6-0013
2024-01
EC-Z665
Rev. 1

Remote I/O Series

24 years of successful sales, more than 1200 thousand units sold!


Multi-point Remote I/O **R9** Series


Multi-channel, Scalable Remote I/O **R3** Series


Compact, Scalable Remote I/O **R30** Series


Expandable, Compact Remote I/O **R7** Series


Slice Type, Scalable Remote I/O **R8** Series


Slice Type, Scalable Remote I/O **R80** Series


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


Compact, Scalable Remote I/O **R5** Series


Ultra-slim, Scalable Remote I/O **R6** Series


Plug-in Remote I/O **R10** Series

What is Remote I/O?

Remote I/O, otherwise called distributed I/O, refers to electronic devices that use transmission technology to send and receive input and output signals to/from master electronics like DCS, PLC and PCs often in the fields of process or factory automation. Remote I/O communication uses open networks with open communication protocols. We support our customers with a line up of Remote I/O solutions that use globally accepted major open networks like Modbus, CC-Link, MECHATROLINK, PROFIBUS, etc.

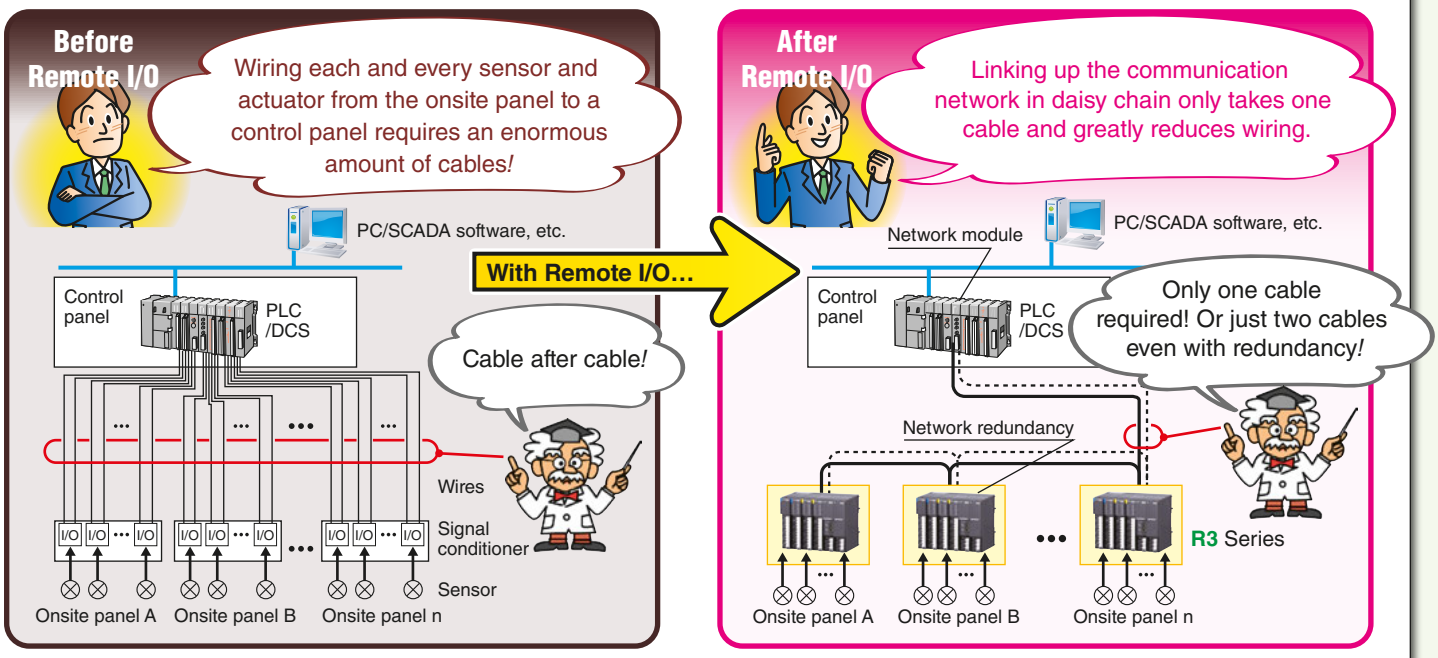
MG CO., LTD.
(formerly M-System Co., Ltd.)
www.mgco.jp

Make Greener automation

Applications of Remote I/O

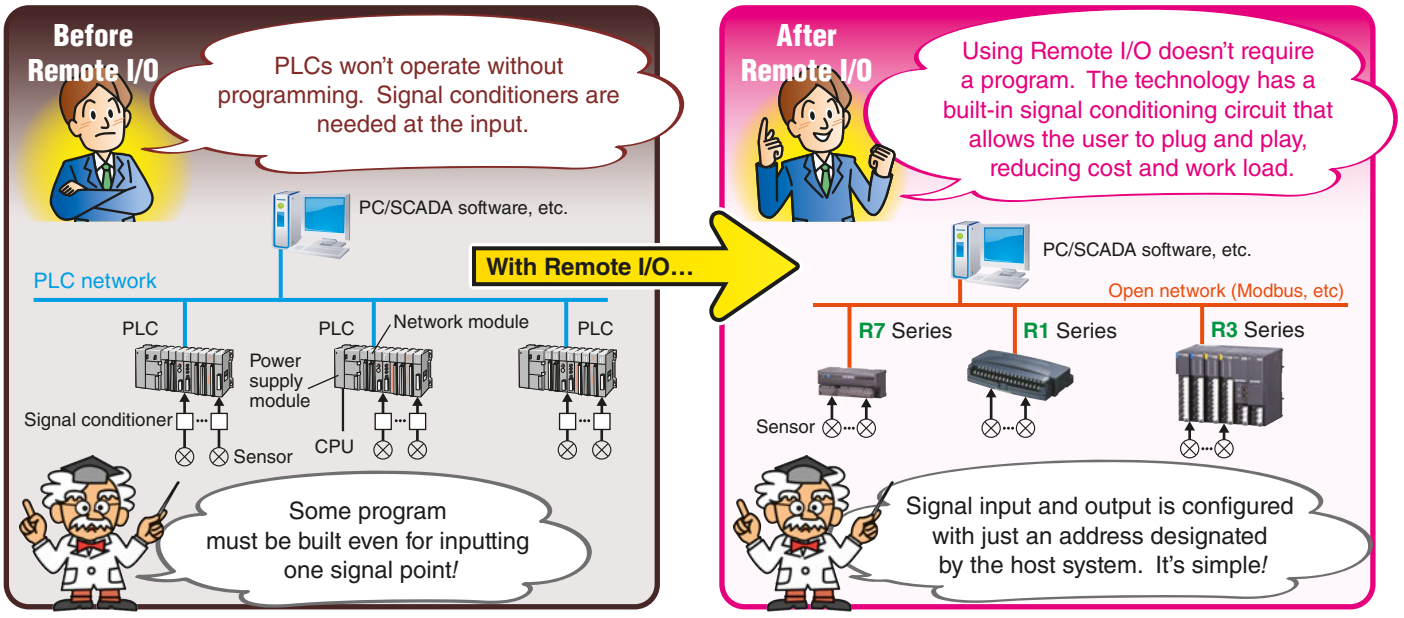
1. Replacing I/O modules of PLC and DCS

Reduce system wiring

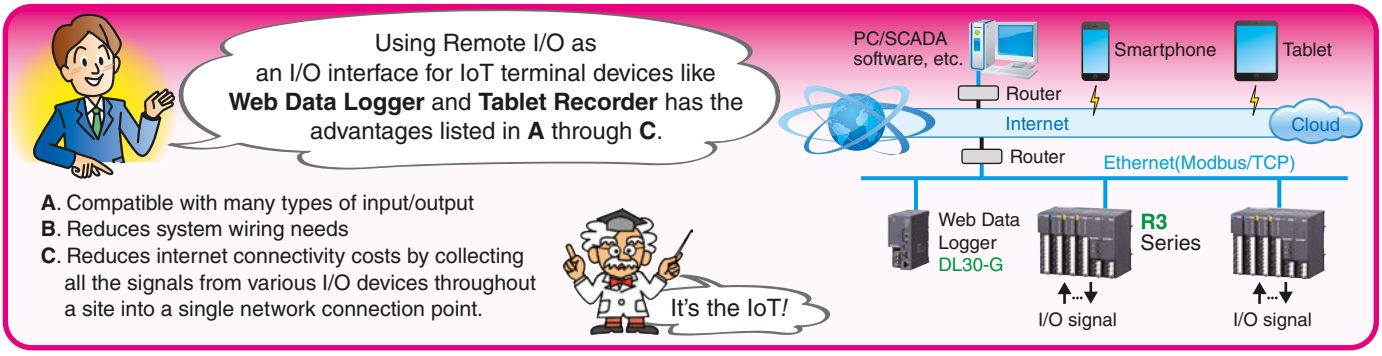


2. I/O for PC based SCADA systems

No programming required. Reduced costs.



3. As I/O solution for IoT terminals

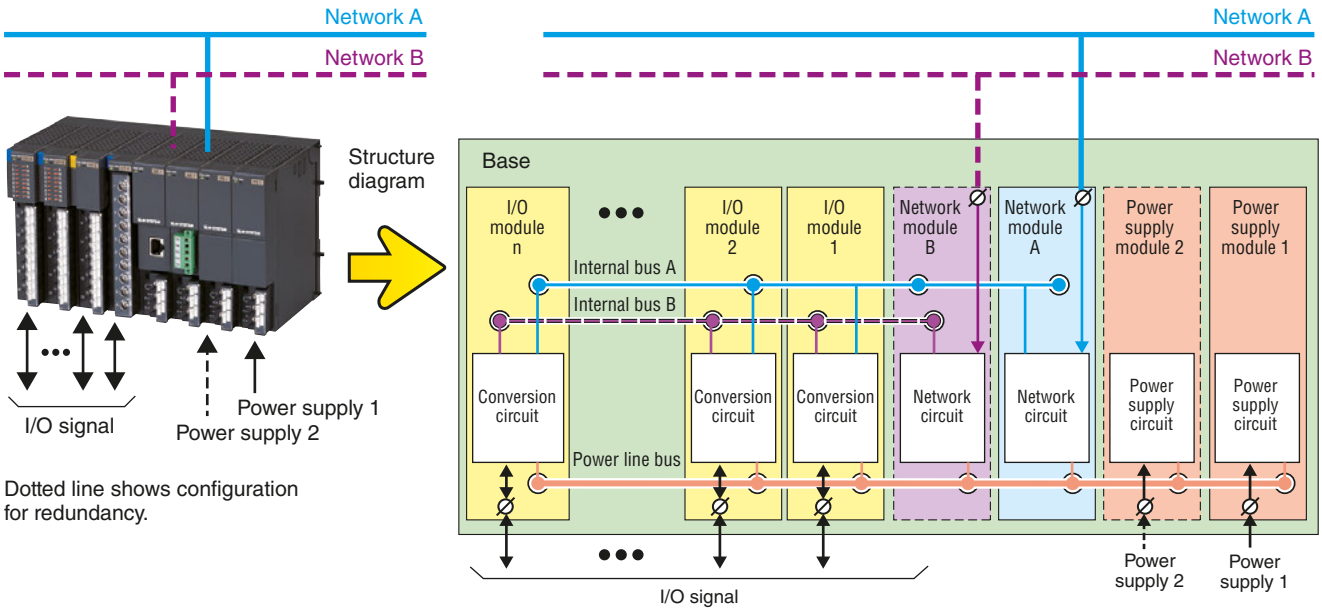


Remote I/O Features Explained Using R3 Series

Structure of Remote I/O R3 Series

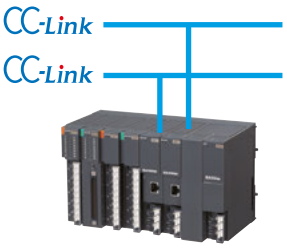
Redundant or two independent communication and power supply systems

As shown in the following image, the **R3** Series is made from the combination of a power supply module, network module and input/output modules. The modules are inserted onto the base in basically any combination, with redundant or two independent power/network system a standard feature of the series.
The input/output modules and network module can be replaced with the power turned ON. This replacement method is called “hot swap.”



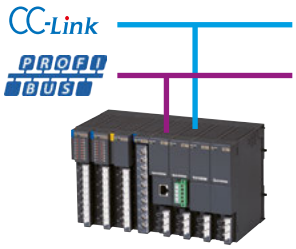
Redundant network or two independent network protocols

Redundant network (example)



Redundancy with two same network modules

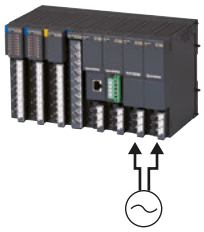
Two network protocols (example)



Two independent network modules communicating with each master at once

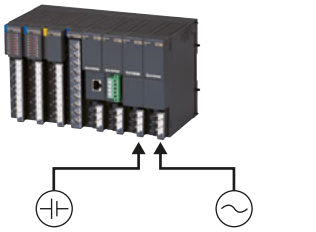
Redundant power supply or two independent power sources

Redundant power supply (example)



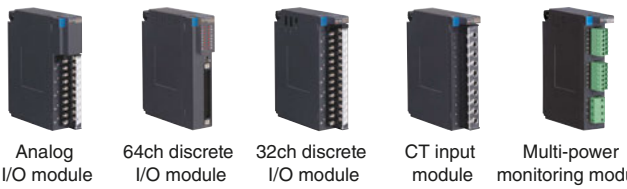
Redundancy with two power supply modules

Two power sources (example)



Two independent power sources

Many types of input/output modules are available



Hot-swappable I/O modules

A line up of over 50 signal types and 120 models is available, which can be switched out even while the power is still on (hot swap).

Analog input
- Universal
- DC voltage
- DC current
- Thermocouple
- RTD
- Thermistor
- Potentiometer
- 4-20 mA input with 2-wire transmitter excitation supply
- Strain gauge

Analog output
- DC voltage
- DC current

AC power input
- CT
- AC voltage
- AC current
- Zero-phase current transformer
- Multi-power monitoring
- AC power

Pulse input
- Speed/position
- High speed pulse
- High speed totalized pulse
- Low speed totalized pulse
- Totalized pulse

Pulse output
- Pulse output
- One-shot pulse output

Discrete input
- Discrete input
- AC contact input

Discrete output
- Discrete output
- Remote control relay

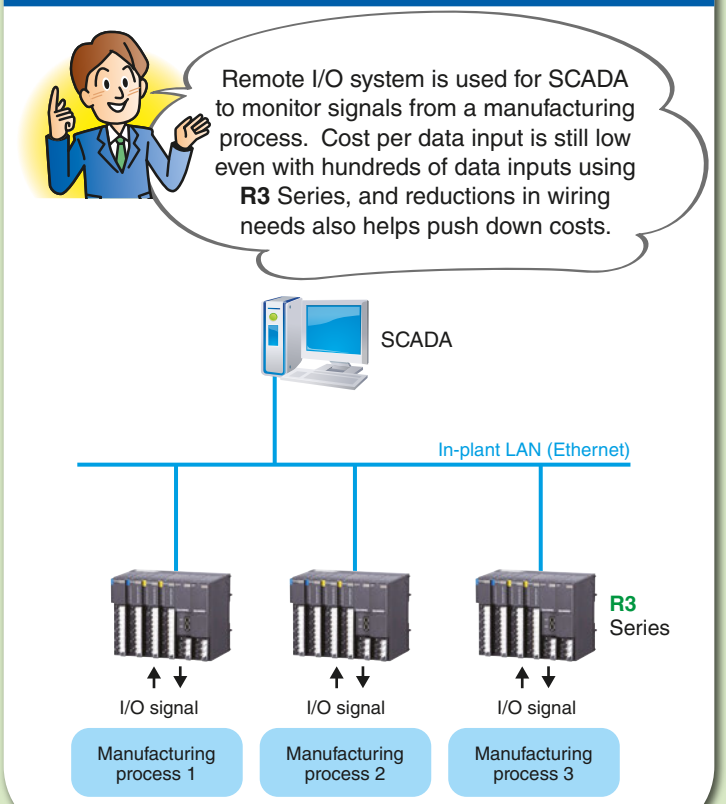
Discrete input/output

BCD input/output
- BCD input
- BCD output

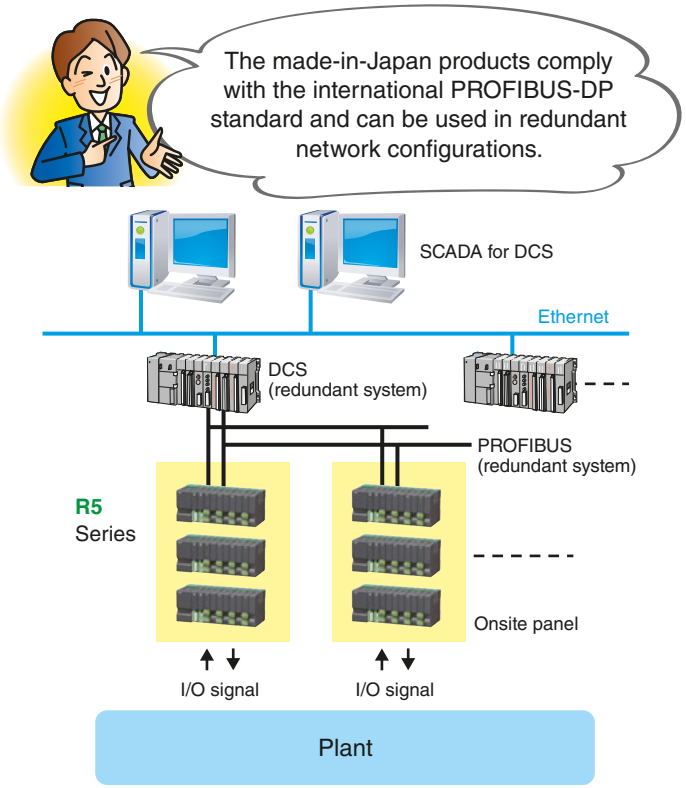
Air conditioning
- I/I positioner
- Heat meter

Examples of Remote I/O Applications

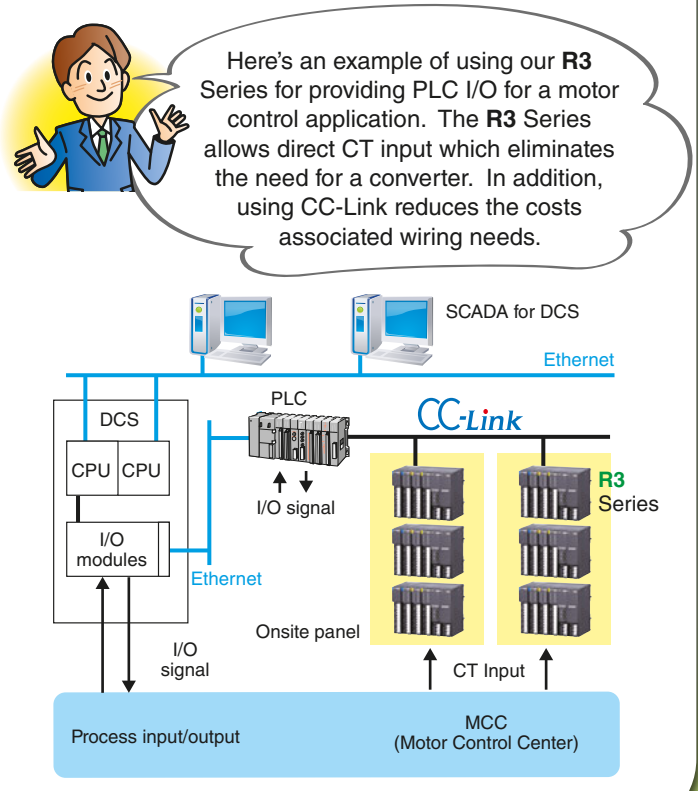
In-plant LAN (PC SCADA)



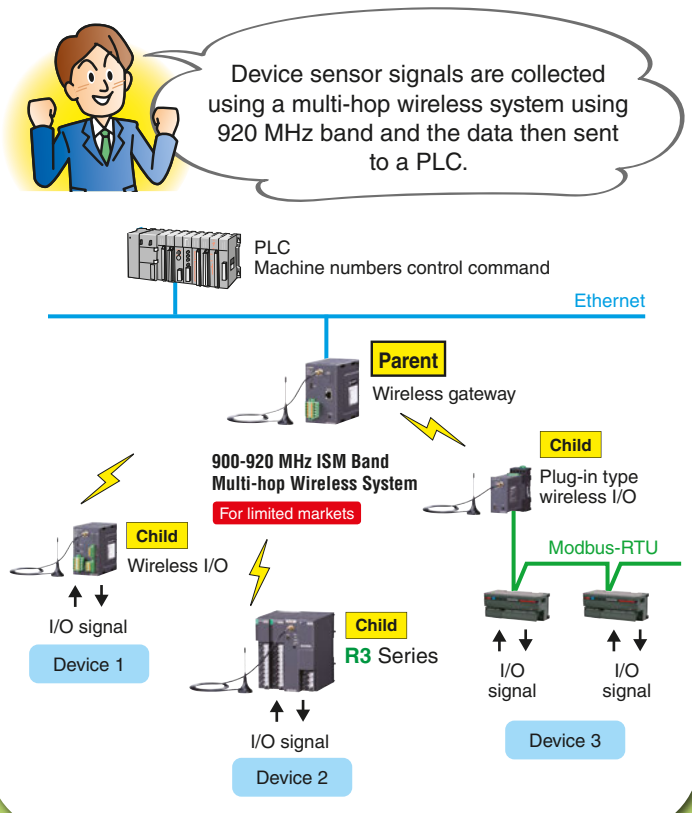
I/O for DCS (redundant communication network)



I/O for DCS/PLC

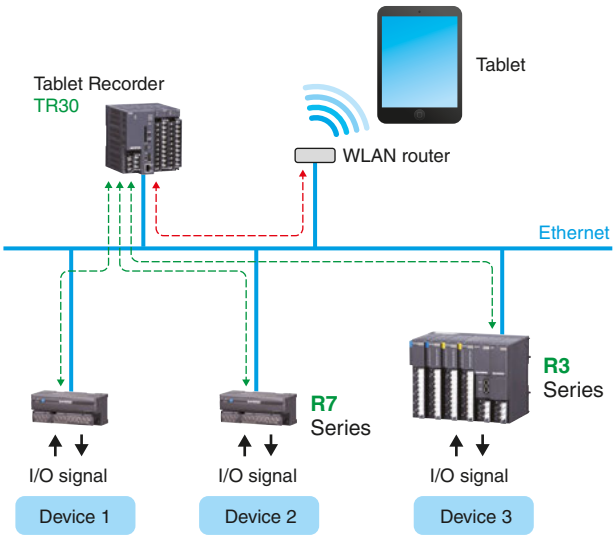


Wireless remote I/O



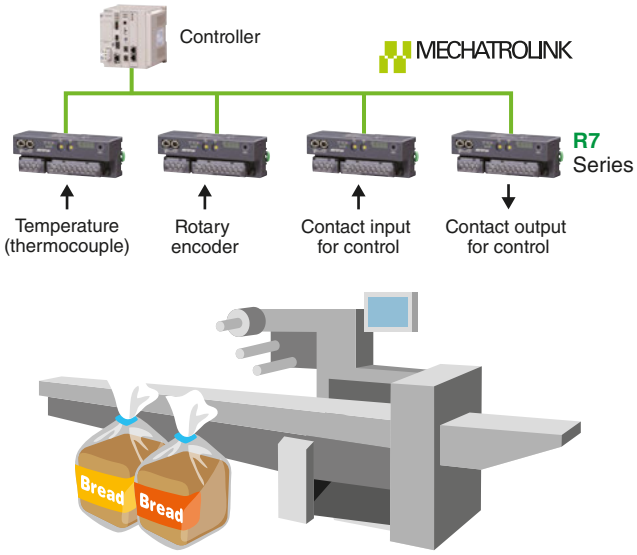
I/O for Tablet Recorder

Here's an example of using a remote I/O for several testing devices distributed in different locations to collect measurement data by **Tablet Recorder** over a LAN line.



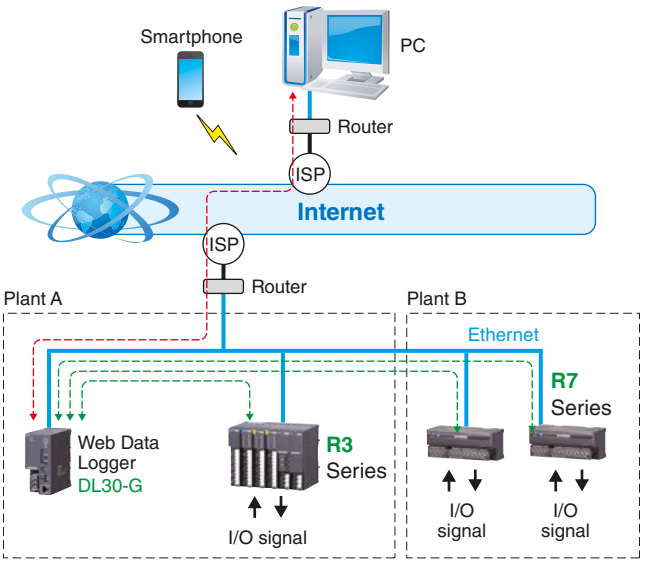
Super high speed I/O for motion control

Here's an example of using remote I/O for MECHATROLINK-III, network for motion control.



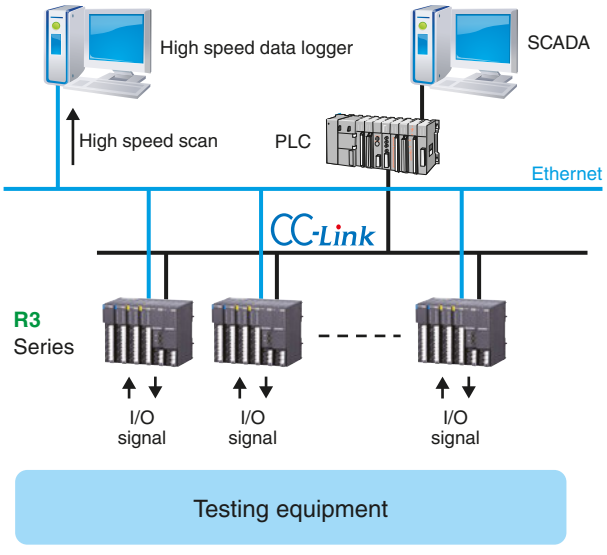
Internet connection

R3 Series or **R7** Series can be used as a remote I/O device for **Web Data Logger**. Data saved on **Web Data Logger** can be viewed remotely from a PC or mobile device over the internet.



I/O for high speed data logger (two independent communication networks)

Remote I/O data can be interfaced with two network systems, CC-Link and Modbus/TCP.



Open Networks in Terms of Communication

EtherCAT®

Origins	Bechoff Automation GmbH
Main sponsor	EtherCAT® Technology Group
Number of participants	5,920
Transmission speed	Full duplex, 100 Mbps
Number of nodes	65,535
Network configuration, total length	Up to 100 m STP cables category 5/5e Star / line / tree

Open network that leverages the super high speed of Ethernet and has functionality for high-precision synchronization between nodes, as well as simple wiring configurations.

Remote I/O R7 Series, R8 Series, R30 Series, R80 Series, JC Series

CC-Link IE Field

Origins	Mitsubishi Electric Corporation
Main sponsor	CC-Link Partner Association
Number of participants	3,823
Transmission speed	1 Gbps
Number of nodes	254 (total number of master and slave nodes)
Network configuration, total length	Max. distance between nodes: 100 m STP cable (category 5e) Line / star / ring configurations

A comprehensive Ethernet based network that seamlessly connects an information network to production sites.

Remote I/O R3 Series, R7 Series, R30 Series

CC-Link IE TSN

Origins	Mitsubishi Electric Co
Main sponsor	CC-Link Partner Asso
Number of participants	3,823
Transmission speed	1 Gbps / 100 Mbps
Number of nodes	64,770 (total number of
Network configuration, total length	Double shielded twist Line / star / line-star / Maximum distance be

Leading the world in combining gigabit Ethernet Networking (TSN). Multiple network protocols ensuring time-sharing, real-time communication

Remote I/O R30 Series, R80 Series

EtherNet/IP

Origins	Control equipment manufacturers		
Main sponsor	ODVA, Inc.		
Number of participants	Over 700		
Transmission speed	10/100 Mbps	Number of nodes	No limitations
Network config., total length	Distance between nodes: up to 100 mm, STP cables category 5/5e, Star / line / tree		

Network for industrial applications that has a control protocol on top of an Ethernet TCP/IP.
Other commonly available Ethernet devices can be mixed on the Ethernet network.

Remote I/O R3 Series, R7 Series

MECHATROLINK - III

Origins	Yaskawa Electric Corporation		
Main sponsor	MECHATROLINK Members Association		
Number of participants	3,381		
Transmission speed	100 Mbps	Number of nodes	Maximum 62 stations
Network config., total length	Cascade / star configurations, Max. transmission distance: 100 m between stations Minimum distance between stations: 20 cm		

Motion network that maintains synchronization between all slaves in a system. In addition to offering complete synchronization with the servo drives, can also be used for connecting actuators for inverters, stepping motors and sliders, and peripheral devices for motion control applications such as other I/O, temperature controllers and image processing devices.

Remote I/O R3 Series, R7 Series

PROFINET

Origins	Control equipment manufacturers		
Main sponsor	PROFIBUS & PROFINET International		
Number of participants	Over 1,400		
Transmission speed	100 Mbits/s with copper wires, 1 Gbits/s (Option)	Number of nodes	No limitations
Network config., total length	Copper wires: 100 m, Communication cables: copper wires, fiber optic cables, wireless		

PROFINET is an Ethernet based network developed by PI (PROFIBUS & PROFINET International) for industrial automation that is 100 % compatible with IEEE standard IEEE802.3 defining Ethernet.

Remote I/O Please contact us for further details.

Modbus/TCP

Origins	Modicon Inc.		
Main sponsor	Modbus-IDA		
Number of participants	682		
Transmission speed	10 Mbps / 100 Mbps / 1,000 Mbps	Number of nodes	Max. 1024 (Max. numbered nodes supported: 248)
Network config., total length	Line / star configurations, Maximum 500 m (depends on cable type)		

Modbus protocol that operates with Ethernet TCP/IP.

Remote I/O R3 Series, R5 Series, R6 Series, R7 Series, R9 Series, R30 Series

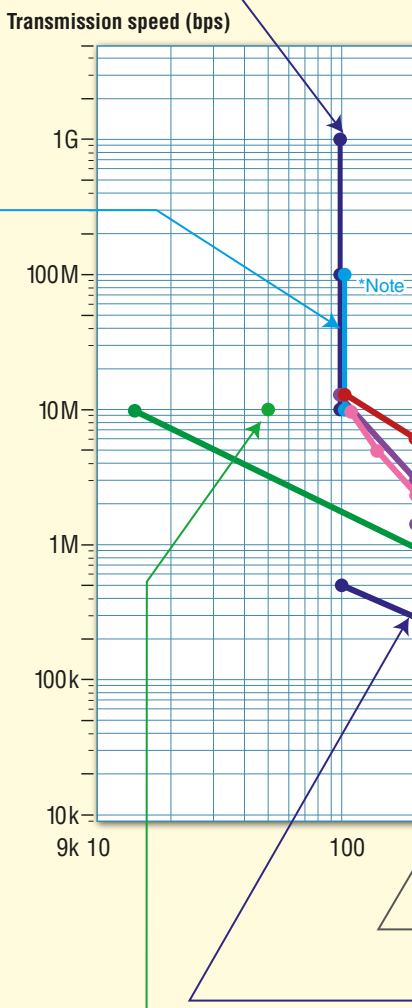
FL-net

Origins	Requested user specifications from Japan Automobile Manufacturing Association		
Main sponsor	JEMA (The Japan Electrical Manufacturers' Association)		
Number of participants	Over 34		
Transmission speed	10 Mbps / 100 Mbps	Number of nodes	254 nodes
Network config., total length	10BASE-T: 100 m when using twisted-pair cable, 10BASE5: 500 m when using thick type coaxial cable, 10 BASE-FL: 2000 m when using fiber optic cable		

Open network originating from Japan's industry for factory automation. Operates with Ethernet UDP/IP using a communications protocol with token passing methodology so no master node is required.

Remote I/O R3 Series

*Note: Communication speeds and distances are with STP cables.



MECHATROLINK - II

Origins	Yaskawa Electric C
Main sponsor	MECHATROLINK M
Number of participants	3,381
Transmission speed	10 Mbps
Number of nodes	Maximum 30 node
Network configuration, total length	2-core STP (dedic Maximum 50 m (1

Positioned as a motion field network among control elements like I/O and actuators in a c inputting control data.

● Client-Server Type Open Network

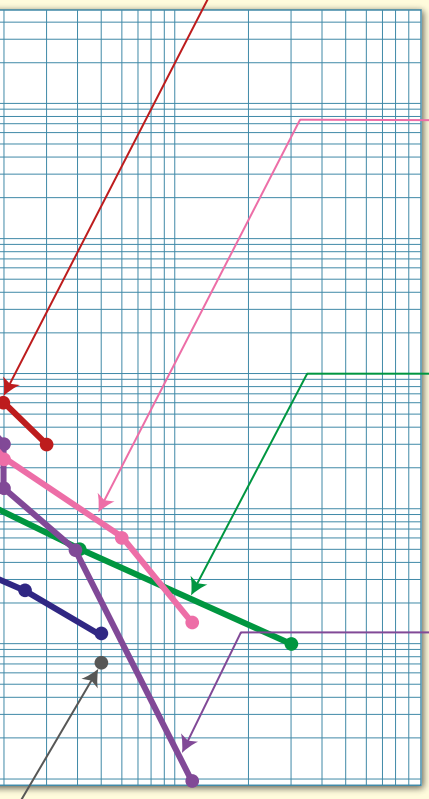
OPC UA

Origins	Industrial automation and other fields		
Main sponsor	OPC Foundation		
Number of participants	Over 680		
Transmission speed	--- (depending upon the connected network communication type)	Number of nodes	No limit (depending upon the server specifications)
Network config., total length	Client-Server configurations. The server specifications determine the number of connectable nodes. Transmission distance depends upon the connected network communication type.		

OPC UA (Unified Architecture) solves various issues recognized with the conventional OPC (OPC Classic).
Based on SOAP/XML/Web services, it realizes high-security data communication without depending upon the platform.

Remote I/O R30 Series

Speeds and Transmission Distance



HLS Hi-speed Link System

Origins	Step Technica Co., Ltd.	Remote I/O	R7 Series JC Series
Main sponsor	---		
Number of participants	---		
Transmission speed	3 Mbps / 6 Mbps / 12 Mbps	Number of nodes	Maximum 63 nodes
Network config., total length	Multidrop connection, Shielded twisted-pair cable (half duplex) or shielded 4-core twisted-pair cable (full duplex), Maximum 300 m (@ 3 Mbps)		

Super high-speed, highly reliable open field network offered by Step Technica. Used in various control device networks in factory automation for applications like with semiconductor manufacturing or high precision machining.

CUnet

Origins	Step Technica Co., Ltd.	Remote I/O	JC Series
Main sponsor	---		
Number of participants	---		
Transmission speed	3 Mbps / 6 Mbps / 12 Mbps	Number of nodes	Maximum 64 nodes
Network config., total length	Multimaster broadcasting, Multidrop connection (RS-485). Shielded cable (cat. 3), Maximum 300 m (@ 3 Mbps)		

Multimaster remote I/O control network offered by Step Technica, which supports discrete I/O, analog I/O and positioning control.

CC-Link

Origins	Mitsubishi Electric Corporation	Remote I/O	R1 Series R3 Series R5 Series R6 Series R7 Series R8 Series R9 Series
Main sponsor	CC-Link Partner Association		
Number of participants	3,823		
Transmission speed	156 kbps / 625 kbps / 2.5 Mbps / 5 Mbps / 10 Mbps	Number of nodes	Maximum 64 nodes
Network config., total length	Bus type network using shielded 3-core twisted-pair cable. Maximum 1200 m (@ 156 kbps). Also has fiber optic repeater.		

High speed network for device level and sensor level PLCs (by Mitsubishi Electric) widely used primarily for factory automation.

Modbus

Origins	Control equipment manufacturers	Remote I/O	R1 Series R3 Series R5 Series R6 Series R7 Series R8 Series R9 Series R10 Series
Main sponsor	Modbus Organization		
Number of participants	682		
Transmission speed	300 - 115.2 kbps (RS-232-C), Max. 10 Mbps (RS-485)	Number of nodes	Maximum 247 nodes
Network config., total length	Has no physical layer standards and typically uses serial connections like RS-232-C or RS-485. Maximum length of 1200 m when using RS-485 (depends on communication speed)		

A versatile open field network that uses a simple protocol and can be used on multiple levels.
Used extensively around the world.

PROFIBUS

Origins	Control equipment manufacturers	Remote I/O	R3 Series R5 Series R6 Series
Main sponsor	PROFIBUS & PROFINET International		
Number of participants	Over 1,400		
Transmission speed	9.6 k - 12 Mbps	Number of nodes	Maximum 126 nodes
Network config., total length	Special copper wire (STP cable) or fiber optic cable with bus / ring / tree configurations. Maximum 1200 m (@ 9.6 kbps)		

A device level and sensor level network for PLC and DCS used around the world but heavily in Europe.
Comes in three types: DP, PA, FMS

LonWorks

Origins	Echelon Corporation	Remote I/O	R3 Series R7 Series R9 Series
Main sponsor	LonMark International		
Number of participants	Over 850		
Transmission speed	610 - 2.5 Mbps	Number of nodes	64 nodes/subsystem (FTT-10)
Network config., total length	For the network, uses media like twisted-pair cables, power line cables, coaxial cables and fiber optic cables. Free topology, bus configurations. Maximum 2700 m (twisted-pair cables)		

An autonomous distributed network used for the controller, device and sensor levels. Comes in a wide variety of applications for building controls, factory automation and home automation.

DeviceNet

Origins	Control equipment manufacturers	Remote I/O	R1 Series R3 Series R5 Series R6 Series R7 Series R8 Series R80 Series
Main sponsor	ODVA, Inc.		
Number of participants	Over 700		
Transmission speed	125 kbp / 250 kbps / 500 kbps	Number of nodes	Maximum 64 nodes
Network config., total length	Bus and tree configurations made with shielded 4-core twisted-pair cables. Maximum 500 m (@ 100 kbps)		

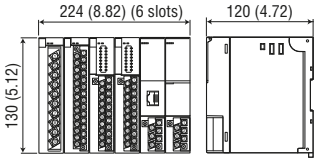
Widely used around the world primarily for factory automation applications as a device level network for PLC and DCS.

Number of participants as of August 2020

Remote I/O Series Lineup

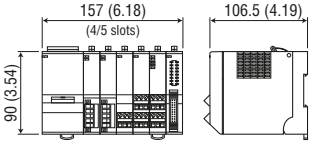
Dimensions in mm (inch)

Multi-channel, Scalable Remote I/O
R3 Series



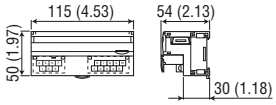
CC-Link DeviceNet Modbus PROFIBUS
T-Link FL-net Modbus/TCP LONWORKS
EtherNet/IP MECHATROLINK MECHATROLINK - III CC-Link IE Field
EtherCAT

Compact, Scalable Remote I/O
R5 Series



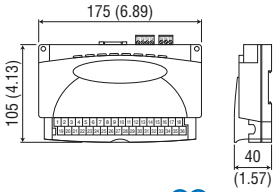
Modbus/TCP Modbus DeviceNet
CC-Link PROFIBUS T-Link

Expandable, Compact Remote I/O
R7 Series



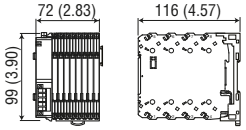
CC-Link DeviceNet T-Link Modbus
LONWORKS Modbus/TCP MECHATROLINK
FLEX NETWORK EtherNet/IP HLS Hi-speed Link System
EtherCAT CC-Link IE Field

Compact, Multi-point Remote I/O
R1 Series



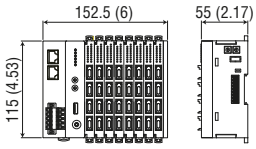
Modbus DeviceNet CC-Link

Ultra-slim, Scalable Remote I/O
R6 Series



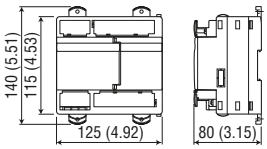
Modbus/TCP Modbus DeviceNet
CC-Link PROFIBUS T-Link

Slice Type, Scalable Remote I/O
R8 Series



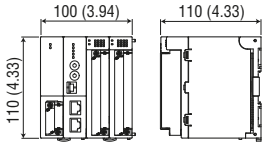
EtherCAT Modbus DeviceNet
CC-Link EtherNet/IP

Multi-point Remote I/O
R9 Series



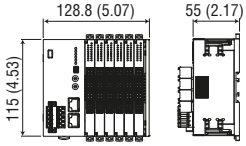
Modbus/TCP Modbus
CC-Link LONWORKS

Compact, Scalable Remote I/O
R30 Series



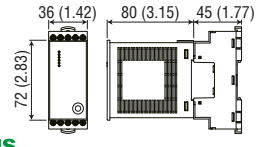
CC-Link IE Field CC-Link IE TSN
Modbus/TCP EtherCAT OPC UA

Slice Type, Scalable Remote I/O
R80 Series



CC-Link IE TSN EtherCAT
DeviceNet

Plug-in Remote I/O
R10 Series



Modbus

Website
Request Info

MG CO., LTD.
(formerly M-System Co., Ltd.)
www.mgco.jp

Your local representative: