MSYSTEM

Total Components Supplier for PA / FA / BA

I/O SOLUTION PRODUCTS 2016-2017

EC-Z750-A
May 2016
500476

SENTRONIC AG Produkte, Support und Service
Rugghölzli 2
CH - 5453 Busslingen
Tel. +41 (0)56 222 38 18
Fax +41 (0)56 222 10 12
mailbox@sentronic.com
www.sentronic.com

CATEGORY INDEX

PC / DCS / PLC

HVAC Controllers Page 40

Limited to Japanese Market

LED Tube Page 40

Limited to Japanese Market

Telemetering System

Limited to Japanese Market

Multiplex Transmission System Page 27

Wireless I/O System for IoT Page 41

Limited to Japanese Market

Web Data Loggers Page 32 - 33

Recorders Page 27 - 31

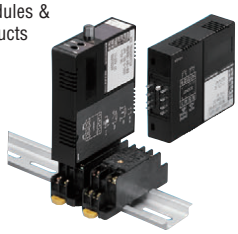
Indicators Page 14 - 16

- Digital Panel Meters
- Bargraph Indicators
- Field Indicators

Signal Conditioners Page 4 - 11

- Four-wire Signal Conditioners

- Function Modules & Retrofit Products



- Two-wire Signal Conditioners

Power Transducers Page 18 - 20

- Power Transducers
- Multi Power Monitors
- Remote I/O for Energy Consumption Monitoring

Limit Alarms Page 12 - 13

- Programmable Alarms
- Analog Alarms
- Direct Sensor Input Analog Alarms

Lightning Surge Protectors Page 38 - 39

Sensors / Transmitters

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

SCADA Software

Limited to Japanese Market

PID Control Components

Page 34-35

Tower Lights

Page 17

Temperature Controllers

Page 35

Control Room

Remote I/O

Page 21-26

- Mixed Signal Remote I/O

- All-in-One Style Remote I/O

- Compact Remote I/O for FA Control Equipment

CC-Link EtherNet/IP DeviceNet
MECHATROLINK EtherCAT
FLEX NETWORK Modbus/TCP
HLS PROFIBUS Modbus
T-Link FL-net LONWORKS

Manual Loading Stations

Page 11

Electric Actuators

Page 36-37

Pneumatic Transducers

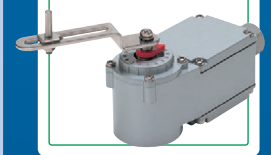
Page 10

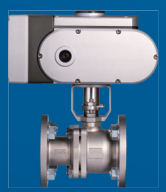
Valve Positioners

Page 11

Position Sensors

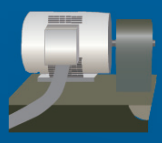
Page 11





Electric Control Valves

Pneumatic Control Valves



Motors

Field

Final Control Elements

SIGNAL CONDITIONERS

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

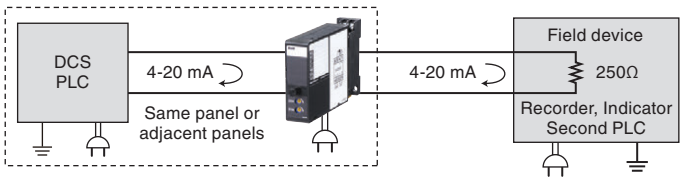
Choose by Power Supply

- 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.

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

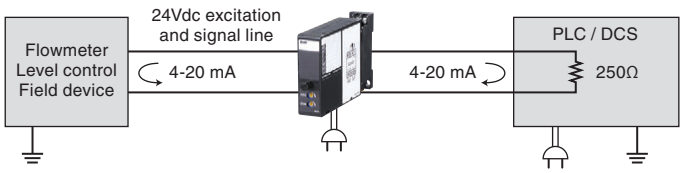


e.g. M2VS DC input, fixed range
W2VS DC input, fixed range, signal splitter
M6xXV DC input, programmable range

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

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



e.g. M2DYS Fixed range
W2DYS Fixed range, signal splitter
M3LDY Programmable linearization

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

4-wire Signal Conditioners

M2/W2 Series

Compact Plug-in Socket Mounted Signal Conditioners

- Wide selection of input/output ranges and functions
- W2 Series provide a second isolated output of independent range
- DIN rail or surface mounting
- 2000 Vac isolation
- Base socket included with the modules

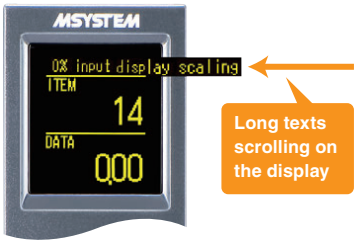
M2 Series

W2 Series
Signal Splitters

M2E Series NEW

Compact Signal Conditioners with OEL Display

- Bright, high-contrast OEL (Organic Electroluminescent) display
- Programming parameters and selections are shown in text scrolling on the display: intuitive, easy programming just like operating a cell phone
- Field selectable I/O range
- PC configuration is also available



Setting View

M2E Series

M5/W5 Series

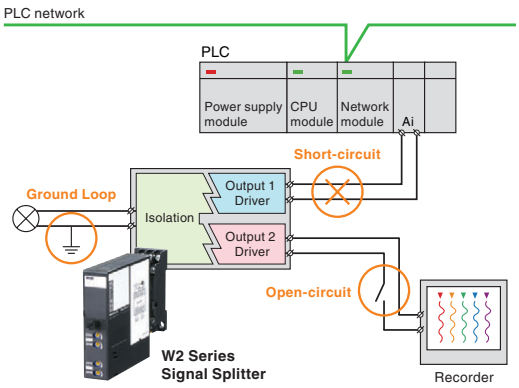
Terminal Block Type Compact Signal Conditioners

- Only 41 mm (1.61 in) deep, terminal block style modules can be installed anywhere, even behind the panel cover.
- W5 Series provide a second isolated output of independent range
- DIN rail mounting
- 2000 Vac isolation

M5 Series

W5 Series
Signal Splitters

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.

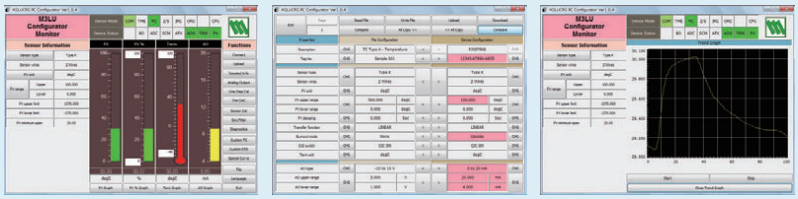
4-wire Signal Conditioners

M3L Series

PC Programming or "One-Step Cal" Configuration without PC

- Enhanced PC configurator software
- Easy and precise "One-Step Cal" field configuration without needing a PC
- Universal I/O specifications ideal for spare parts stock reduction programs
- DIN rail mounting
- 1500 Vac isolation

Enhanced PC Configurator Software



"One-Step Cal" Field Calibration

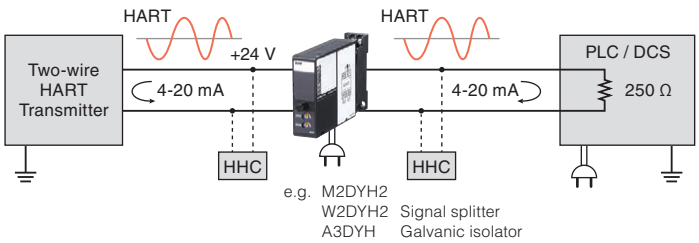
Precise input and output ranges can be set with the front control buttons step by step with a help of flashing LED patterns to confirm each step of setup actions.

M3S Series Space-saving Signal Conditioners

- Space-saving 12 mm (0.47 in) wide modules with separable terminal blocks
- Universal AC/DC power input available

ISOLATOR APPLICATIONS 2

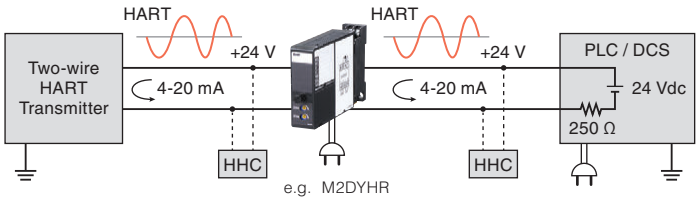
Four-wire isolator / current loop supply : 4-20 mA (active) input / 4-20 mA output (source) / Line powered



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, from any termination point of the loop at both sides of the isolator.

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

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



SENTRONIC AG Produkte, Support und Service
Rugghölzli 2
CH - 5453 Busslingen
Tel. +41 (0)56 222 38 18
Fax +41 (0)56 222 10 12
mailbox@sentronic.com
www.sentronic.com

M6 Series

Ultra-Slim Signal Conditioners

- Only 5.9 mm (0.23 in) wide ultra-slim design for M6D/M6S series
- Selectable connection styles: Tension-clamp, screw terminal or euro terminal
- Low power consumption, high load drive capability
- Backplane base available to save individual power input wiring
- 2000 Vac isolation

M6S Series

M6N Series

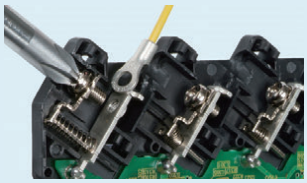
M6D Series

M6S Series : Tension Clamp Style

5.9 mm (0.23 in) wide module.
No special tool or skill is required when wiring.

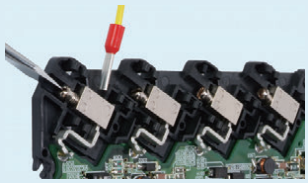
M6N Series : Screw Terminal Style

7.5 mm (0.30 in) wide module.
Self-up screws prevent falling off a terminal.



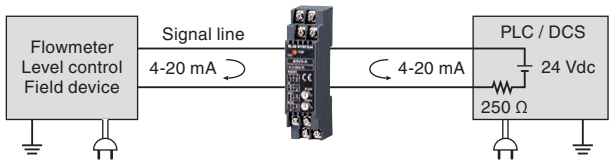
M6D Series : Euro Terminal Style

5.9 mm (0.23 in) wide module.
Suitable for solid wires, pin terminals.



ISOLATOR APPLICATIONS 3

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

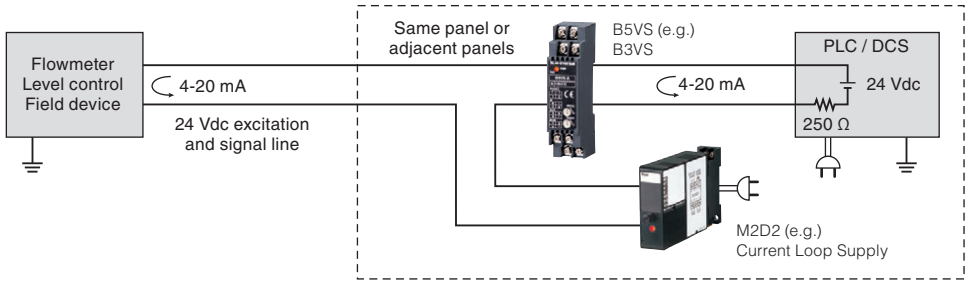


e.g. B5VS Single channel
B3VS Single or dual channel

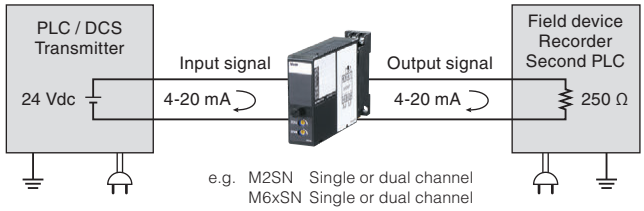
Basic isolator designed to interface a PLC and DCS system that provides a 24 Vdc power supply with a 4-20 mA input.

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

With the excitation supply to the field device



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



e.g. M2SN Single or dual channel
M6xSN Single or dual channel
B5SN Single channel

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

2-wire Signal Conditioners

Field-mount HART Temperature Transmitter

B6U / B6U-B

- Plug-in two-line LCD display
- HART programmable
- User's own temperature calibration tables can be used
- AMS software version 6.0 or higher
- IP66 / IP67 field enclosure; Stainless steel optional
- ATEX / FM approval

B6U

B6U-B

Head-mount, HART Programmable

27HU / 27HU-B

- HART programmable
- User's temperature table and Callendar-Van Dusen approximation formula
- 4-digit LED indicator optional
- IP66 / IP67 field enclosure; Stainless steel optional
- ATEX / FM approval

DIN Rail Mount, HART & PROFIBUS

B3HU / B3HU2 / B3PU

- 18 mm (0.71 in) wide, space-saving
- AMS software version 6.0 or higher
- SIMATIC PDM
- ATEX / FM approval (B3HU)
- HART 7 (B3HU2)

Head-mount, PC Programmable

27 Series

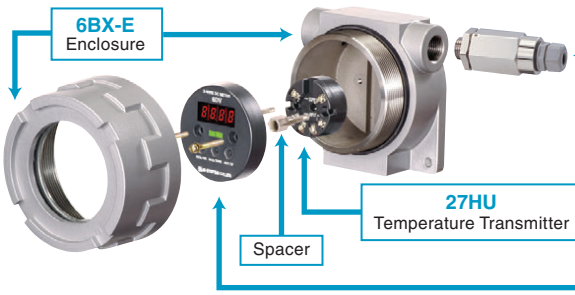
- PC Programmable
- Function monitor LED optional for RTD and potentiometer input
- ATEX / FM approval

Head-mount, Fixed Range Type

26 Series

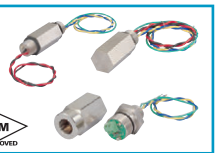
- Linearization, sensor burnout detection, cold junction compensation (T/C input) standard
- Optional 25 msec. response time selectable (26TS1, 26RS)
- ATEX approval (26REX)

FIELD-MOUNT ACCESSORIES



MD6 Series Surge Protectors

Directly mountable to the cable conduit of two-wire transmitters and other field devices in an outdoor enclosure



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

- No external power source required
- Scaling and linearization via the front controls
- Mountable on top of head-mount transmitter, installed together in an outdoor enclosure

6DV

6DV-B

DIP Switch Configurable

B3 Series

- 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

Terminal Block Type

B5 Series

- Only 41 mm (1.61 in) deep, terminal block style modules can be installed anywhere, even behind the panel cover.

A3DYH Galvanic Isolator

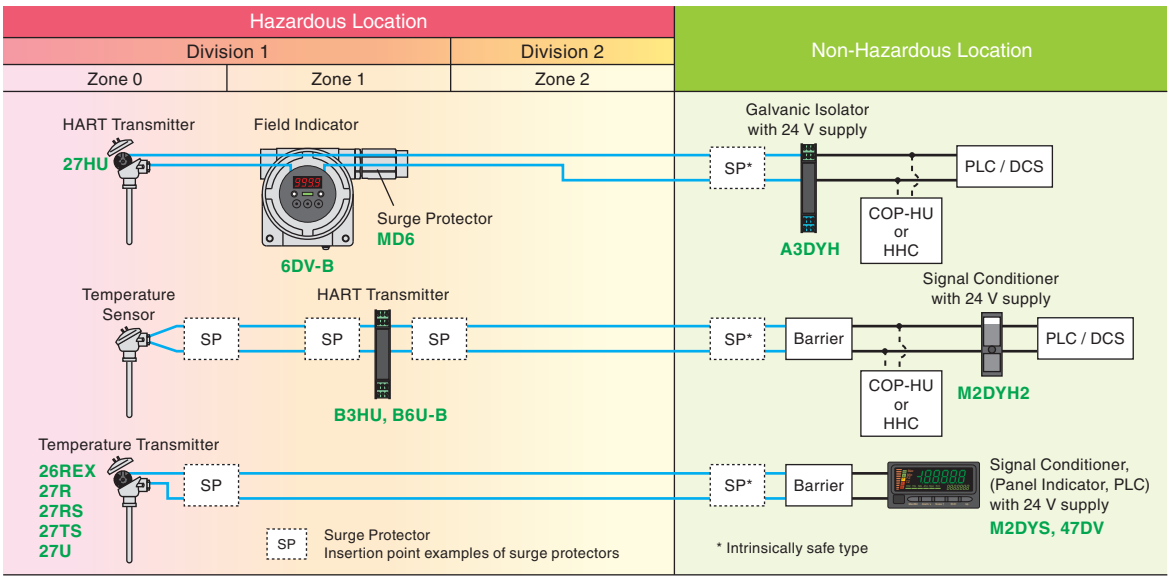
- Isolated intrinsically safe associated apparatus – No need of grounding
- Isolates and relays HART signal bidirectionally

Combination Examples for Hazardous Location Products

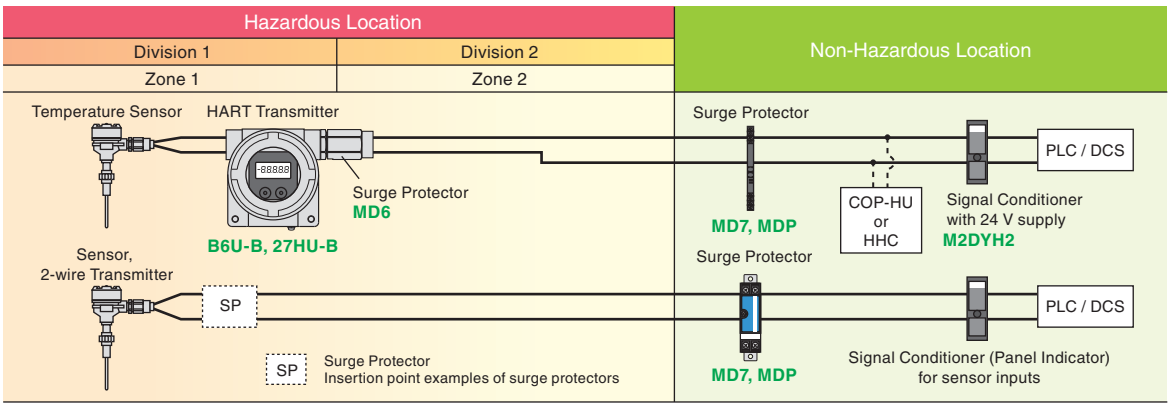
HAZARDOUS LOCATION PRODUCTS GUIDE

Model selections are only examples. For an actual installation of particular products, refer to the respecitve data sheets to confirm technical feasibilities.

Intrinsically Safe



Explosion-proof / Flameproof



Function Modules & Retrofit Products

Function Modules

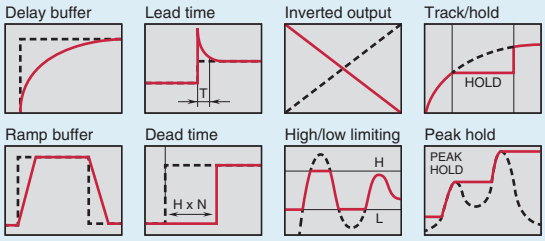
- Math functions
- Process functions
- Filters
- Unique functions to ensure stable process operations and to solve problems in system upgrading

M2 Series

M6 Series

- 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

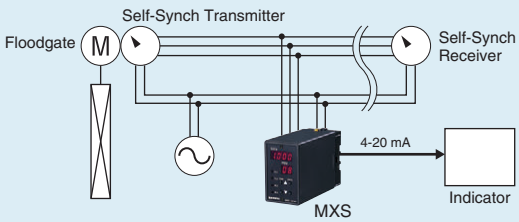
I/O CHARACTERISTICS EXAMPLES



Self-Synch Transmitter

MXS

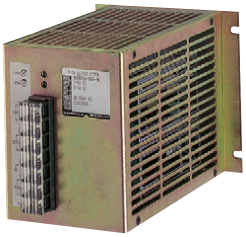
- Converting position signals from a self-synchronizing motor into a DC signal proportional to the rotating shaft position
- Position indication using self-synch, tank gauge, sounding level meter



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

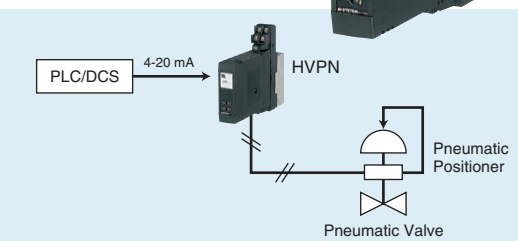
CVR1

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

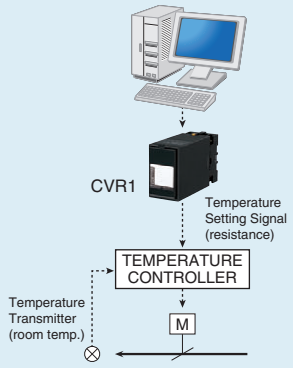
I/P Transducer

HVP / HVPN

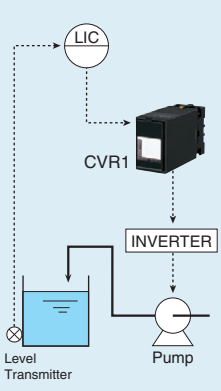
- Semiconductor pressure sensor in the feedback circuit
- Max. air capacity 60 N*l* /minute



Damper Operation for Air Conditioning



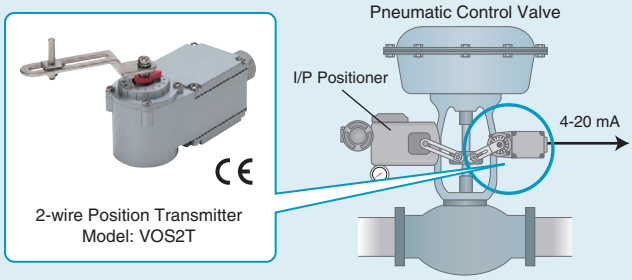
Motor Speed Setting



VOS2T / VOS2T-R Two-wire Position Transmitters

- Detecting mechanical position of pneumatic and electric actuators to send a proportional 4-20 mA signal
- Linear motion type (±22.5°) or rotary motion type (±45°)
- Brushless design for long lasting reliability
- Lightweight & compact
- IP 66

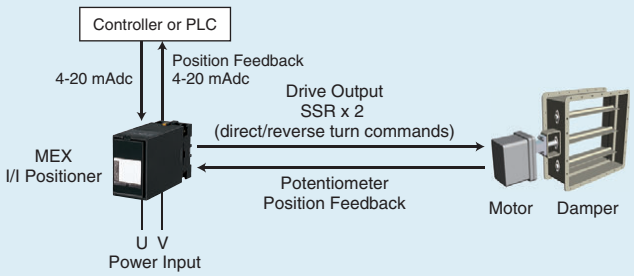
Remote Monitoring of Pneumatic Control Valve Position



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 Vac 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

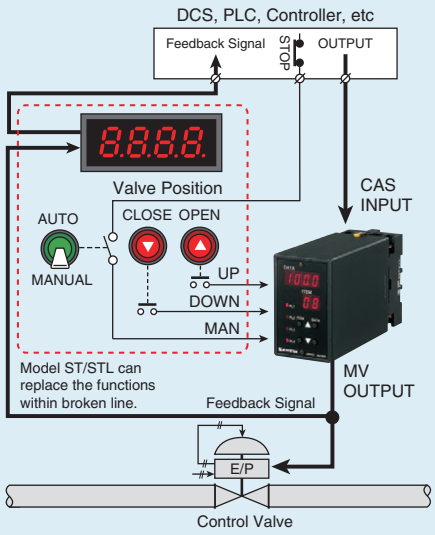
MXCB/MXAB
Programmable type

ABF3
Built-in manual loader

NEW

ABS3
Parameter Generator

Manual Loading Station Using the MXAB



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.

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

M7E Series Compact Dual/Quad Alarms with LCD Display

- Multi-line LCD display showing parameters and selections in text: intuitive, easy programming just like operating a cell phone
- Field selectable input range
- Dual SPDT or quad NO or NC output
- PC configuration is also available

M2E Series *
with OEL Display

* M2E Series is under development as of April 2016.

Compact Size Panel Surface Mount
KS2V2 / KS2TR2

- 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

Analog Alarms

Simple Dial Setting

KSE

- Fixed range input
- Single or dual SPDT output


KSE-1


KSE-2

Compact Analog Alarms

M2 Series

- Fixed range DC mV, V & mA input
- Single (NO/NC, DPDT) or dual output (SPDT)
- Easy thumbwheel switch adjustment
- M2AVS uses potentiometer adjustments with a help of 0-1 V monitor output


M2SED


M2AVS

Thumbwheel Switch Setting

ASD1 / KSED

- Fixed range input
- Single or dual SPDT output
- ASD1 is selectable with deadband


ASD1


KSED

Direct Sensor Input Analog Alarms

AL-UNIT Series

- Rotary switch adjustments (0-99%, 1% increments)
- Dual SPDT output

AE-UNIT Series

- Thumbwheel switch adjustments (0-99%, 1% increments)
- Dual SPDT output
- Extra DC transmitter output

A-UNIT Series

- Potentiometer adjustments
- Dynamic deadband
- Dual SPDT output

M-PAC Series

- Front potentiometer or remote dial/DC voltage setpoint control selectable
- Single trip, latching or dual trip relay outputs
- Transmitter output and other options

FUNCTION	AL-UNIT	AE-UNIT	A-UNIT	M-PAC
DC input	Y	Y	Y	Y
Thermocouple input	Y	Y	Y	Y
RTD input	Y	Y	Y	Y
Potentiometer input	Y	Y	Y	Y
2-wire transmitter input (with excitation)	Y	Y	Y	Y
Frequency input	Y	Y	Y	Y
Tachogenerator input	Y	Y	Y	---
AC current/voltage input	Y	Y	Y	Y
PT input	Y	Y	Y	---
CT input	Y	Y	Y	---

INDICATORS

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
- IP 66 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
- IP 66 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

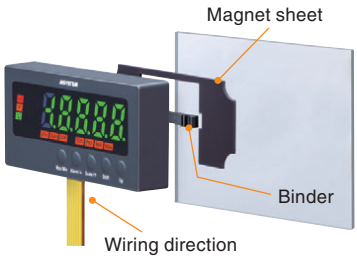
Flat Rear Surface Stuck to the Panel with a Magnet NEW

47NL Series

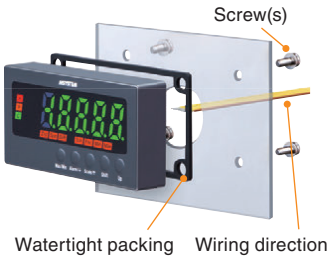
- 96 x 48 mm
- 4 or 4 1/2 digit display
- Large 16 mm-high LED display: Bright and colorful
- Mountable on standard 30 mm round panel cutout
- IP 66 (except for magnet mounting)
- Moving average function to suppress display flickering
- High/low alarm trips
- Short-depth flat type

TENSION-CLAMP TERMINAL BLOCK TYPE

MAGNET MOUNTING

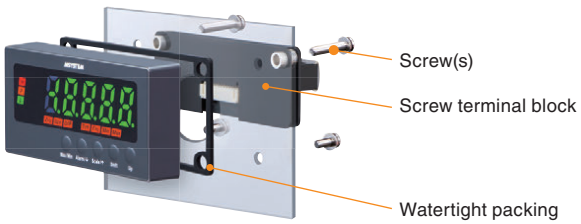


SCREW MOUNTING



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	---	---	---	---

Bargraph Indicators

48N Series Bargraph Indicators

- 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
- IP 65 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 NEW

- 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

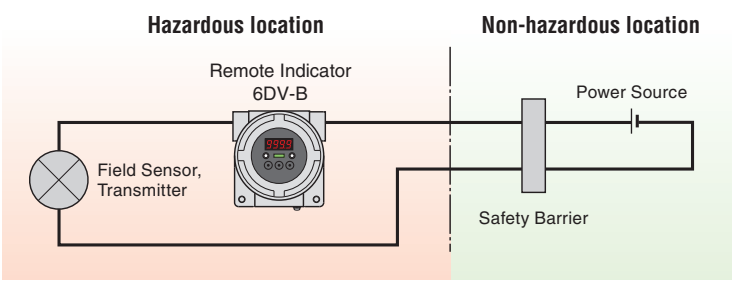
6DV / 6DV-B Loop Powered Field Indicator

- 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

TWO-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 IP 65 construction is ideal for harsh industrial applications

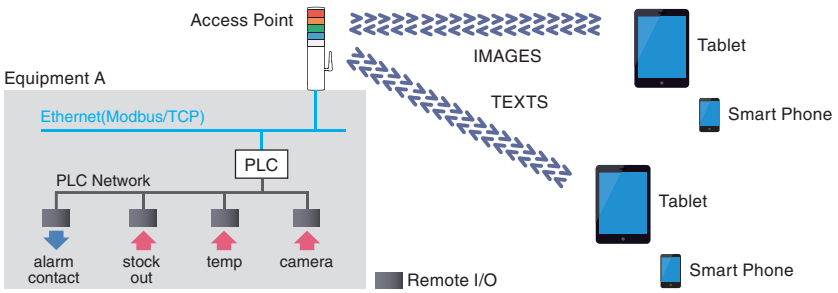
Modbus/TCP CC-Link

CE R&TTE

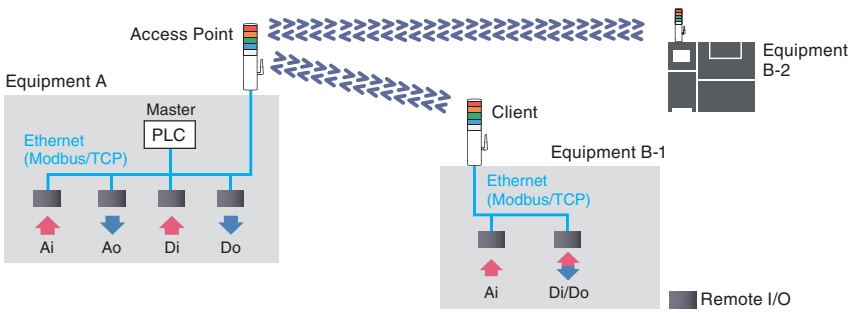
WLAN access point type

TOWER LIGHT APPLICATIONS

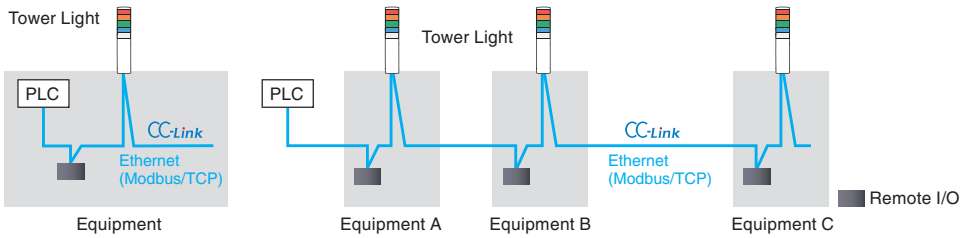
Remote monitoring and control of an equipment using mobile interface



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

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.

Power Transducers

LT-UNIT Series

- 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

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

FUNCTION	LT-UNIT	L-UNIT	K-UNIT
VT transducer (RMS sensing)	Y	Y	Y
VT transducer (average sensing, RMS calibrated)	---	Y	Y
CT transducer (RMS sensing)	Y	Y	Y
CT transducer (average sensing, RMS calibrated)	---	Y	Y
VT/CT transducer (RMS sensing)	---	Y	---
VT/CT transducer (average sensing, RMS calibrated)	---	Y	---
Watt transducer	Y	Y	Y
Var transducer	Y	Y	Y
Power factor transducer	Y	Y	Y
Phase angle transducer	Y	Y	Y
Frequency transducer	Y	Y	Y

Multi Power Monitors

53U / 54U Series

Multi Power Monitor and Transducer

- Single-phase 2-wire and 3-wire, three-phase 3-wire and 4-wire systems
- IP 52 front panel (53U, 54U)
- Various network communication and Ao/Do combinations selectable
- Up to 31st harmonic distortion measurement
- Software lock

L53U

DIN rail mounted

- Modbus + Di/Do
- Ao x 2 points + Di/Do
- Ao x 4 points

Modbus

53U

96-mm square panel size

- Modbus + Di/Do
- Ao x 2 points + Di/Do
- Ao x 4 points
- Do x 4 points

Modbus

54U / 54UC / 54UL

110-mm square panel size

- Ao x 4 points
- Di/Do

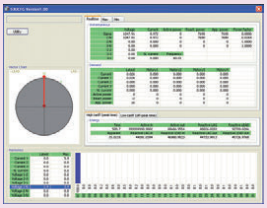
Modbus CC-Link LONWORKS

User-Friendly PC Software Setting

Save yourself much time using the free PC Configurator software to create, save and download your own parameter settings.

Local (RS-232C) or Network (Modbus-RTU)

Multi Power Monitor 53U

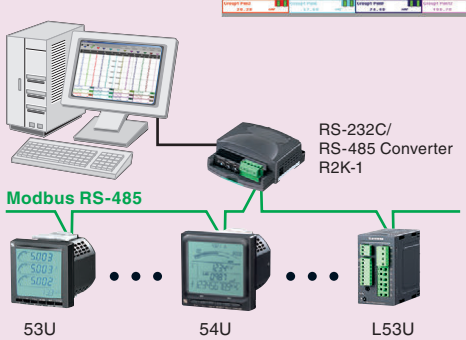


Monitoring window for real-time, instantaneous values, max/min values, energy and harmonic distortions

Configuration window for quick and easy viewing/setting of basic parameters

Monitoring and Storing Measured / Computed Values on the PC

The PC Recorder Light MSR128LU dedicated for the 53U / 54U / L53U is free for downloading from our web site.

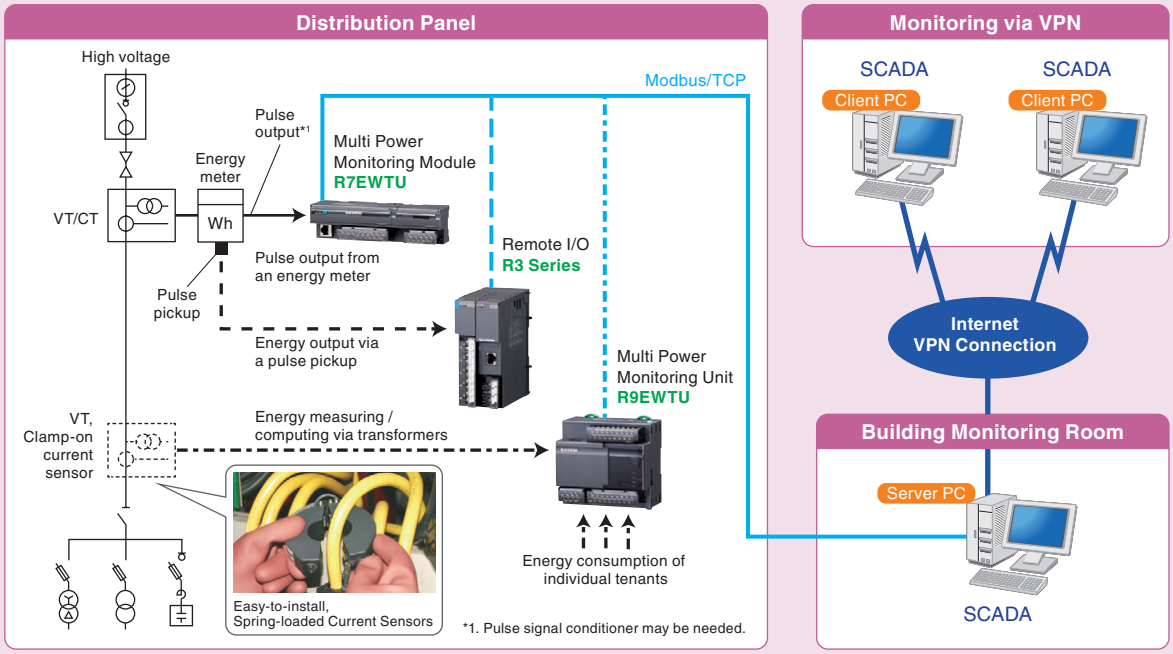


Remote I/O for Energy Consumption Monitoring

Start Your Energy Saving Program with a Minimum Time & Cost

- 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

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



R7MWTU / R7EWTU / R7CWTU / R7LWTU

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

Modbus LONWORKS CC-Link Modbus/TCP

R9MWTU / R9EWTU / R9CWTU / R9LWTU

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

Modbus LONWORKS CC-Link Modbus/TCP

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

Modbus LONWORKS CC-Link Modbus/TCP DeviceNet PROFIBUS

REMOTE I/O

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

Mixed Signal I/O
with free combination of I/O, network and power supply

LARGE NUMBER OF I/O POINTS

Multi-channel, Mixed Signal Remote I/O

R3 Series

Hot Swappable Modules

Compact, Mixed Signal Remote I/O

R30 Series

Compact size

Slice Type, Mixed Signal Remote I/O

R8 Series

Flexible Configuration without Base

SMALL NUMBER OF I/O POINTS

Compact, Mixed Signal Remote I/O

R5 Series

Easy Access to Field Terminals

Ultra-Slim, Mixed Signal Remote I/O

R6 Series

Only 78 mm wide with 8 I/O modules

All-in-One I/O
with I/O, network and power supply in single package

LARGE NUMBER OF I/O POINTS

Compact, Multi-point Remote I/O

R1 Series

12-point Universal Input Module

SMALL NUMBER OF I/O POINTS

Expandable, Compact Remote I/O

R7 Series

Attached with Discrete I/O Extension Module

Mixed Signal Remote I/O

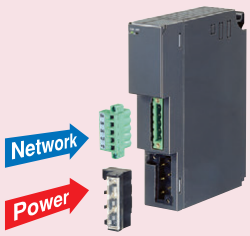
R3 Series

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

CC-Link DeviceNet PROFIBUS Modbus Modbus/TCP
EtherNet/IP LONWORKS MECHATROLINK T-Link FL-net

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.

R30 Series Compact, Mixed Signal Remote I/O NEW

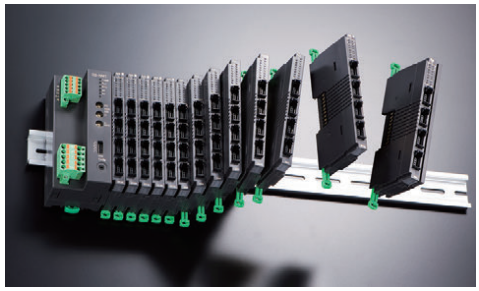
- Compact size
- High speed bus
- R3 I/O modules can be added by using a special connecting base
- CC-Link/IE network module is planned

EtherCAT Modbus/TCP

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 or MIL connector

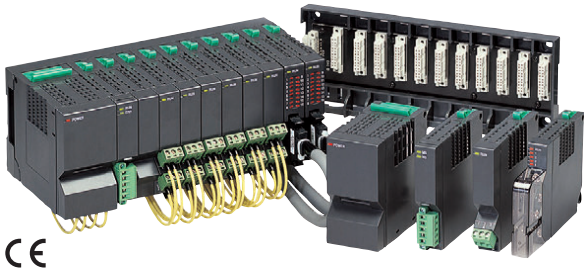
Modbus EtherCAT CC-Link DeviceNet



R5 Series

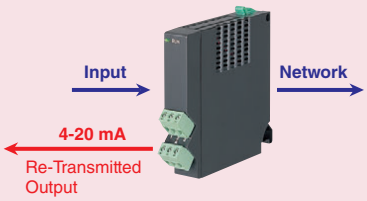
Compact, Mixed Signal Remote I/O

- 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

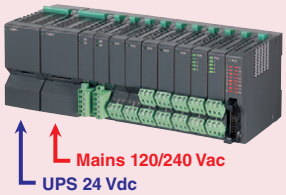


CC-Link DeviceNet PROFIBUS Modbus Modbus/TCP T-Link

The slanted I/O terminals are easily accessible with high-density wiring.



Re-transmitted 4 to 20 mA output is optional for local monitoring or recording.



Add another power module for a backup power source.

R6 Series

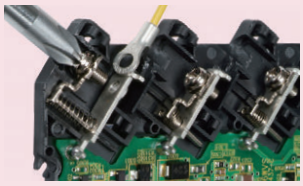
Ultra-Slim, Mixed Signal Remote I/O

- 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

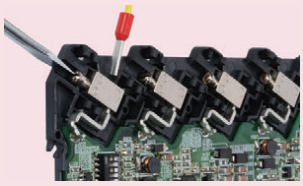
CC-Link DeviceNet PROFIBUS Modbus Modbus/TCP T-Link

Three Terminal Connection Styles Selectable

Tension-Clamp R6S Series



Screw Terminal R6N Series



Euro Terminal R6D Series

I/O Selection Guide

FUNCTION	R3 Series	R30 Series	R5 Series	R6 Series	R8 Series
Analog Input Module (Isolated)					
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 ch
DC current input (non-isolated)	16 ch	---	---	---	4 / 16 ch
Thermocouple input	4 / 8 ch	4 ch	1 / 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	---	1 / 2 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	---	---	---	---
Temperature Control Module					
Temperature Control	2 loops	---	---	---	2 loops
Analog Output Module (isolated)					
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	---	1 / 2 ch	2 ch	2 ch
Pulse I/O Module					
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	---	---
Analog Input Module with Transmitter Output (isolated)					
DC voltage input	---	---	1 ch	---	---
DC current input	---	---	1 ch	---	---
Thermocouple input	---	---	1 ch	---	---
RTD input	---	---	1 ch	---	---
Potentiometer input	---	---	1 ch	---	---
4-20mA input with excitation	---	---	1 ch	---	---
Alarm Module (isolated)					
DC voltage input	4 / 8 ch	---	---	---	---
DC current input	4 / 8 ch	---	---	---	---
Thermocouple input	4 ch	---	---	---	---
RTD input	4 ch	---	---	---	---
4-20mA input with excitation	4 ch	---	---	---	---
Discrete I/O Module					
Discrete input	Di 16	Di 16	Di 4 / 16	Di 4	Di 4 / 16
Discrete input with excitation supply	Di 16 / 32 / 64	---	---	---	---
AC contact input	Di 16	---	---	---	---
Discrete input / output	Di 8, Do 8	---	---	---	---
Relay contact output	Do 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
BCD Code I/O Module					
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

CC-Link DeviceNet Modbus Modbus/TCP
LONWORKS MECHATROLINK HLS Hi-speed Link System FLEX NETWORK®

FUNCTION		R7M	R7E	R7D	R7C	R7L
Basic Module		Modbus	Modbus/TCP	DeviceNet	CC-Link	LONWORKS
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 current output	2 ch	Y	Y	Y	Y	Y
Totalized pulse input	8 ch	Y	---	Y	Y	---
Remote control relay control output	4/8 ch	Y	---	---	Y	Y
Extension Module						
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

CC-Link DeviceNet Modbus

Compact Remote I/O for FA Control Equipment

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

MECHATROLINK

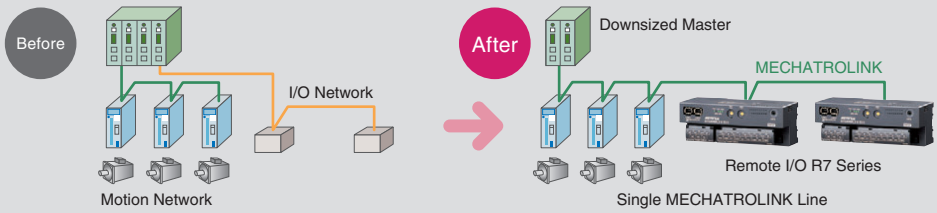
- Motion and I/O networks can be on single MECHATROLINK line to save wires and cost
- High speed AD conversion and isolation of sensor signals
- Compact, terminal block style, all-in-one modules

R7ML CE

R7K4FML CE

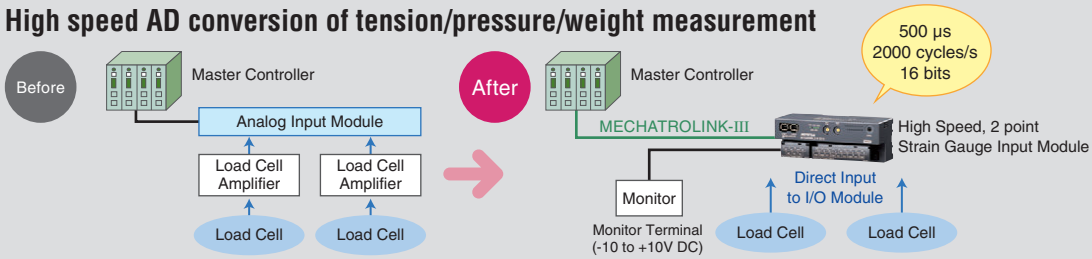
R7G4HML3 CE

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



R7 Series Compact Remote I/O for HLS

HLS Hi-speed Link System

- 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 CE

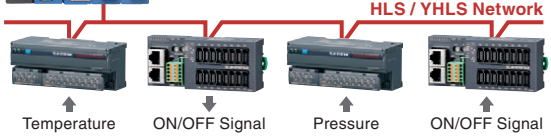
R7F4DH CE

R7K4DH CE

APPLICATION EXAMPLE WITH YOKOGAWA FA-M3 YHLS MASTER MODULE

YOKOGAWA ◆ FA-M3V VITESSE

YHLS Master Module
Model: F3LH01-1N, F3LH02-1N



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

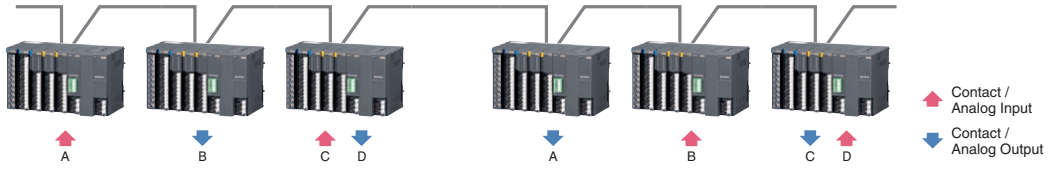
YHLS (Yokogawa Hi-speed Link System) adopts a HLS-compliant open protocol, enhanced to allow easy monitoring of transmission line quality during development and operation of IT machine systems.

YHLS and HLS network devices are compatible.

MSYSTEM

MULTIPLEX TRANSMISSION SYSTEM

PEER-TO-PEER COMMUNICATION WITHOUT NEEDING A MASTER



D3 Series

- Max. 10 km 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

DLA1

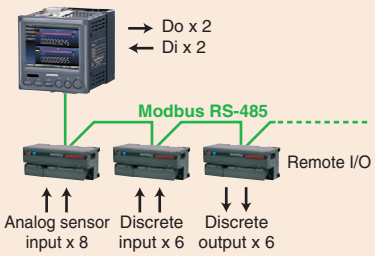
- Simple setting by matching the station address of paired modules
- No total system failure thanks to the masterless configuration
- All-in-one unit packaging I/O, power and network interface modules

RECORDERS

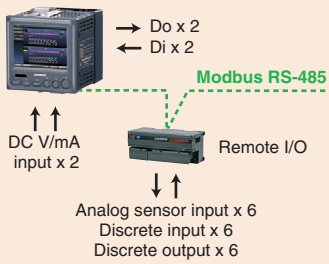
71VR1 Compact Paperless Recorder

- 3.5 inch TFT color LCD display
- 1/4 DIN size (96 x 96 mm) panel mount compact recorder
- Max. 8-point each of analog and discrete inputs are stored, displayed and alerted.
- Max. 8-point discrete outputs can be assigned to alarm trips.
- Direct field inputs at the built-in terminals and optional remote inputs via Modbus-RTU
- Data can be transferred to PC via the front IR port
- IP 65 front panel

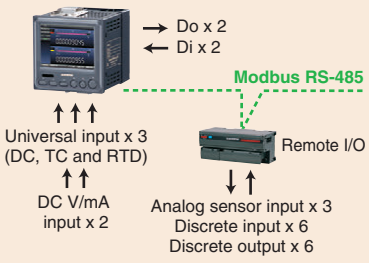
Remote I/O Type 71VR1-E001



DC Input Type 71VR1-E101



Universal Input Type 71VR1-E501



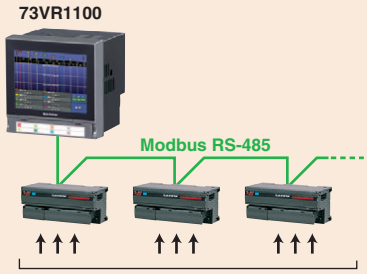
73VR Series Paperless Recorder

- 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.
- IP 65 front panel

Remote I/O Acquisition: 73VR1100

CE

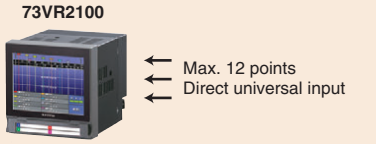
- Recording up to 128-point data transmitted from independent I/O located remotely in the field, or inside an instrumentation or control cabinet.
- Instead of using expensive sensor cables, reduce wiring runs by using field networks.
- I/O separated 73VR1100 provides an installation flexibility, fitting in the tight space of a control panel or machinery chassis.



Built-in Universal Input: 73VR2100

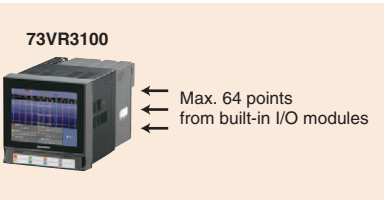
CE

- DC current/voltage, thermocouple and RTD inputs from 2 to 12 points
- Independent input type and range selectable for each channel
- 100 msec. storing rate up to 6 points

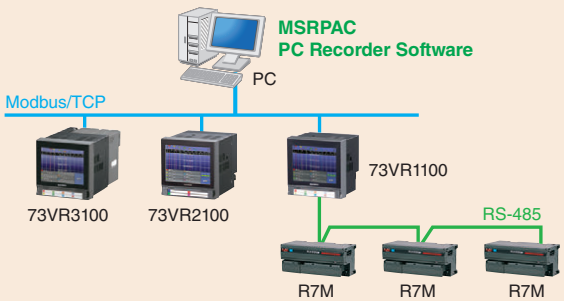


Selectable I/O Modules: 73VR3100

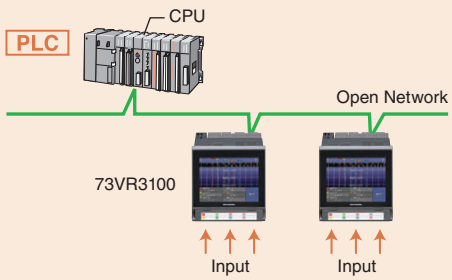
- Up to four R3 Series I/O modules (max. 64 points) can be selected and mounted at the rear of the recorder.
- Compatible with various open networks to communicate with major PLC: the 73VR3100 used as remote I/O with local display and recorder, integrated in a PLC control system
- 20 msec. storing rate with the combination of 8 analog and 8 discrete inputs



Expanded System via Ethernet

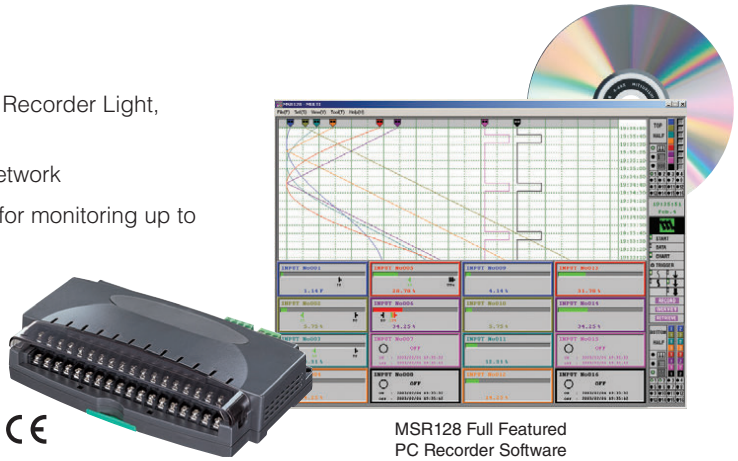


PLC Remote I/O with Local Display / Recording



Remote Data Acquisition Hardware and Software
PC Recorder

- Data collected by PC Recorder Software: PC Recorder Light, MSR128 and MSRpro
- Modbus-RTU or Modbus TCP/IP (Ethernet) network
- Full featured PC Recorder Software MSR128 for monitoring up to 128 channels simultaneously
- High speed sampling 50 ms / 8 ch with the basic software PC Recorder Light
- Complete lines of M-System's remote I/O products are available to accept a wide variety of field signal

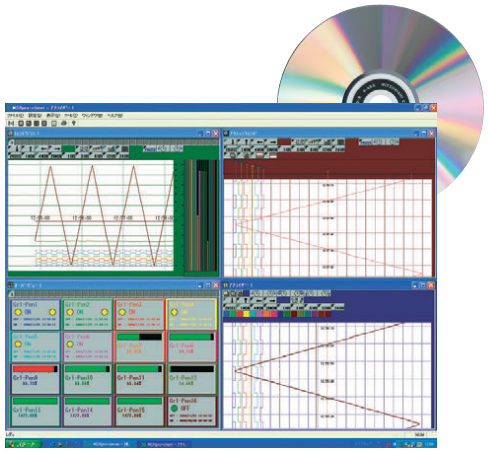


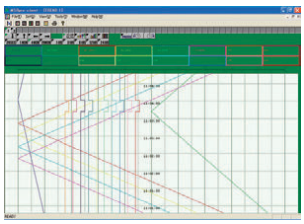
MSR128 Full Featured
PC Recorder Software

MSRpro Client/Server System
High Performance PC Recorder

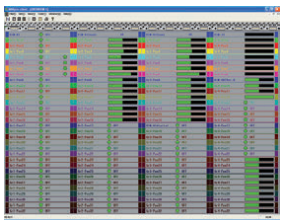
MSRpro

- 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

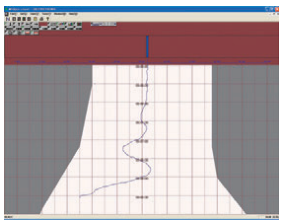




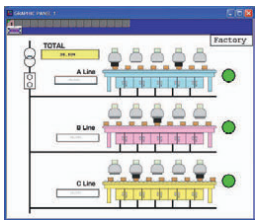
Trend View



Overview

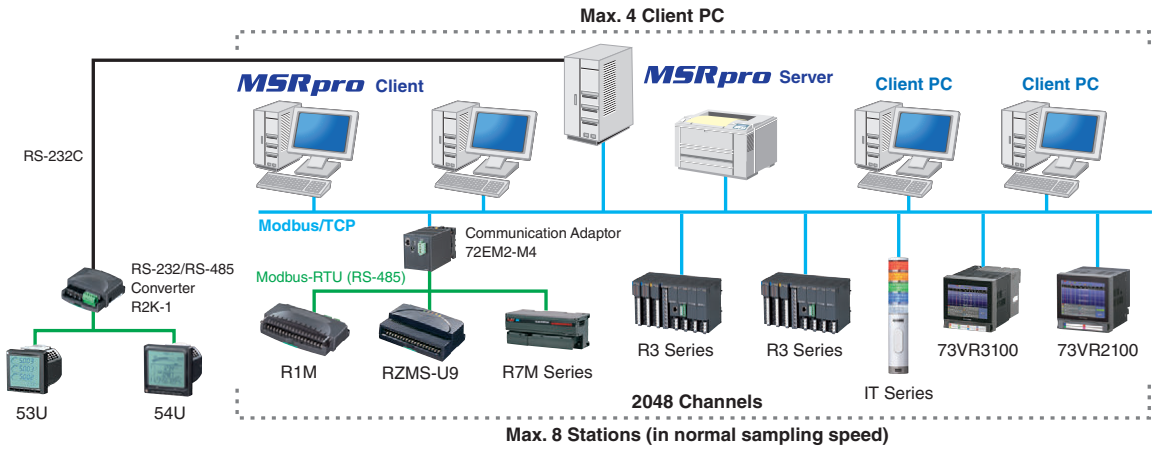


Active Trend



Graphic

SYSTEM CONFIGURATION EXAMPLES



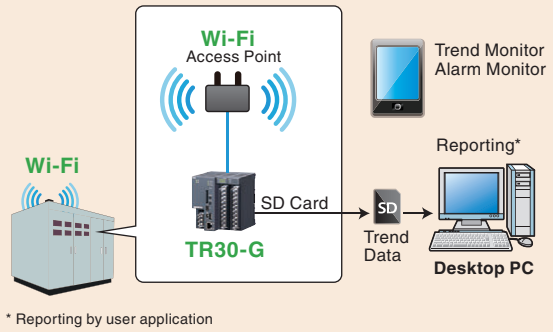
TR30-G Tablet Recorder
Web-enabled DAQ System NEW

- 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
- SNTP 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.

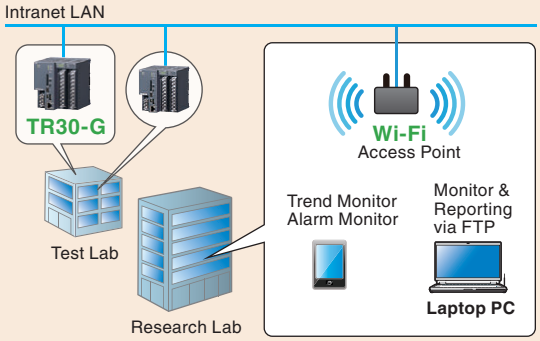
APPLICATION EXAMPLES

Plant Field Maintenance



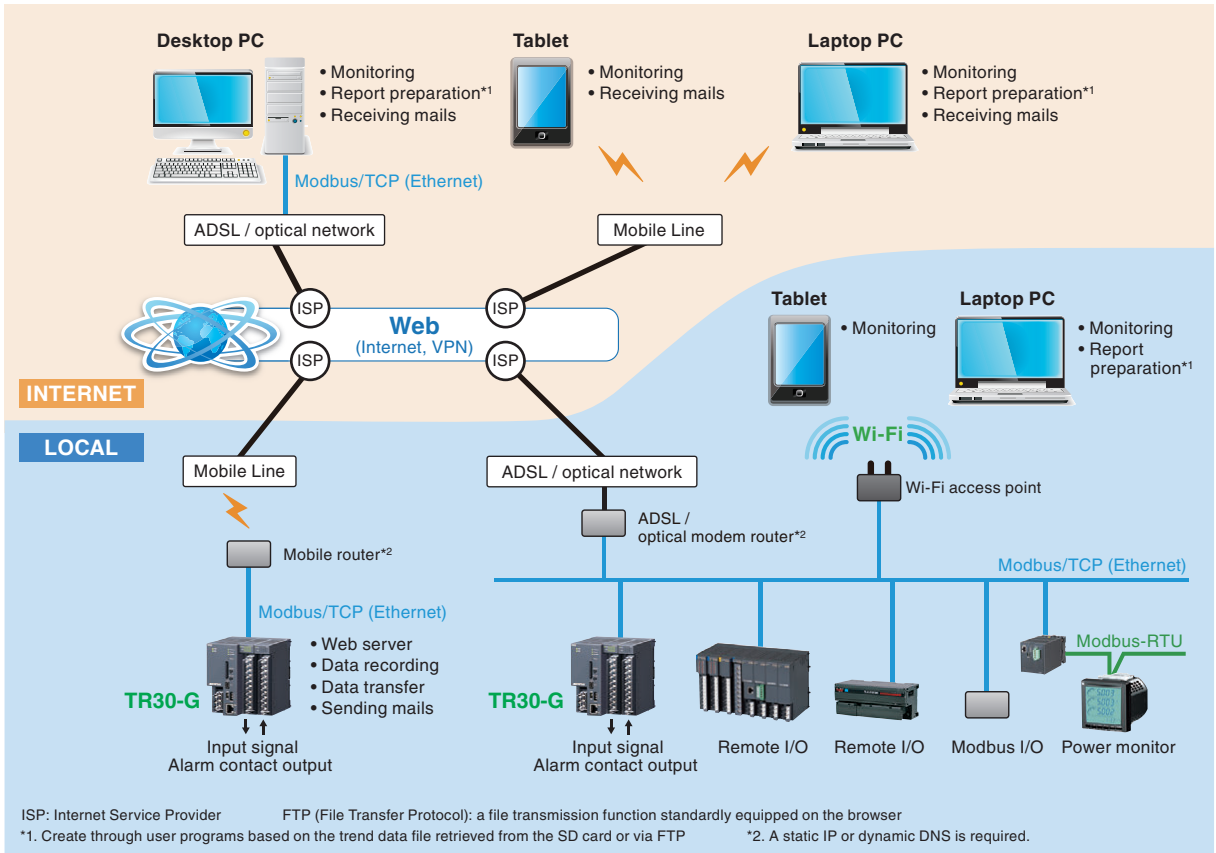
* Reporting by user application

Test and Research



Browser Views

System Configuration



ISP: Internet Service Provider FTP (File Transfer Protocol): a file transmission function standardly equipped on the browser

*1. Create through user programs based on the trend data file retrieved from the SD card or via FTP *2. A static IP or dynamic DNS is required.

WEB DATA LOGGERS

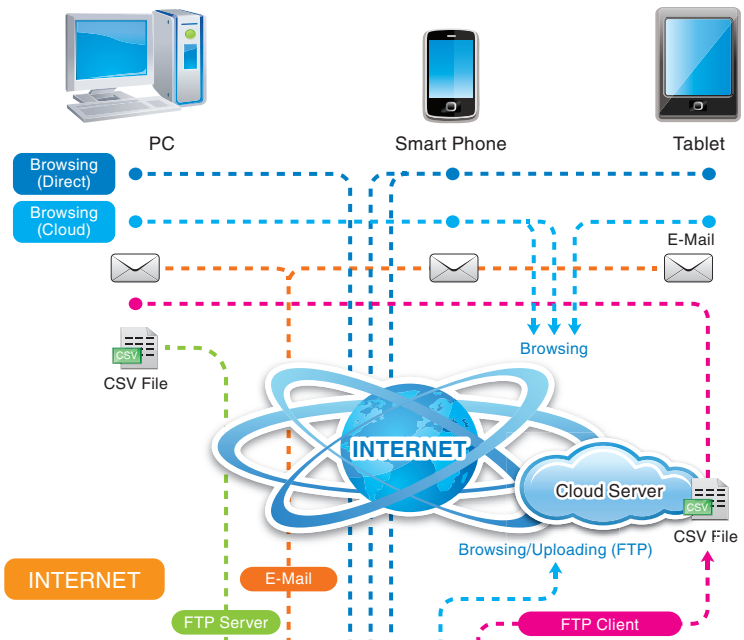
DL8 Series

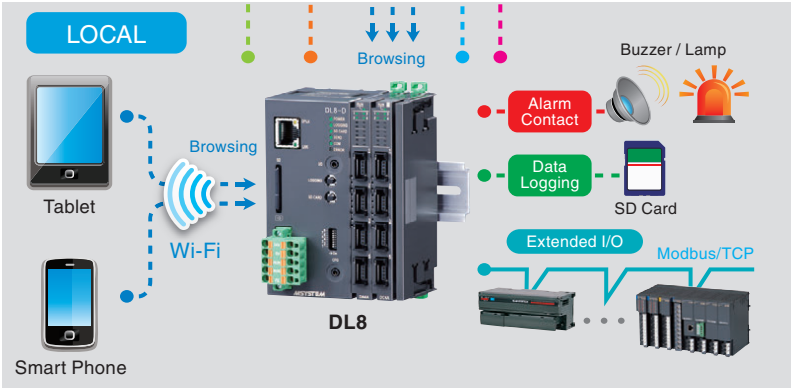
Web Enabled Remote Terminal Unit

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

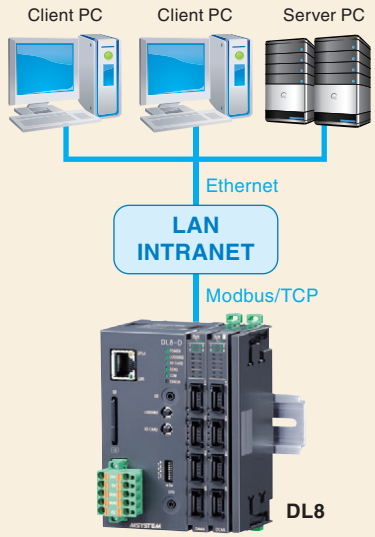
- Simple remote monitoring via internet without needing to build up a complex PC based system
- Pre-installed user-friendly browser view for remote data access through smart phones or tablets
- Reporting by e-mails
- Local data stored in an SD card memory
- Various network protocols are usable: TCP/IP, 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

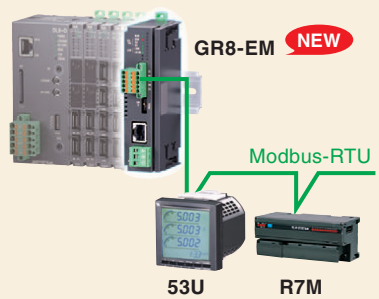




LAN / INTRANET SYSTEM CONFIGURATION



GR8-EM ETHERNET ADAPTOR for Modbus-RTU extension



Web Browsed Views Designed for Mobiles

Trend View

Data View

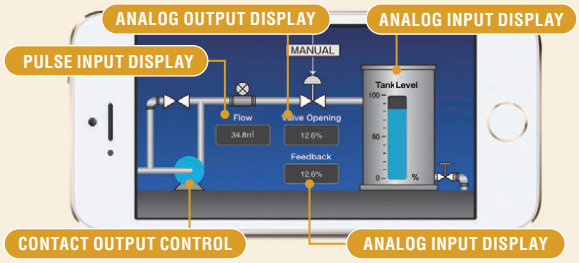
Event Log

Customized Web Browser Views DL8-D OPTION NEW

DATA VIEW BY HTML
Example using the DL8 original tags

• Composite Picture

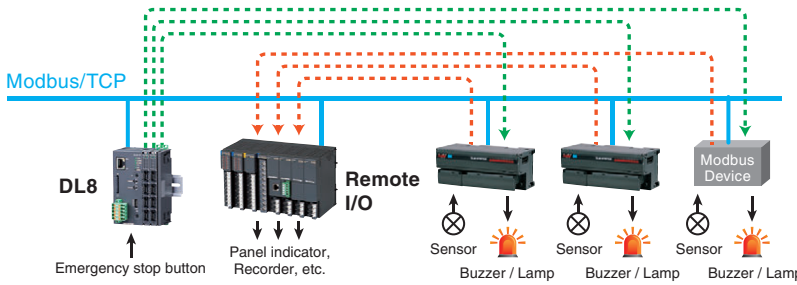
GRAPHIC VIEW
Example using JavaScript



• Composite Picture

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

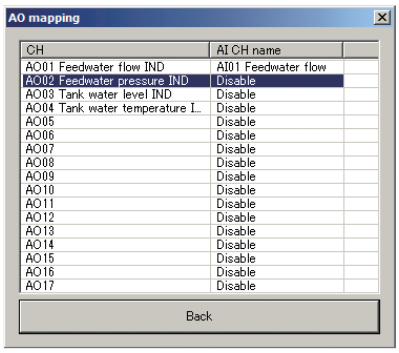
- Peer-to-peer connection between Modbus/TCP slaves
- Di/Do and Ai/Ao signal marshaling is easily set up on the DL8
- Remote multiplex transmission on IP network



• 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.



TYPICAL APPLICATIONS

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

PID CONTROL COMPONENTS

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
- IP 55 front panel

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

Powerful Engineering Tools

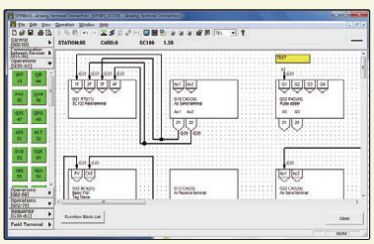
PC Configuration Software SCCFG

Used to configure display setting.

SCCFG

Loop Configuration Builder Software SFEW3E

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

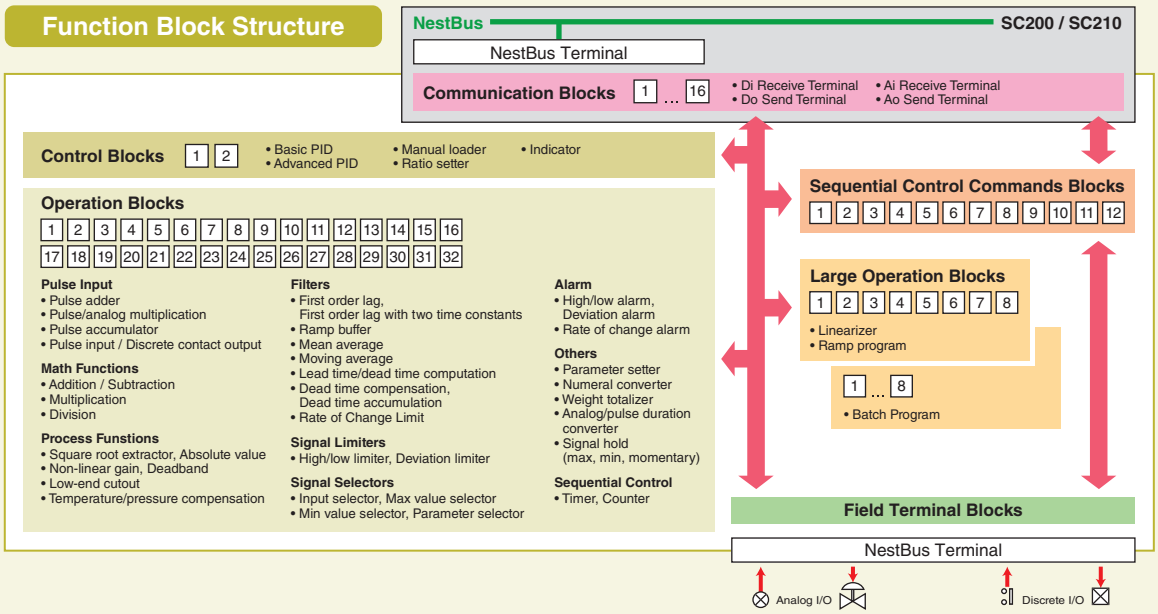


SFEW3E

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.

Function Block Structure

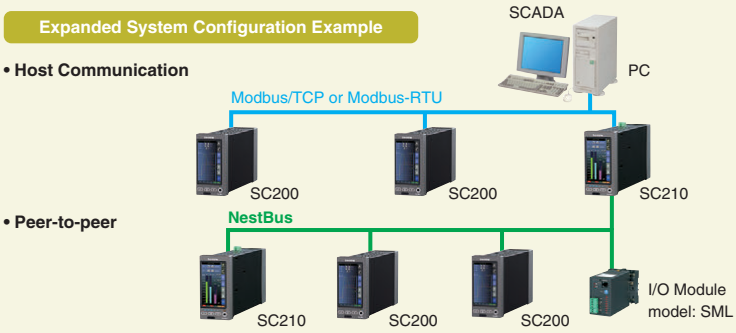


EXCELLENT EXPANDABILITY – Peer-to-peer and Host Communication

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.

Expanded System Configuration Example



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

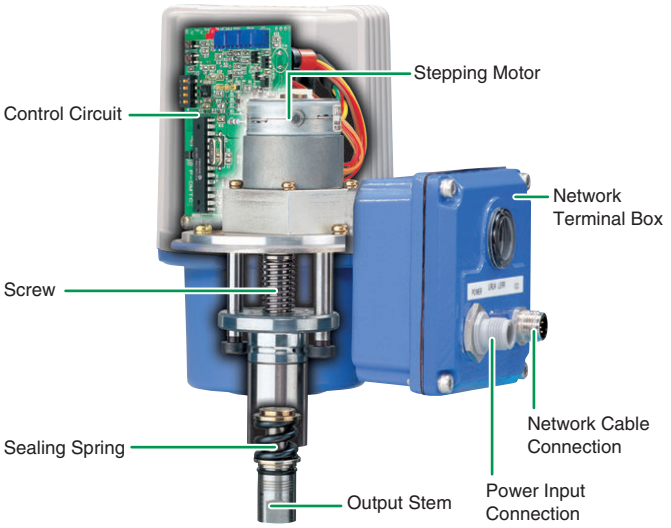
TC10EM
1/4 DIN size
Two PID loops

ELECTRIC ACTUATORS

MSP / MRP Series

Open Network Capable Linear / Rotary Motion Actuator

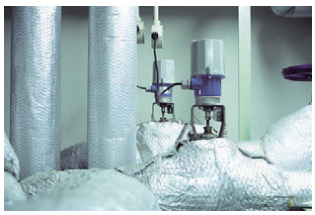
- High resolution positioning for superior control
- Built-in feedback positioner and electric limiter
- Brushless stepping motor assures long-life operation
- 1/1000 resolution
- Optional network interface with CC-Link, DeviceNet



Transparent image of MSP5D

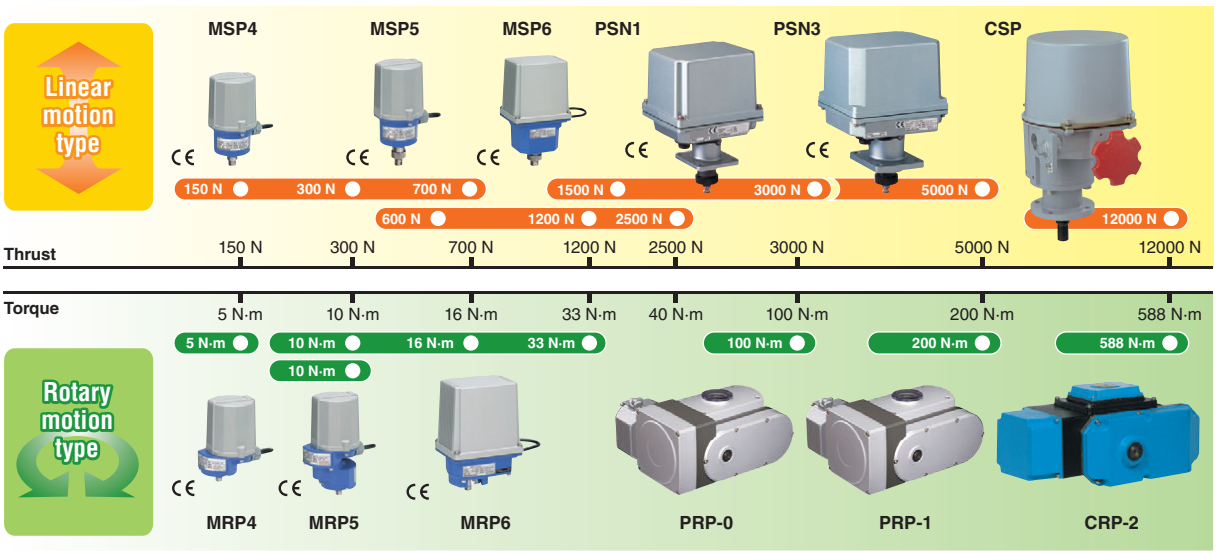
APPLICATIONS

- Pilot plants
- Fuel valve control
- HVAC damper positioning
- Tank valve control in blending machines
- Pharmaceutical, wastewater flow control
- Paper profiling control



Air conditioning system

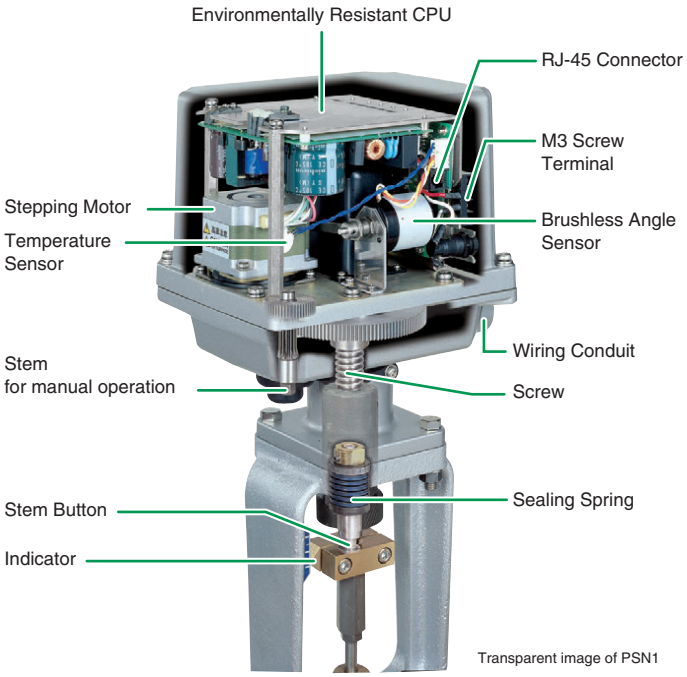
Linear and Rotary Actuators for Valve and Machinery Control



PSN / PRP Series

Linear / Rotary Motion Actuator

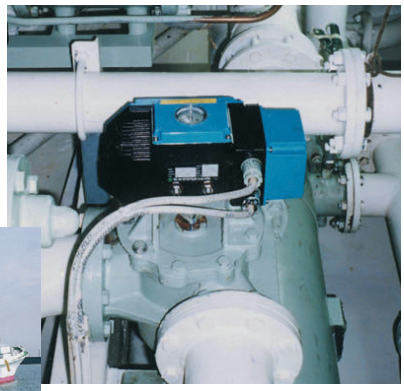
- Brushless angle sensor eliminates problems with mechanical potentiometer feedback sensing
- Opening/closing speed, split range and failsafe position programmable by hand-held programmer
- Internal temperature sensor to control heater in cold climate and to prevent motor from overheating
- Forced-open/-closed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



Transparent image of PSN1

APPLICATIONS

- Chemical injection/mixing
- Pharmaceutical flow control
- Food processing machines
- Fuel valve control
- HVAC damper positioning


Engine coolant line control


PSN installed in a water treatment plant

EA Series
Rotary Motion Actuator

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

For OEM

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

One-Port SPD for Power Supply

MAKF / MAT2

- 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 applicable to three-phase power line in single module

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

Battery Powered Health Testing

MDPA-24

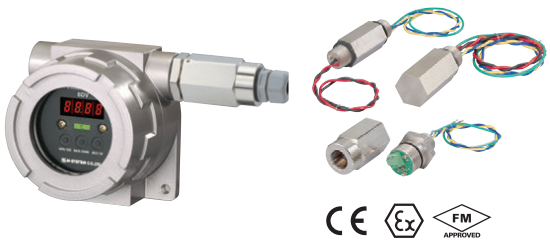
- Protects 4-20 mA & pulse signals
- Battery powered life monitoring function includes a 'Test' button with indicators alerting panel inspectors of the surge protector's health.

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

Field Transmitter Cable Conduit Mount

MD6N-24 / MD6T-24 / MD6P-24

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



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

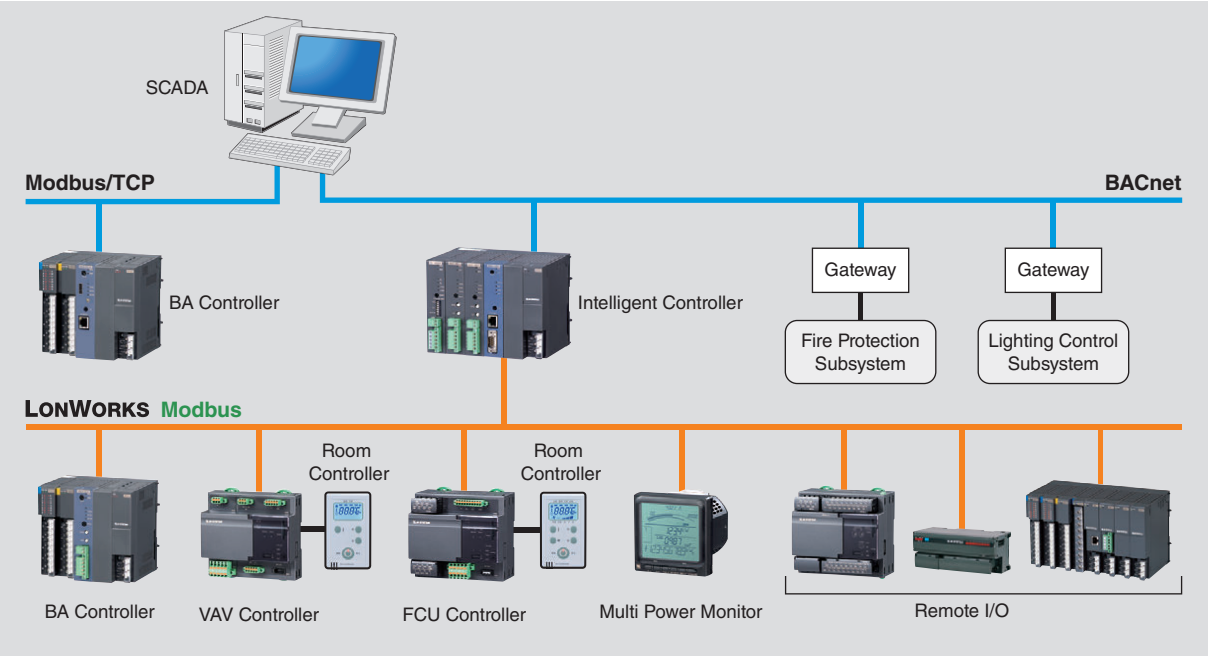
SENTRONIC AG Produkte, Support und Service
Rugghölzli 2
CH - 5453 Busslingen
Tel. +41 (0)56 222 38 18
Fax +41 (0)56 222 10 12
mailbox@sentronic.com
www.sentronic.com

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



Intelligent Controller
BA3-CB3

BA Controller
BA3-CL3 LONWORKS
BA3-CE10 Modbus/TCP

VAV Controller
BA9-VAV LONWORKS
BA9M-VAV Modbus

FCU Controller
BA9-FCU LONWORKS
BA9M-FCU Modbus

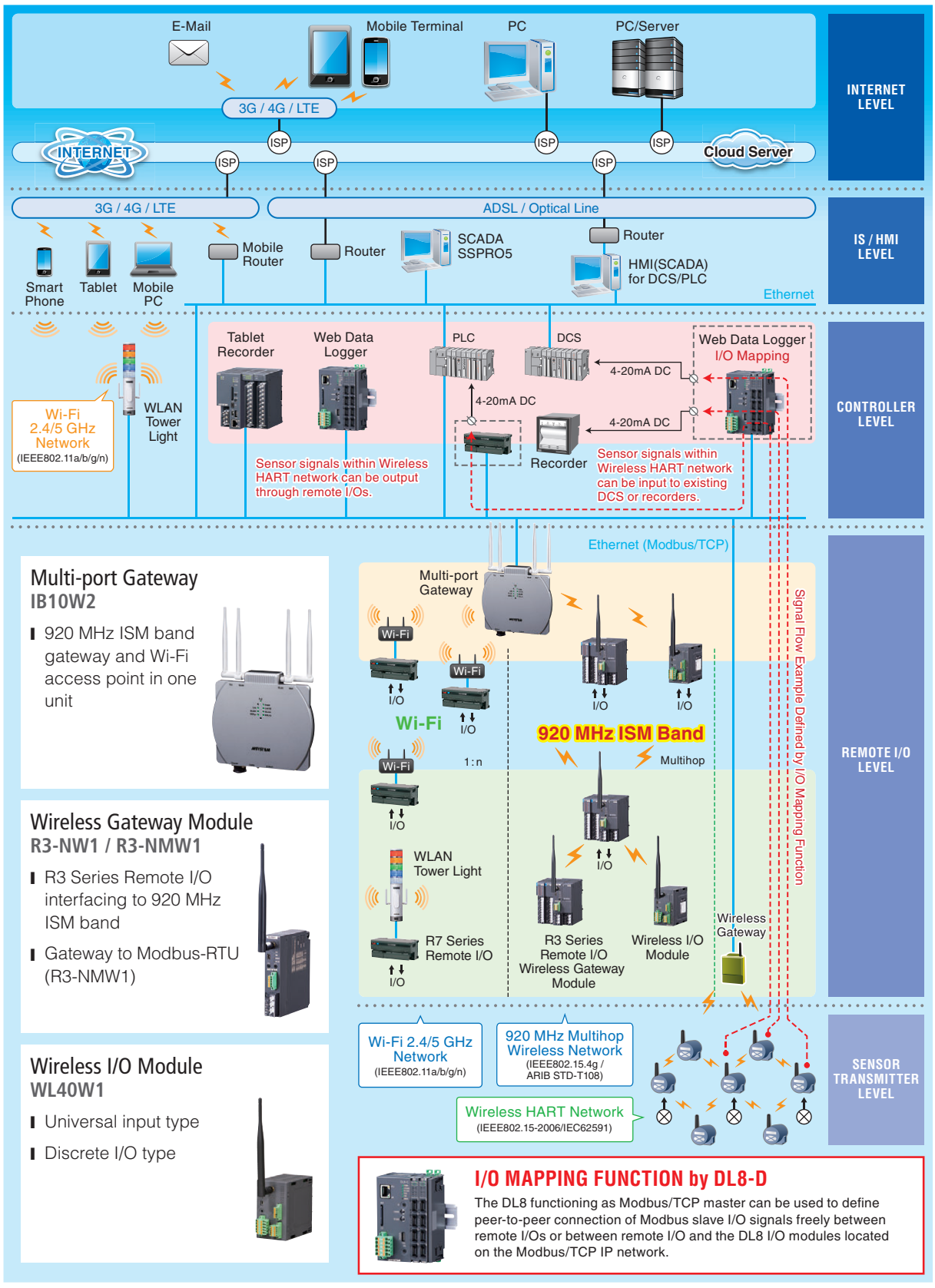



LED Tube for Replacing Fluorescent Lamps without Modification

- 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 NEW

- 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



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

- Universal input type
- Discrete I/O type

I/O MAPPING FUNCTION by DL8-D

The DL8 functioning as Modbus/TCP master can be used to define peer-to-peer connection of Modbus slave I/O signals freely between remote I/Os or between remote I/O and the DL8 I/O modules located on the Modbus/TCP IP network.

SIGNAL CONDITIONERS SELECTION GUIDE 1

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	
Four-wire Signal Conditioners	Universal input	DC output	M2XU			
	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	W2TS	M5TS	W5TS
		Configurable	M2XT2, M2EXT	W2XT		
	RTD	Fixed range	M2RS	W2RS	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, M2DNY	W2DYS, W2DNY	M5DY	W5DY
		Configurable				
		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			
	Pulse isolation	Fixed range	M2PP	W2PP		
		Configurable				
	Pneumatic input	19.6-98.1 kPa	M2PV	W2PV		
	Function modules		» See Page 10			
Two-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				
	Thermocouple	Fixed range			B5TS	
		Configurable				
		Configurable, IS				
	RTD	Fixed range			B5RS	
		Fixed range, IS				
		Configurabe				
		Configurable, IS				
	Potentiometer	Fixed range			B5MS	
		Configurable				
	Pulse to analog	Fixed range				
		Configurable				
	Universal input	Configurable, IS				
		4-20 mA output, HART, IS				
		PROFIBUS				
	Limit alarms		» See Page 12-13			

						
M3 / B3 / A3	**M3S**	**M6**	**B6 / 27**	**27**	**26**	**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	M6xXV				
	M3SWVS	M6xWVS				
						Thermocouple
M3LT	M3SXT	M6xXT				
	M3SRS					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		
					26R1, 26RS	RTD
					26REX	
B3FR				27R, 27RS		
				27R, 27RS		
						Potentiometer
				27PM		
						Pulse to analog
B3FP						
				27U		Universal input
B3HU, B3HU2			B6U, B6U-B, 27HU-B	27HU		
B3PU						
» See Page 12-13						Limit alarms

SIGNAL CONDITIONERS SELECTION GUIDE 2

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.

Plug-in Type Signal Conditioners

Pico-M Series

Dual Output Super-mini Signal Conditioners

- High-density mounting thanks to low heat generating design
- 4-way isolation
- 4-20 mA second output available

M-UNIT Series

Plug-in Signal Conditioners

- Broadest range of I/O signals and functions
- LCD display optional
- 2000 Vac isolation

W-UNIT Series

Plug-in Signal Splitters

- Two-independent output ranges can be specified
- 2000 Vac isolation

MX-UNIT Series

Front-Configurable Signal Conditioners

- Simple configuration via the front Up/Down buttons with a help of two displays, by calling parameters' ID numbers (ITEM) and choosing values (DATA)
- Field selectable sensor type and range

K-UNIT Series

Plug-in Signal Conditioners

- Low cost
- Wide selection of power transducers

F-UNIT Series

Space-saving Signal Conditioners

- AC or DC powered
- Zero and span adjustments behind the access cover

H-UNIT Series

Space-saving Signal Conditioners

- DC powered
- Pneumatic transducers available

Two-wire Signal Conditioners

6-UNIT Series

Field-mounted Signal Conditioners

- Field-selectable input types via internal DIP switches
- Rugged metal housing provides increased noise and RFI protection
- Outdoor enclosure 6BX-E available

T-UNIT Series

Super-mini Signal Conditioners

- High-density mounting on wall / DIN rail
- Super-small pneumatic-to-current transducer available

B-UNIT Series

Space-saving Signal Conditioners

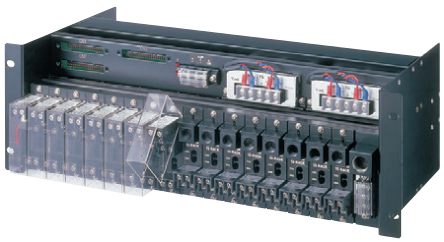
- Wide supply voltage range 12-60 Vdc

Rack-mounted Signal Conditioners

10-RACK Series

High-density Signal Conditioners

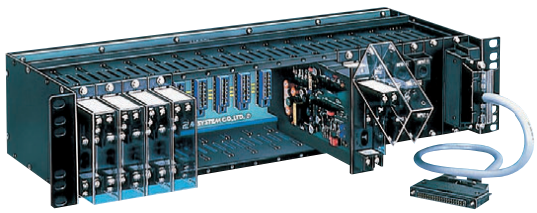
- Up to 16 units in 19-inch rack
- Direct interface to various DCS via connector



15-RACK Series

Dual Channel Isolators

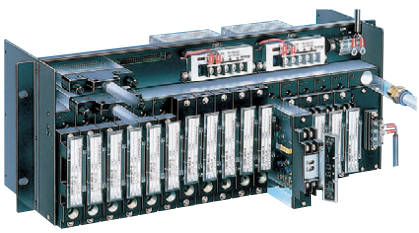
- Space-saving isolators for economical multi-channel input processing



18-RACK Series

DCS Signal Conditioners

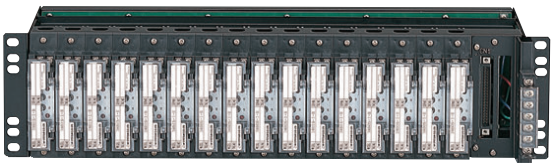
- Up to 16 units in 19-inch rack
- Direct interface to various DCS via connector



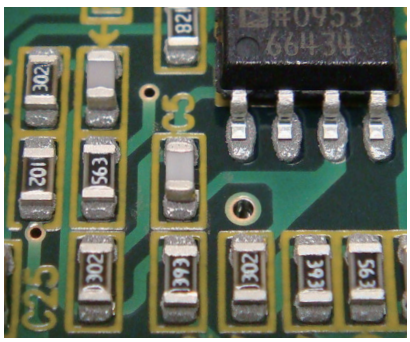
38-RACK Series

Interposing Relays

- Complete packaging for interposing relays
- Simplifying designing, installation, wiring and testing



M-SYSTEM COMPANY



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.

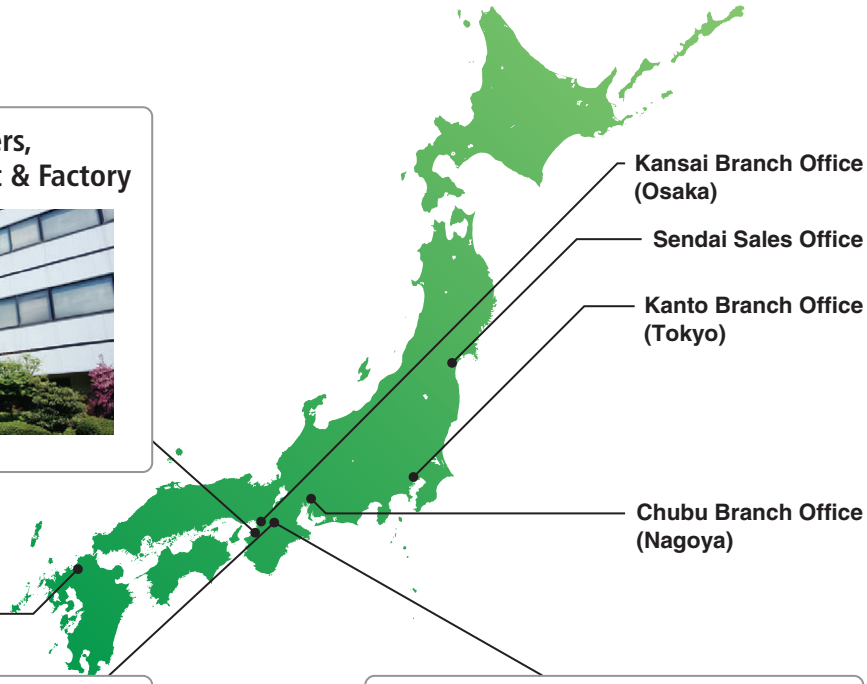
We offer continued reassurance. Always Customers First.

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



Kyoto Techno Center

Type testing and evaluation facilities

- VCCI (Japan) and FCC (US) registered anechoic chamber
- 6 m^2 shielded room capable of conducting multiple tests at once

Kyoto Research Center & Factory

New factory expanded January 2016

- Second manufacturing location inspired by BCP revised after East Japan Earthquake in 2011
- Showcase plant utilizing M-System's BA controllers

GLOBAL SALES NETWORK