controllers and I/O devices for flexibility of I/O points.



# TEMPERATURE CONTROLLERS

## TC10 Series

- Universal input configurable to T/C, RTD, DC current or voltage independently
- Discrete input for remote trigger
- Clamp-on current sensor input to detect wire breakdown or overload
- Modbus-RTU slave



TC10NM  
1/8 DIN size  
One PID loop



TC10EM  
1/4 DIN size  
Two PID loops



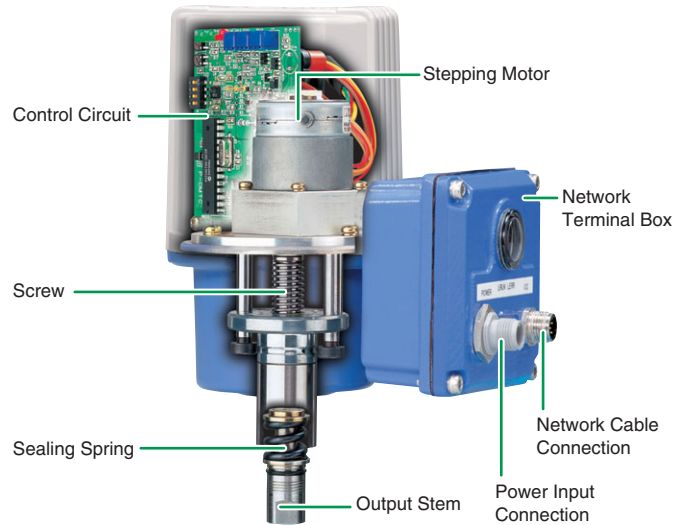
# FINAL CONTROL COMPONENTS

- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
- Remote I/O
- Paperless Recording System
- Web Data Loggers
- PID Control Components
- Temperature Controllers
- Final Control Components**
- Lightning Surge Protectors

## MSP / MRP Series

### Open Network Capable Linear / Rotary Motion Actuator

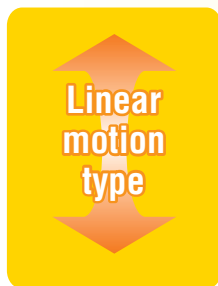
- High resolution positioning for superior control
- Built-in feedback positioner and electric limiter
- Brushless stepping motor assures long-life operation
- 1/1000 resolution
- Optional network interface with CC-Link, DeviceNet



Transparent image of MSP5D

## Linear and Rotary Actuators for Valve and Machinery Control

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### MSP4



150 N  
33.7 lbf

### MSP5



300 N 500 N 700 N  
67 lbf 112 lbf 157 lbf

### MSP6



1500 N  
337 lbf

600 N  
135 lbf

1200 N  
270 lbf

1800 N  
404 lbf

#### Thrust

150 N  
33.7 lbf

300 N  
67 lbf

700 N  
157 lbf

1200 N  
270 lbf

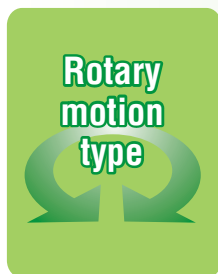
#### Torque

5 N·m  
3.69 lbf·ft

10 N·m  
7.38 lbf·ft

16 N·m  
11.8 lbf·ft

33 N·m  
24.3 lbf·ft



5 N·m  
3.69 lbf·ft

10 N·m  
7.38 lbf·ft

16 N·m  
11.8 lbf·ft

24 N·m  
17.7 lbf·ft

33 N·m  
24.3 lbf·ft

### MRP4



CE  
IP66

### MRP5



CE  
IP66

### MRP6



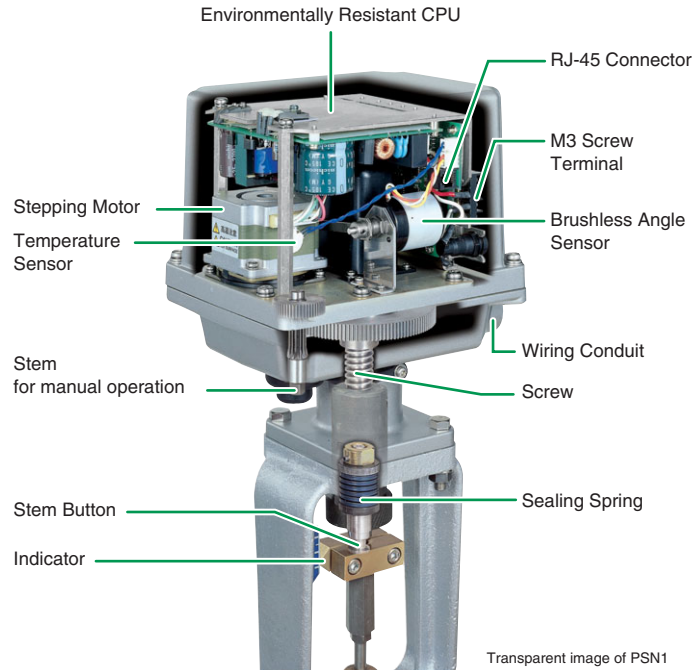
CE  
IP55



# PSN /PRP Series

## Linear / Rotary Motion Actuator

- Brushless angle sensor eliminates problems with mechanical potentiometer feedback sensing
- Opening/closing speed, split range and failsafe position programmable by hand-held programmer
- Internal temperature sensor to control heater in cold climate and to prevent motor from overheating
- Forced-open/-closed contacts for remote or manual override
- Lloyd's Register type approved (PRP)



### EA Series Rotary Motion Actuator

- Reversible AC motor
- Inching and proportional control
- High vibration resistance

For OEM



- Signal Conditioners
- Limit Alarms
- Indicators
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- PID Control Components
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- Final Control Components
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<p><b>PSN1</b></p> <p>CE IP55</p> <p>2500 N 562 lbf</p> <p>3000 N 674 lbf</p> <p>5000 N 1124 lbf</p> <p>100 N·m 73.8 lbf-ft</p> <p><b>PRP-0</b></p> <p>IP66</p>	<p><b>PSN3</b></p> <p>CE IP55</p> <p>3000 N 674 lbf</p> <p>5000 N 1124 lbf</p> <p>200 N·m 148 lbf-ft</p> <p><b>PRP-1</b></p> <p>IP66</p>	<p><b>CSP</b></p> <p>IP56</p> <p>12000 N 2698 lbf</p> <p>600 N·m 443 lbf-ft</p> <p><b>PRP-2*</b></p>
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\* The PRP-2 is available in Autumn 2018. Specifications are subject to change without notice.

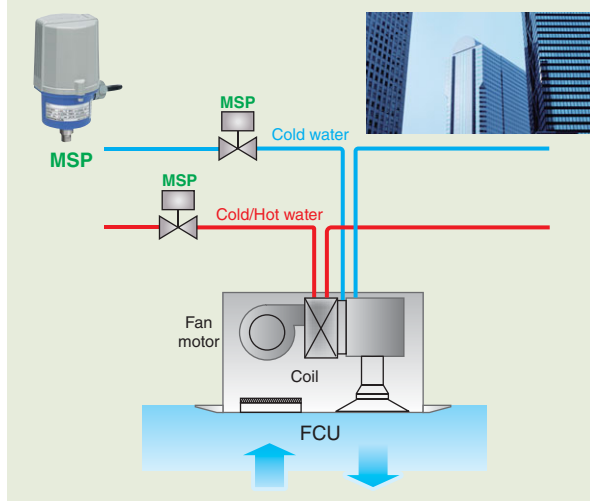


# Electric Actuator Application Examples

- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
- Remote I/O
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- Temperature Controllers
- Final Control Components**
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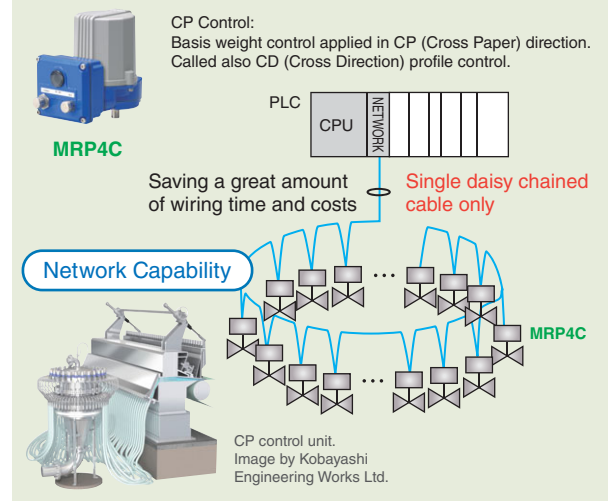
## BUILDING HVAC

Cold/Hot Water Control for Fan Coil Unit



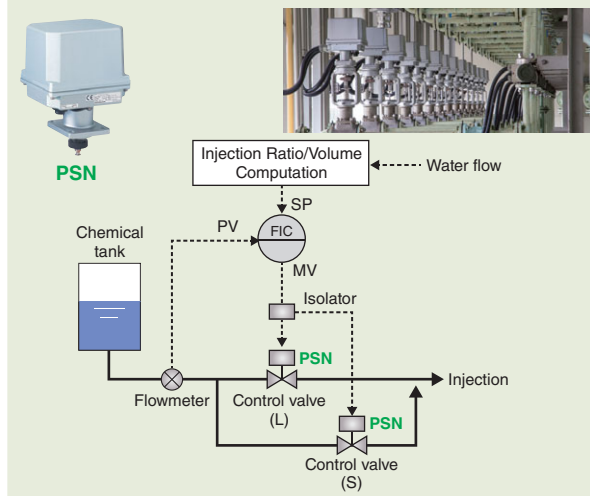
## PAPER

Paper Profile Control



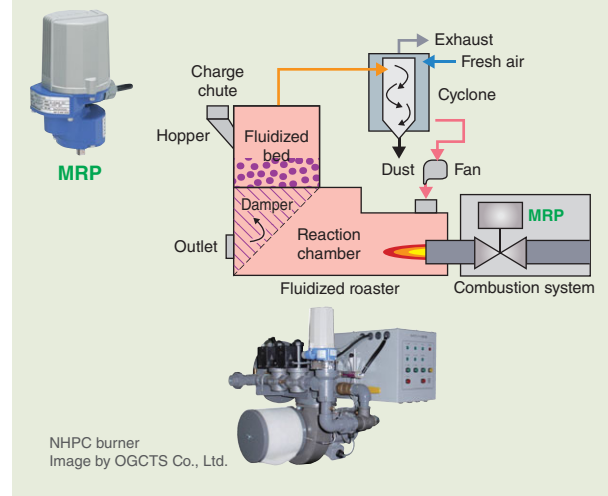
## WATER TREATMENT

Chemical Injection Ratio Control



## FOOD

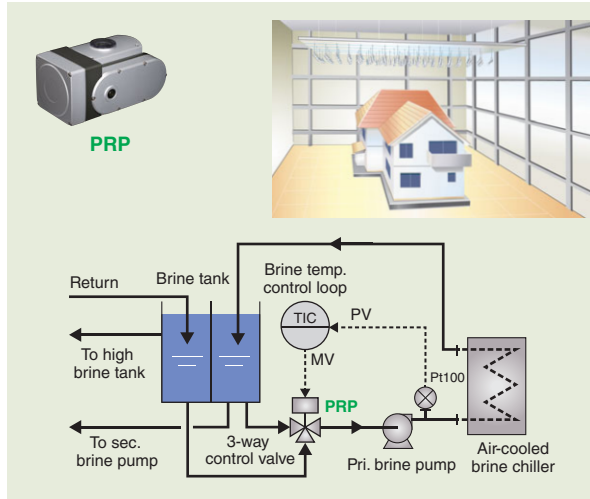
Gas Flow Control in Combustion System for Roasting Machine



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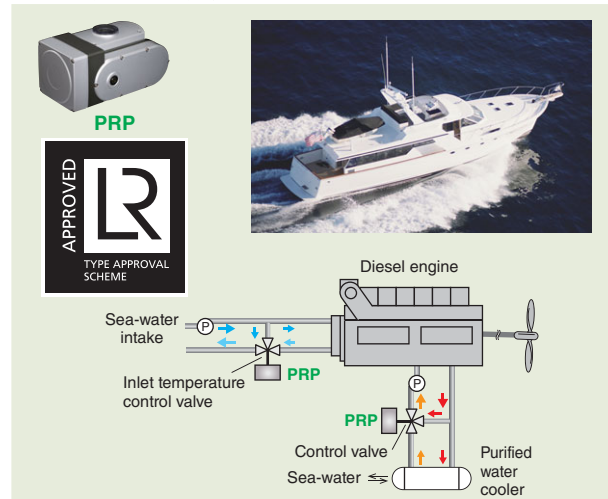
## ENVIRONMENTAL TEST CHAMBER

Brine Temperature Control in an Environmental Test Chamber



## SHIP

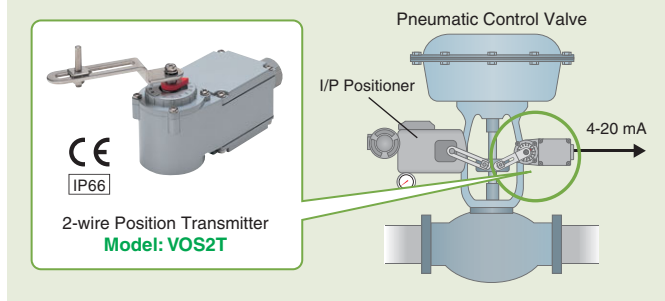
Diesel Engine Cooling System



## VOS2T / VOS2T-R 2-wire Position Transmitters

- ▮ Detecting mechanical position of pneumatic and electric actuators to send a proportional 4-20 mA signal
- ▮ Linear motion type ( $\pm 22.5^\circ$ ) or rotary motion type ( $\pm 45^\circ$ )
- ▮ Brushless design for long lasting reliability
- ▮ Lightweight & compact
- ▮ IP66

### Remote Monitoring of Pneumatic Control Valve Position

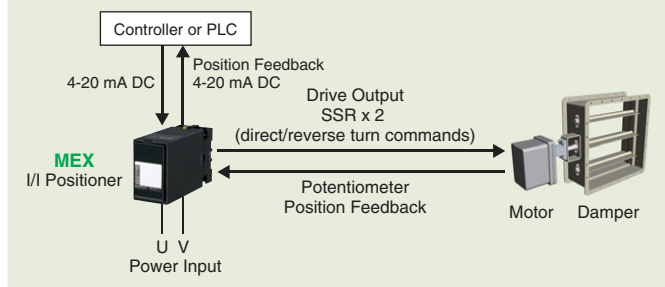


## MEX Series I/I Positioners

- ▮ Positioning of valve and damper can be controlled with a direct/reverse turn motor
- ▮ Remote 4-20 mA positioning input, SSR or 24 V AC dry contact switch output
- ▮ Adjustable deadband, timer, electronic limits and other additional functions depending upon models
- ▮ Modbus and LonWORKS for position setting available



### Positioning of a Damper



## Manual Loading Stations

- ▮ Holding control signals in case of computer or DCS failure
- ▮ ON/OFF signal input or analog signal input
- ▮ Manual control with an external Up/Down contact signal or with the front manual loader
- ▮ Ramp rate adjustable



CB2/AB2



MXCB/MXAB  
Programmable type

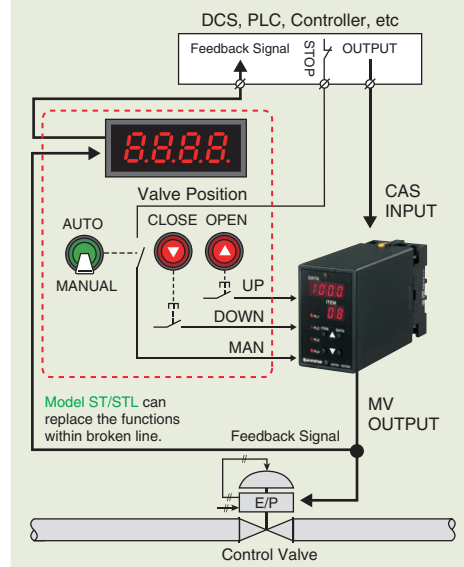


ABF3  
Built-in manual loader



ABS3  
Parameter Generator

### Manual Loading Station Using the MXAB



- Signal Conditioners
- Limit Alarms
- Indicators
- Tower Lights
- Power Transducers
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- PID Control Components
- Temperature Controllers
- Final Control Components
- Lightning Surge Protectors

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# LIGHTNING SURGE PROTECTORS

## M-Rester Series

### M-System Surge Protectors Absorb Only the Lightning Surges With No Interruption of the Instrumentation Signal



- Protecting sensors, signal and power lines, communication networks
- Excellent protection by multi-stage SPD: extra protection by a series resistance with diodes to limit current flow in addition to the discharge element at the first stage
- Each model identified by specific sensors or devices to be protected; with carefully chosen specifications to provide maximum protection
- One-port surge protectors are also available for power line protection

### Superior Selection Across a Broad Range of Sensor / Signal Types and Applications

- 4-20 mA & pulse signals
- Thermocouple
- RTD
- Potentiometer
- Strain gauge
- Frequency pickup
- RS-485 / RS-422
- Ethernet
- DeviceNet
- PROFIBUS
- LONWORKS
- Multi-stage SPD for AC/DC power supply lines up to 30 amps
- One-port SPD
- Class I and III
- Life monitor function for health testing
- Plug-in base wiring for easy maintenance
- Ultra-slim design for high density mounting
- Hazardous location approvals

### Life Monitor & Surge Counter

#### MAA-100 / MAA-200 / MAAC-100 / MAAC-200

- Protects 120 Vac / 240 Vac power supply lines for up to 5 amps load current
- Life monitor function helps you to decide when you should replace the surge protector, reducing maintenance and preventing downtime.
- Alarm contact output to alert externally the surge protector's health



CE

### One-Port SPD for Power Supply

#### MAKF / MAT2 / MAT3

- Connected in parallel between the power and ground lines regardless of load current
- Thermal breaker ensures degraded head element to be automatically separated from the power lines to prevent overheating.
- MAT2 / MAT3 applicable to three-phase power line in single module



MAKF



MAT2



MAT3

CE

CE

- Signal Conditioners
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Lightning Surge Protectors

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## Plug-in Base Mounted

### MDP Series

- Lightweight, easy-to-handle, plug-in construction
- Head element can be removed and tested without disconnecting wires.
- Base socket connects input/output signals when the head element is removed.



## Ultra-Slim Housing

### MD7 Series

- High density mounting with 7 mm wide modules
- Max. discharge current 20 kA (8/20 µsec.)
- Floating mode for the field to avoid ground loops
- DIN rail mounting / grounding



APPLICATION	MDP SERIES	MD7 SERIES
4-20 mA loop, pulse signal, 24 V	Y	Y
4-20 mA loop, life monitor	Y	Y
2-wire transmitter loop, 1 channel or 2 channels	---	Y
3-wire transmitter loop	---	Y
Thermocouple transmitter	Y	Y
RTD transmitter	Y	Y
Potentiometer & transmitter	Y	Y
Strain gauge & transmitter	Y	Y
Self-synch & transmitter	Y	Y
Pulse sensor & transmitter	Y	Y
AC power supply	Y	Y
DC power supply, 12/24 Vdc	Y	Y
RS-422 / RS-485	Y	Y
PROFIBUS-PA	Y	Y
FOUNDATION Fieldbus	Y	Y
LonWORKS (FTT-10A)	Y	Y

Signal Conditioners
Limit Alarms
Indicators
Tower Lights
Power Transducers
Remote I/O
Paperless Recording System
Web Data Loggers
PID Control Components
Temperature Controllers
Final Control Components

Lightning Surge Protectors

## Battery Powered Health Testing

### MDPA-24

- Protects 4-20 mA & pulse signals
- Battery powered life monitoring function includes a 'Test' button with indicators alerting panel inspectors of the surge protector's health.



## Field Transmitter Cable Conduit Mount

### MD6N-24 / MD6T-24 / MD6P-24

- Protects 4-20 mA & pulse signals
- Directly mountable to the cable conduit of 2-wire transmitters and other field devices in an outdoor enclosure



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## 8-port Pulse Signal Use

### MDR2

- Protection for semiconductor switches of discrete outputs
- PNP or NPN connection
- Applicable to multi analog signals (non-isolated between channels)
- Space saving with multi-channel protectors
- LED monitor indicating degradation of voltage limiter, driven by discrete I/O signal without auxiliary power supply



## PoE Plus / 1000BASE-T Ethernet Use

### MDCAT

- Power-over-Ethernet compatible
- 1000BASE-T / 100BASE-TX / 10BASE-T
- Ideal to protect network devices powered from Ethernet such as webcams
- Conforms to IEC 61643-21, Categories C1, C2



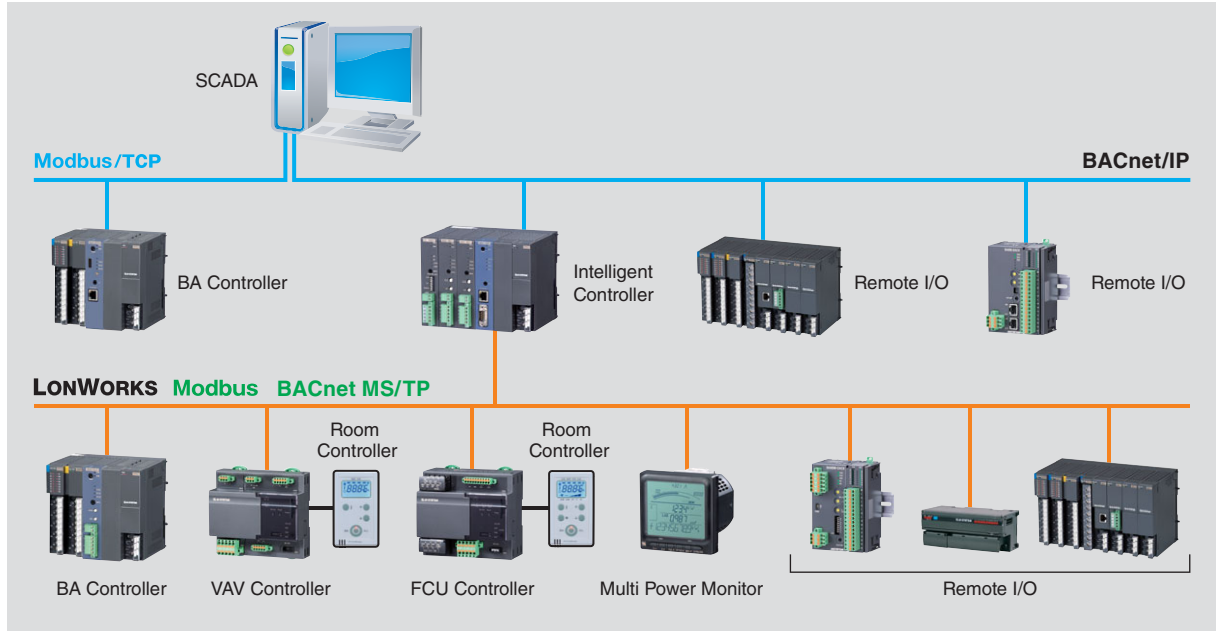
# FOCUSED NEW PRODUCTS FOR JAPAN

Products introduced in this section are only available in Japanese market or for limited release outside Japan.

## HVAC Controllers for Energy-Efficient Building Managing System

- Open protocol network based
- Intelligent controller, network gateway (master) modules and economical I/O modules can be freely selected.
- DDC equipped with convenient control functions
- IEC-61131 Function Blocks

- Signal Conditioners
- Limit Alarms
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**Intelligent Controller**  
BA3-CB3

**BA Controller**  
BA3-CL3 **LONWORKS**  
BA3-CE10 **Modbus/TCP**  
BA3-CB10 **BACnet MS/TP**

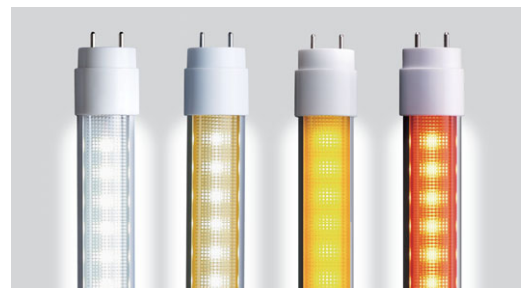
**VAV Controller**  
BA9-VAV **LONWORKS**  
BA9M-VAV **Modbus**

**FCU Controller**  
BA9-FCU **LONWORKS**  
BA9M-FCU **Modbus**



## LED Tubes for Replacing Fluorescent Lamps without Modification

- Direct replacement of existing lamps using the existing lamp holder
- Universally adaptable to glow tube starter, rapid start and inverter ballast types, single and dual-lamp lighting fixtures
- Energy-saving, long-life LED lamp
- Glass-free and mercury-free design for safe working condition and non-hazardous waste disposal





# Wireless I/O System for IoT

- Convenient wireless converter/gateways to collect field sensor data
- Remote monitoring using your mobile terminals via the internet
- Abnormality can be alerted via e-mails

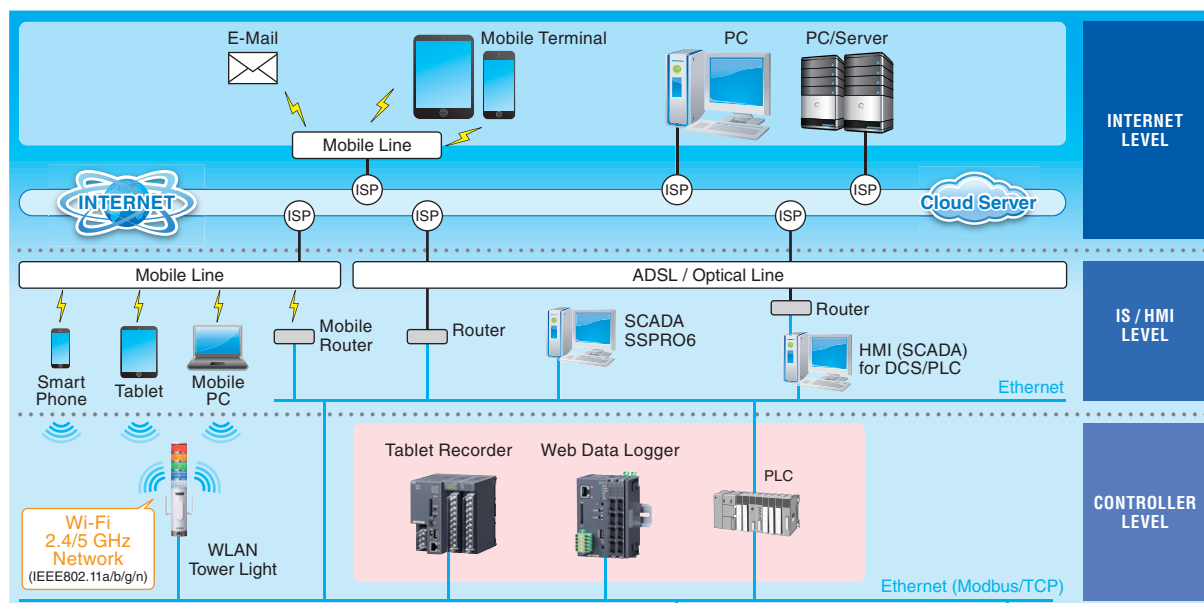
## 900MHz ISM band wireless I/O WL40F Series

FCC Part 15  
compliant

Incorporates the module  
compliant with FCC Part 15,  
and can be used only in the US.



- Signal Conditioners
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### Multi-port Gateway IB10W2

- 920 MHz ISM band gateway and Wi-Fi access point in one unit



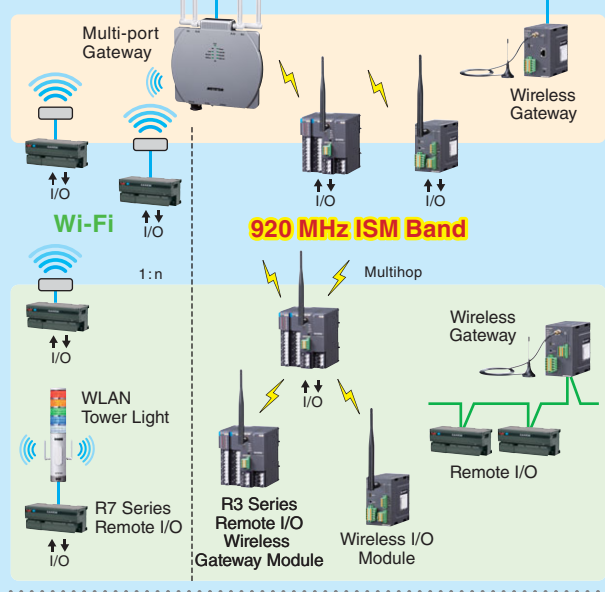
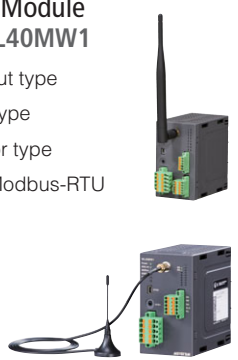
### Wireless Gateway Module R3-NW1 / R3-NMW1

- R3 Series Remote I/O interfacing to 920 MHz ISM band
- Gateway to Modbus-RTU (R3-NMW1)



### Wireless I/O Module WL40W1 / WL40MW1

- Universal input type
- Discrete I/O type
- Power monitor type
- Gateway to Modbus-RTU (WL40MW1)



Wi-Fi 2.4/5 GHz Network  
(IEEE802.11a/b/g/n)

920 MHz Multihop Wireless Network  
(IEEE802.15.4g / ARIB STD-T108)

### Wireless Gateway Module WL40EW2 / WL40EW3

- 920 MHz ISM band gateway
- I/O mapping (marshalling) (WL40EW3)



### Tower Light IT Series

- 920 MHz ISM band gateway
- WLAN (Wi-Fi access point)



REMOTE I/O LEVEL

SENSOR TRANSMITTER LEVEL

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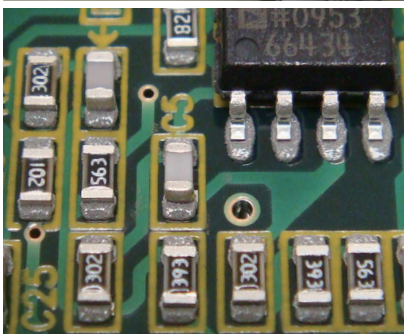
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- Signal Conditioners
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## We have not discontinued our products without compatible replacements.

We do not easily stop manufacturing products once released in the market, without trying to supply compatible products of equal or better performance to replace with, because we believe it is an important responsibility as the world's leading manufacturer to continue serving people who maintain the performance of process control systems. Visit M-System web site and find specifications and instruction manuals no matter how old the product, downloadable online.

## We supply ready-to-install products in fast and precise delivery time.

The standard manufacturing lead time for most M-System products with customer's specified range is 5 days. But more than quarter of the total shipments are delivered in shorter lead time, and Quick Service Center expedites more than 600 orders every month on the same day or the next day after ordered.

So do not worry too much about the standard delivery. Just let us know 'When' you need one of our products. They are calibrated for your exact needs with no extra charge.

Once a delivery time is promised, you can of course count on us to deliver them precisely on time.

## We strive toward complete offerings with special specification products.

We offer an enormous selection of signal conditioners and remote I/Os, power monitors, paperless recorders, panel meters, surge suppressors and valve actuators, and even that may not be enough for your particular needs.

But do not give up easily. Just ask us. We continue to work toward full product offerings with special specifications without additional charge, starting with major product series. In addition, we put our effort to make them into standard selections so that they are more easily accessible to you and everyone else in the future.

## We offer continued reassurance. Always Customers First.

Based on our "Customer Creed" policy, we go beyond normal manufacturers' obligations with our special repair service. If you suspect damage to a product by mistakes in handling, contact our Customer Center. We would be happy to check and repair it without charge. Consult M-System web site for detailed terms and conditions applicable to this service.

# Locations

## JAPAN

**Osaka Headquarters, International Department & Factory**

**Kansai Branch Office (Osaka)**

**Sendai Sales Office**

**Kanto Branch Office (Tokyo)**

**Chubu Branch Office (Nagoya)**

**Mie Factory**

**Kyushu Sales Office**

**Kyoto Techno Center**

**Kyoto Research Center & Factory**

- Signal Conditioners
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**Type testing and evaluation facilities**

- VCCI (Japan) registered anechoic chamber
- 6 m<sup>2</sup> shielded room capable of conducting multiple tests at once

• Second manufacturing location inspired by BCP revised after East Japan Earthquake in 2011

• Showcase plant utilizing M-System's BA controllers

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## GLOBAL SALES NETWORK

**Europe**

- Norway
- Sweden
- UK
- Netherlands
- Belgium
- Poland
- Hungary
- Switzerland
- France
- Spain
- Portugal
- Greece
- Italy

**Middle East**

- UAE

**Asia**

- Indonesia
- Philippines
- Malaysia
- Thailand
- Hong Kong
- Vietnam

**MG Korea Co., Ltd.**

**M-System Co., Ltd.**

**M-System China Co., Ltd. (Shanghai, Guangzhou)**

**Taiwan**

**Australia**

**New Zealand**

**MGTEC Asia Pte. Ltd.**

**Canada**

**USA**

**Mexico**

**Brazil**

**Argentina**

**Turkey**

**South Africa**

**M-System India Pvt. Ltd.**

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