MITSUBISHI ELECTRIC ENGINEERING

FAgoods

Purpose-Specific Products

General Catalog

Time and Wire Saving Devices

Upgrade Tool Products

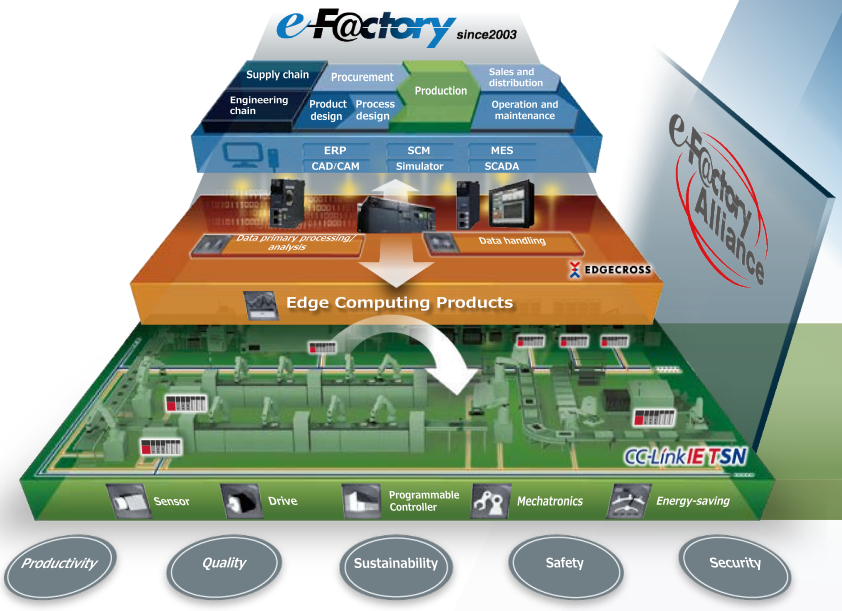
2025-26

Network Devices

Products for Monitoring and Traceability

Products for System Maintenance

MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED



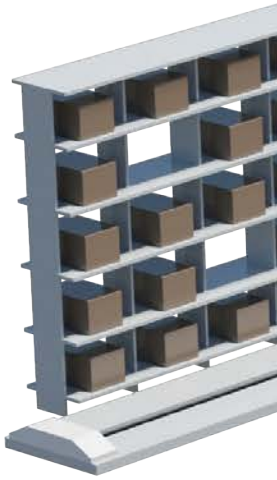
Source: Mitsubishi Electric Corporation

e-F@ctory

Manufacturing can be optimized by analyzing and utilizing the data collected from various devices and equipment connected with IIoT in developing, manufacturing, and logistics processes.
Our high technical capability and quality and technique to link FA devices and IT system will offer solutions for next-generation manufacturing such as mass customization, preventive maintenance, and traceability.

Fields of manufacturing are changing and to be changed

Labor-saving will support future manufacturing as the number of workers is decreasing today.
Our products provide five methods for control panel solutions according to fields of manufacturing.



Five methods for smart factory

Time and wire saving devices

01 Easy wiring to reduce unnecessary work

Network devices

02 Introduction of small-scale IIoT to reform production sites

Products for monitoring and traceability

03 Visualization (monitoring and diagnosis) of production sites

Upgrade tool products

04 Upgrading system leading to smart factory

Products for system maintenance

05 Stable operation for productivity improvement

Time and wire saving devices

Easy wiring to reduce unnecessary work

Our products help solve the problems of wiring work in the control panel by reducing wiring work for PLCs (programmable controllers), servo systems, HMIs (Human Machine Interfaces), and computerized numerical controllers (CNCs).

Network devices

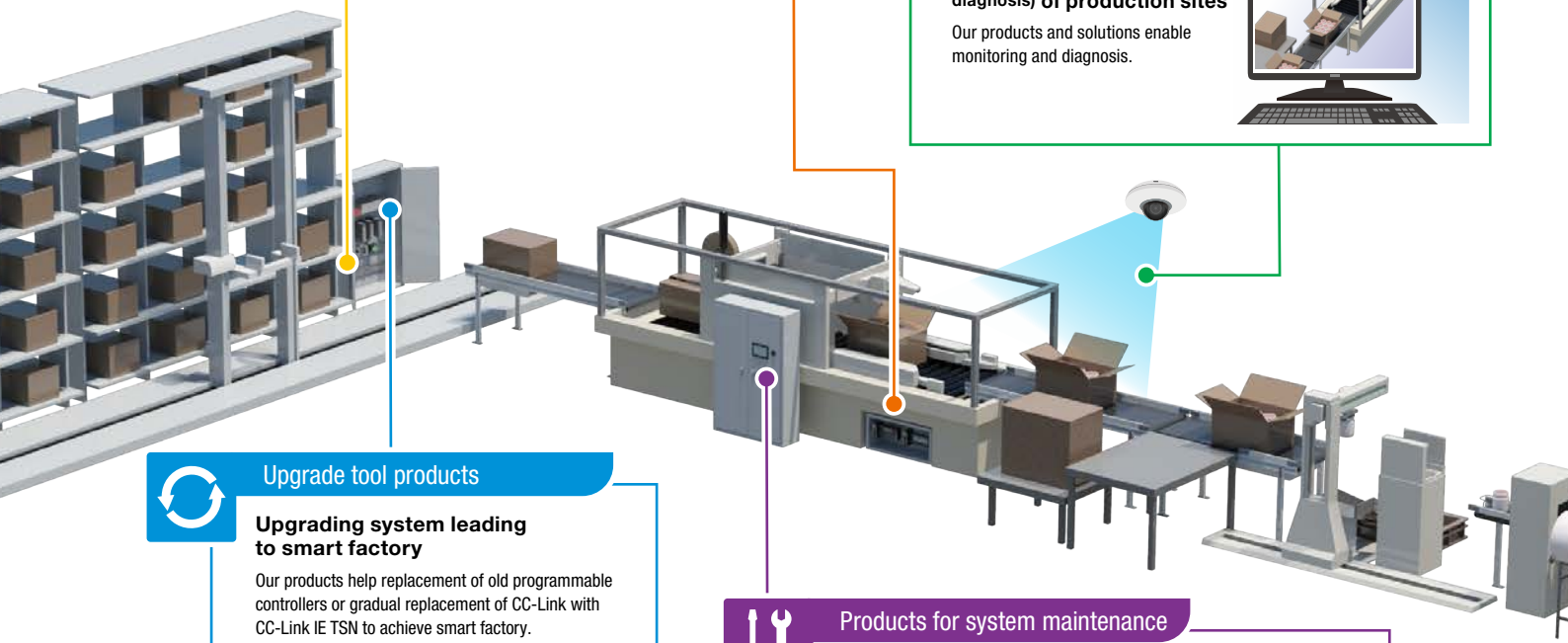
Introduction of small-scale IIoT to reform production sites

We provide products to use the CC-Link family, SSCNET, or FL-net communication.

Products for monitoring and traceability

Visualization (monitoring and diagnosis) of production sites

Our products and solutions enable monitoring and diagnosis.



Upgrade tool products

Upgrading system leading to smart factory

Our products help replacement of old programmable controllers or gradual replacement of CC-Link with CC-Link IE TSN to achieve smart factory.

Products for system maintenance

Stable operation for productivity improvement

From preventive maintenance to predict troubles at the production site to corrective maintenance to deal with emergencies, our products support the starting line to solve your issues.

Our products solve your issues.

Network devices

Introduction of small-scale IIoT to reform production sites

We provide products to be connected to industrial networks, which is necessary to rapidly-advancing introduction of IIoT in factories.
We support introduction of IIoT in factories by providing methods to use networks to visualize data and images and to link devices and machines, and providing contracted development of network devices.

- Integrating data from devices by connecting the devices to a network
- Using devices that are not in the CC-Link IE TSN lineup
- Introducing CC-Link IE TSN without taking time and cost

Products for monitoring and traceability

Visualization (monitoring and diagnosis) of production sites

Our products and solutions enable monitoring and diagnosis.

- Checking images of the production site using an HMI (GOT)
- Recording occurrences of short-term downtime
- Visualizing production status

Products for system maintenance

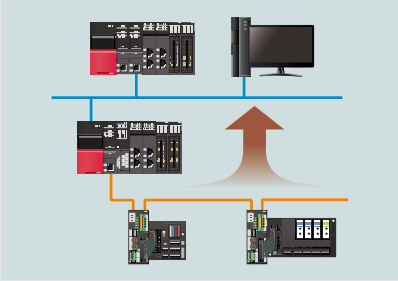
Stable operation for productivity improvement

From preventive maintenance to predict troubles at the production site to corrective maintenance to deal with emergencies, our products support the starting line to solve your issues.

- Reducing workloads of maintenance personnel
- Streamlining the investigation of the cause of the trouble to minimize the impact on production
- Eliminating sudden facility shutdowns

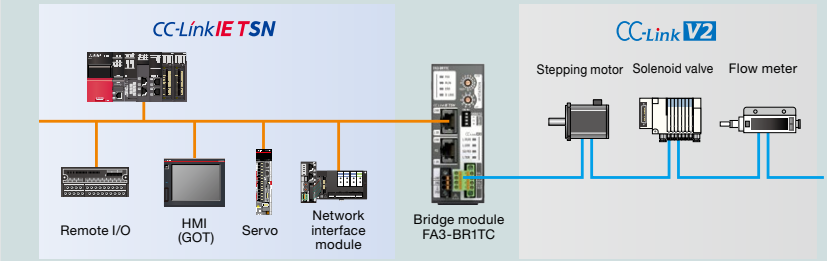
Production site where sensors, switches, and other devices are all connected

Small-scale IIoT



The network interface module collects data from a digital signal converter (terminal module) and an analog signal converter, enabling small-scale IIoT.

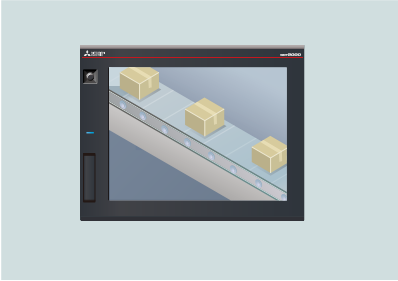
Connect CC-Link devices to CC-Link IE TSN networks



- CC-Link manager station not required
- Control devices not in the CC-Link IE TSN lineup
- Using existing devices and wiring helps to cut costs and reduce construction time.
- Reusing devices reduces plastic usage.

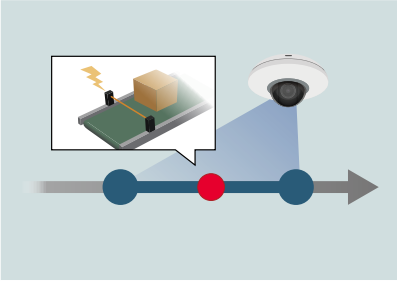
Production site where processes are visible (monitored and diagnosed) with network connection

Checking images using an HMI (GOT)



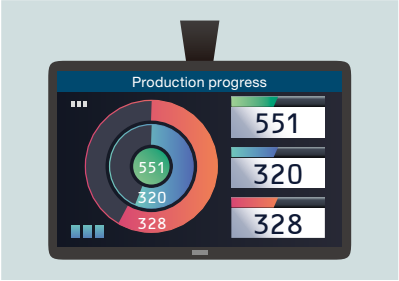
The network camera interface module enables the production site to be monitored remotely using an on-site HMI (GOT).

Downtime countermeasures (camera monitoring)



When a trouble is detected, the network camera interface module enables recording images before and after the trouble for the trouble analysis.

ANDON system



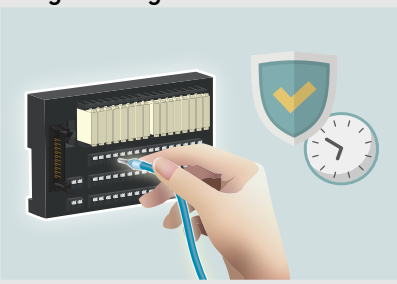
The RFID interface "visualizes" the production status and quality of all processes.

Safe and secure production site

Voice alerts for operators away from the system

Voice alerts are given so that operators away from the system can notice the alerts. The volume and language can be selected according to the operating environment.

Eliminating the need for retightening reduces work load



Screw tightening during maintenance is not required, reducing work load of workers.
Rewiring work is also facilitated by push-in connection.

Monitoring facility status

Collecting information from sensors and visualizing the facility status reduce the workload of on-site workers.

Network devices

Network devices

INDEX

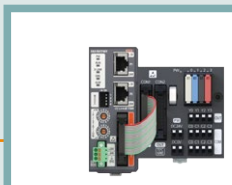
Configuration diagram

Small-scale IIoT system for integrated data management

Visualization of production lines and systems with sensors and switches

Network distributed type

Refer to P.10.



Network interface module

Digital signal converter (terminal module)

Indication light

Magnetic starter

CC-Link IE TSN
CC-Link IE Field
CC-Link IE Field Basic
SLMP (standard Ethernet)
CC-Link
MODBUS/TCP

Network interface module

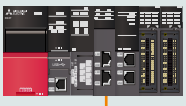
Analog signal converter

Sensor

Network bridge (CC-Link IE TSN–CC-Link bridge module)

Connecting CC-Link devices to CC-Link IE TSN

Refer to P.24.



CC-Link IE TSN

Remote I/O

HMI (GOT)

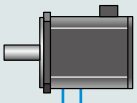
Servo

Network interface module

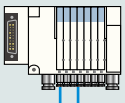
CC-Link IE TSN – CC-Link Bridge Module

CC-Link V2

Stepping motor



Solenoid valve

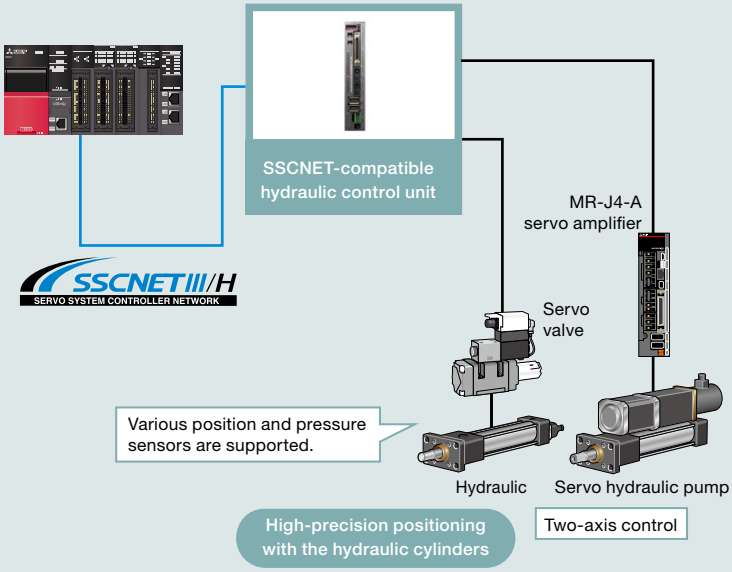


Hydraulic control

Easy synchronous operation of hydraulic cylinders using the SSCNET-compatible hydraulic control unit

Network distributed type

Refer to P.46.

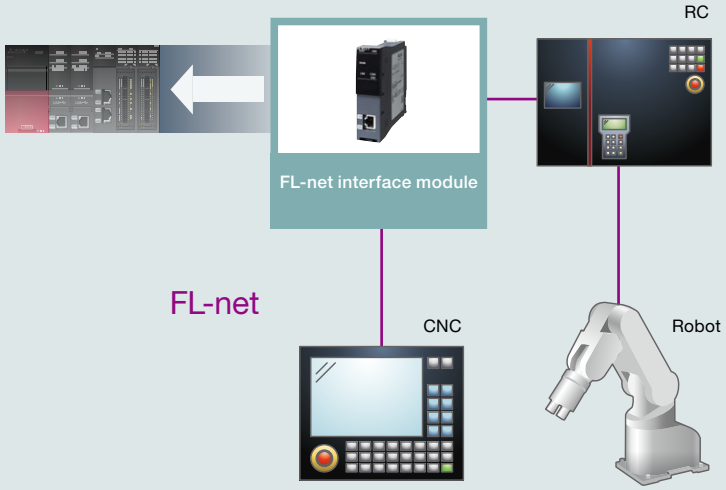


Open network connection

FL-net (OPCN-2) system configuration with the MELSEC iQ-R series

Slot-in type

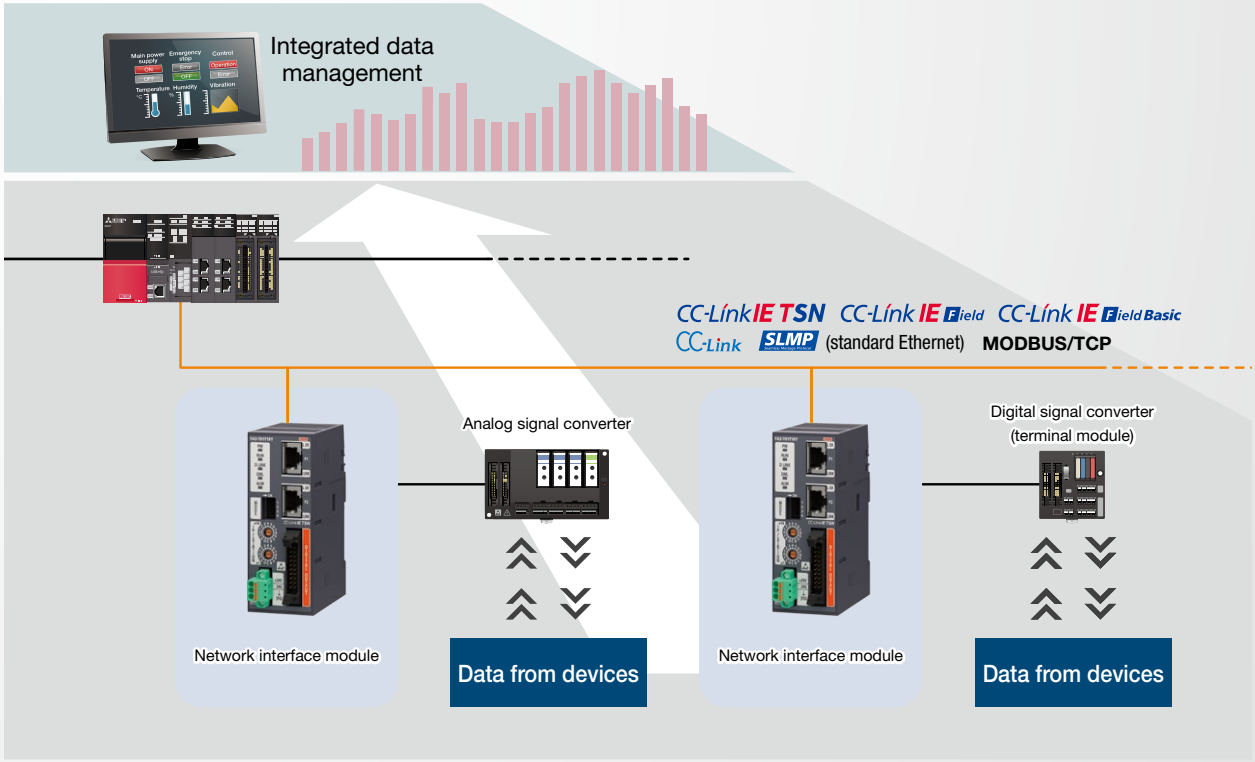
Refer to P.52.



Small-scale IIoT (Network interface module)

Connecting the digital signal converter (terminal module) and the analog signal converter through a network to

collect data from devices enables small-scale IIoT.



P. 11

Small-scale IIoT system for integrated data management

Data from devices is collected in upper hierarchical levels through a network, visualizing the data.

P. 12

Saving cost and time for wiring in panel and system

Wiring from the inside of the control panel to the device and relay box can be performed using only one CC-Link dedicated cable.
Wiring can be also simply performed when increasing devices.

P. 13

Switching the network using switches

The network can be switched among CC-Link IE TSN, CC-Link IE Field, CC-Link IE Field Basic, SLMP (standard Ethernet), and MODBUS/TCP using the switches on the network interface module.
(CC-Link-compatible products are also available.)

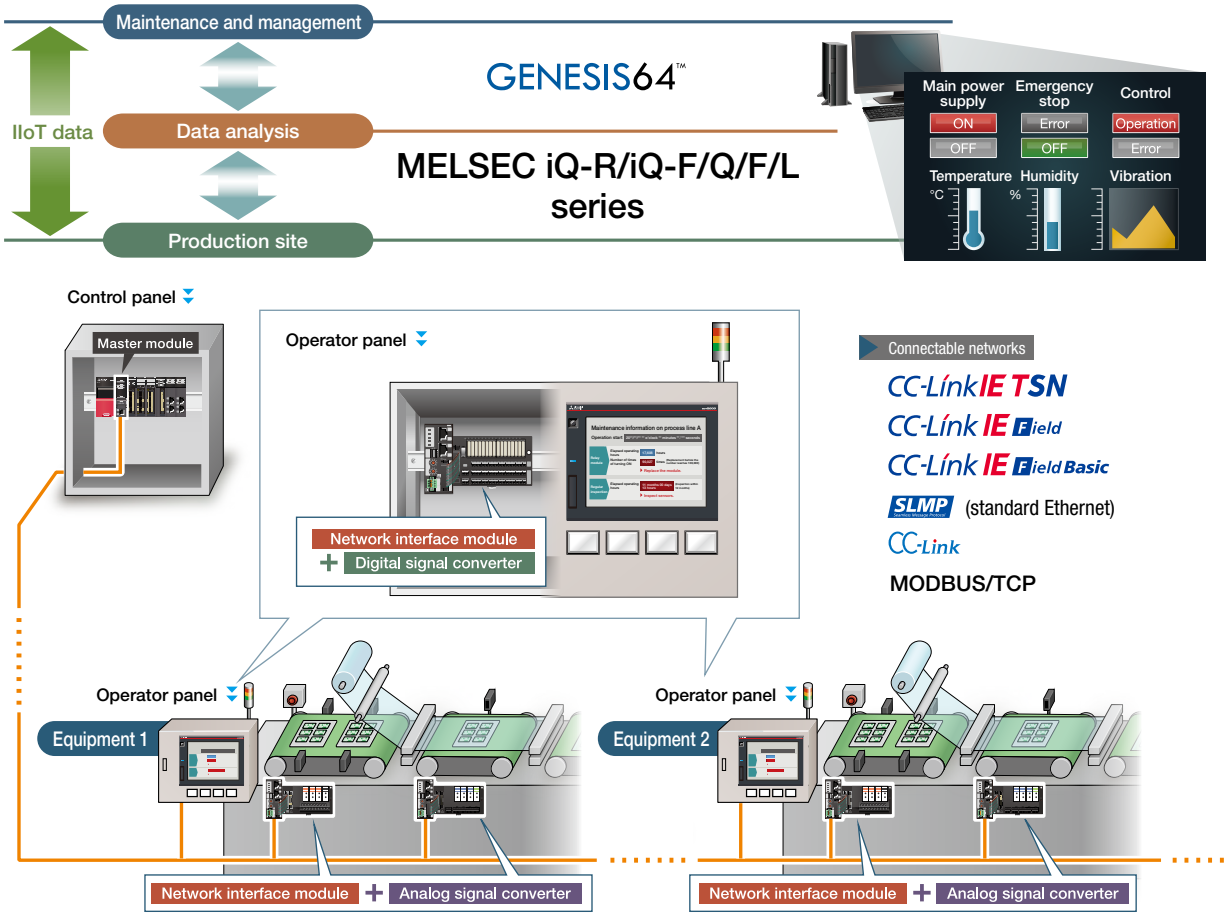
P. 13

Module selectable configuration

Modules can be selected individually, contributing to cost and space saving.

Small-scale IIoT system for integrated data management

By connecting devices of a digital signal converter (terminal module) and analog signal converter via network using the network interface modules, data from connected devices at production sites is collected, visualized, and analyzed. This enables users to establish systems that improve productivity and quality.



Connection between devices and upper hierarchical levels for data transmission via network

On-site operation data is collected, stored, visualized, and analyzed to be used for device control.

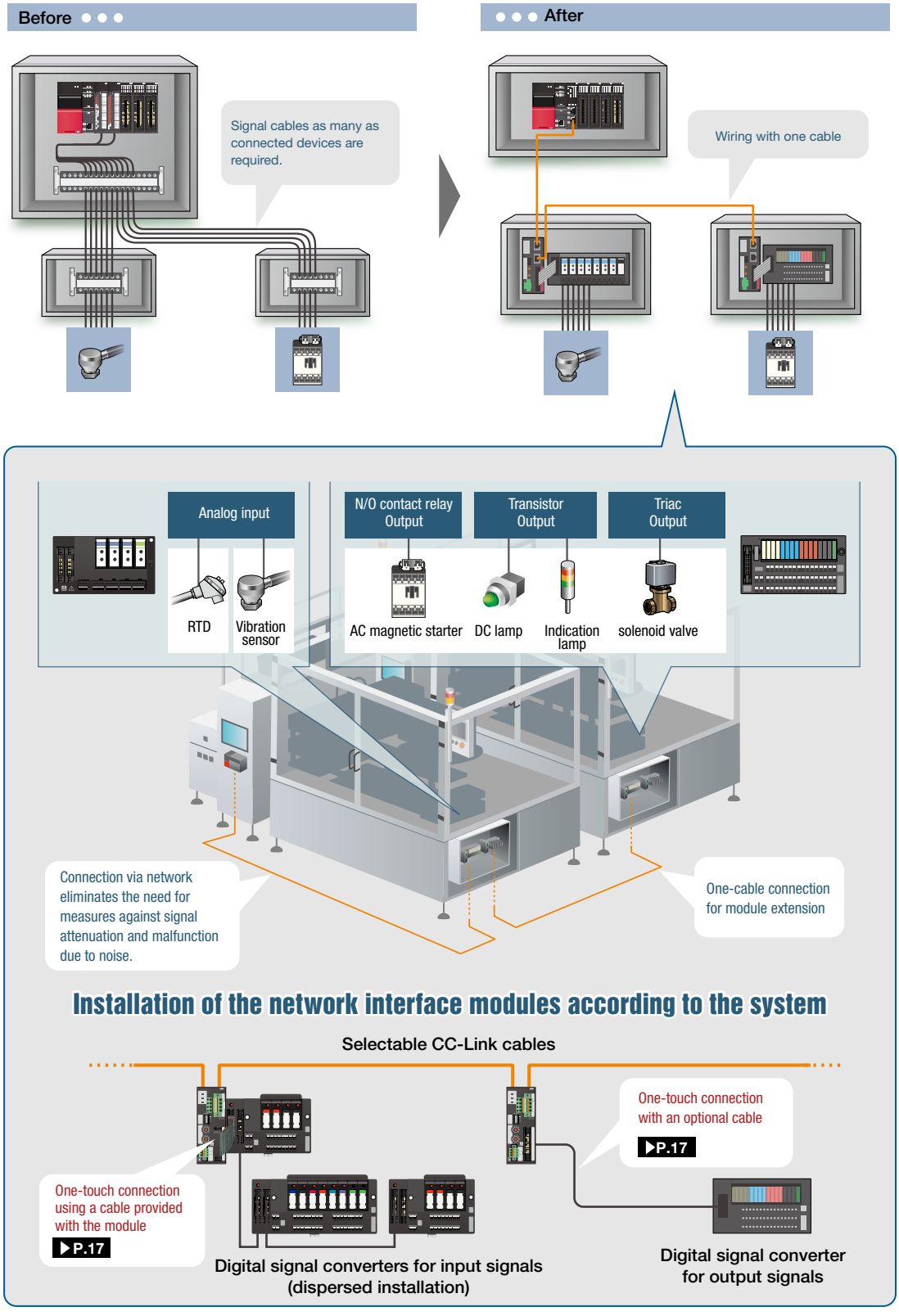
Analog signal converter

Digital signal converter (terminal module)

Devices	
Input	Switch, measuring device, flow/vibration/humidity/concentration sensor, RTD, etc.
Output	Magnetic contactor, indication lamp, solenoid valve, etc.

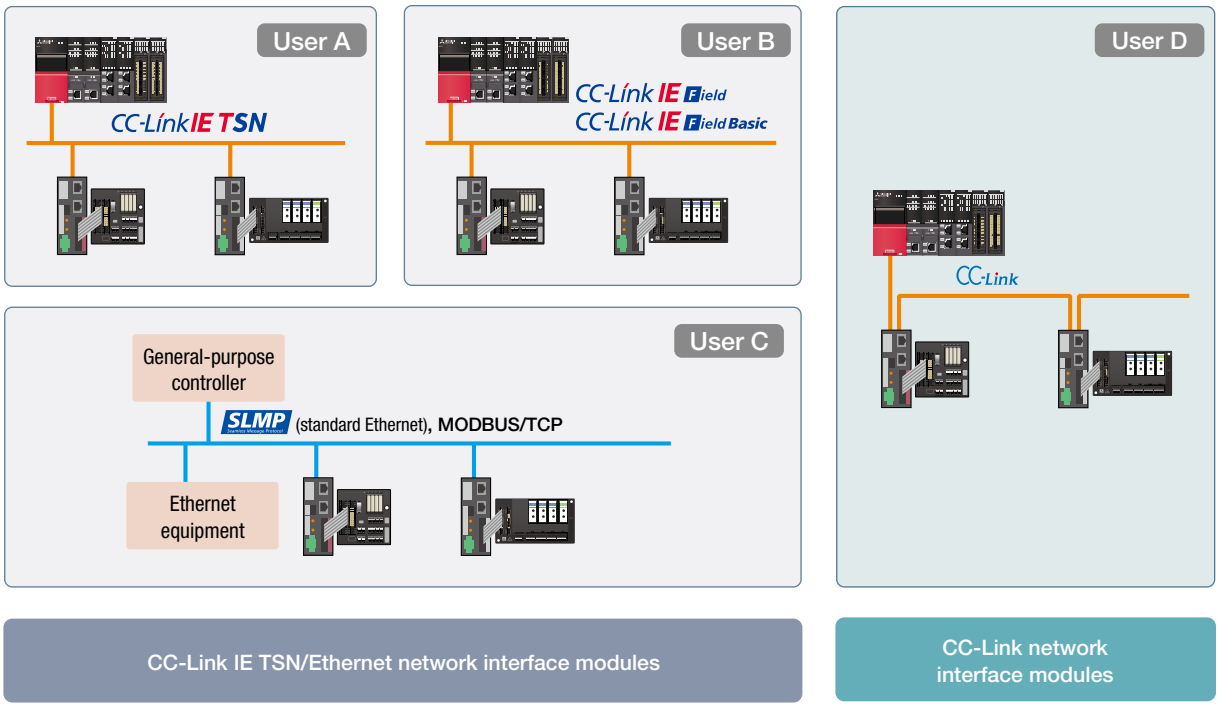
Saving cost and time for wiring in panel and system and easy wiring

A programmable controller and devices can be connected using an Ethernet cable and CC-Link cable. Wiring can be easy even when devices are added. A digital signal converter (terminal module) can be easily connected to an analog signal converter using a dedicated one-touch connector cable.



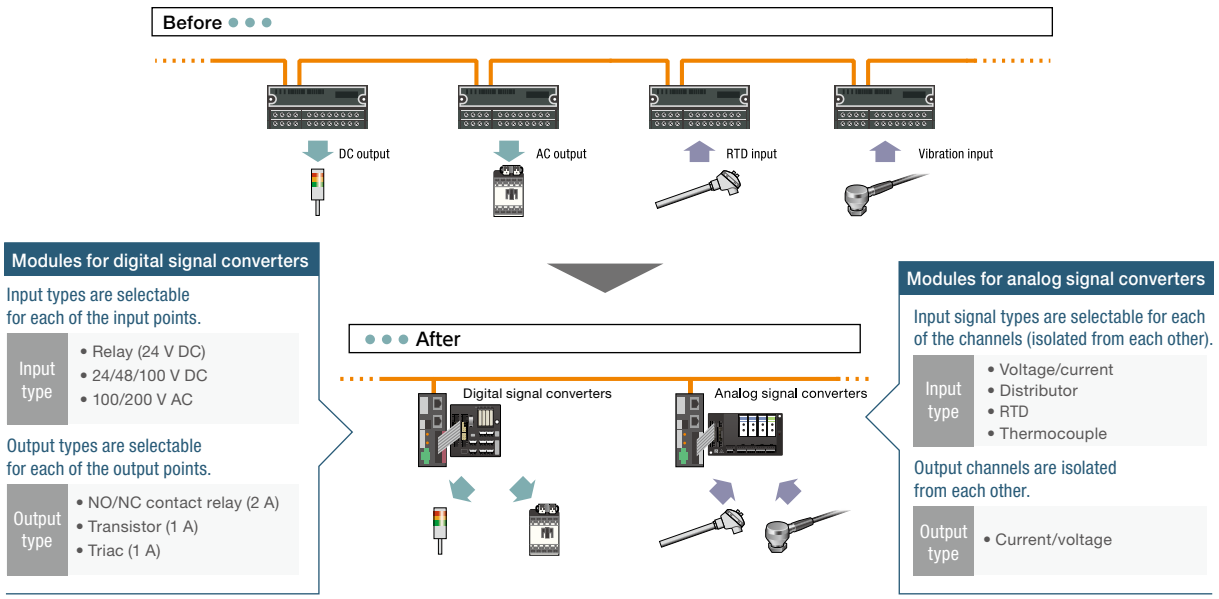
Switching the network using switches

The network can be selected among CC-Link IE TSN, CC-Link IE Field, CC-Link IE Field Basic, SLMP (standard Ethernet), and MODBUS/TCP using the switches on the network interface module. (CC-Link-compatible products are also available.)



Module selectable configuration

Individually selecting a module (control method) corresponding to each device enables optimal system configuration and cost and space saving. Also, control methods that are not supported by remote modules can also be available by using a digital/analog signal converter.



Product lineup and combinations

When a digital signal converter (terminal module) is used

Check the compliance with the overseas standards of the products to be used in combination.

Programmable controller module IPC	Network interface module		Digital signal converter (terminal module)				
	Product	Model	Control method			Terminal block type	Model
CC-Link IE TSN manager station · MELSEC iQ-R · MELSEC iQ-F CC-Link IE Field manager station · MELIPC · MELSEC iQ-R · MELSEC iQ-F · MELSEC-Q · MELSEC-L · MELSEC-F CC-Link IE Field Basic manager station · MELIPC · MELSEC iQ-R · MELSEC iQ-F · MELSEC-Q · MELSEC-L SLMP client · MELIPC · MELSEC iQ-R · MELSEC iQ-F · MELSEC-Q · MELSEC-L · MELSEC-F MODBUS/TCP · MELSEC iQ-R · MELSEC-Q · MELSEC-L CC-Link manager station · MELSEC iQ-R · MELSEC iQ-F · MELSEC-Q · MELSEC-L · MELSEC-F General-purpose controller (standard Ethernet)	Digital signal converter for input signals	With a dedicated cable FA3-TH1□16XC-01C Without a dedicated cable FA3-TH1□16XC	Installation base unit (module selectable type)		4 points, independent	Spring clamp	FA1-TH4X2SC20S1E
					8 points, independent		FA1-TH8X2SC20S1E
			Module pre-mounted type	24VDC (N/O contact)	4 points, independent (positive)	Spring clamp	FA1-TH4X24RA1L20S1E
					4 points, independent (negative)		FA1-TH4X24RA1H20S1E
					8 points, independent (positive)	Spring clamp	FA1-TH8X24RA1L20S1E
					8 points, independent (negative)		FA1-TH8X24RA1H20S1E
					16 points, independent (positive)	Spring clamp	FA1-TH16X24RA1L20S1E
					16 points, independent (negative)		FA1-TH16X24RA1H20S1E
					16 points, independent	Screw (M3)	FA-TH16XRA20S
			Module built-in type	24VDC	16 points/common, 2-wire type	Screw (M3)	FA-TH16X24D31
						Screw (M3.5)	FA-TH16X24D31L
				48VDC	16 points/common, 2-wire type	Screw (M3.5)	FA-TH16X48D31L
				100VDC	16 points/common, 2-wire type	Screw (M3.5)	FA-TH16X100D31L
				100VAC	16 points/common, 2-wire type	Screw (M3)	FA-TH16X100A31
						Screw (M3.5)	FA-TH16X100A31L
				200VAC	16 points/common, 2-wire type	Screw (M3)	FA-TH16X200A31
						Screw (M3.5)	FA-TH16X200A31L
	Digital signal converter for output signals (sink)	With a dedicated cable FA3-TH1□16Y-01C Without a dedicated cable FA3-TH1□16Y	Installation base unit (module selectable type)		4 points, independent (sink)	Spring clamp	FA1-TH4Y2SC20S1E
					8 points, independent (sink)		FA1-TH8Y2SC20S1E
					16 points, independent (sink)		FA1-TH16Y2SC20S1E
			Module pre-mounted type	N/O contact relay	16 points, independent	Spring clamp	FA1-TH16Y2RA20S1E
						Screw (M3)	FA-TH16YRA20S
							FA-TH16YRA20
						Screw (M3.5)	FA-TH16YRA20SL
					16 points/common, 1-wire type	Screw (M3)	FA-TH16YRA11S
							FA-TH16YRA11
					16 points/common, 2-wire type	Screw (M3)	FA-TH16YRA21S
							FA-TH16YRA21
				N/C contact relay	16 points, independent	Screw (M3.5)	FA-TH16YRAB20SL
				C/O contact relay	16 points, independent	Screw (M3)	FA-TH16YRAC20S
				Triac	16 points, independent	Spring clamp	FA1-TH16Y1SR20S1E
						Screw (M3)	FA-TH16YSR20S
					16 points/common, 1-wire type	Screw (M3)	FA-TH16YSR11S
					16 points/common, 2-wire type	Screw (M3)	FA-TH16YSR21S
				Transistor (sink)	16 points, independent (sink)	Spring clamp	FA1-TH16Y1TR20S1E
					16 points/common, 1-wire type (sink)	Screw (M3)	FA-TH16YTL11S
					16 points/common, 2-wire type (sink)	Screw (M3)	FA-TH16YTL21S
					16 points/common, 1-wire type (source)	Screw (M3)	FA-TH16YTH11S
					16 points, independent (sink/source shared type)	Screw (M3)	FA-TH16YTR20S
			Module built-in type		16 points, independent, 2A (sink/source shared type)	Screw (M3)	FA-TH16Y2TR20
	Digital signal converter for output signals (source)	With a dedicated cable FA3-TH1□16YE-01C Without a dedicated cable FA3-TH1□16YE	Installation base unit (module selectable type)		4 points, independent (sink)	Spring clamp	FA1-TH1E4Y2SC20S1E
					8 points, independent (sink)		FA1-TH1E8Y2SC20S1E
					16 points, independent (source)		FA1-TH1E16Y2SC20S1E
			Module pre-mounted type	N/O contact relay	16 points, independent (source)	Spring clamp	FA1-TH1E16Y2RA20S1E
					16 points, independent (source)	Screw (M3)	FA1-TH1E16Y2RA20S
				Triac	16 points, independent (source)	Spring clamp	FA1-TH1E16Y1SR20S1E
				Transistor (source)	16 points, independent (source)	Spring clamp	FA1-TH1E16Y1TR20S1E
					16 points, independent (sink/source shared type)	Screw (M3)	FA-THE16YTR20S
					16 points/common, 1-wire type (source)	Screw (M3)	FA-THE16YTH11S

Module						
Specifications (Signal pass-through modules cannot be used.)						Model
Functional module	Input		24VDC relay isolation (navy blue)		Quantity: 1 Quantity: 2 Quantity: 4	FA1-TM1X24RA-*
			24VDC photocoupler isolation (black)			FA1-TM1X24D-*
			48VDC photocoupler isolation (sky blue)			FA1-TM1X48D-*
			100VDC photocoupler isolation (purple)			FA1-TM1X100D-*
			100VAC photocoupler isolation (orange)			FA1-TM1X100A-*
			200VAC photocoupler isolation (red)			FA1-TM1X200A-*
			Dummy (for dustproof) (green)		Quantity: 4	FA1-TM1ND4
Slim module	Input/output		N/O contact relay (beige)	Input: 24VDC Output: 24VDC, 100 to 240VAC, 2A	Quantity: 2 Quantity: 4	FA-NYP24WK*
			N/C contact relay (sky blue)			FA-NYBP24WK*
	Output		C/O contact relay (white)	24VDC, 100 to 240VAC, 6A	Quantity: 4	FA-LYCA024VSK4
			Triac (black)	30 to 240VAC, 1A	Quantity: 2 Quantity: 4	FA-SN24A01FS*
			Transistor (red)	3 to 30VDC, 1A		FA-SN24D01HZS*

The asterisk in the model name is replaced by a number indicating the quantity.
It is replaced by "2" when the quantity is two, or "4" when the quantity is four.

Related products

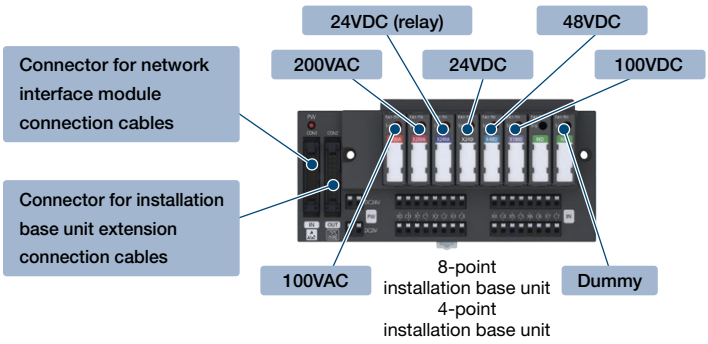
Digital signal converter (terminal module)

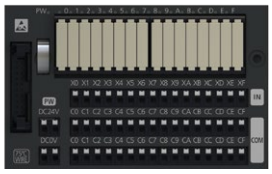
Digital signals will be converted between devices such as the network interface module and sensor.
For terminal blocks, the spring clamp terminal block type and screw terminal block type are available.

More information

- **Input** Spring clamp terminal block | Screw terminal block

Modules for different input voltage loads (24VDC, 48VDC, 100VDC, 100VAC, 200VAC) can be selected and mixed per point depending on the connected device.

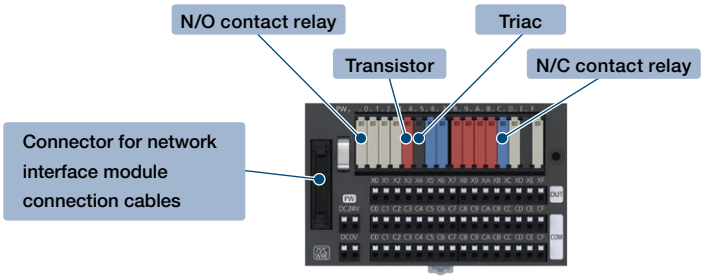




Unit with a 16-point relay module
Unit with a 8-point relay module
Unit with a 4-point relay module

- **Output** Spring clamp terminal block | Screw terminal block

Modules for different control methods (relay, triac, transistor) can be selected and mixed per point depending on the connected device.



Unit with a 16-point relay module selectable type (installation base unit)
Unit with a 16-point relay module
Unit with a 8-point relay module selectable type (installation base unit)
Unit with a 4-point relay module selectable type (installation base unit)

When an analog signal converter is used

Check the compliance with the overseas standards of the products to be used in combination.

Programmable controller module IPC	Network interface module		Analog signal converter					
	Product	Model	Installation base unit		Mountable module (Pass-through modules cannot be used.)			
			Model		Specifications			Model
CC-Link IE TSN manager station · MELSEC iQ-R · MELSEC iQ-F CC-Link IE Field manager station · MELIPC · MELSEC iQ-R · MELSEC iQ-F · MELSEC-Q · MELSEC-L · MELSEC-F CC-Link IE Field Basic manager station · MELIPC · MELSEC iQ-R · MELSEC iQ-F · MELSEC-Q · MELSEC-L SLMP client · MELIPC · MELSEC iQ-R · MELSEC iQ-F · MELSEC-Q · MELSEC-L · MELSEC-F MODBUS/TCP · MELSEC iQ-R · MELSEC-Q · MELSEC-L CC-Link manager station · MELSEC iQ-R · MELSEC iQ-F · MELSEC-Q · MELSEC-L · MELSEC-F General-purpose controller (standard Ethernet)	Analog signal converter for input signals	With a dedicated cable FA3-AT1□8X-01C Without a dedicated cable FA3-AT1□8X	4-channel spring clamp terminal block FA1-AT1B4X1TE 4-channel screw terminal block FA1-AT1B4X1TB 8-channel spring clamp terminal block FA1-AT1B8X1TE 8-channel screw terminal block FA-ATB8XTB	+	Voltage input	0 to 5V		FA-ATSVM1XV05
						1 to 5V		FA-ATSVM1XV15
						-10 to 10V		FA-ATSVM1XV1010
					Current input	4 to 20mA		FA-ATSVM1XA420
					Distributor (2-wire transmitter)	4 to 20mA		FA-ATSVM1XD
					RTD input	Pt100	-200 to +650°C	FA-ATSVM1XRPT
						Pt100	0 to +100°C	FA-ATSVM1XRPT0010
						Pt100	0 to +200°C	FA-ATSVM1XRPT0020
						JPt100	-200 to +600°C	FA-ATSVM1XRJPT
					Thermocouple input	Type B thermocouple	+600 to +1700°C	FA-ATSVM1XTB
						Type R thermocouple	0 to +1600°C	FA-ATSVM1XTR
						Type S thermocouple	0 to +1600°C	FA-ATSVM1XTS
						Type K thermocouple	-200 to +1200°C	FA-ATSVM1XTK
							0 to +400°C	FA-ATSVM1XTK0040
							0 to +600°C	FA-ATSVM1XTK0060
							0 to +800°C	FA-ATSVM1XTK0080
						Type E thermocouple	-200 to +900°C	FA-ATSVM1XTE
						Type J thermocouple	-40 to +750°C	FA-ATSVM1XTJ
						Type T thermocouple	-200 to +350°C	FA-ATSVM1XTT
						Type N thermocouple	-200 to +1250°C	FA-ATSVM1XTN
					CT input	AC0 to 600A		FA1-AT1CT-1-5
					Dummy	Quantity: 5		FA-ATNDM5
	Analog signal converter for output signals	With a dedicated cable FA3-AT1□8Y-01C Without a dedicated cable FA3-AT1□8Y	4-channel spring clamp terminal block FA1-AT1B4Y1TE 4-channel screw terminal block FA1-AT1B4Y1TB 8-channel spring clamp terminal block FA1-AT1B8Y1TE 8-channel screw terminal block FA-ATB8YTB	+	Voltage output	0 to 5V		FA-ATSVM1YV05
						1 to 5V		FA-ATSVM1YV15
						0 to 10V		FA-ATSVM1YV010
						-10 to 10V		FA-ATSVM1YV1010
					Current output	0 to 20mA		FA-ATSVM1YA020
						4 to 20mA		FA-ATSVM1YA420
					Dummy	Quantity: 5		FA-ATNDM5

Related products

Analog signal converter

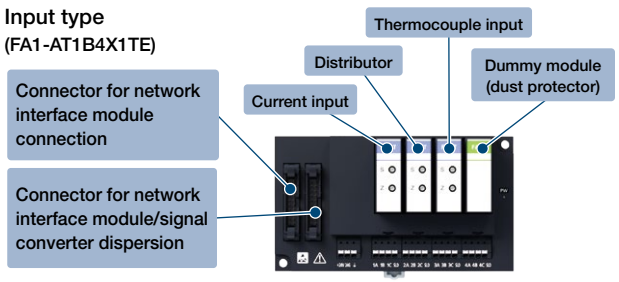
Analog signals will be converted between devices such as the network interface module and temperature sensor. Isolation is implemented between channels.

Spring clamp terminal block　Screw terminal block

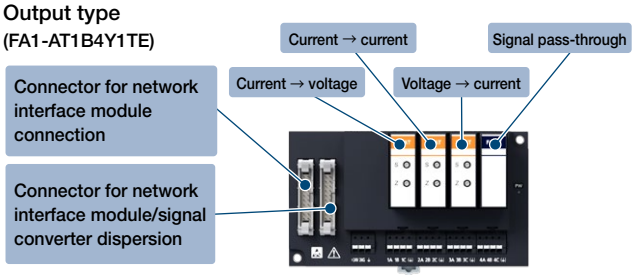
For input, modules for different analog inputs (voltage, current, distributor, thermocouple, RTD) can be selected and mixed per channel.
For output, modules for different analog outputs (voltage, current) can be selected and mixed per channel.

More information

Input type
(FA1-AT1B4X1TE)



Output type
(FA1-AT1B4Y1TE)



Model list

Network interface module

Supported network	Dedicated cable	Type		Model
CC-Link IE TSN CC-Link IE Field CC-Link IE Field Basic SLMP (standard Ethernet) MODBUS/TCP	Included	For digital signal converter	Input	FA3-TH1M16XC-01C
			Output (sink)	FA3-TH1M16Y-01C
			Output (source)	FA3-TH1M16YE-01C
		For analog signal converter	Input	FA3-AT1M8X-01C
			Output	FA3-AT1M8Y-01C
	Not included Use an optional cable.	For digital signal converter	Input	FA3-TH1M16XC
			Output (sink)	FA3-TH1M16Y
			Output (source)	FA3-TH1M16YE
		For analog signal converter	Input	FA3-AT1M8X
			Output	FA3-AT1M8Y
CC-Link IE TSN CC-Link IE Field CC-Link IE Field Basic SLMP (standard Ethernet)	Included	For digital signal converter	Input	FA3-TH1T16XC-01C
			Output (sink)	FA3-TH1T16Y-01C
			Output (source)	FA3-TH1T16YE-01C
		For analog signal converter	Input	FA3-AT1T8X-01C
			Output	FA3-AT1T8Y-01C
	Not included Use an optional cable.	For digital signal converter	Input	FA3-TH1T16XC
			Output (sink)	FA3-TH1T16Y
			Output (source)	FA3-TH1T16YE
		For analog signal converter	Input	FA3-AT1T8X
			Output	FA3-AT1T8Y
CC-Link	Included	For digital signal converter	Input	FA3-TH1C16XC-01C
			Output (sink)	FA3-TH1C16Y-01C
			Output (source)	FA3-TH1C16YE-01C
		For analog signal converter	Input	FA3-AT1C8X-01C
			Output	FA3-AT1C8Y-01C
	Not included Use an optional cable.	For digital signal converter	Input	FA3-TH1C16XC
			Output (sink)	FA3-TH1C16Y
			Output (source)	FA3-TH1C16YE
		For analog signal converter	Input	FA3-AT1C8X
			Output	FA3-AT1C8Y

Product line

Basically included items: Module, User's Manual (Hardware), mounting bracket
*1: For the model with a dedicated cable, the dedicated cable is also included.
*2: The terminating resistor kit (110Ω: 2 pcs, 130Ω: 2 pcs) is included with the CC-Link-compatible model.

Connection cable

Network interface module dedicated cable

Product	Remarks	Cable length	Model
Dedicated cable	Included with the product (FA3-□□-01C)	0.1m	-
Extension cable for signal converter*1	Optional cables for modules for which dedicated cables are not included with modules	1m	FA3-CB2L10MM1H20
		2m	FA3-CB2L20MM1H20
		3m	FA3-CB2L30MM1H20

*1: For information on other cables, please consult your local Mitsubishi representative.

CC-Link cable

Supported version	Specifications	Cable length	Model
Ver.1.00	Standard cable	200m*1	FA-CBL200SB
	High-performance cable		FA-CBL200SBH
	Vibration-resistant cable (for movable part)		FA-CBL200SBZ
	Cable with a built-in 24VDC power cable	100m*2	FA-CBL100PWSB
Ver.1.10	Standard cable	200m*1	FA-CBL200PSBH
	Vibration-resistant cable (for movable part)		FA-CBL200PSBZ
	Cold-resistant cable		FA-CBL200LTPSBH
	Cable with a built-in 24VDC power cable	100m*2	FA-CBL100PWPSBH

*1: Custom lengths are not available, but a 1000-meter option is available.
*2: Custom lengths are not available, but a 500-meter option is available.

Specifications

CC-Link IE TSN/Ethernet-compatible network interface modules (MODBUS/TCP-compatible products)

Digital signal converter (Terminal module)	FA3-TH1M16XC	FA3-TH1M16XC-01C
	FA3-TH1M16Y	FA3-TH1M16Y-01C
	FA3-TH1M16YE	FA3-TH1M16YE-01C
Analog signal converter	FA3-AT1M8X	FA3-AT1M8X-01C
	FA3-AT1M8Y	FA3-AT1M8Y-01C

- Productivity and quality are improved by connecting a device such as a sensor connected to a digital signal converter (terminal module) or an analog signal converter via network to collect the operating information of the facility and control the device depending on the circumstances.
- All devices at dispersed sites can be connected to the network with only one manager module.
- One-touch connection using a dedicated cable for the network interface module and a digital signal converter (terminal module) or analog signal converter reduces the time for wiring.

Specifications

For digital signal converter connection (input)

Item		FA3-TH1M16XC
Input type		Positive common/negative common shared type
No. of inputs		16 points
Input response time	OFF → ON	0.1/0.2/1/1.5/5/10/20/70ms or less*1
	ON → OFF	0.4/0.5/1/1.5/5/10/20/70ms or less*1
Current consumption		0.11A
Weight		160g

*1: The module response time is not included.

For digital signal converter connection (output)

Item		FA3-TH1M16Y	FA3-TH1M16YE
Output type		Sink type	Source type
No. of outputs		16 points	
Response time	OFF → ON	0.5ms or less*2	
	ON → OFF	1.5ms or less*2	
Current consumption		0.12A	
Weight		160g	

*2: The module response time is not included.

For analog signal converter connection (input)

Item		FA3-AT1M8X
No. of analog input points		8 channels/module
I/O characteristics	Analog input range	1 to 5V
	Digital output	0 to 16000
Accuracy (accuracy for the maximum digital output value)	Ambient temperature 0 to 55°C	±0.3% (±48 digits)*3
	Ambient temperature 25±5°C	±0.1% (±16 digits)*3
	Maximum resolution	0.25mV
Maximum conversion speed		1ms/channel*4
Current consumption		0.14A
Weight		160g

*3: The module's accuracy is not taken into account.
*4: The module response time is not included.

For analog signal converter connection (output)

Item		FA3-AT1M8Y
No. of analog output points		8 channels/module
I/O characteristics	Digital input value	0 to 16000
	Analog output range	1 to 5V
Accuracy	Ambient temperature 0 to 55°C	±0.3% (±12mV)*5
	Ambient temperature 25±5°C	±0.1% (±4mV)*5
	Maximum resolution	0.25mV
Maximum conversion speed		1ms/channel*6
Current consumption		0.14A
Weight		160g

*5: The module's accuracy is not taken into account.
*6: The module response time is not included.

Common specifications

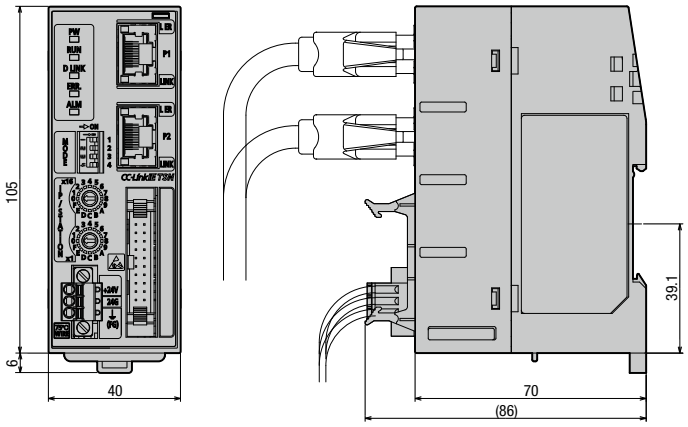
Item		CC-Link IE TSN	CC-Link IE Field	CC-Link IE Field Basic	SLMP (standard Ethernet)	MODBUS/TCP
Operating ambient temperature		0 to 55°C				
Operating ambient humidity		5 to 95%RH, non-condensing				
Network specifications	Communication speed	1Gbps/100Mbps	1Gbps	100Mbps	100Mbps	100Mbps/10Mbps
	Station type	Remote station	Remote device station	Remote station	Server	Remote station
	Authentication class	Authentication class B	–	–	–	–
	Topology	· Line/star topology · Mixture of line topology and star topology	· Line/star topology · Mixture of line topology and star topology · Ring topology	Star topology	Star topology	Star topology
External interface	Communication part	RJ45 connector				
	Module power supply part	Two-piece spring clamp terminal block				
Module installation		DIN rail installation or installation using the mounting bracket included with the module				
Communication cable	1Gbps	Ethernet cable that satisfies the 1000BASE-T standard, Category 5e or higher (double shielded/STP) straight cable				
	100Mbps	Ethernet cable that satisfies the 100BASE-TX standard, Category 5 or higher (double shielded/STP) straight cable				
	10Mbps	Ethernet cable that satisfies the 10BASE-T standard, Category 3 or higher (shielded/STP) straight cable				
Module power supply	Voltage	24VDC (ripple ratio: within 5%) (allowable voltage range: 20.4 to 28.8VDC)				
	Current	Refer to the individual specifications.*7				
External dimensions		105 (H) × 40 (W) × 70 (D) mm (not including the projections)				
Applicable standard *8		UL, CE, KC				

*7: The digital signal converter or the analog signal converter requires a separate 24VDC power supply. For specifications, refer to the manuals for the modules used.
*8: Check the compliance with the overseas standards of the products to be used in combination.

External dimensions

Common external dimensions for digital signal converter (terminal module) connection and analog signal converter connection

(Unit: mm)



CC-Link IE TSN/Ethernet-compatible network interface module

Digital signal converter (Terminal module)	FA3-TH1T16XC	FA3-TH1T16XC-01C
	FA3-TH1T16Y	FA3-TH1T16Y-01C
	FA3-TH1T16YE	FA3-TH1T16YE-01C
Analog signal converter	FA3-AT1T8X	FA3-AT1T8X-01C
	FA3-AT1T8Y	FA3-AT1T8Y-01C

- Productivity and quality are improved by connecting a device such as a sensor connected to a digital signal converter (terminal module) or an analog signal converter via network to collect the operating information of the facility and control the device depending on the circumstances.
- All devices at dispersed sites can be connected to the network with only one manager module.
- One-touch connection using a dedicated cable for the network interface module and a digital signal converter (terminal module) or analog signal converter reduces the time for wiring.

Specifications

For digital signal converter connection (input)

Item		FA3-TH1T16XC
Input type		Positive common/negative common shared type
No. of inputs		16 points
Input response time	OFF → ON	0.1/0.2/1/1.5/5/10/20/70ms or less*1
	ON → OFF	0.4/0.5/1/1.5/5/10/20/70ms or less*1
Current consumption		0.11A
Weight		160g

*1: The module response time is not included.

For digital signal converter connection (output)

Item		FA3-TH1T16Y	FA3-TH1T16YE
Output type		Sink type	Source type
No. of outputs		16 points	
Response time	OFF → ON	0.5ms or less*2	
	ON → OFF	1.5ms or less*2	
Current consumption		0.12A	
Weight		160g	

*2: The module response time is not included.

For analog signal converter connection (input)

Item		FA3-AT1T8X
No. of analog input points		8 channels/module
I/O characteristics	Analog input range	1 to 5V
	Digital output	0 to 16000
Accuracy (accuracy for the maximum digital output value)	Ambient temperature 0 to 55°C	±0.3% (±48 digits)*3
	Ambient temperature 25±5°C	±0.1% (±16 digits)*3
	Maximum resolution	0.25mV
Maximum conversion speed		1ms/channel*4
Current consumption		0.14A
Weight		160g

*3: The module's accuracy is not taken into account.
*4: The module response time is not included.

For analog signal converter connection (output)

Item		FA3-AT1T8Y
No. of analog output points		8 channels/module
I/O characteristics	Digital input value	0 to 16000
	Analog output range	1 to 5V
Accuracy	Ambient temperature 0 to 55°C	±0.3% (±12mV)*5
	Ambient temperature 25±5°C	±0.1% (±4mV)*5
	Maximum resolution	0.25mV
Maximum conversion speed		1ms/channel*6
Current consumption		0.14A
Weight		160g

*5: The module's accuracy is not taken into account.
*6: The module response time is not included.

Common specifications

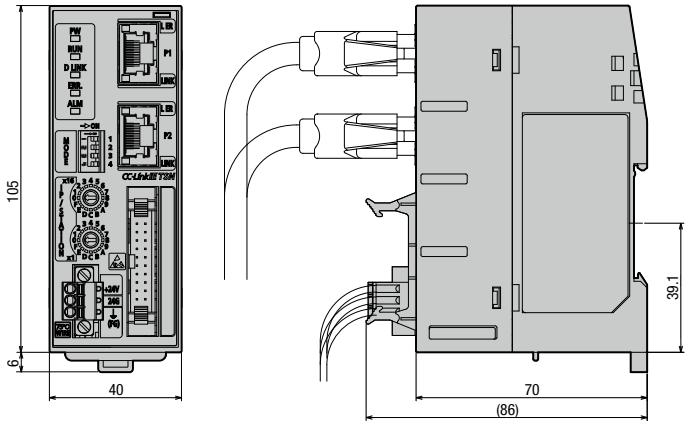
Item		CC-Link IE TSN	CC-Link IE Field	CC-Link IE Field Basic	SLMP (standard Ethernet)
Operating ambient temperature		0 to 55°C			
Operating ambient humidity		5 to 95%RH, non-condensing			
Network specifications	Communication speed	1Gbps/100Mbps	1Gbps	100Mbps	100Mbps
	Station type	Remote station	Remote device station	Remote station	Server
	Authentication class	Authentication class B	–	–	–
	Topology	· Line/star topology · Mixture of line topology and star topology	· Line/star topology · Mixture of line topology and star topology · Ring topology	Star topology	Star topology
External interface	Communication part	RJ45 connector			
	Module power supply part	Two-piece spring clamp terminal block			
Module installation		DIN rail installation or installation using the mounting bracket included with the module			
Communication cable	1Gbps	Ethernet cable that satisfies the 1000BASE-T standard, Category 5e or higher (double shielded/STP) straight cable			
	100Mbps	Ethernet cable that satisfies the 100BASE-TX standard, Category 5 or higher (double shielded/STP) straight cable			
Module power supply	Voltage	24VDC (ripple ratio: within 5%) (allowable voltage range: 20.4 to 28.8VDC)			
	Current	Refer to the individual specifications.*7			
External dimensions		105 (H) × 40 (W) × 70 (D) mm (not including the projections)			
Applicable standard *8		UL, CE, KC			

*7: The digital signal converter or the analog signal converter requires a separate 24VDC power supply. For specifications, refer to the manuals for the modules used.
*8: Check the compliance with the overseas standards of the products to be used in combination.

External dimensions

Common external dimensions for digital signal converter (terminal module) connection and analog signal converter connection

(Unit: mm)



CC-Link-compatible network interface module

Digital signal converter (Terminal module)	**FA3-TH1C16XC**	**FA3-TH1C16XC-01C**
	FA3-TH1C16Y	**FA3-TH1C16Y-01C**
	FA3-TH1C16YE	**FA3-TH1C16YE-01C**
Analog signal converter	**FA3-AT1C8X**	**FA3-AT1C8X-01C**
	FA3-AT1C8Y	**FA3-AT1C8Y-01C**

- Productivity and quality are improved by connecting a device such as a sensor connected to a digital signal converter (terminal module) or an analog signal converter via network to collect the operating information of the facility and control the device depending on the circumstances.
- All devices at dispersed sites can be connected to the network with only one master module.
- One-touch connection using a dedicated cable for the network interface module and a digital signal converter (terminal module) or analog signal converter reduces the time for wiring.

Specifications

For digital signal converter connection (input)

Item		FA3-TH1C16XC
Input type		Positive common/negative common shared type
CC-Link station type		Remote I/O station
No. of occupied stations		32 points are assigned to a station. (16 points are used.)
No. of inputs		16 points
Input response time	OFF → ON	1.5ms or less*1
	ON → OFF	
Current consumption		90mA
Weight		160g

*1: The module response time is not included.

For digital signal converter connection (output)

Item		FA3-TH1T16Y	FA3-TH1T16YE
Output type		Sink type	Source type
CC-Link station type		Remote I/O station	
No. of occupied stations		32 points are assigned to a station. (16 points are used.)	
No. of outputs		16 points	
Response time	OFF → ON	0.5ms or less*2	
	ON → OFF	1.5ms or less*2	
Current consumption		100mA	90mA
Weight		160g	

*2: The module response time is not included.

For analog signal converter connection (input)

Item		FA3-AT1C8X
No. of analog input points		8 channels/module
CC-Link station type		Remote device station
CC-Link version		Ver.1.10
No. of occupied stations		2
I/O characteristics	Analog input range	1 to 5V
	Digital output	0 to 16000
Accuracy (accuracy for the maximum digital output value)	Ambient temperature 0 to 55°C	±0.3% (±48 digits)*3
	Ambient temperature 25±5°C	±0.1% (±16 digits)*3
	Maximum resolution	0.25mV
Maximum conversion speed		1ms/channel*4
Current consumption		120mA
Weight		170g

*3: The module's accuracy is not taken into account.
*4: The module response time is not included.

For analog signal converter connection (output)

Item		FA3-AT1C8Y
No. of analog output points		8 channels/module
CC-Link station type		Remote device station
CC-Link version		Ver.1.10
No. of occupied stations		2
I/O characteristics	Digital input value	0 to 16000
	Analog output range	1 to 5V
Accuracy	Ambient temperature 0 to 55°C	±0.3% (±12mV)*5
	Ambient temperature 25±5°C	±0.1% (±4mV)*5
	Maximum resolution	0.25mV
Maximum conversion speed		1ms/channel*6
Current consumption		120mA
Weight		170g

*5: The module's accuracy is not taken into account.
*6: The module response time is not included.

Common specifications

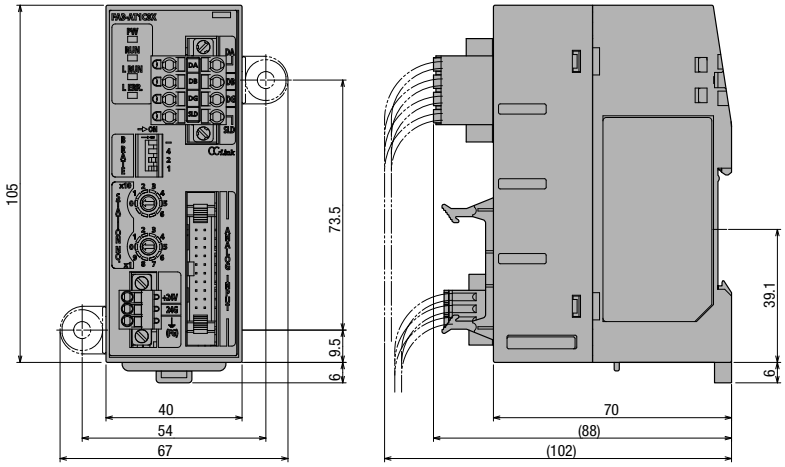
Item		Specifications
Operating ambient temperature		0 to 55°C
Operating ambient humidity		5 to 95%RH, non-condensing
Network specifications	Communication speed	10M/5M/2.5M/625k/156kbps
	Network topology	Bus topology (EIA RS485 compliant)
External interface	Communication part	Two-piece spring clamp terminal block
	Module power supply part	
Module installation		DIN rail installation or installation using the mounting bracket included with the module
Module power supply	Voltage	24VDC (ripple ratio: within 5%) (allowable voltage range: 20.4 to 28.8VDC)
	Current	Refer to the individual specifications.*7
External dimensions		105 (H) × 40 (W) × 70 (D) mm (not including the projections)
Applicable standard *8		UL, CE, KC

*7: The digital signal converter or the analog signal converter requires a separate 24VDC power supply. For specifications, refer to the manuals for the modules used.
*8: Check the compliance with the overseas standards of the products to be used in combination.

External dimensions

Common external dimensions for digital signal converter (terminal module) connection and analog signal converter connection

(Unit: mm)



Network bridge (CC-Link IE TSN–CC-Link bridge module)

CC-Link devices can be connected to CC-Link IE TSN.

P. 25

Connecting CC-Link devices to CC-Link IE TSN

CC-Link devices can be controlled on the CC-Link IE TSN side.

P. 25

Gradual replacement to CC-Link IE TSN

Existing devices, wiring, and operation data can be used.

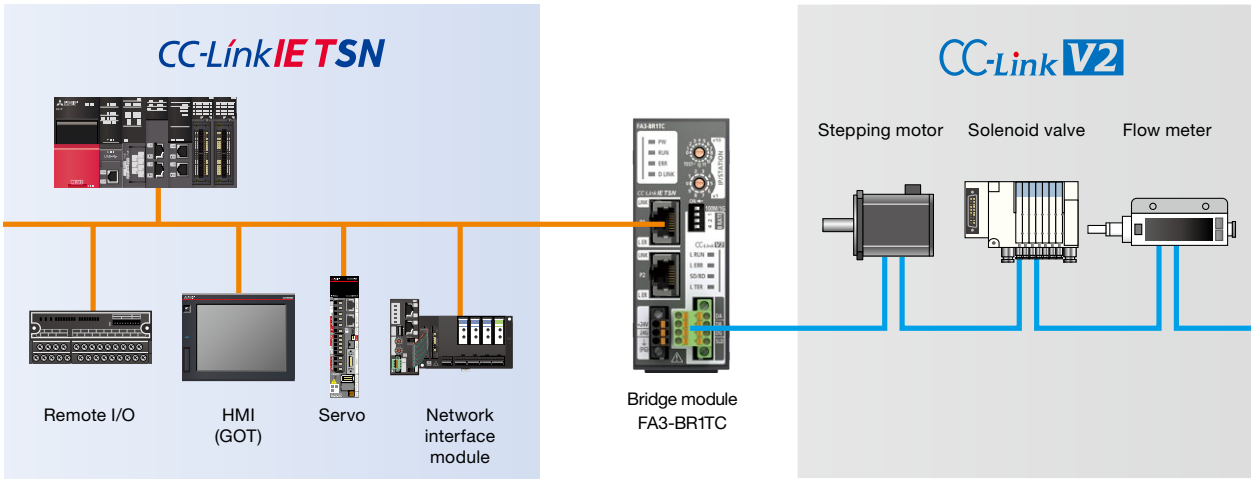
P. 26

Start-up support

With "easy setting" and "network status check" using the engineering tool, we support the start-up of the production site.

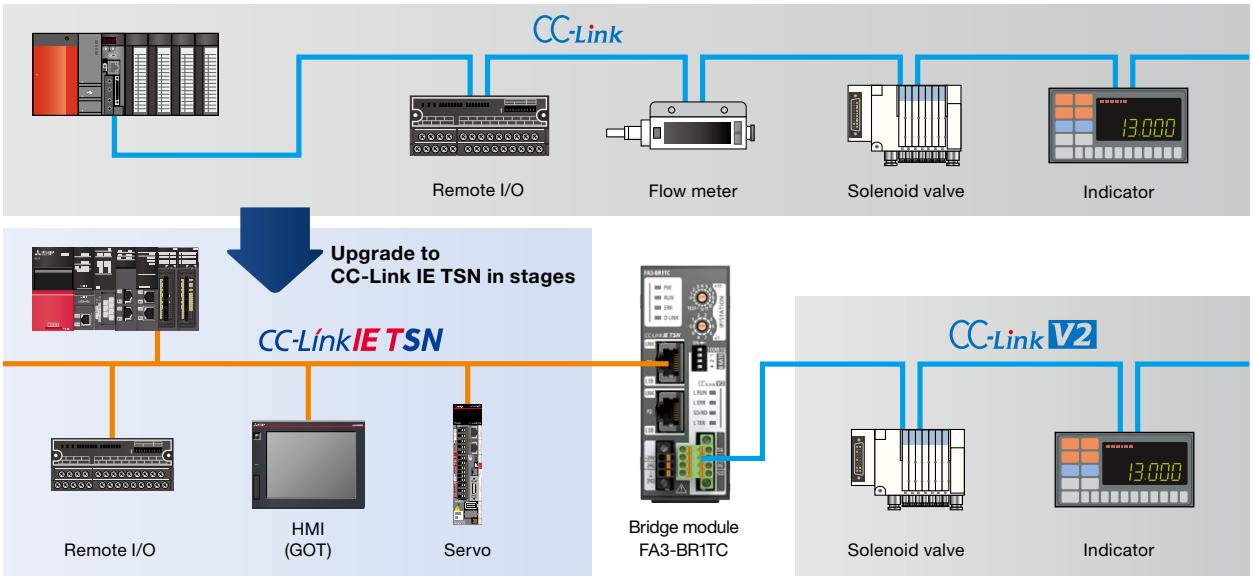
Connecting CC-Link devices to CC-Link IE TSN

- A CC-Link manager station is not required.
- Devices missing in the CC-Link IE TSN lineup can be connected. (Maximum 64 CC-Link stations)
- The devices are CC-Link IE TSN Class B Ver. 2.0 compatible.



Gradually replacing to CC-Link IE TSN

- By using the existing devices and wiring as they are, costs can be reduced and the duration of work can be shortened.
- The amount of plastic materials is reduced by reusing the devices.
- Data is collected from both new and old lines and equipment to verify the data using Mitsubishi Electric MELSOFT Gemini.
- Operation data from old lines and equipment can be used for new lines and equipment.



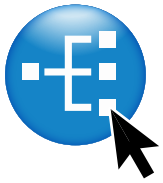
Start-up support: Easy setting using engineering tool

There is no need to start up multiple engineering tools and set them individually.
Both CC-Link IE TSN and CC-Link can be set using the same tool.

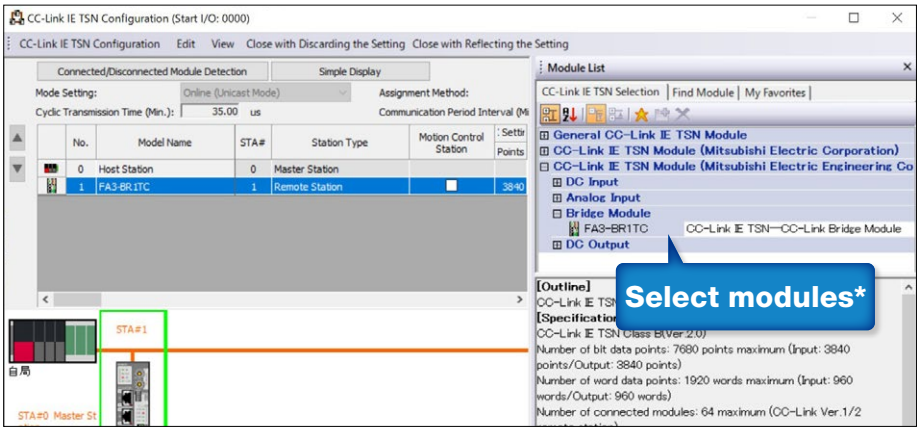
STEP 1 Startup tool

Startup GX Works3
(a Mitsubishi Electric product).

STEP 2 Add modules



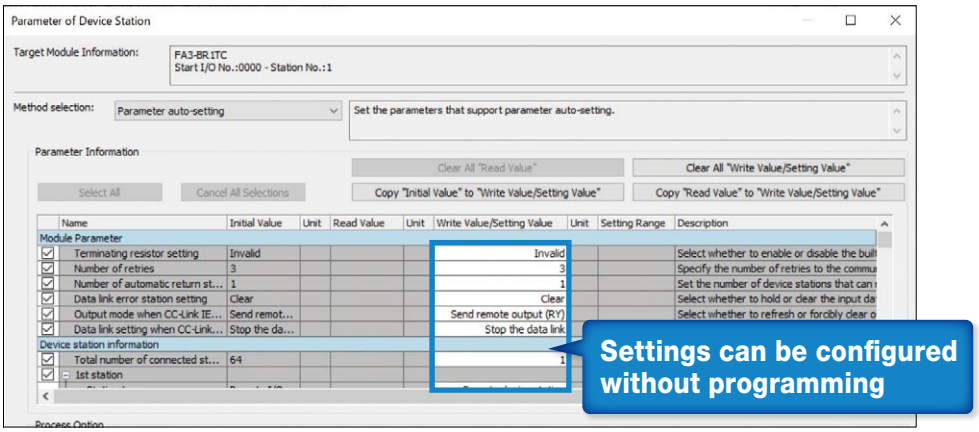
Select modules from the "Module List"
in the "CC-Link IE TSN Configuration" window.



* If the module is not displayed in the list, import the CSP+ file.

STEP 3 Parameter settings

- CC-Link IE TSN and CC-Link parameters can be configured without any programming.
- There is no need to setup multiple engineering tools.
- The automatic detection function of the CC-Link system is supported.



Start-up support: Checking network status using engineering tool

The network connection status at start-up can be checked with one tool.

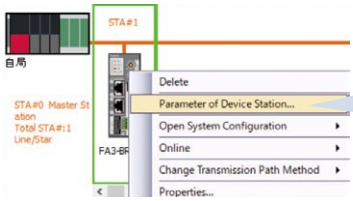
STEP 1 Startup tool

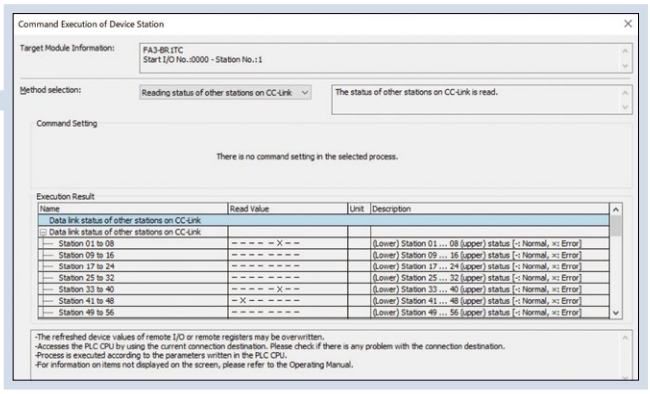
Startup GX Works3
(a Mitsubishi Electric product).

STEP 2 Display the Configuration window

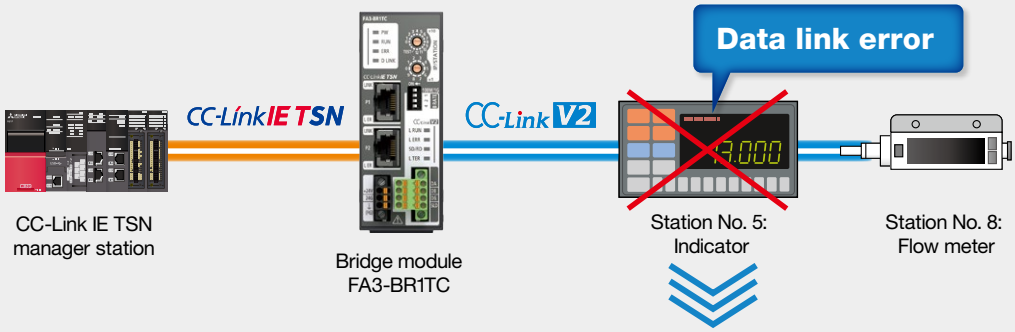
STEP 3 Check the connection status

Display the "CC-Link IE TSN Configuration" window and check the network connection status in the "Command Execution of Device Station" window.





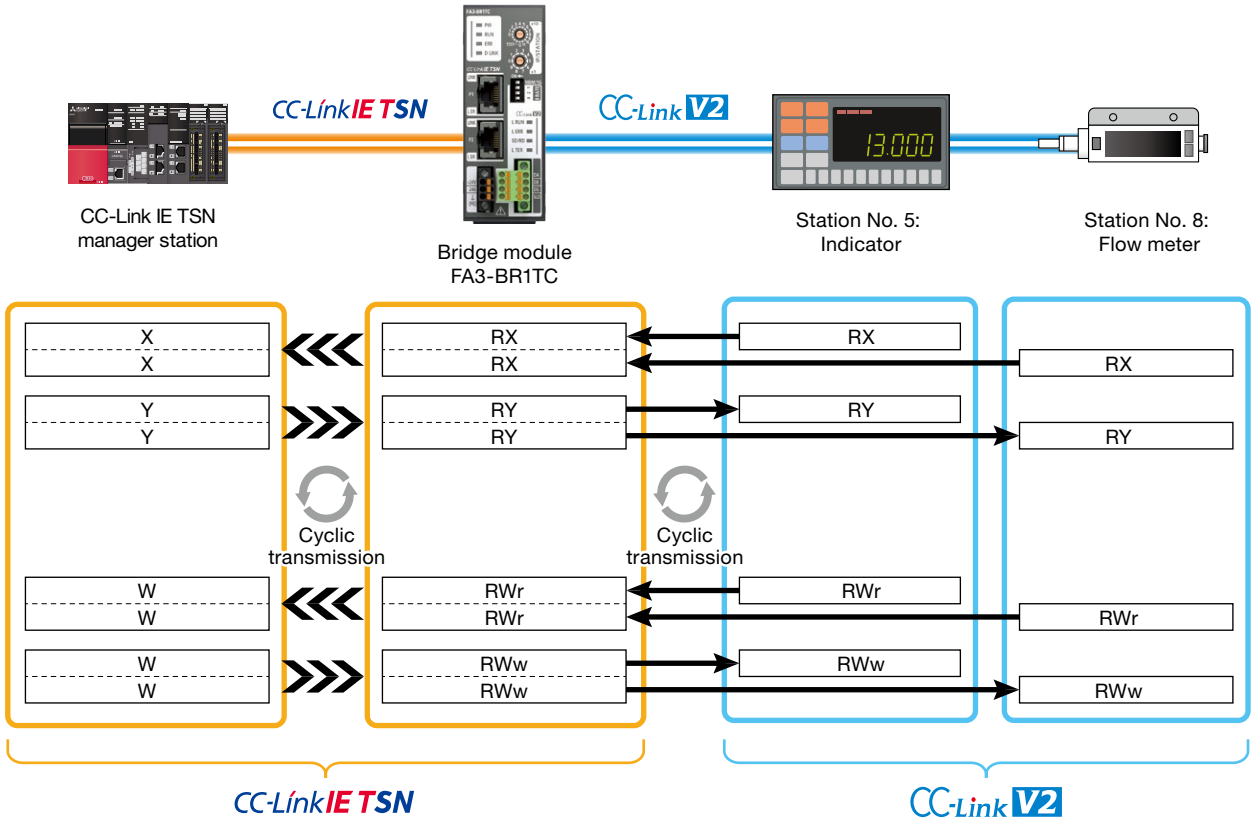
Data link error example



Name	Read Value	Unit	Description
Data link status of other stations on CC-Link			
Data link status of other stations on CC-Link			
Station 01 to 08	- - - - - × - -		(Lower) Station 01 ... 08 (upper) status [-: Normal, ×: Error]

Data communications between CC-Link IE TSN and CC-Link

Both CC-Link word data and bit data can be read from and written to the CC-Link IE TSN manager station.



Function List

Common specifications

Function	Description
Error history function	Checks the error history of this module using the engineering tool.
Unit test function	Checks for abnormalities with the module's hardware.

CC-Link IE TSN functions

Function	Description
Error notification function	Notifies the CC-Link IE TSN master station of CC-Link errors.
CC-Link IE TSN diagnostics	Checks the status of the module using the engineering tool. This function also checks the reasons of and solutions to errors.
Automatic parameter setting function	Automatically sets parameters via the master station when the module accesses or returns to the network.

CC-Link functions

Function			Description
Cyclic transmission	Communication with other stations	Communication using RX and RY	Communicates I/O data between the module and other stations with bits.
		Communication using RWr and RWw	Communicates I/O data between the module and other stations with words.
	Link refresh		Refreshes the CC-Link IE TSN and CC-Link data in the module.
	Cyclic data assurance		Prevents read/write data from being separated from new and old data.
	Input data from data link faulty station		Holds or clears input data from stations with a faulty data link.
	CC-Link IE TSN Master station output Hold/Clear setting during CPU module STOP		Holds or clears the refresh data of Remote output (RY) to 0 when CC-Link IE TSN communications stop.
	Data link setting at CPU module error on CC-Link IE TSN master station		Stops or resumes data link when the CC-Link IE TSN communications stop.
	Setting at data link error on CC-Link IE TSN side		Holds or clears data sent to CC-Link when a data link error occurs in the bridge module.
	Data link stop and restart		Stops or restarts data link during operations such as debugging.
	Remote I/O station points setting		8, 16, or 32 refresh points can be selected.
RAS	Device station cut-off function		Continues data link with normally operating stations and disconnects device stations that cannot perform data link due to an error.
	Automatic return function		Automatically returns the disconnected device station to the network and restarts the data link when a disconnected station returns to normal.
Diagnostics	Line test		Checks whether data link with the device station is possible.
	CC-Link diagnostics		Checks the status of the CC-Link system.
Other	Reserved station function		Reserves a disconnected device station and does not recognize it as an error station.
	Error invalid station setting function		Prevents a device station from being detected as an error station.
	Temporary error invalid station setting function		Temporarily prevents a station from being detected as an error station when a device station data link error occurs.
	Automatic detection of connected devices function		Automatically detects connected devices in the "Device list".

Model list

CC-Link IE TSN - CC-Link bridge module

Specifications		Model
CC-Link IE TSN - CC-Link bridge module	• User's Manual (Hardware) • Mounting bracket	FA3-BR1TC

Specifications

CC-Link IE TSN - CC-Link bridge module

FA3-BR1TC

- Devices missing in the CC-Link IE TSN lineup can be controlled.
- Gradual replacement to CC-Link IE TSN is possible.
- By using the existing devices and wiring as they are, costs can be reduced and the duration of work can be shortened.
- The amount of plastic materials is reduced by reusing the devices.
- Data can be collected from both new and old lines and equipment to verify the data using Mitsubishi Electric MELSOFT Gemini.
- Operation data of the old lines and equipment can be used for the new lines and equipment.

Specifications

Item			Description
External interface	CC-Link IE TSN communication part		RJ45 connector × 2
	CC-Link communication part		Terminal block for the CC-Link system (2-piece spring clamp terminal block)
	Module power supply part		Terminal block for module power supply and FG (2-piece spring clamp terminal block)
Applicable DIN rail			TH35-7.5Fe, TH35-7.5Al (compliant with JIS C 2812)
Connection cable and wire	CC-Link IE TSN	1Gbps	An Ethernet cable that meets the 1000BASE-T standard (straight/crossover)
			Category 5e or higher (double-shielded, STP) cable
		100Mbps	An Ethernet cable that meets the 100BASE-TX standard (straight/crossover)
			Category 5 or higher (double shielded, STP) cable
	CC-Link		Ver. 1.10-compatible CC-Link dedicated cable (FA-CBL200PSBH, FANC-110SBH, and CS-110 manufactured by Mitsubishi Electric)
			Terminal slot size of the terminal block: 2.4mm × 1.5mm
	Module power supply and FG	Wire size	0.14 to 1.5mm^2 (24 to 16 AWG)
		Type	Stranded or solid wire
		Material	Copper
		Temperature rating	75°C or higher
Module power supply	Voltage		24VDC (ripple ratio: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current		150mA
External dimensions	Height (H)		105mm
	Width (W)		40mm
	Depth (D)		70mm (not including a terminal block)
			86mm (including a terminal block)
Weight			180g

Network specifications

Item			Description
CC-Link IE TSN	Communication speed		1Gbps/100Mbps
	Station type		Remote station
	Certification class		Class B Ver. 2.0
	Topology		Line topology/Star topology/Mixture of star and line topology/Ring topology
	Number of link points	RX/RY	3840 points (480 bytes)/3840 points (480 bytes)
		RWw/RWr	960 points (1920 bytes)/960 points (1920 bytes)
CC-Link	Transmission speed		Select from 156kbps, 625kbps, 2.5Mbps, 5Mbps, or 10Mbps.
	CC-Link version		Ver. 2.00
	Station type		Manager station
	Maximum number of connectable stations		64 stations
	Maximum number of link points	CC-Link Ver. 1	Remote I/O (RX/RY)	2048 points (256 bytes)/2048 points (256 bytes)
			Remote register (RWw/RWr)	256 points (512 bytes)/256 points (512 bytes)
		CC-Link Ver. 2	Remote I/O (RX/RY)	3584 points (448 bytes)/3584 points (448 bytes)
			Remote register (RWw/RWr)	816 points (1632 bytes)/816 points (1632 bytes)
	Station-to-station cable length (minimum station-to-station distance)			20cm
	Maximum overall cable length (maximum transmission distance)			156kbps: 1200m 625kbps: 900m 2.5Mbps: 400m 5Mbps: 160m 10Mbps: 100m

Version that supports CC-Link IE TSN

Class	Support
Class A Ver. 2.0	×
Class B Ver. 2.0	○

CC-Link connection specifications

Send station	Receive station						
CC-Link Ver. 2.00	CC-Link Ver. 2.00			CC-Link Ver. 1.10			
Manager station	Local station	Intelligent device station	Remote device station	Local station	Intelligent device station	Remote device station	Remote I/O station
CC-Link IE TSN - CC-Link bridge module	×	×	○*1	×	×	○*2	○*2

*1: Extended cyclic communication
*2: Cyclic communication

Economical network setup (CC-Link)

Various types of cables and branch modules are available

for connection to the CC-Link network.

1 CC-Link simple type T-branch module

Enabling T-branch of a power cable

2 CC-Link terminated cable

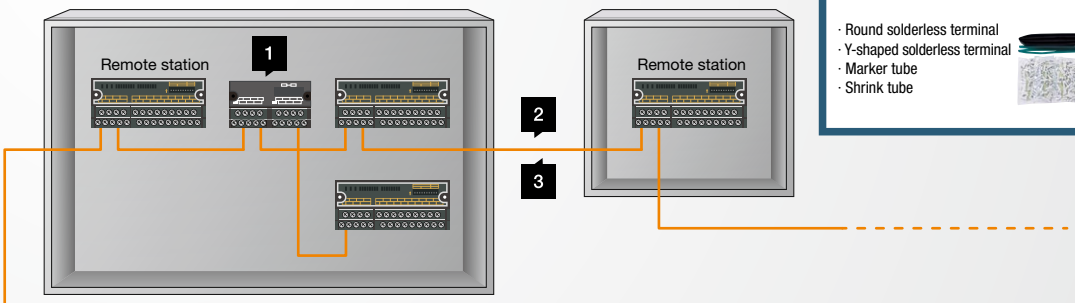
- Round solderless terminal cable
- Y-shaped solderless terminal cable
- One-touch connector cable
- Cylindrical rod terminal cable

3 CC-Link cable

- Standard cable
- Flexible cable
- Cold-resistant cable
- Cable with built-in power cable

CC-Link cable terminated parts set

- Round solderless terminal
- Y-shaped solderless terminal
- Marker tube
- Shrink tube



4 Waterproof type T-branch module

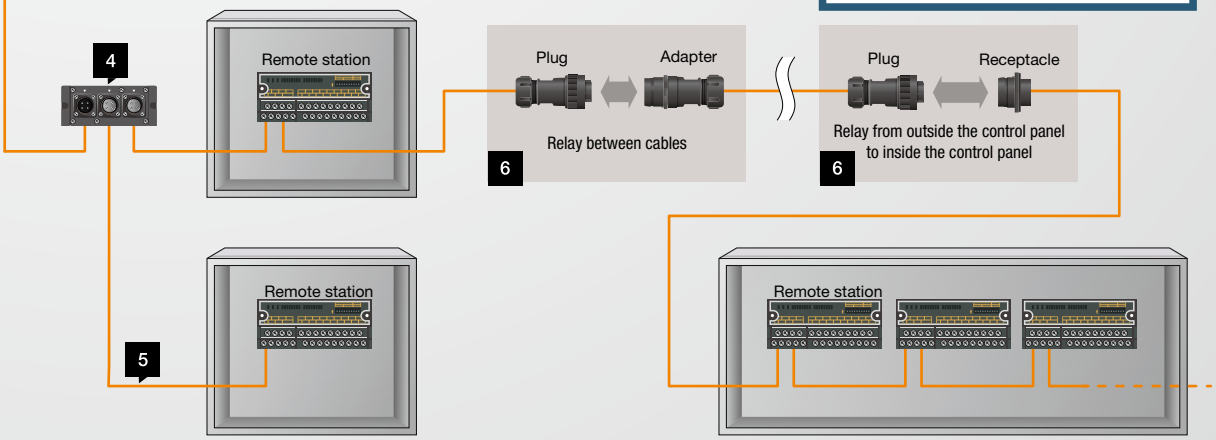
Enabling T-branch of the power cable (IP67)

5 CC-Link cable with waterproof connector

6 Waterproof connector

The waterproof connectors can be connected and removed with one click.

Dustproof cap for CC-Link waterproof connector



Model list

CC-Link simple type T-branch module

Specifications			Model
Simple type	Built-in 110Ω terminating resistor (Switching between on and off)	M3 screw	FA-TK72

CC-Link terminated cable

Supported version	Specifications	Cable length	Model
Ver.1.00	Round solderless terminal	0.3m	FA-CBL03CC
		0.5m	FA-CBL05CC
		1m	FA-CBL10CC
		2m	FA-CBL20CC
	Y-shaped solderless terminal	0.3m	FA-CBL03CCY
		0.5m	FA-CBL05CCY
		0.7m	FA-CBL07CCY
		1m	FA-CBL10CCY
		2m	FA-CBL20CCY
Ver.1.10	Round solderless terminal	0.3m	FA-CBL03CCPH
		0.4m	FA-CBL04CCPH
		1m	FA-CBL10CCPH
		2m	FA-CBL20CCPH
	Y-shaped solderless terminal	0.2m	FA-CBL02CCPHY
		0.3m	FA-CBL03CCPHY
		0.5m	FA-CBL05CCPHY
		0.7m	FA-CBL07CCPHY
		1m	FA-CBL10CCPHY
		1.5m	FA-CBL15CCPHY
		2m	FA-CBL20CCPHY
	Cylindrical bar terminal	0.2m	FA-CBL02CCPHF
		0.5m	FA-CBL05CCPHF
		0.7m	FA-CBL07CCPHF
	One-touch connector	0.2m	FA-CBL02CCPHP

CC-Link cable

Supported version	Specifications	Cable length	Model
Ver.1.00	Standard cable	200m*1	FA-CBL200SB
	High-performance cable		FA-CBL200SBH
	Vibration-resistant cable (for movable part)		FA-CBL200SBZ
	Cable with a built-in 24VDC power cable	100m*2	FA-CBL100PWSB
Ver.1.10	Standard cable	200m*1	FA-CBL200PSBH
	Vibration-resistant cable (for movable part)		FA-CBL200PSBZ
	Cold-resistant cable		FA-CBL200LTPSBH
	Cable with a built-in 24VDC power cable	100m*2	FA-CBL100PWPSBH

*1: Custom lengths are not available, but a 1000-meter option is available.
*2: Custom lengths are not available, but a 500-meter option is available.

CC-Link cable terminated parts set

Specifications	Model
Round solderless terminal type, Quantity: 100	FA-R100SET
Y-shaped solderless terminal type, Quantity: 100	FA-Y100SET

CC-Link waterproof type T-branch module

Specifications			Model
Waterproof type	Dedicated to communication cables	4-pin connector	FA-TW43
	For cables with a built-in power cable	7-pin connector	FA-TW73

Cable with CC-Link waterproof connector

Supported version	Specifications	Cable length	Model
Ver.1.10	With a female connector (FA-204-PF8) on one end	5m	FA-CBL05PSBH4F
	With a male connector (FA-204-PM8) on one end	5m	FA-CBL05PSBH4M
Ver. 1.00, Cable with a built-in power cable	With a female connector (FA-207-PF12) on one end	10m	FA-CBL10PWSB7F
	With a male connector (FA-207-PM12) on one end	10m	FA-CBL10PWSB7M
	With a male connector (FA-207-PM12) and a female connector (FA-207-PF12)	1m	FA-CBL01PWSB7MF

CC-Link waterproof connector

Specifications			Model
4-pin adapter	Female (connecting to the plug, FA-204-PM*)	Packing diameter: ϕ6	FA-204-AdF6
		Packing diameter: ϕ8	FA-204-AdF8
		Packing diameter: ϕ10	FA-204-AdF10
		Packing diameter: ϕ12	FA-204-AdF12
	Male (connecting to the plug, FA-204-PF*)	Packing diameter: ϕ6	FA-204-AdM6
		Packing diameter: ϕ8	FA-204-AdM8
		Packing diameter: ϕ10	FA-204-AdM10
		Packing diameter: ϕ12	FA-204-AdM12
7-pin adapter	Female (connecting to the plug, FA-207-PM*)	Packing diameter: ϕ6	FA-207-AdF6
		Packing diameter: ϕ8	FA-207-AdF12
	Male (connecting to the plug, FA-207-PF*)	Packing diameter: ϕ6	FA-207-AdM6
		Packing diameter: ϕ8	FA-207-AdM8
		Packing diameter: ϕ12	FA-207-AdM12
4-pin plug	Female	Packing diameter: ϕ6	FA-204-PF6
		Packing diameter: ϕ8	FA-204-PF8
		Packing diameter: ϕ10	FA-204-PF10
		Packing diameter: ϕ12	FA-204-PF12
	Male	Packing diameter: ϕ6	FA-204-PM6
		Packing diameter: ϕ8	FA-204-PM8
		Packing diameter: ϕ10	FA-204-PM10
		Packing diameter: ϕ12	FA-204-PM12
7-pin plug	Female	Packing diameter: ϕ6	FA-207-PF6
		Packing diameter: ϕ8	FA-207-PF8
		Packing diameter: ϕ10	FA-207-PF10
		Packing diameter: ϕ12	FA-207-PF12
	Male	Packing diameter: ϕ8	FA-207-PM8
		Packing diameter: ϕ10	FA-207-PM10
		Packing diameter: ϕ12	FA-207-PM12
4-pin receptacle	Female		FA-204-RF
	Male		FA-204-RM
7-pin receptacle	Female		FA-207-RF
	Male		FA-207-RM
Built-in 110Ω terminating resistor (4-pin)	Male		FA-CONW4P110E
Built-in 110Ω terminating resistor (7-pin)	Male		FA-CONW7P110E

Dustproof cap for CC-Link waterproof connector

Specifications		Model
For adapter	Used for FA-204-AdM*/AdF*, FA-207-AdM*/AdF* (IP67 non-compliant)	FA-NRW-20-AdCa
For plug	Used for FA-204-PM*/PF*, FA-207-PM*/PF* (IP67 non-compliant)	FA-NRW-20-PCa1
For receptacle	Used for FA-204-RM/RF, FA-207-RM/RF, FA-TW43/73 (IP67 non-compliant)	FA-NRW-20-RCa

Specifications

CC-Link cable

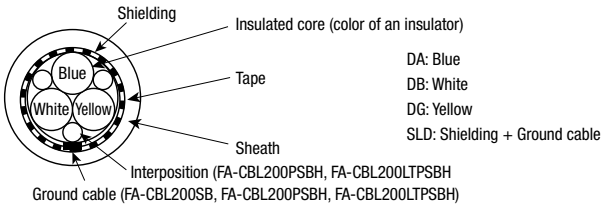
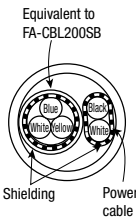
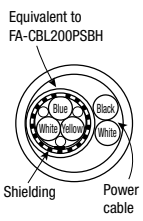
FA-CBL200SB
FA-CBL200SBH
FA-CBL200SBZ
FA-CBL200PSBH
FA-CBL200PSBZ
FA-CBL200LTPSBH
FA-CBL100PWSB
FA-CBL100PWPSBH

■ Vibration-resistant cables (for movable part) and cold-resistant cables are available.
■ Cables with a built-in 24VDC power cable for CC-Link remote station is available.

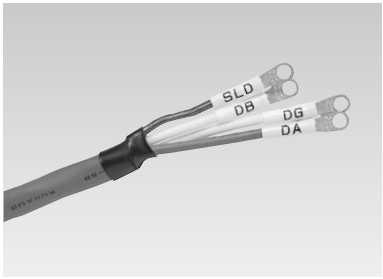
Related products

CC-Link cable terminated parts set P.35
Waterproof connector P. 41 to 43

Specifications

Item		Specifications						Specifications (power supply)	
		CC-Link cable	CC-Link high-performance cable	CC-Link vibration-resistant cable	Ver. 1.10-compatible CC-Link cable	Ver.1.10-compatible vibration-resistant CC-Link cable*3	Ver.1.10-compatible cold-resistant CC-Link cable	CC-Link cable with a power cable*1	Ver.1.10-compatible CC-Link cable with a power cable*2
		FA-CBL200SB	FA-CBL200SBH	FA-CBL200SBZ	FA-CBL200PSBH	FA-CBL200PSBZ	FA-CBL200LTPSBH	FA-CBL100PWSB	FA-CBL100PWPSBH
Version		Ver. 1.00			Ver. 1.10			Ver. 1.00	Ver. 1.10
Application		For fixed part		For movable part	For fixed part	For movable part	For fixed part	For fixed part	
Conductor	Material	Annealed copper assembled wire		Annealed copper composite stranded wire	Annealed copper stranded wire	Annealed copper composite stranded wire	Annealed copper stranded wire	Annealed copper assembled wire	
Conductor	No. of wires/wire diameter	20 wires/0.18mm		3×33 wires/0.08mm	7 wires/0.32mm	3×33 wires/0.08mm	7 wires/0.32mm	30 wires/0.18mm	
Conductor	Nominal cross sectional area	0.5mm^2						0.75mm^2	
Conductor	Resistance (20°C)	37.8Ω/km or less		43.4Ω/km or less	34.5Ω/km or less	43.4Ω/km or less	34.5Ω/km or less	25.1Ω/km or less	
Characteristic impedance (1MHz)		100±15Ω	130±15Ω	100±15Ω	110±15Ω	110±15Ω	110±15Ω		
Capacitance (1kHz)		60nF/km or less	40nF/km or less	60nF/km or less	50nF/km or less	60nF/km or less	50nF/km or less		
Maximum specification voltage/current								26.4VDC/7A (30°C)	
Insulation resistance		10000MΩ·km or more						10MΩ·km or more	
Withstand voltage		500VDC for one minute						1000VAC for one minute	
Outside diameter		Approx. 7.0mm	Approx. 8.0mm	Approx. 8.0mm	Approx. 7.6mm	Approx. 8.0mm	Approx. 7.6mm	Approx. 12.0mm	
Weight		Approx. 13kg/200m	Approx. 12kg/200m	Approx. 14kg/200m	Approx. 14kg/200m	Approx. 14kg/200m	Approx. 14kg/200m	Approx. 15kg/100m	Approx. 16kg/100m
Length		200m						100m	
Cable type		Shielded twisted pair cable						Shielded twisted pair cable	
Color of sheath		Brown		Dark brown	Brown	Dark brown	Black	Brown	
Operating temperature		-15 to 75°C		0 to 75°C	-15 to 75°C	0 to 75°C	-40 to 60°C	-15 to 75°C	
Cross section									
Manufacturer (KURAMO ELECTRIC CO., LTD.) model		FANC-SB	FANC-SBH	FANC-SBZ	FANC-110SBH	FANC-110SBZ-5	LT-FANC-110SBH	FANC-(SB)	PW110SBH

*1: The specifications of the FA-CBL100PWSB are only for the power supply. Since the specifications of the communication cable is equivalent to the FA-CBL200SB, refer to the specifications for the FA-CBL200SB.
*2: The specifications of the FA-CBL100PWPSBH are only for the power supply. Since the specifications of the communication cable is equivalent to the FA-CBL200PSBH, refer to the specifications for the FA-CBL200SB.
*3: The maximum transmission distance of the FA-CBL200PSBZ (vibration-resistant cable) is 50% of that of the FA-CBL200PSBH (fixing cable).
When using them together, double the transmission distance to achieve the maximum transmission distance. (FA-CBL200PSBH maximum transmission distance ≥ [FA-CBL200PSBH cable length] + [FA-CBL200PSBZ cable length] × 2)

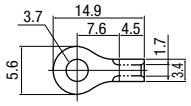
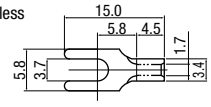


CC-Link terminated cable (Round/Y-shaped solderless terminal type)

FA-CBL**CC
FA-CBL**CCY
FA-CBL**CCPH
FA-CBL**CCPHY

■ Since the cable terminal is processed to match the terminal block of the CC-Link remote station, wiring can be easier.
■ A marker tube with a signal name is attached to each wire to prevent incorrect wiring.

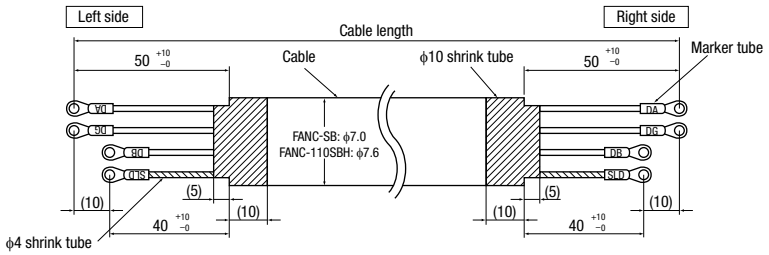
Specifications

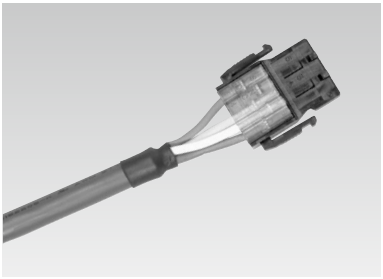
Item	Specifications			
	FA-CBL**CC	FA-CBL**CCY	FA-CBL**CCPH	FA-CBL**CCPHY
Cable	CC-Link cable (FA-CBL200SB)		Ver. 1.10-compatible CC-Link cable (FA-CBL200PSBH)	
Solderless terminal	Round solderless terminal	Y-shaped solderless terminal	Round solderless terminal	Y-shaped solderless terminal
Solderless terminal dimensions	Round solderless terminal  (Unit: mm)		Y-shaped solderless terminal  (Unit: mm)	
Marker tube printing	Blue core: "DA", White core: "DB", Yellow core: "DG", Shielding (green): "SLD"			
Shrink tube for shielding	Green ϕ4			
Shrink tube for cable	Black ϕ10			

Model		FA-CBL**CC	FA-CBL**CCY	FA-CBL**CCPH	FA-CBL**CCPHY
**	Length	Weight	Weight	Weight	Weight
02	0.2m	–	–	–	Approx. 20g
03	0.3m	Approx. 30g	Approx. 30g	Approx. 30g	Approx. 30g
04	0.4m	–	–	Approx. 40g	–
05	0.5m	Approx. 50g	Approx. 50g	–	Approx. 50g
07	0.7m	–	Approx. 70g	–	Approx. 70g
10	1.0m	Approx. 100g	Approx. 100g	Approx. 100g	Approx. 100g
15	1.5m	–	–	–	Approx. 150g
20	2.0m	Approx. 200g	Approx. 200g	Approx. 200g	Approx. 200g

External dimension

(Unit: mm)





CC-Link terminated cable (one-touch connector type)

FA-CBL**CCPHP

■ Cost and time spent on cable processing can be saved.

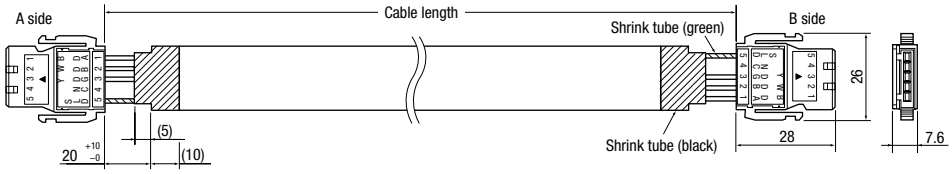
Specifications

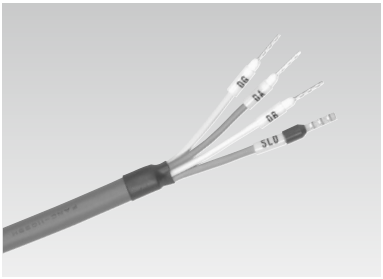
Item	Specifications
Cable	Ver. 1.10-compatible CC-Link cable (FA-CBL200PSBH)
Connector manufacturer model	35505-6000-B0M GF manufactured by 3M Japan Limited
Model to be connected	35610-6234-B00 PE manufactured by 3M Japan Limited
Applicable model	CC-Link partner products to which the one-touch connectors of Mitsubishi Electric CC-Link modules, the AJ65VBT series, can be connected

Model		FA-CBL**CCPHP
**	Length	Weight
02	0.2m	Approx. 50g

External dimension

(Unit: mm)





CC-Link terminated cable (Cylindrical rod terminal type)

FA-CBL**CCPHF

■ Cost and time spent on cable processing can be saved.
■ A marker tube with a signal name is attached to each wire to prevent incorrect wiring.

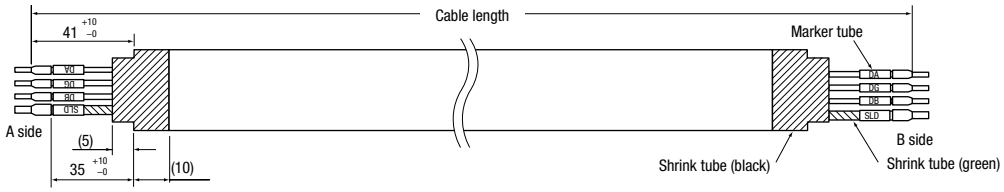
Specifications

Item	Specifications
Cable	Ver. 1.10-compatible CC-Link cable (FA-CBL200PSBH)
Connector manufacturer model	35505-60 00-B0M GF manufactured by 3M Japan Limited AI 0.5-10 WH (signal line), AI 2.5-10 BU (shielding)
Model to be connected	35610-6234-B00 PE manufactured by 3M Japan Limited
Marker tube printing	Blue core: "DB", White core: "DB", Yellow core: "DG", Shielding (green): "SLD"
Applicable model	CC-Link partner products to which the one-touch connectors of Mitsubishi Electric CC-Link modules, the AJ65VBT series, can be connected

Model		FA-CBL**CCPHF
**	Length	Weight
02	0.2m	Approx. 20g
05	0.5m	Approx. 50g
07	0.7m	Approx. 70g

External dimension

(Unit: mm)



CC-Link terminated parts set (Round/Y-shaped solderless terminal type)

FA-R100SET
FA-Y100SET

■ The CC-Link terminated parts set can be purchased.

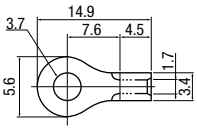
Specifications

Item		Specifications	
		FA-R100SET	FA-Y100SET
Solderless terminal		Round solderless terminal, Quantity: 400	Y-shaped solderless terminal, Quantity: 400
Marker tube	Marking and size	Marking: "DA", "DB", "DG", "SLD" Size: ϕ3 × 15mm (inside diameter × length)	
	Quantity	100/each marking	
Shrink tube	For shielding	ϕ4 green 4m	
	For cable sheath	ϕ10 back 2m	
Weight		Approx. 350g	Approx. 340g

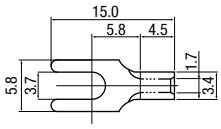
External dimension

(Unit: mm)

Round solderless terminal



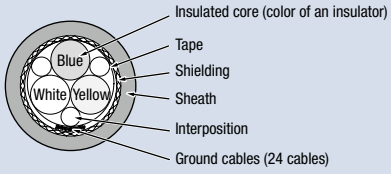
Y-shaped solderless terminal



CC-Link cable terminal processing

• Required tools

(1) Crimping tool ..... Used for crimping the solderless terminals
(2) Nipper ..... Used for cutting interposed materials for a cable
(3) Hot air generator ..... Used for shrinking tubes
(The generators that can generate hot air of 120˚C or higher. Example: HAKKO heating gun 880B manufactured by HAKKO Corporation.)



Structure diagram of Ver. 1.10-compatible CC-Link cable

• Procedure (Example: When processing one end of a cable)

Round/Y-shaped solderless terminal processing

(1) Cut the cable to a length of minus 14mm from the length of cable you want to complete.
(2) Cut the ϕ4 (green) shrink tube to a length of about 36mm.
(3) Cut the ϕ10 (black) shrink tube to a length of about 15mm.
(4) Peel the cable sheath about 52mm from the cable end.
(5) Untie the shield (tin-plated soft copper braided wire) and twist it from the root together with the ground wire to make one stranded wire.
(6) Peel the tape and cut the tape and interposed material at the root.
(7) Cut the insulating core (white) and the shielded stranded wire so that they are a length of about 42mm from the peeled end of the sheath.
(8) Insert the ϕ4 (green) shrink tube up to the root of the peeled end of the shielded stranded wire.
(9) Shrink the shrink tubing using a hot air generator. (Be careful not to apply excessive heat as the insulator melts easily.).
(10) Insert the ϕ10 (black) shrink tube into the cable and set it at a position of about 5mm from the peeled end to the peeled side and about 10mm to the non-peeled side.
(11) Shrink the shrink tubing using a hot air generator. (Be careful not to apply excessive heat as the insulator melts easily.).
(12) Peel off the insulator of each core wire by about 5mm from the end.
(13) Insert the marker tubes "DA" into the blue core, "DB" into the white core, "DG" into the yellow core, and "SLD" into the green (shielded stranded wire). (Insert the marker tubes with the solderless terminals on the right so that characters on the marker tubes can be read.)
(14) Place a solderless terminal on the isolator-peeled part of each core and crimp the terminal using a crimping tool.
Caulking wire diameter of the crimping tool … 1.25mm^2

CC-Link simple type T-branch module

FA-TK72

■ The 24VDC power cable can be T-branched.
■ Since a 110Ω terminating resistor is built in the module, it can be used as a terminating resistor. (Switching between on and off)
■ Terminal block can be removed from the module, enabling easy wiring and maintain.

Related products

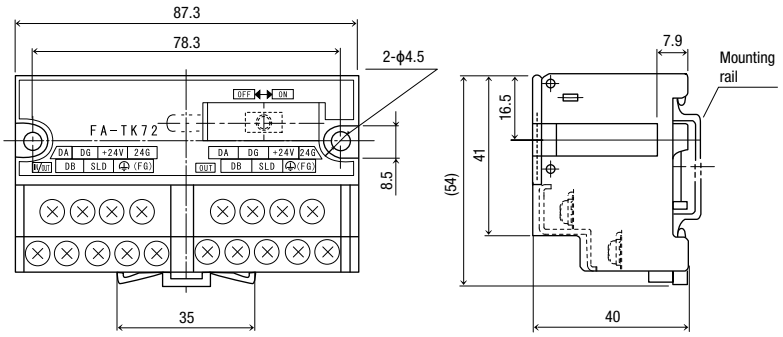
CC-Link cable P.35
CC-Link terminated cable P.36 and 37
CC-Link terminated parts set P.38

Specifications

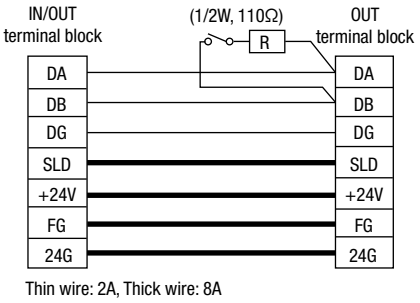
Item		Specifications
Maximum operating voltage/current		Voltage: 26.4VDC/Current: Signal ····· 2A, Power supply, ground wire ····· 8A
Terminal screw		M3 screw, spring-up, 7.62mm pitch
Applicable wire, tightening torque		0.3 to 2mm^2 (with solderless terminal used), 58.8 to 88.2N·cm (6 to 9kgf·cm)
Module installation	DIN rail	TH35-7.5Fe, TH35-7.5AI (IEC 60715 compliant)
	Screw type	M4 × 0.7mm × 15mm or more, tightening torque: 78 to 118N·cm (8 to 12kgf·cm)
Withstand voltage, insulation resistance		500VAC for one minute, 100MΩ or more (between charged areas and ground)
Weight		Approx. 140g

External dimension

(Unit: mm)



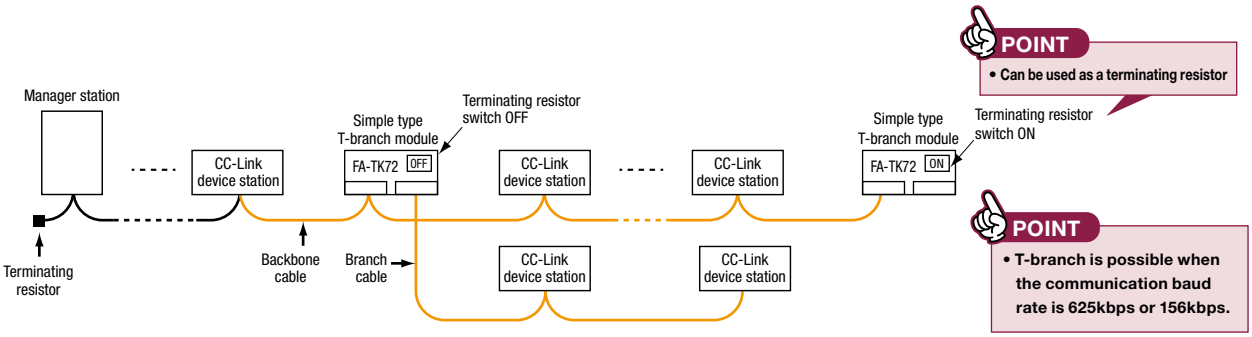
Connection diagram



Thin wire: 2A, Thick wire: 8A

Application example

An example of T-branched connection of a CC-Link cable by using the CC-Link simple type T-branch module is shown below.



Note: There are restrictions on the T-branch connection of the CC-Link cable. For details on the restrictions, refer to the CC-Link Manager/Local Module User's Manual (Detailed) and the CC-Link catalogs.

CC-Link Waterproof type T-branch module

FA-TW43
FA-TW73

■ One-touch connection and removal of the waterproof connectors reduces cost and time for wiring.
■ The 24VDC power cable can be branched.

Related products

CC-Link cable P.35
Dustproof cap P.44
Terminating connector P.41
Waterproof connector P.41 to 43
Cable with waterproof connector P.45

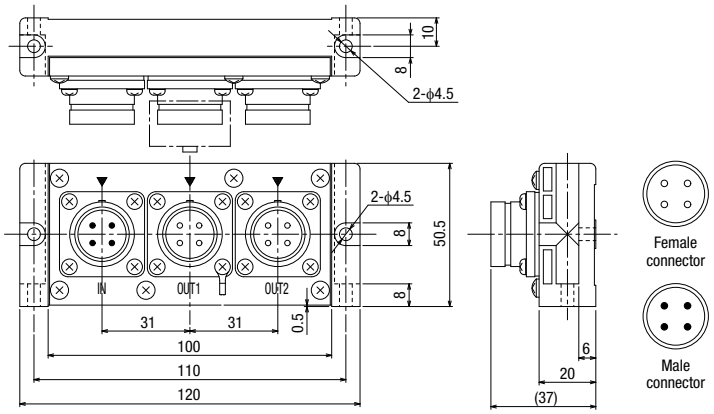
Specifications

Item		Specifications	
		FA-TW43	FA-TW73
Connector		4-pin connector	7-pin connector
Protection level		IP67*	
Maximum operating voltage/current		26.4VDC/Signal ····· 2A, Ground wire ····· 8A	26.4VDC/Signal, Ground wire ····· 2A, Power supply ····· 8A
Applicable wire		1.25mm^2 or less	
Module installation	Horizontal	M4 × 0.7mm × 13mm or more, tightening torque: 78 to 118N·cm (8 to 12kgf·cm)	
	Vertical	M4 × 0.7mm × 15mm or more, tightening torque: 78 to 118N·cm (8 to 12kgf·cm)	
Withstand voltage, insulation resistance		2000VAC for one minute, 100MΩ or more (between charged areas and ground)	
Weight		Approx. 200g	Approx. 200g

*: This specification is for when applicable connectors are connected to these models.

External dimension

(Unit: mm)



Connection diagram

FA-TW43

IN Male connector		OUT1 Female connector		OUT2 Female connector	
1	DA	1	DA	1	DA
2	DB	2	DB	2	DB
3	DG	3	DG	3	DG
4	SLD	4	SLD	4	SLD

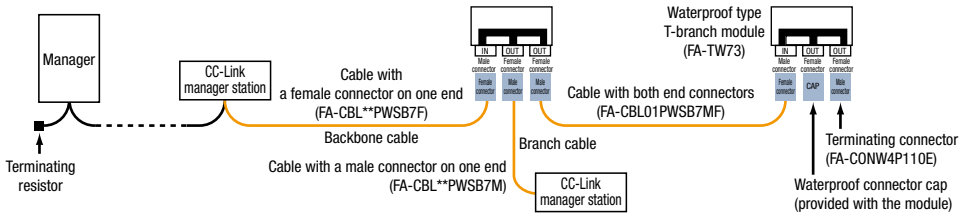
FA-TW73

IN Male connector		OUT1 Female connector		OUT2 Female connector	
1	DA	1	DA	1	DA
2	DB	2	DB	2	DB
3	DG	3	DG	3	DG
4		4		4	
5	+24V	5	+24V	5	+24V
6	24G	6	24G	6	24G
7	SLD	7	SLD	7	SLD

Thin wire: 2A, Thick wire: 8A

Application example

An example of T-branched connection of a CC-Link cable using the CC-Link waterproof type T-branch module is shown below.



POINT

• T-branch is possible when the communication baud rate is 625kbps or 156kbps.

Note: There are restrictions on the T-branch connection of the CC-Link cable. For details on the restrictions, refer to the CC-Link Manager/Local Module User's Manual (Detailed) and the CC-Link catalogs.

CC-Link waterproof connector (with a built-in terminating resistor)

FA-CONW4P110E
FA-CONW7P110E

■ The CC-Link waterproof connectors are a connector with a 110Ω built-in terminating resistor and connected to the waterproof type T-branch modules.

Related products

Waterproof type
T-branch module P.40

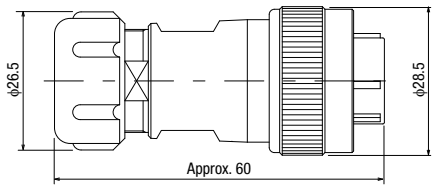
Specifications

Item	Specifications	
	FA-CONW4P110E	FA-CONW7P110E
Protection level	IP67*	
Terminating resistor	110Ω, 1/2W	
Contact	4-pin male	7-pin male
Weight	Approx. 40g	Approx. 40g

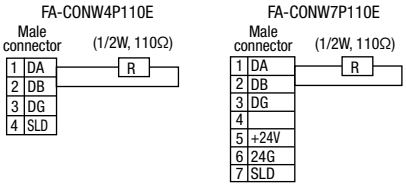
*: This specification is for when applicable connectors are connected to these models.

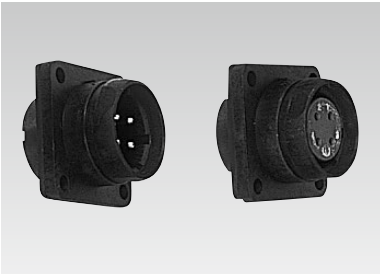
External dimension

(Unit: mm)



Connection diagram





CC-Link waterproof connector (receptacle)

FA-204-RM
FA-204-RF
FA-207-RM
FA-207-RF

■ The CC-Link waterproof connectors (receptacle) are a one-touch connection/removal junction connector and connected to the panels.

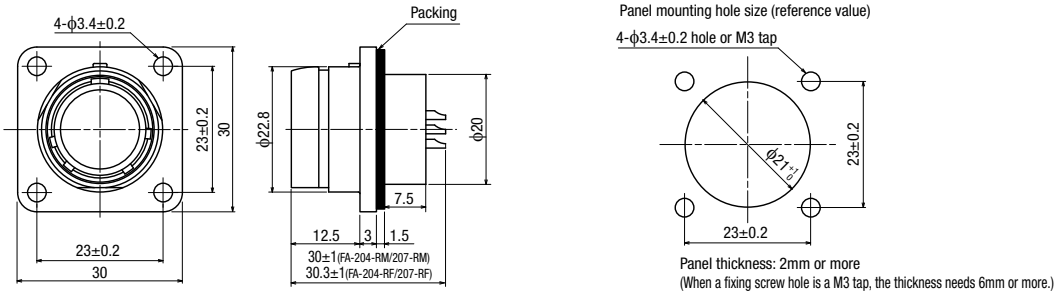
Specifications

Item	Specifications			
	FA-204-RM	FA-204-RF	FA-207-RM	FA-207-RF
Protection level	IP67*1			
Applicable wire	Cross-sectional area: 1.25mm^2 or less, Connection method: Soldering			
Contact	4-pin male	4-pin female	7-pin male	7-pin female
	Material: Brass, gold plating, Contact resistance: 5mΩ or less			
Withstand voltage, insulation resistance	1500VAC for one minute, 2000MΩ or more (between contacts)		1000VAC for one minute, 2000MΩ or more (between contacts)	
Operating temperature range	-25 to 85°C			
Vibration resistance, shock resistance, corrosion resistance	Vibration resistance: JIS C 0040 compliant, Shock resistance: 500m/s^2 (50G) 3 times for each shaft, Corrosion resistance: JIS C 0023 compliant			
Weight	Approx. 30g	Approx. 30g	Approx. 30g	Approx. 30g

*1: This specification is for when applicable connectors are connected to these models.
*2: A packing must be fitted into a panel.

External dimension

(Unit: mm)



CC-Link waterproof connector (plug)

FA-204-PM**
FA-204-PF**
FA-207-PM**
FA-207-PF**

■ The CC-Link waterproof connectors (plug) are a one-touch connection/removal connector and reduce cost and time for wiring.

Related products
CC-Link cable P.35

Specifications

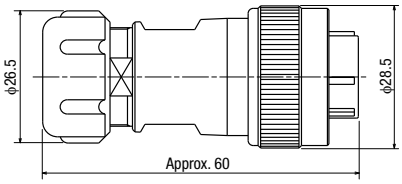
Item	Specifications			
	FA-204-PM**	FA-204-PF**	FA-207-PM**	FA-207-PF**
Protection level	P67*1			
Applicable wire	Cross-sectional area: 1.25mm^2 or less, Connection method: Soldering			
Contact	4-pin male	4-pin female	7-pin male	7-pin female
	Material: Brass, gold plating, Contact resistance: 5mΩ or less			
Packing diameter	**: 6 ····· ϕ5.5 to 6.3, 8 ····· ϕ7.0 to 8.5, 10 ····· ϕ8.6 to 10.5, 12 ····· ϕ10.6 to 12.5*2			
Withstand voltage, insulation resistance	1500VAC for one minute, 2000MΩ or more (between contacts)		1000VAC for one minute, 2000MΩ or more (between contacts)	
Operating temperature range	-25 to 85°C			
Vibration resistance, shock resistance, corrosion resistance	Vibration resistance: JIS C 0040 compliant, Shock resistance: 500m/s^2 (50G) 3 times for each shaft, Corrosion resistance: JIS C 0023 compliant			

Model	FA-204-PM**	FA-204-PF**
**	Weight	Weight
6	Approx. 40g	Approx. 40g
8	Approx. 40g	Approx. 40g
10	Approx. 40g	Approx. 40g
12	Approx. 40g	Approx. 40g
Model	FA-207-PM**	FA-207-PF**
**	Weight	Weight
6	–	Approx. 40g
8	Approx. 40g	Approx. 40g
10	Approx. 40g	Approx. 40g
12	Approx. 40g	Approx. 40g

*1: This specification is for when applicable connectors are connected to these models.
*2: Use a cable that matches each packing diameter.

External dimension

(Unit: mm)



CC-Link waterproof connector (adapter)

FA-204-AdM**
FA-204-AdF**
FA-207-AdM**
FA-207-AdF**

■ The CC-Link waterproof connectors (adapter) are a one-touch connection/removal connector and reduce cost and time for wiring.

Related products
CC-Link cable P.35

Specifications

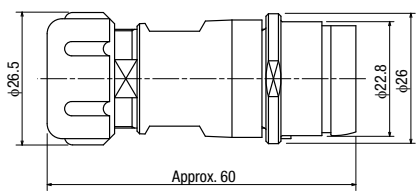
Item	Specifications			
	FA-204-AdM**	FA-204-AdF**	FA-207-AdM**	FA-207-AdF**
Protection level	IP67*1			
Applicable wire	Cross-sectional area: 1.25mm^2 or less, Connection method: Soldering			
Contact	4-pin male	4-pin female	7-pin male	7-pin female
	Material: Brass, gold plating, Contact resistance: 5mΩ or less			
Packing diameter	**: 6 ····· ø5.5 to 6.3, 8 ····· ø7.0 to 8.5, 10 ····· ø8.6 to 10.5, 12 ····· ø10.6 to 12.5*2			
Withstand voltage, insulation resistance	1500VAC for one minute, 2000MΩ or more (between contacts)		1000VAC for one minute, 2000MΩ or more (between contacts)	
Operating temperature range	-25 to 85°C			
Vibration resistance, shock resistance, corrosion resistance	Vibration resistance: JIS C 0040 compliant, Shock resistance: 500m/s^2 (50G) 3 times for each shaft, Corrosion resistance: JIS C 0023 compliant			

Model	FA-204-AdM**	FA-204-AdF**
**	Weight	Weight
6	Approx. 40g	Approx. 40g
8	Approx. 40g	Approx. 40g
10	Approx. 40g	Approx. 40g
12	Approx. 40g	Approx. 40g
Model	FA-207-AdM**	FA-207-AdF**
**	Weight	Weight
6	Approx. 40g	Approx. 40g
8	Approx. 40g	–
12	Approx. 40g	Approx. 40g

*1: This specification is for when applicable connectors are connected to these models.
*2: Use a cable that matches each packing diameter.

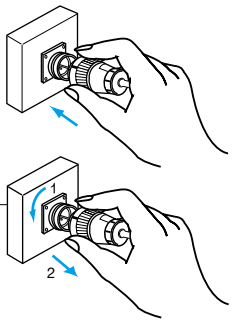
External dimension

(Unit: mm)



Description of the waterproof connectors

Waterproof connector connecting/removing method



• Connection

Align the plug guide with the receptacle guide and push in the plug straight. (Since this connector is a 5-pin plug, insert the plug into the receptacle and turn the plug so that the guides can be aligned.)

• Removal

Turn the coupling nut 45 degrees to the left as shown by the arrow and pull out the connector.

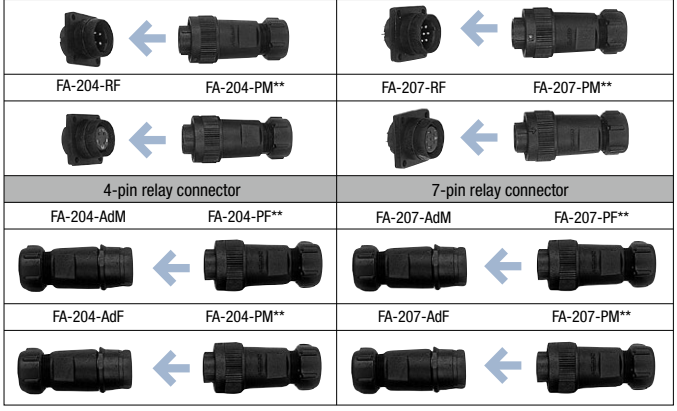
Applicable CC-Link cables

Refer to the table on the right for CC-Link cables that can be fitted to the packing diameters of the waterproof connectors.

Packing diameter	CC-Link cable
6	–
8	FA-CBL200SB/SBH/SBZ/PSBH/PSBZ/LTPSBH
10	–
12	FA-CBL100PWSB/PWPSBH

Applicable waterproof connector

4-pin connector		7-pin connector	
FA-204-RM	FA-204-PF**	FA-207-RM	FA-207-PF**
FA-204-RF	FA-204-PM**	FA-207-RF	FA-207-PM**
4-pin relay connector		7-pin relay connector	
FA-204-AdM	FA-204-PF**	FA-207-AdM	FA-207-PF**
FA-204-AdF	FA-204-PM**	FA-207-AdF	FA-207-PM**



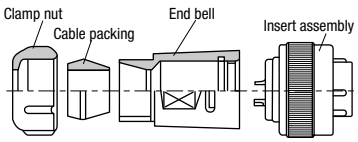
Waterproof connector connecting method

• Waterproof connector pin No.

Item	4-pin connector	7-pin connector
Pin No. (on the connector attaching surface)	Male connector: 1, 2, 3, 4 / Female connector: 2, 1, 4, 3	Male connector: 1, 2, 3, 4, 5, 6, 7 / Female connector: 2, 1, 5, 4, 3, 7, 6

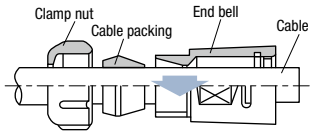
• Procedure for connecting the waterproof connector to the cable

(1) Disassembling the connector



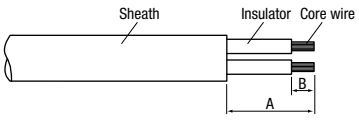
1) Turn the insert assembly counterclockwise and remove it from the end bell.
2) Loosen the clamp nut and remove the cable packing from the end bell.

(2) Fitting each disassembled part through the cable in the order as shown below.



Note 1: Ensure that the order (position) and orientation of each dissembled part are correct.

(3) Remove the sheath and insulator from each cable used. The length to be removed is shown in the following table.



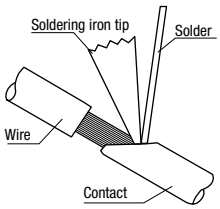
Shell size 20

Length A (mm)	Length B (mm)	Cross-sectional area (mm²)
18	5.2	1.25 or less

(4) Preliminary soldering of the core wire in the terminated cable

Note 2: Ensure that the cable sheath is not preliminarily soldered.
Note 3: Solder within the hole diameter of the contact evenly.

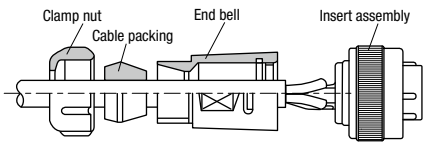
(5) Soldering

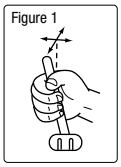


1) Insert the preliminarily-soldered wire into the solder pot of the contact.
2) Heat the contact and core wire using a soldering iron.
3) Solder to fill the gap between the contact and the core wire.

Soldering iron	Cross-sectional area (mm²)	Temperature of soldering iron tip (°C)
30W	0.5	280
60W	1.25	350

(6) Assembling the connector as shown below





1) Hold the insert assembly and turn the end ball to tighten it.
• Tightening torque……10kgf·cm to 15kgf·cm
2) Press the cable packing into the end bell and fix the end bell to tighten the clamp nut.
• Tightening torque……15kgf·cm to 20kgf·cm
3) Move the cable back, forth, left, and right to fit it (Figure 1). Tighten it again with the specified torque value.

Dustproof cap for CC-Link waterproof connector

FA-NRW-20-PCa1
FA-NRW-20-RCa
FA-NRW-20-AdCa

■ The dustproof caps are used to protect unused CC-Link waterproof connectors from dust.

Related products

Waterproof type T-branch module P.40
Waterproof connector P.41 to 43

Specifications

Item	Specifications		
	FA-NRW-20-PCa1	FA-NRW-20-RCa	FA-NRW-20-AdCa
Material	Nylon	Synthetic rubber	Synthetic rubber
Weight	Approx. 20g	Approx. 20g	Approx. 10g

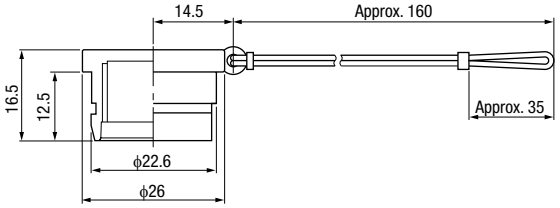
Note: They are not waterproof.

	Model	FA-NRW-20-PCa1	FA-NRW-20-RCa	FA-NRW-20-AdCa
Fitting connector	FA-204-PM*	○	–	–
	FA-204-PF*	○	–	–
	FA-207-PM*	○	–	–
	FA-207-PF*	○	–	–
	FA-TW43	–	○	–
	FA-TW73	–	○	–
	FA-204-RM	–	○	–
	FA-204-RF	–	○	–
	FA-207-RM	–	○	–
	FA-207-RF	–	○	–
	FA-204-AdM*	–	–	○
	FA-204-AdF*	–	–	○
	FA-207-AdM*	–	–	○
	FA-207-AdF*	–	–	○

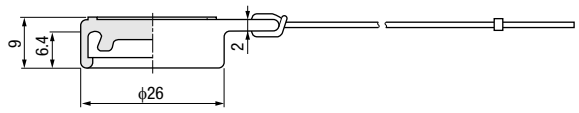
External dimension

(Unit: mm)

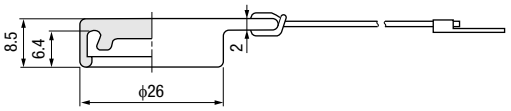
[FA-NRW-20-PCa1]

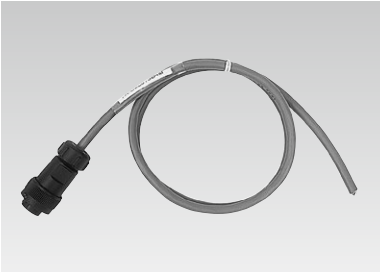


[FA-NRW-20-RCa]



[FA-NRW-20-AdCa]





CC-Link cable with a waterproof connector on one end

FA-CBL**PSBH4M
FA-CBL**PSBH4F
FA-CBL**PWSB7M
FA-CBL**PWSB7F

■ The CC-Link cables (with a waterproof connector on one end) are a one-touch connection/removal cable and reduce cost and time for wiring.

Related products

CC-Link cable P.40
Waterproof connector P.41 to 43

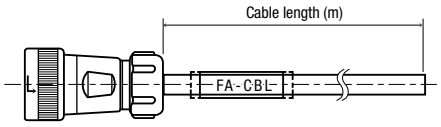
Specifications

Item	Specifications			
	FA-CBL**PSBH4M	FA-CBL**PSBH4F	FA-CBL**PWSB7M	FA-CBL**PWSB7F
Cable	FA-CBL200PSBH		FA-CBL100PWSB	
Connector	FA-204-PM8	FA-204-PF8	FA-207-PM12	FA-207-PF12
	4-pin male	4-pin female	7-pin male	7-pin female

Model		FA-CBL**PSBH4M	FA-CBL**PSBH4F	FA-CBL**PWSB7M	FA-CBL**PWSB7F
**	Length	Weight	Weight	Weight	Weight
05	5m	Approx. 590g	Approx. 590g	–	–
10	10m	–	–	Approx. 1.9kg	Approx. 1.9kg

External dimension

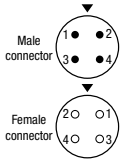
(Unit: mm)



Connection diagram

4-pin connector

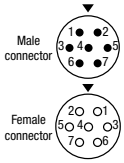
Pin No.	Signal	Wire color
1	DA	Blue
2	DB	White
3	DG	Yellow
4	SLD	Shielding



(on the connector attaching surface)

7-pin connector

Pin No.	Signal	Wire color
1	DA	Blue
2	DB	White
3	DG	Yellow
4		
5	+24V	White
6	24G	Black
7	SLD	Shielding



(on the connector attaching surface)

CC-Link cable with waterproof connectors on both ends

FA-CBL01PWSB7MF

■ The CC-Link cable (with waterproof connectors on both ends) is a one-touch connection/removal cable and reduces cost and time for wiring.

Related products

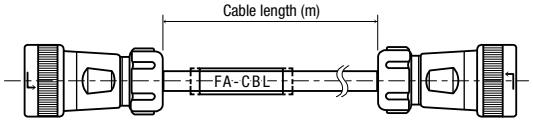
CC-Link cable P.40
Waterproof connector P.41 to 43

Specifications

Item	Specifications	
	FA-CBL01PWSB7MF	
Cable	FA-CBL100PWSB	
Connector	FA-207-PM12	FA-207-PF12
	7-pin male	7-pin female
Length	1m	
Weight	Approx. 330g	

External dimension

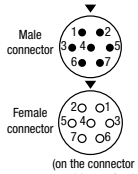
(Unit: mm)



Connection diagram

7-pin connector

Pin No.	Signal
1	DA
2	DB
3	DG
4	
5	+24V
6	24G
7	SLD



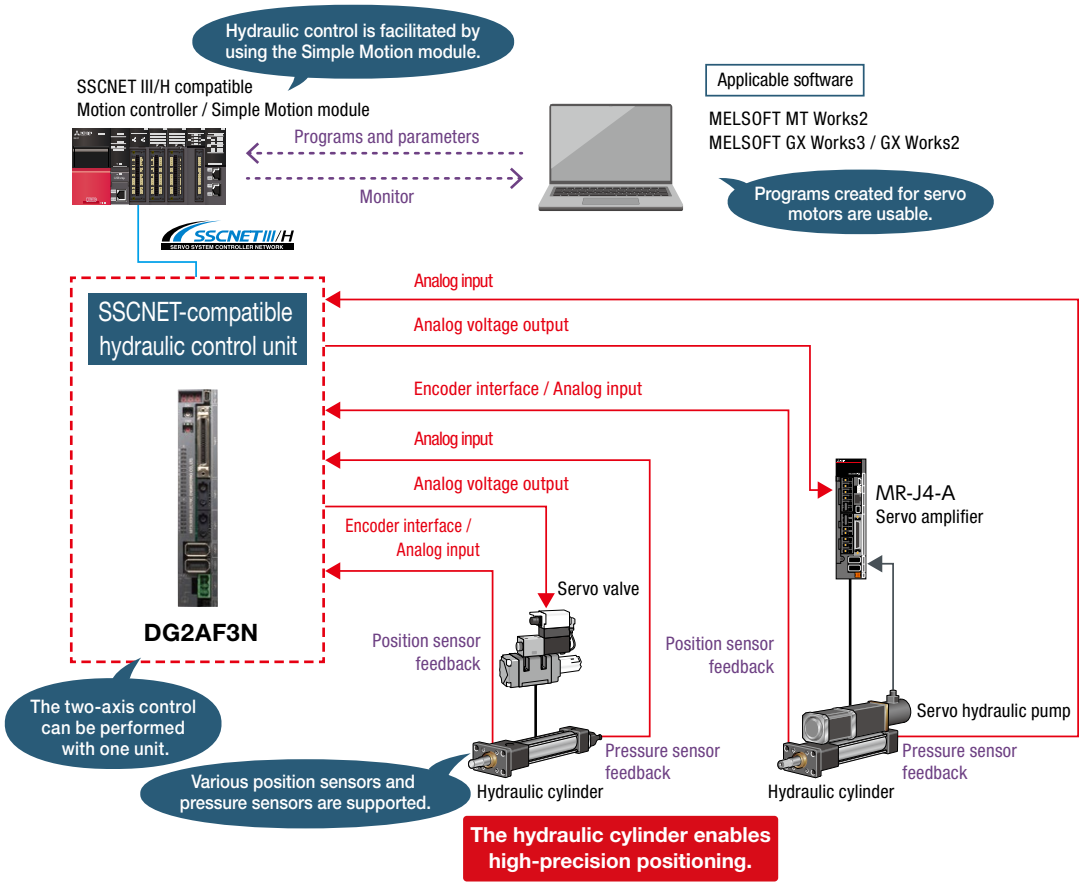
(on the connector attaching surface)

Hydraulic control (SSCNET-compatible hydraulic control unit)

Positioning control or pressure control by hydraulic cylinder can be performed

when the SSCNET-compatible hydraulic control unit is connected with a Motion controller or Simple Motion module through SSCNET III/H, Mitsubishi Electric servo system network.

System configuration example



The hydraulic cylinder enables high-precision positioning.

Various position sensors and pressure sensors are supported.

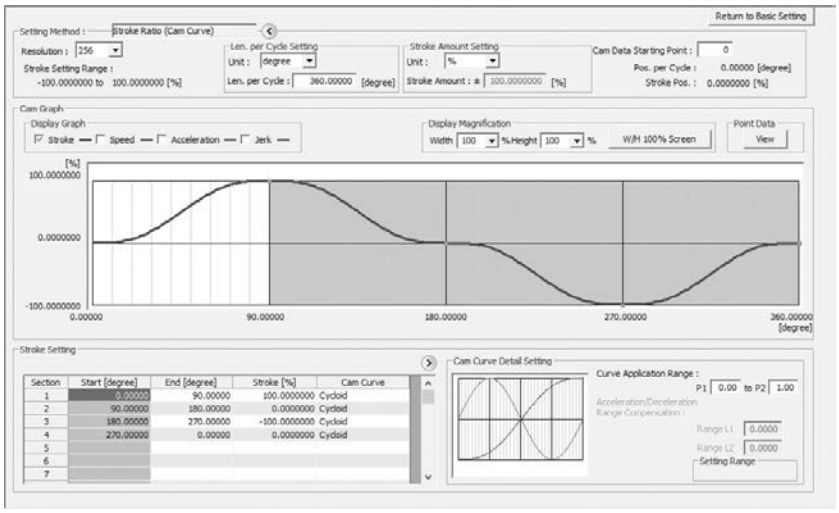
Pressure control is enabled without the need for an analog module.

A single hydraulic control unit enables two-axis control.

Synchronous control

In addition to complementary control, advanced synchronous control enables synchronous operation just by setting parameters.

Linear motion	Reciprocating motion	Feed motion
Ball screw	Reciprocating cam	Belt conveyor



Model list

SSCNET-compatible hydraulic control unit

Product	Specifications		Model
SSCNET-compatible hydraulic control unit	Two-axis control of two SSCNET III/H stations per unit *: Power supply connector provided with the unit	Analog input voltage specifications	DG2AF3N
		Analog input current specifications	DG2AF3N-P01

Related products

Junction terminal block

Connection method	Specifications	Model
Spring clamp	· Our general-purpose interface amplifier junction terminal block can be used. · Sink/source shared type, full signal	DG2SV1TB

Connection cable

Specifications	Cable length	Model
· A dedicated cable to connect an SSCNET-compatible hydraulic control unit and our general-purpose interface amplifier junction terminal block	0.5m	DG4AF3CB05
	1m	DG4AF3CB10

Mitsubishi Electric related products

Product	Specifications	Model/Product
SSCNET III/H cable	Cable for connection between the SSCNET-compatible hydraulic control unit and the SSCNET III/H-compatible Motion controller/Simple Motion module	MR-J3BUS□M
		MR-J3BUS□M-A
		MR-J3BUS□M-B
ABS serial synchronous encoder	Resolution: 4194304PLS/rev Allowable revolution: 3600r/min	Q171ENC-W8
Serial absolute synchronous encoder cable	Cable for connection between the SSCNET-compatible hydraulic control unit and the ABS serial synchronous encoder	Q170ENCCBL□M-A
ABS serial encoder battery/battery case/battery cable	3.6V, 2000mAh	MR-J3W03BATSET

Specifications

SSCNET-compatible hydraulic control unit

DG2AF3N
DG2AF3N-P01

- Two types of the SSCNET-compatible hydraulic control unit are available: DG2AF3N (voltage analog input) and DG2AF3N-P01 (current analog input).
- Hydraulic servos can be incorporated into the SSCNET III/H servo network. Positioning and pressure control with the hydraulic servo are possible.
- The 2-axis control can be performed with one hydraulic control unit.
- Setting the pressure feedback value enables automatic mode switch from the position control to the pressure control.
- The programming similar to the control program of the servo amplifier (MR-J4-B) can be applied to the control programs for the hydraulic servos and servo valves.
- The position feedback signal is supported by the Mitsubishi Electric serial and SSI (binary) encoders in addition to the analog input and ABZ phase encoders. (The supported encoders are only those meeting the specifications of the encoder interface.)

Product specifications

Item		Product specifications	
		SSCNET-compatible hydraulic control unit	
		DG2AF3N	DG2AF3N-P01
Analog input		Analog voltage input	Analog current input
		0 to 10V, -10 to 10V, 4 points Resolution: 16 bits max.	4 to 20mA, 4 points Resolution: 16 bits max.
Analog voltage output		0 to 10V, -10 to 10V, 4 points Resolution: 16 bits max.	
No. of control axes		2	
SSCNET III/H communication cycle		SSCNET III/H (/H) 0.222ms to 0.888ms	
Encoder interface		Serial encoder manufactured by Mitsubishi Electric, A/B/Z-phase differential input, SSI* (binary code), 2 points max.	
Digital input for emergency stop		24VDC, 1 point, photocoupler isolation, independent common (sink/source selectable)	
Digital input		24VDC, 12 points, photocoupler isolation (sink/source collectively selectable for the common)	
Digital output		24VDC, 8 points, photocoupler isolation (sink/source collectively selectable for the common)	
ABS serial encoder battery		3.6V battery (Also used for MR-J3BAT and MR-J3. Only required if using the ABS function.)	
Power supply	Voltage	20.4 to 26.4VDC (ripple ratio within 5%)	
	Current consumption	0.3A	
Compliance with global standards		CE, UL/cUL	
Structure		Natural cooling, open (IP20)	
Installation	Screw type	M5 × 10mm or more, tightening torque: 78 to 118N·cm	
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (IEC 60715 compliant)	
External dimension		168 (H) × 30 (W) × 100 (D)mm	
Weight		300g	
Operating ambient temperature		0 to 55°C	
Storage ambient temperature		-25 to 75°C	

*: Synchronous Serial Interface

■ Position sensors

GYSE-S Probe (SSI output) and GYSE-A Probe (High performance analogue output) manufactured by SANTEST CO., LTD
Absolute linear encoder SR67A manufactured by Magnescale Co., Ltd
*: These models are verified by Mitsubishi Electronic Engineering.
Apart from them, other position sensors which are compatible with the above encoder interface can be used.

■ Connectable controllers and main operating systems

Motion controller	Main operating system
Q173DSCPU	SW8DNC-SV22S84QJ
Q172DSCPU	SW8DNC-SV22S84QL
Q170MSCPU(-S1)	SW8DNC-SV22S84QN

■ Compatible Simple Motion modules and supported versions

Simple Motion module	Serial No.
QD77MS□	First five digits: 20052 or later
LD77MS□	First five digits: 20072 or later
RD77MS□	First two digits: 12 or later

*: Each of the Motion controllers shown above uses a customized operating system for the main operating system.

Specifications of the control signal input/output

Digital input

Item		Specifications
No. of input points		12
Input type		Sink/source shared type
Wiring method for common		12 points/common
Insulation method		Photocoupler insulation
Rated input voltage		24VDC
Rated input current		Approx. 5mA
Operating voltage range		21.6 to 26.4VDC (24VDC±10%, Ripple ratio: within 5%)
On voltage/current		17.5VDC or more/3.5mA or less
Off voltage/current		7VDC or more/1mA or less
Input resistance		Approx. 6.8kΩ
Response time	OFF → ON	4ms or less
	ON → OFF	4ms or less

Digital output

Item		Specifications
No. of output points		8
Output type		Sink/source shared type
Wiring method for common		8 points/common
Insulation method		Photocoupler insulation
Rated load voltage		24VDC
Maximum load current		0.3A/point, 1A/common
Operating voltage range		21.6 to 26.4VDC (24VDC±10%, Ripple ratio: within 5%)
Maximum voltage drop at ON		1VDC or less
Leakage current at OFF		5VDC or more/0.1mA or less
Response time	OFF → ON	1ms or less
	ON → OFF	1ms or less (Rated load, resistive load)

Emergency stop input

Item		Specifications
No. of input points		1
Input type		Sink/source shared type
Wiring method for common		1 point/common
Insulation method		Photocoupler insulation
Rated input voltage		24VDC
Rated input current (Iin)		Approx. 5mA
Operating voltage range		21.6 to 26.4VDC (24VDC±10%, Ripple ratio: within 5%)
On voltage/current		17.5VDC or more/3.5mA or less
Off voltage/current		7VDC or more/1mA or less
Input resistance		Approx. 6.8kΩ
Response time	OFF → ON	4ms or less
	ON → OFF	4ms or less

Analog input

Item	Specifications	
Model	DG2AF3N	DG2AF3N-P01
No. of input points	4	
Input voltage/current	0 to 10V, -10 to +10V	4 to 20mA
Resolution	16 bits	

Analog output

Item	Specifications
No. of output points	4
Output voltage	0 to 10V, -10 to +10V
Resolution	16 bits

Specifications of the encoder

Mitsubishi Electronic encoder

Item	Specifications
Supported encoder	Q171ENC-W8 (four-wire type)
Supported signal type	Differential output type (equivalent to SN75C1168)
Transmission method	Serial communication
Synchronization method	Asynchronous system
Communication speed	2.5Mbps
Position detection method	Absolute (ABS) method
Resolution	4194304PLS/rev (22 bits)
No. of connectable encoders	2/per unit
External connection method	20-pin connector
Connection cable	Q170ENCCBL□M-A (□ indicates the cable length.)
Length	30m max.
Backup method for absolute position	With the battery (MR-J3BAT)
Battery life (actual operating life)	12000 hours (with two encoders connected)
	24000 hours (with an encoder connected)

ABZ phase encoder (differential input type)

Item	Specifications
No. of connectable encoders	2/per unit
Supported signal type	Differential output type (equivalent to 26LS31)
Maximum input pulse frequency	1Mpps (Up to 4Mpps after multiplication by 4)
Pulse width	1μs or more
Rise/fall time	0.25μs or less
Phase difference	0.25μs or more
High-state voltage	2.0 to 5.25VDC
Low-state voltage	0 to 0.8VDC
Differential voltage	±0.2V
Length	30m max.

SSI encoder

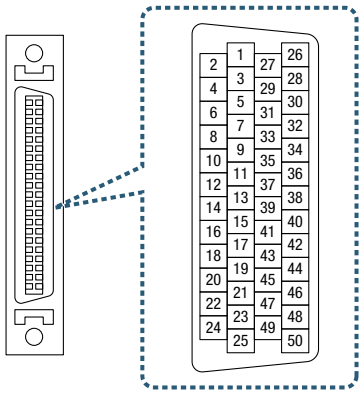
Item	Specifications
Transmission method	Synchronous serial communication
Communication speed	100kbps to 5Mbps
Position detection method	Absolute (ABS) method
Data format	Binary (pure binary)
Data length	1 bit to 31 bits
No. of connectable encoders	2/per unit
Connection cable	Shielded twisted pair cable with a diameter of 0.2mm^2 or more (24AWG or more)
Maximum cable length	Communication speed: Maximum cable length* 100kbps: 400m 200kbps: 190m 300kbps: 120m 400kbps: 80m 500kbps: 60m 1Mbps: 25m 1.5Mbps: 10m 2Mbps: 5m

*: The maximum cable length is indicated as a guide.

External connection

Control signal I/O connector

Digital input/output signals, analog input/output signals, and emergency stop input signal are connected using the control signal I/O connector.
The following is the front view of the I/O connector pin arrangement.



■ Control signal I/O connector

Pin No.	Signal name		Pin No.	Signal name		Pin No.	Signal name		Pin No.	Signal name	
	General-purpose	Dedicated		General-purpose	Dedicated		General-purpose	Dedicated		General-purpose	Dedicated
2	Analog input 1		1	Analog common		27	Analog input 2		26	Analog common	
4	Analog input 3		3	Analog common		29	Analog input 4		28	Analog common	
6	Analog common		5	Analog common		31	Analog common		30	Analog common	
8	Analog common		7	Analog output 1		33	Analog common		32	Analog output 2	
10	Empty		9	Analog output 3		35	Empty		34	Analog output 4	
12	Digital input X0	FLS1*1	11	Empty		37	Digital input X1	RLS1*1	36	Empty	
14	Digital input X4	General-purpose	13	Digital input X2	DOG1*1	39	Digital input X5	General-purpose	38	Digital input X3	General-purpose
16	Digital input X8	DOG2*1	15	Digital input X6	FLS2*1	41	Digital input X9	General-purpose	40	Digital input X7	RLS2*1
18	Digital input common		17	Digital input XA	General-purpose	43	Digital input common		42	Digital input XB	General-purpose
20	Empty		19	Emergency stop		45	Empty		44	Emergency stop common	
22	Digital output Y2	General-purpose	21	Digital output Y0	General-purpose	47	Digital output Y3	General-purpose	46	Digital output Y1	General-purpose
24	Digital output Y6	General-purpose	23	Digital output Y4	General-purpose	49	Digital output Y7	General-purpose	48	Digital output Y5	General-purpose
			25	Digital output common					50	Digital output common	

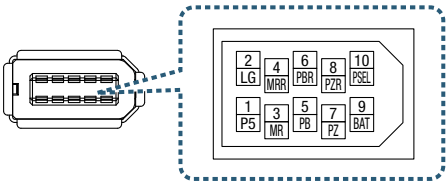
*1: "General-purpose" and "Dedicated" can be switched according to the settings.

Supported connector model (commercially available)

- Soldering type connector: 10150-3000PE (manufactured by 3M Japan Limited)
- Shell kit: 10350-52F0-008 (manufactured by 3M Japan Limited)

Encoder connector

Serial encoders and ABZ phase encoders are connected using the encoder connector.
The following is the front view of the encoder connector pin arrangement.



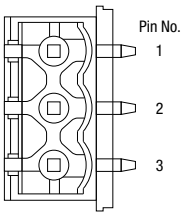
■ Encoder connector

Pin No.	Signal name	Signal name of each encoder			
		Serial encoder		ABZ phase encoder	SSI encoder
		Two-wire type	Four-wire type		
1	P5	5V	5V	5V	
2	LG	LG	LG	LG	
3	MR	MR	MR	PA	CLK+
4	MRR	MRR	MRR	PAR	CLK-
5	PB			PB	DATA+
6	PBR			PBR	DATA-
7	PZ		MX	PZ	
8	PZR		MXR	PZR	
9	BAT	BAT	BAT		
10	PSEL			PSEL	

Supported connector model (commercially available)

- Receptacle: 36210-0100PL (manufactured by 3M Japan Limited)
- Shell kit: 36310-3200-008 (manufactured by 3M Japan Limited)

Power supply connector



■ Power supply connector

Pin No.	Signal name
1	24VDC
2	24G
3	FG

Supported connector model (commercially available)

- FKC 2.5/3-ST-5.08 (manufactured by PHOENIX CONTACT GmbH & Co. KG)

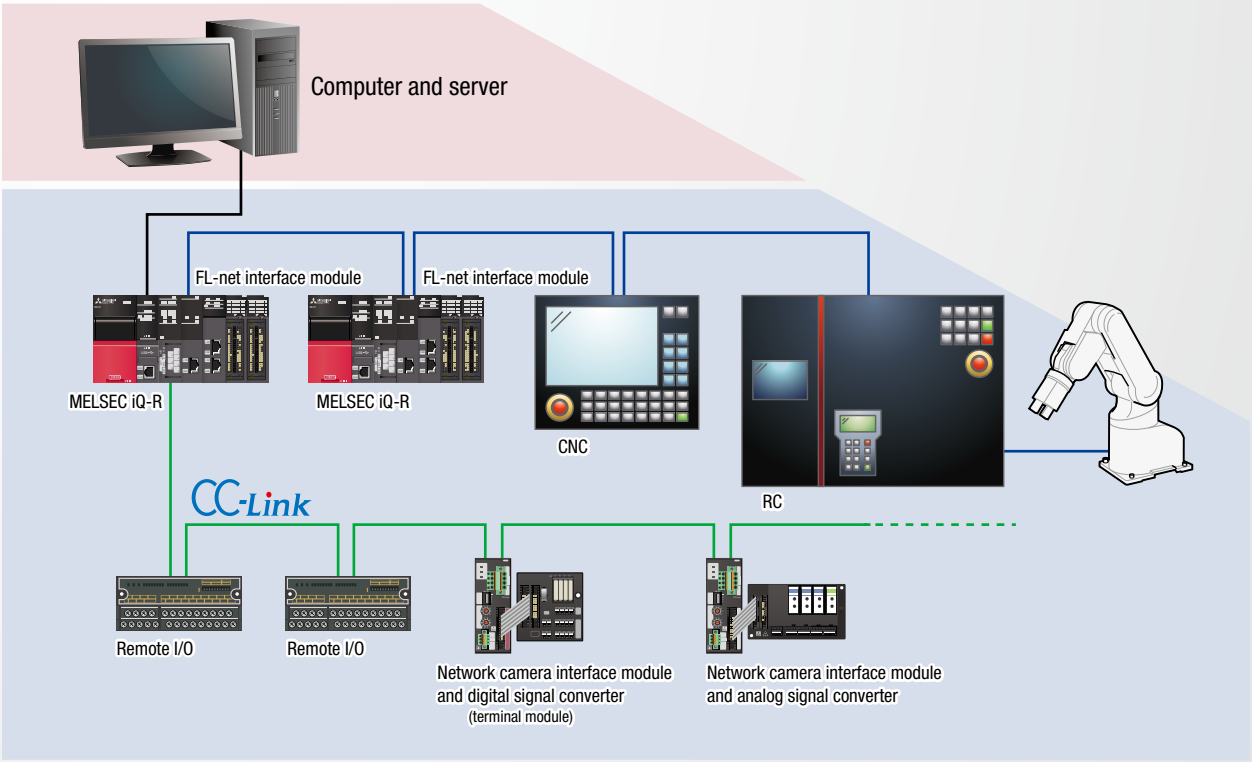
Power cable

- 0.3 to 2.5mm^2 (12 to 22AWG)

Open network connection (FL-net interface module)

MELSEC iQ-R series programmable controllers manufactured by Mitsubishi Electronic are available for building the FL-net (OPCN-2) system. The FL-net (OPCN-2) can be interconnected to devices, such as programmable controllers, computerized numerical controllers (CNC), and personal computers which are manufactured by different manufacturers,

providing control and monitoring.



P. 53

Easy system start-up

The module supports the functions of Mitsubishi Electric GX Works3, making users' programming easier.

P. 54

Two communication functions to match the application

Data communications on FL-net (OPCN-2) are performed by either "cyclic transmission" or "message transmission".

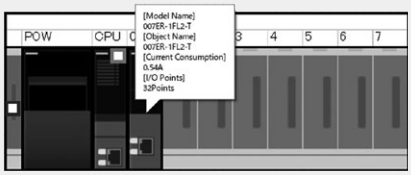
P. 54

Masterless and large-scale network

Masterless method enables users to connect/disconnect each node to/from the network at any time and connect a maximum of 254 devices.

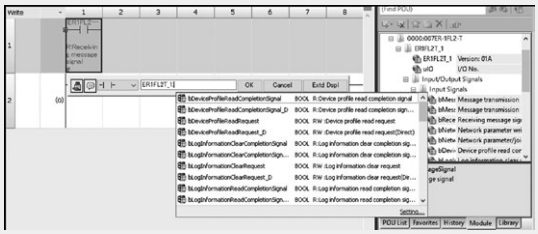
Easy system start-up

The module supports the functions of Mitsubishi Electric GX Works3, making users' programming easier.



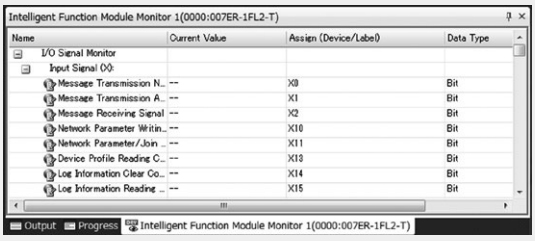
Initial setting on GUI

- Graphically configurable initial setting
- Module assignments by dragging and dropping



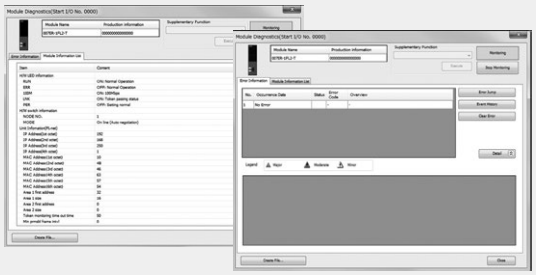
Module label

- Label programming supported
- Device and buffer memory address selection from the list
- Ladder editor input supported
- Auto-tracking of module assignments



Intelligent function module monitor

- Display of device assignment and current value
- Support for start-up and troubleshooting



Module diagnostics

- Display of module status on GX Works3
- Display of error code details
- Same operation as the Mitsubishi Electric MELSEC iQ-R series modules

FB name	Function
P+MEE-007ER-1FL2-T_Initialize_R	Sets the network parameter area of the local node.
P+MEE-007ER-1FL2-T_ByteBlockRead_R	Reads the byte block.
P+MEE-007ER-1FL2-T_ByteBlockWrite_R	Writes the byte block.
P+MEE-007ER-1FL2-T_WordBlockRead_R	Reads the word block.
P+MEE-007ER-1FL2-T_WordBlockWrite_R	Writes the word block.
P+MEE-007ER-1FL2-T_NetworkParameterRead_R	Reads the network parameter/join node information.
P+MEE-007ER-1FL2-T_NetworkParameterWrite_R	Writes the network parameter.
P+MEE-007ER-1FL2-T_OperateCommand_R	Issues the operation command.
P+MEE-007ER-1FL2-T_StopCommand_R	Issues the stop command.
P+MEE-007ER-1FL2-T_DeviceProfileRead_R	Reads the device profile.
P+MEE-007ER-1FL2-T_LogInformationRead_R	Reads the log information.
P+MEE-007ER-1FL2-T_LogInformationClear_R	Clears the log information.
P+MEE-007ER-1FL2-T_MessageReturn_R	Returns the message.
P+MEE-007ER-1FL2-T_SendTransparentMessage_R	Sends the transparent type message.
P+MEE-007ER-1FL2-T_ReceiveTransparentMessage_R	Receives the transparent message.
P+MEE-007ER-1FL2-T_RefreshCyclicData0ther_R	Refreshes the cyclic data of other nodes.
P+MEE-007ER-1FL2-T_RefreshCyclicDataLocal_R	Refreshes the cyclic data of the local node.

Module FB (function block)

- Module FBs available for basic functions (17 types)
- Easier programming
- English and Japanese supported

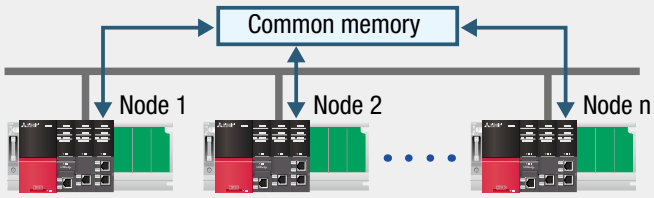
*: Module FBs and the reference manual can be download on our website.

Two types of communication functions to match the application

Data communications on FL-net (OPCN-2) are performed by either cyclic transmission or message transmission.

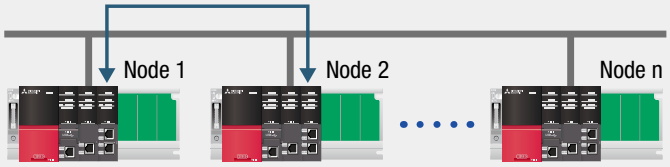
Cyclic transmission

Each node is linked to common memory and data can be shared.



Message transmission

Specific data is communicated as it is required.

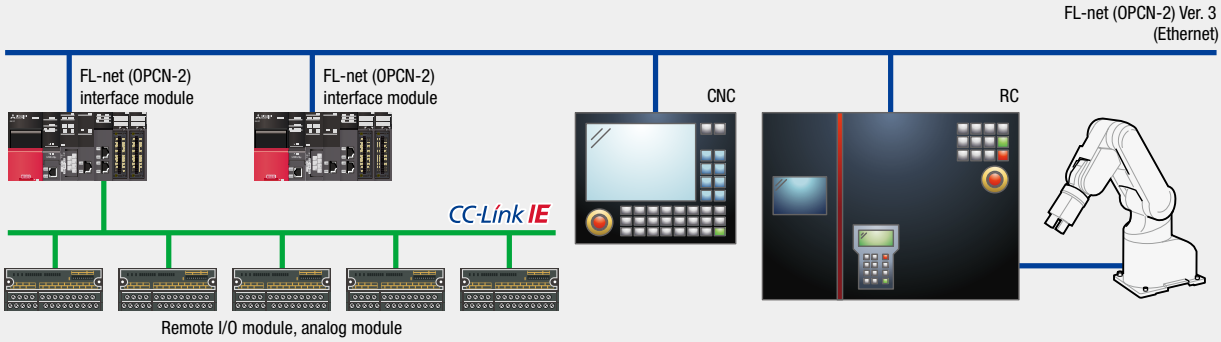


- ✓ Reading/writing word blocks
- ✓ Reading profile
- ✓ Run/Stop commands and other commands

Masterless and large-scale network

Masterless method enables users to connect/disconnect each node to/from the network at any time without affecting communications of other nodes.
Users can freely power on/off any node, and perform maintenance and connect a maximum of 254 devices*1.

*1: 249 devices can be used as control devices. The other five devices are used for failure diagnostics.



Model list

FL-net (OPCN-2) interface module

Product	Specifications	Model
MELSEC iQ-R series-compatible FL-net (OPCN-2) interface module	• Module • User's Manual (Hardware)	ER-1FL2-T
User's Manual (Detailed)	Japanese version	ER-1FL2-T-M1J
	English version	ER-1FL2-T-M1E

Specifications

FL-net (OPCN-2) interface module

ER-1FL2-T

■ The module supports the functions of Mitsubishi Electric GX Works3, making users' programming easier.
■ Data communications on FL-net (OPCN-2) are performed by either cyclic transmission or message transmission.
■ Masterless method enables users to connect/disconnect each node to/from the network at any time and connect a maximum of 254 devices.

Performance specifications

Item			Specifications
Standard			Protocol specification for control network standard (JIS B 3521) FL-net (OPCN-2) Ver.3 Class 1 (Equivalent to Ver. 2)*1
Transmission specifications	Data transmission speed		10BASE-T/100BASE-TX
	Communication mode	10BASE-T	Half-duplex
		100BASE-TX	Full-duplex/Half-duplex
	Transmission method		Base band
	Maximum segment length		100m (length between a hub and a node)*2
	Maximum No. of nodes in system		254
	Maximum No. of cascade connections		10BASE-T: Maximum four stages*3 100BASE-TX: Maximum two stages*3
	Cyclic data volume		Maximum (8192 bits + 8192 words) per system Maximum (8192 bits + 8192 words) per node
	Message data volume		Maximum 1024 bytes
Link data specifications	Common memory area		Area 1 (bit area): 8k bits Area 2 (word area): 8k words
	Message area (Transient area)		Maximum 1024 bytes×2 (1 for each of transmit and receive)
No. of occupied I/O points			32
5VDC internal current consumption			0.54A
External dimension			106 (H) × 27.8 (W) × 110 (D)mm (Installation base unit mounting side: 98mm(H))
Weight			170g

*1: Since there is no compatibility between FL-net (OPCN-2) Ver. 3 and FL-net (OPCN-2) Ver. 1, connections and communications are not possible between these versions.
*2: The maximum segment length of the Ethernet cable is 100m. However, the length may be shorter depending on the operating environment of the cable. For details, consult the manufacturer of the cable used.
*3: This number is applied when a repeater hub is used. For the number of the cascade connections when using a switching hub, consult the manufacturer of the switching hub used.

Support message list

Message	1:1	1:n	Sever function	Client function
Byte block read	○	-	-	○*
Byte block write	○	-	-	○*
Word block read	○	-	○	○*
Word block write	○	-	○	○*
Network parameter read	○	-	○	○
Network parameter write	○	-	-	○*
Operate/stop command	○	-	-	○*
Device profile read	○	-	○	○
Log information read	○	-	○	○
Log information clear	○	○	○	○
Message return	○	-	○	○*
Transparent message transmission	○	○	○	○

Server function……Functions that create a response frame for a received request message and send it.
Client function · · · · Functions that send a response message and receive a response frame.
*: Realized by the transparent message transmission.

Products for monitoring and traceability

Monitoring and traceability

INDEX

Configuration diagram

Monitoring and Traceability (RFID)

Visualization of production status with data from RF tags

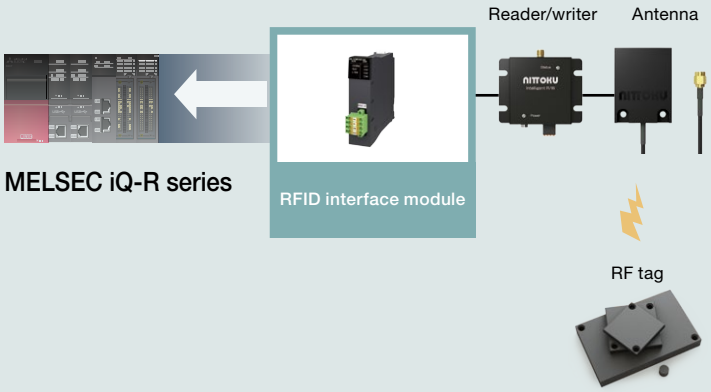
Slot-in type

Network distributed type

Refer to P.68.

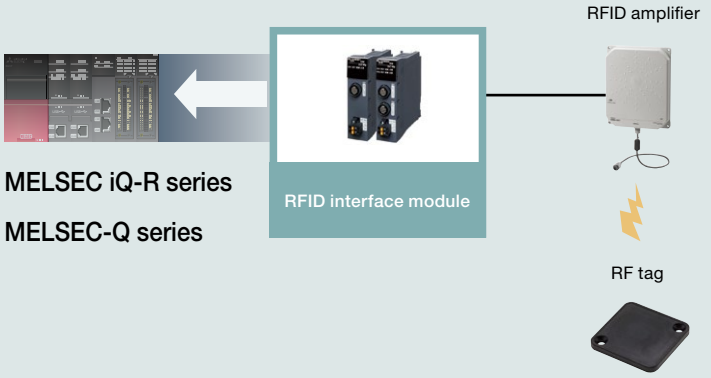
▼Connection with the NITTOKU ITS-H series

Slot-in type

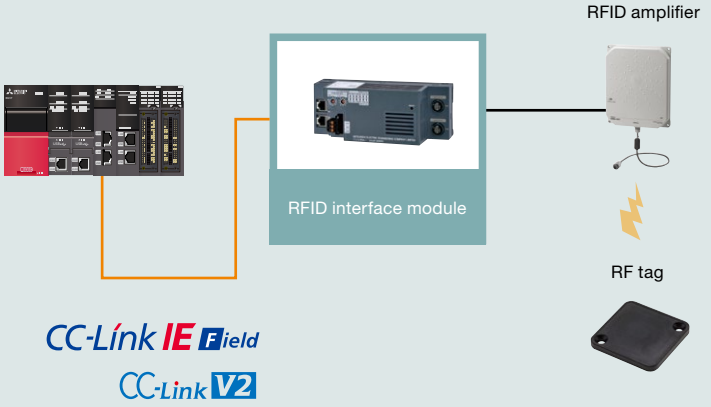


▼Connection with the OMRON V680 series

Slot-in type



Network distributed type

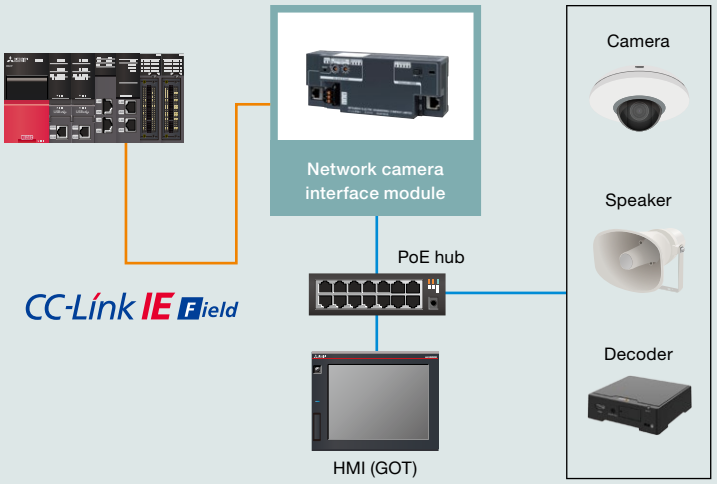


Monitoring and Traceability
(camera monitoring)

Visualization of production sites with network cameras

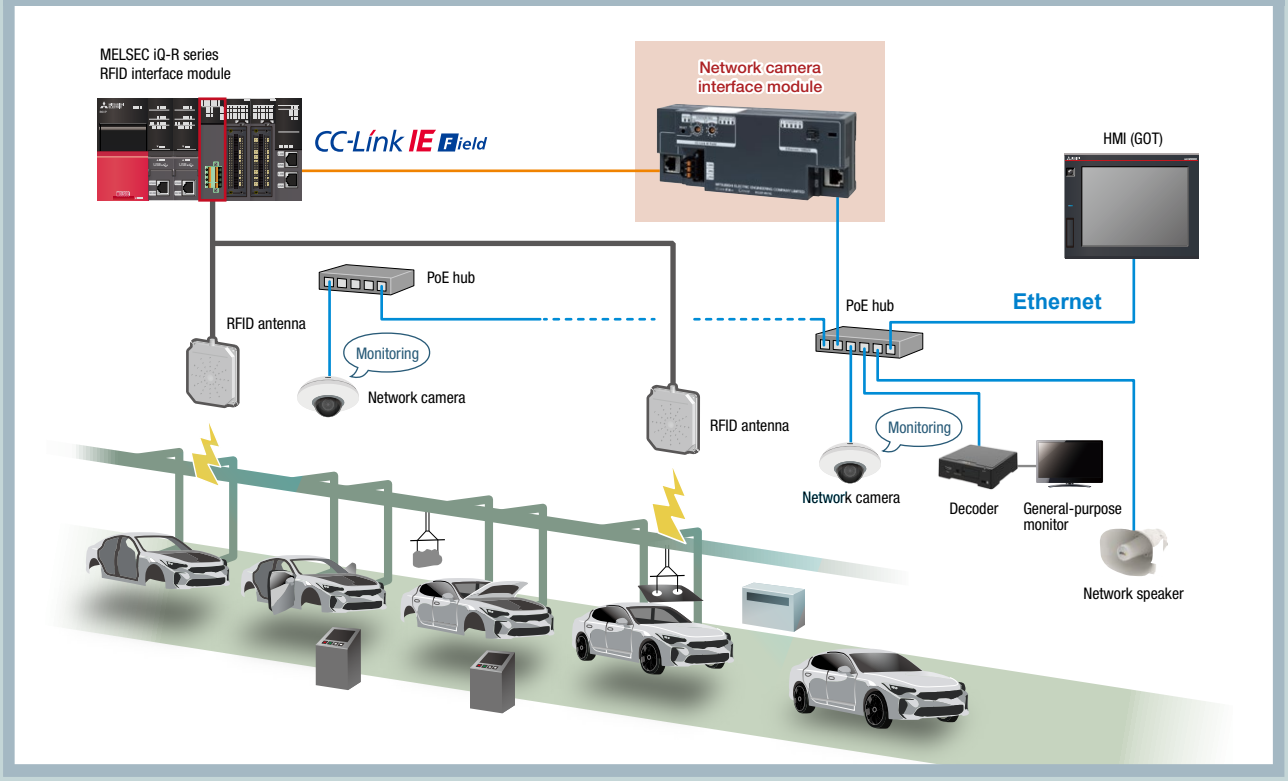
Network distributed type

Refer to P.60.



Related system

Traceability enhancement using drive recorder images



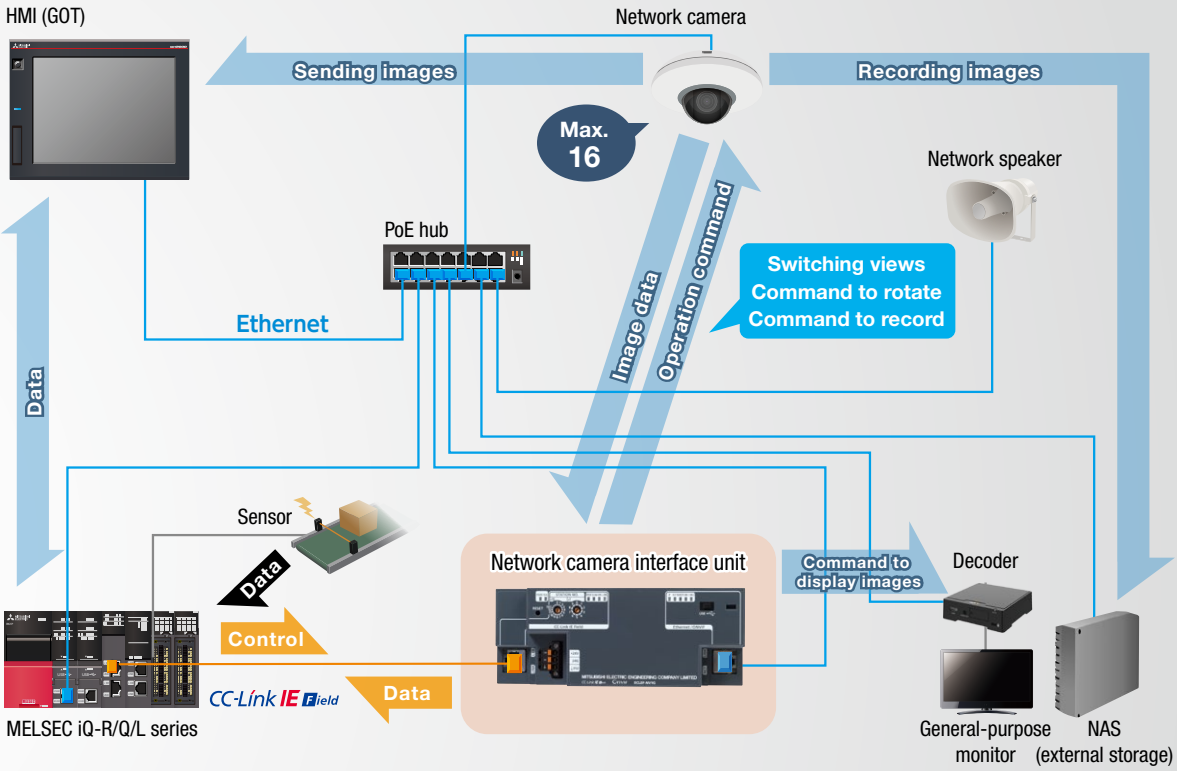
Camera monitoring (Network camera interface module)

Streamlining on-site camera monitoring with an HMI (GOT)

An HMI (GOT) enables easier and more convenient camera monitoring.

For example

Displaying images	Sending images to a GOT or general-purpose monitor
Command to record	Recording triggered by the camera detection function or facility sensor
Data association	Associating clock data, error information, and image data for quick troubleshooting



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Checking images of the production site using an HMI (GOT)

Camera shooting directions can be changed while checking images on the screen of the HMI (GOT).

P. 61

Recording images at a downtime (drive recorder images)

Recording can be triggered by the camera detection function or facility sensor.

P. 62

Sending images to a general-purpose monitor for large-scale split screen display

Images can be sent from multiple cameras to the HMI (GOT) or general-purpose monitor, and displayed images can be switched.

P. 62

Voice messages via a speaker

Error messages or other messages are given by voice using a network speaker.

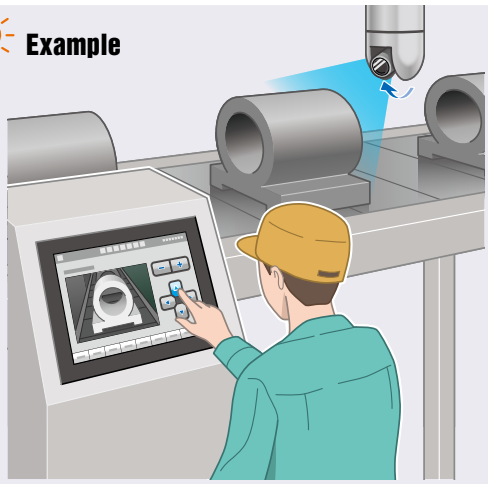
Checking images of the production site using an HMI (GOT)

Live camera images can be checked on the HMI (GOT) without using a personal computer.
The displayed images can be switched to images sent from other cameras and camera shooting directions can be changed while checking images.
The GOT2000 series already used can be used for monitoring.

Switching views among multiple cameras

Changing the camera shooting direction using the HMI (GOT)

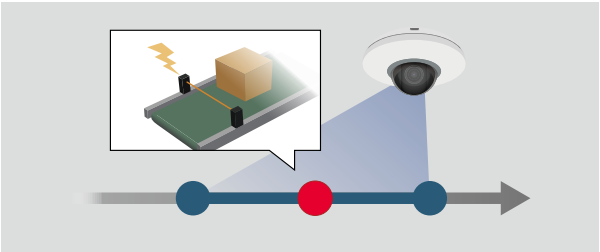
Example



While checking the images displayed on the HMI (GOT), an operator can change the shooting direction by touching buttons on the screen.

Recording images at a downtime (drive recorder images)

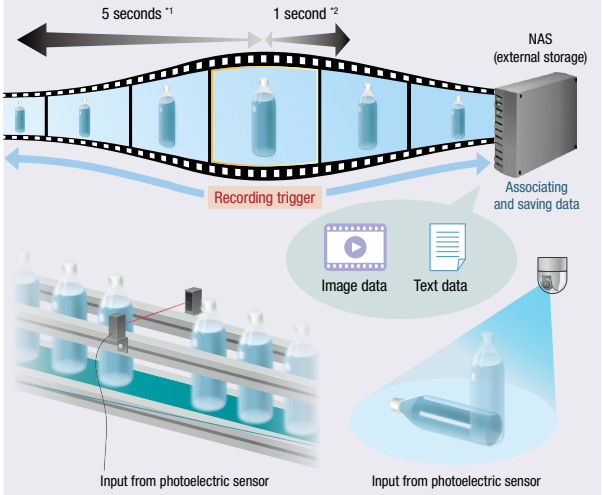
When a trouble occurs, the production status before and after the trouble occurrence can be recorded and used for the trouble analysis.
Camera motion detection, heat detection, and other functions are used to display alarms on the HMI (GOT).



Recording production status upon sensor detection

Using various camera detection functions

Example

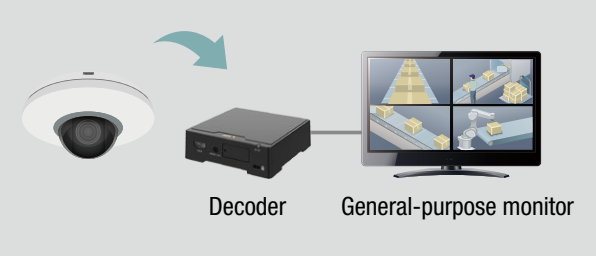


When a sensor detects a fallen bottle, the image can be recorded.

*1, *2: Time can be set individually as desired. The maximum value depends on the camera specifications.

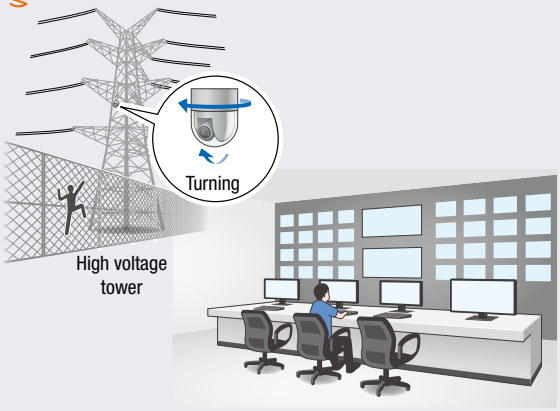
Sending images to a general-purpose monitor for large-scale split screen display

Images from multiple cameras can be sent to a general-purpose monitor using the decoder. (Images can also be sent to a remote location.)



Large scale split display on a general-purpose monitor

Example



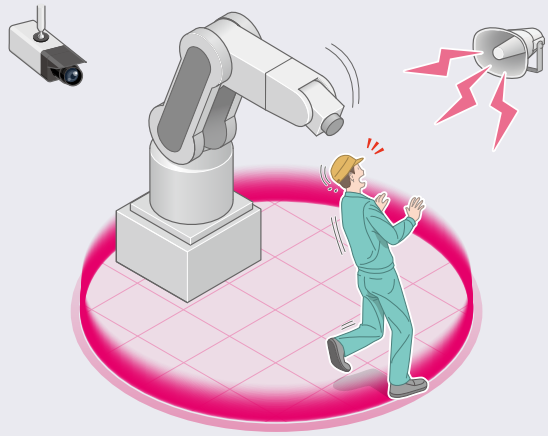
If a sensor detects a person entering a facility (such as a high-voltage tower), the camera shooting direction can be changed and the image can be checked from the monitoring room.

Voice messages via a speaker

Error messages or other messages are given by voice using a network speaker.

Voice messages

Example



The camera motion detection function is used to give alerts and warnings via a speaker when a person enters a restricted area.
The camera detection function can be used as well as the motion detection function.

Application example Temperature monitoring system

- The absolute temperature is obtained at a specified point within the shooting range. (The obtained temperature can be used as numerical value data.)
- Up to ten temperature measurement ranges can be set within the shooting range.
- The maximum temperature, minimum temperature, and average temperature are obtained for each temperature measuring range. (The obtained temperatures can be used as numerical value data).
- The MELSEC iQ-R/Q/L series can be notified of the alarms that the specified temperature or temperature change rate (°C/second) is exceeded.

■ Configuration example

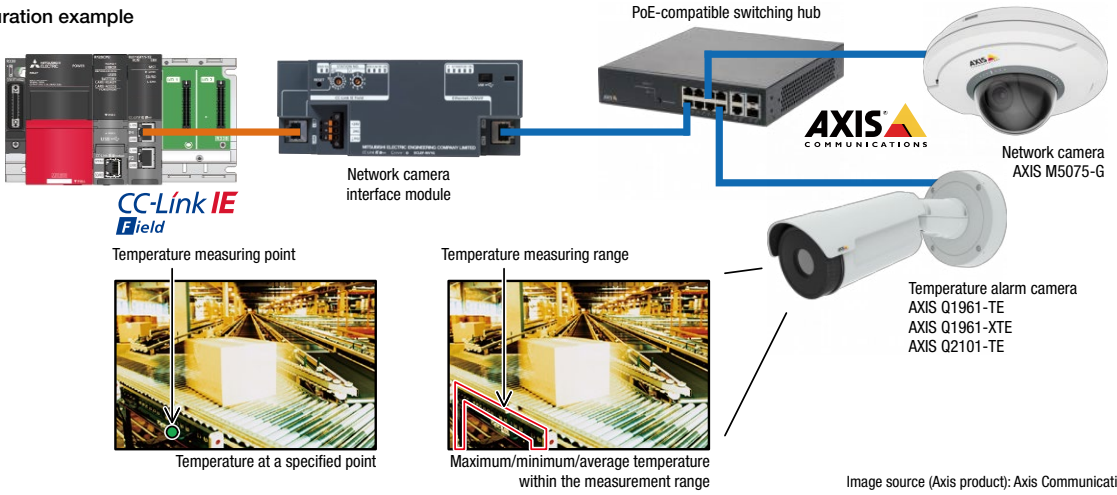


Image source (Axis product): Axis Communications

Application example General-purpose monitor display without a computer

- By using a network decoder, network camera images can be displayed on a general-purpose monitor without a computer.
- Up to 16 network cameras can be freely set for display.
- The display position and size can be freely set for each live image.

■ Configuration example

- The images displayed on the monitor can be changed by triggering signals that can be handled by the programmable controller, such as sensor input.
- A detection function (such as motion detection) equipped in the network camera can also be used as a trigger.

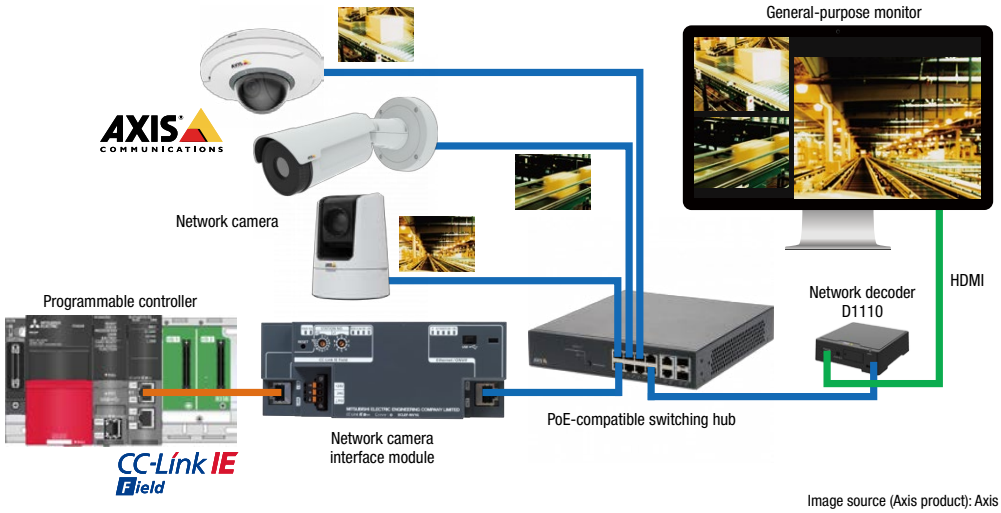
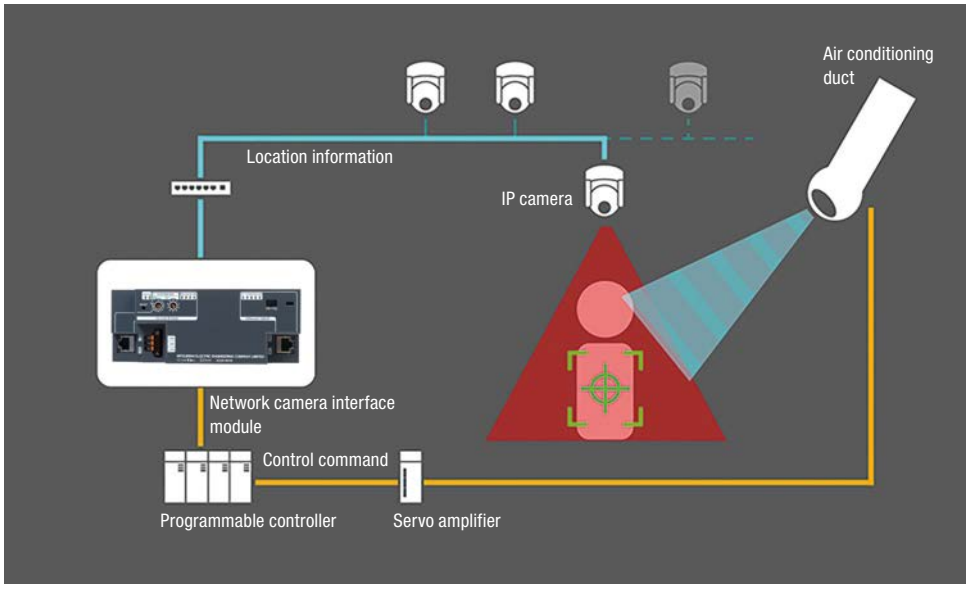


Image source (Axis product): Axis Communications

Application example

Reducing energy loss through an air conditioning duct by tracking human presence

By controlling the air conditioning duct with MELSEC and MELSERVO, air can always be distributed to points where human presence is detected, reducing energy loss and creating a comfortable space.



Click here for the video.

Introduction of a demonstration product

Take a look at our demonstration of the GOT2000 series when connected to network cameras.

By connecting four PTZ network cameras and this product to the HMI (GOT), images captured by the selected network camera can be displayed (❶), and the shooting direction can be changed (❷) on the GOT screen. When an NAS is added, recording can be controlled (❸) on the GOT screen.

* The GOT sample screens and sample ladders used for the demonstration machine can be downloaded from our website.

❶ Displays images captured by cameras

- Switch between multiple cameras
  (up to four screens can be displayed simultaneously)

❷ Controls the shooting direction of the camera

- Register the shooting direction of the camera and control the camera with PTZ
- Manipulate the shooting direction with arrow buttons for the selected camera

❸ Recording controls for connected cameras

- Start/stop recording
- Switch the setting on/off to start recording upon sensor input

* The trigger is optionally set by the programmable controller. A pre-record function is also available (like a drive recorder).

Model list

Network camera interface module

Product	Product line	No. of devices to be registered	Model
CC-Link IE Field Network-compatible network camera interface module	· Module · CD-ROM: Configuration tool, User's Manual (Detailed) in PDF format, USB device driver, CSP+ file · User's Manual (Hardware)	2	ECLEF-NV1G-02
		4	ECLEF-NV1G-04
		8	ECLEF-NV1G-08
		16	ECLEF-NV1G-16

Recommended products

Manufacturer	Product	Model	Firmware version
AXIS COMMUNICATIONS	Network camera	-	5 to 12
	Temperature alarm camera	AXIS Q1961-TE AXIS Q1961-XTE AXIS Q2101-TE *1	6 or later
	Network speaker	AXIS C1004-E	1 or later
		AXIS C1410	
	Network decoder	AXIS D1110	12 or later
Canon	Network camera	-	1.3 or later

*1: The AXIS T99A11 positioning unit is required for changing the shooting direction (PT control).
*2: The user must verify that no operation problem occurs with the target system.
The specifications for the reference products are subject to change without notice due to circumstances of each manufacturer.
Before use, be sure to read "Safety Precautions" in the user's manual of each product.
For mounting and removal and wiring precautions, refer to the manual of the product to be used.
For the latest information, refer to the technical bulletin on our website.

For information on Axis products, refer to the Axis website at https://www.axis.com/.

Specifications

CC-Link IE Field Network-compatible network camera interface module

ECLEF-NV1G-02
ECLEF-NV1G-04
ECLEF-NV1G-08
ECLEF-NV1G-16

- Camera shooting directions can be changed while checking images on the screen of the HMI (GOT).
- Recording can be controlled by triggering the camera detection function or facility sensor.
- Images can be sent from multiple cameras (maximum 16) to the HMI (GOT) or general-purpose monitor, and displayed images can be switched.
- Error messages or other messages are given by voice using a network speaker.
- The absolute temperature can be obtained as a numerical value from the thermal camera.
- Error messages or other messages are given by voice using a network speaker.
- Network devices can be controlled using HTTP (CGI control).

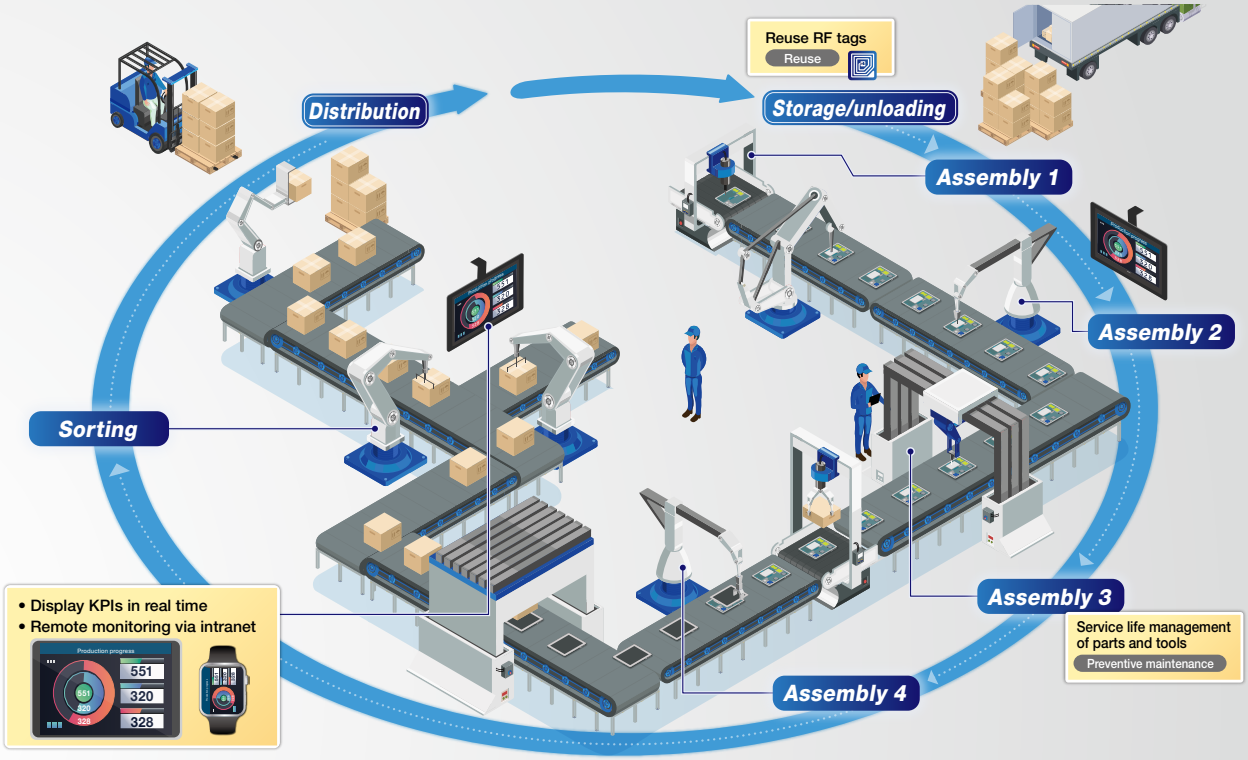
Specifications

Item		Specifications			
		ECLEF-NV1G-02	ECLEF-NV1G-04	ECLEF-NV1G-08	ECLEF-NV1G-16
No. of devices to be registered		2	4	8	16
Operating ambient temperature		0 to 55°C			
Operating ambient humidity		5 to 95%RH, non-condensing			
External power supply		20.4 to 28.8VDC (24VDC-15%, +20%) (ripple ratio: within 5%)			
Current consumption		0.16A			
External dimensions		70 (H) × 180 (W) × 50 (D) mm (When the DIN rail hook is included: 75mm (H)) (When the module power supply and terminal block for FG are included: 56mm (D))			
Weight		330g (including the module power supply and terminal block for FG)			
External interface	Ethernet/camera network	Ethernet: TCP/UDP/HTTP (GET/POST)*1			
		Camera network: Compatible with ONVIF Core Spec Ver. 2.42, ONVIF Test Spec Ver. 23.12, Profile S			
	CC-Link IE Field Network	Station type: Intelligent device station			
Network device registration (camera parameter setting/reading)		[Item] IP address, user name, password, ONVIF enabled/disabled, etc. [Applicable tool ver.] GX Works2: Ver. 1.591R or later, GX Works3: Ver. 1.061P or later			
Connection target model (manufactured by Mitsubishi Electric)		GOT2000 series (GT25 models, GT27 models)*2			

*1: BASIC/DIGEST authentication and WS-Security are supported. Standard Ethernet devices can be controlled using CGI.
*2: To display camera images on the GOT window, GT Designer3 Ver. 1.245F or later is required. If an older version of GT Designer3 is used, an SD card (such as NZ1MEM-2GBSD) must be inserted into the GOT.

RFID (RFID Interface Module)

Facilitate the digitalization of production sites with an RFID system



P. 69

Efficient management and visualization

Comprehensive management of product information is possible from storage to shipment.

P. 70

Connection with the NITTOKU ITS-H series

The digitalization of production sites can be supported with the eight features, including the ability to accept any ISO 15693 compliant RF tags regardless of the manufacturer.

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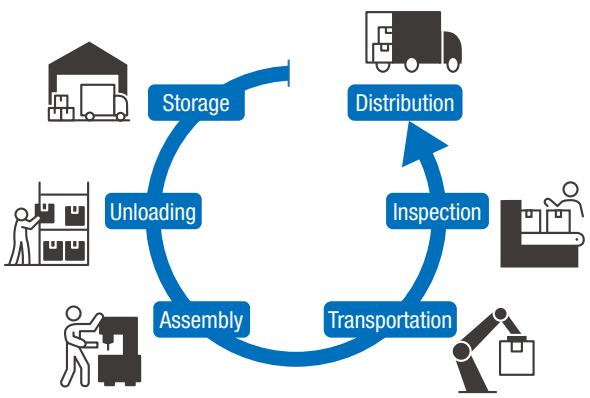
Connection with the OMRON V680 series

The lineup includes the slot-in type for the MELSEC iQ-R/Q series manufactured by Mitsubishi Electric and the CC-Link IE Field/CC-Link-compatible network distribution type. Devices can be selected for the site.

Efficient management and visualization

Comprehensive management of product information

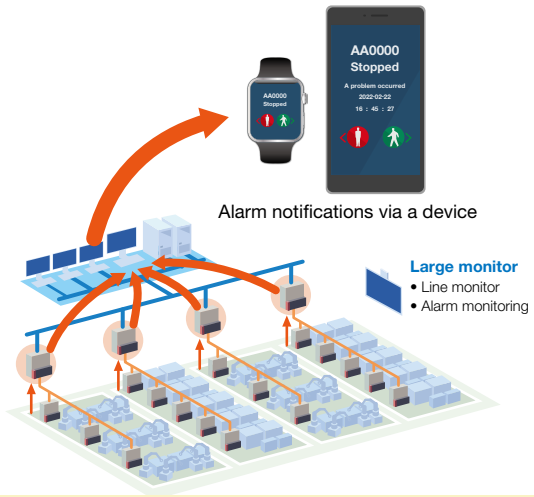


Traceability without consulting with other departments

Reduced work hours

With comprehensive management of production information history from parts storage to product shipment, it is possible to trace product information quickly and efficiently.

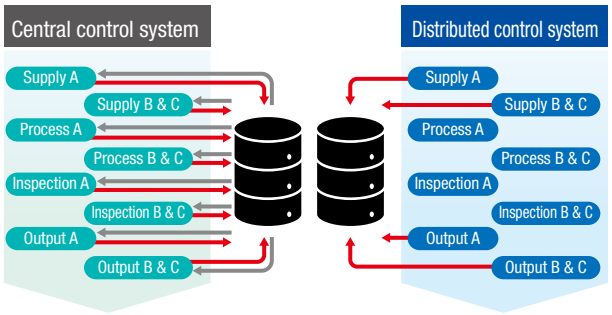
Production status monitoring in real time



Easily check the production site on a tablet.
There is no need to setup a computer.

By displaying the production site in real time using the data from RF tags, human resources can be allocated to more useful tasks.
The production site can be checked in real time on a tablet or computer from a remote location.

Using RFID system in the right place



Large-scale / Complex	Software	Simple
Time consuming / Costly	Construction time / Cost	Quick / Low-cost
Laborious	Additions / Changes	Easy

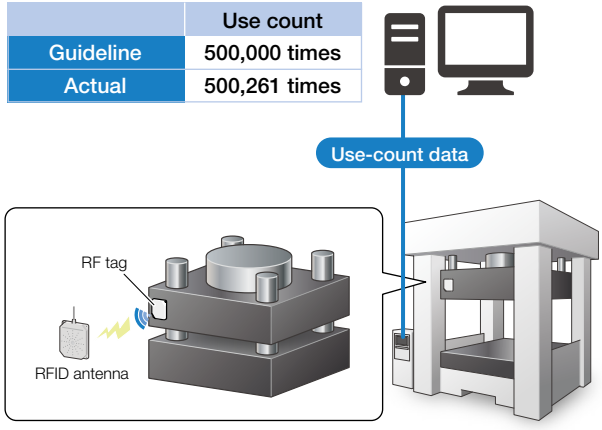
A low-cost, quick to implement, simple system

Easy to expand or change after implementation

Instead of using complex and large-scale systems that collect data for each process, it is possible to create a simple distributed control system at little cost by integrating products with data to minimize data collection.

Preventive maintenance by managing the number of uses

	Use count
Guideline	500,000 times
Actual	500,261 times



Stable operation = Stable production

Prepare for unforeseen incidents and secure manpower

Preventive maintenance is supported by managing consumable part use count with RFID and replacing parts before the production line stops.

Connection with the NITTOKU ITS-H series

This module is the MELSEC iQ-R series-compatible RFID interface module (slot-in type).
The digitalization of production sites can be supported with the eight features, including the ability to accept any ISO 15693 compliant RF tags regardless of the manufacturer.

8 Features

ISO compliant RF tags*

ISO 15693 compliant RF tags can be used regardless of the manufacturer.

Recommended product NITTOKU CO., LTD. RF tags

*Refer to our technical bulletin for our product test.

Connect up to 4 units (per module)

Up to four reader/writers can be installed per module allowing for optimal module configuration and a reduction in spare parts.

600m distributed installation*1

NITTOKU RF tags have a range ten times*2 that of our existing product. This resolves range issues.

*1 The distance between the Mitsubishi Electric RFID interface module and the NITTOKU reader/writer.
*2 Result of in-house testing

High-speed communication with RF tags

High-speed communication is possible with NITTOKU's specialized reader/writer for factory automation use.

* Comparative read speed of 128 bytes (according to NITTOKU CO., LTD.)

Improved communication performance with RF tags

Using NITTOKU's high-performance RF tags allows for two times the communication distance compared to their existing RF tags*.

*According to NITTOKU CO., LTD.

Large-capacity RF tags

8KB RF tags can be used when complex recipes need to be managed.

Customized RF tags

Flexible, next-generation production utilizing cutting-edge 3D printers allows for customized RF tags to be made quickly.

* Service available from NITTOKU CO., LTD

Sample programs for easy design

Sample programs make design and setup easy.

Setup support

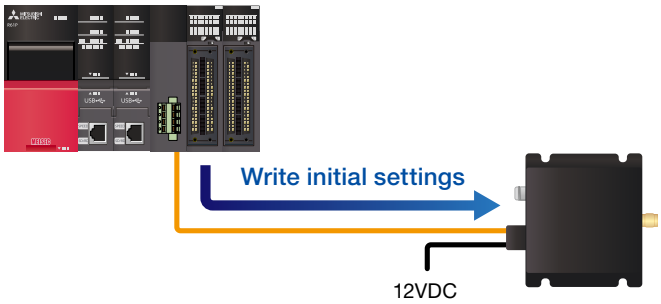
Simple settings

The required settings for operation can be completed in three steps.

Step.1

Initial reader/writer settings

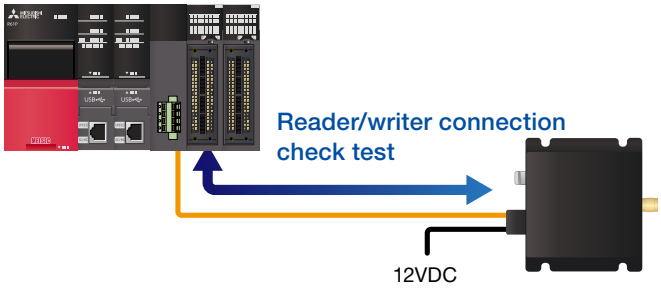
Connect one reader/writer to the module and initialize the settings.
The reader/writer can be initialized without specialist equipment.
(Initialize one reader/writer at a time.)



Step.2

Test mode (reader/writer connection check test)

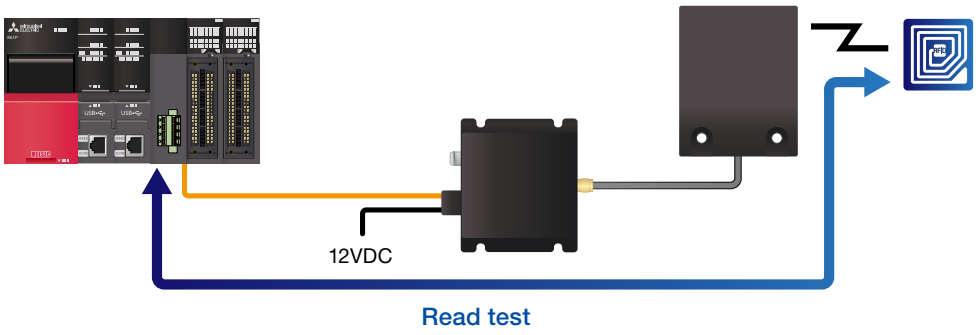
Check the connection of the reader/writer connected to the module. The connection can be checked without using ladder logic. (Up to four units can be connected at a time.)



Step.3

Test mode (read test)

Check communication with the RF tag using the reader/writer connected to the module.
Connection (read) with the RF tag can be checked without using ladder logic. The number of processing points to be read can also be specified.
(Up to four units can be connected at a time.)

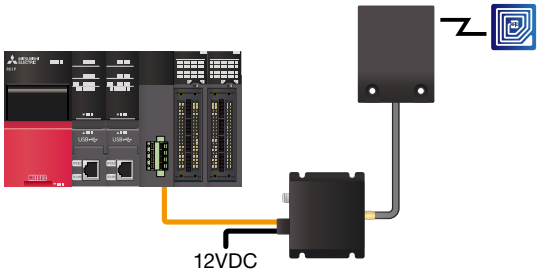


Sample programs

Using a sample program negates the need to create a ladder diagram from scratch.
Sample programs reduce workloads and enable quick setup. Two sample programs are provided.

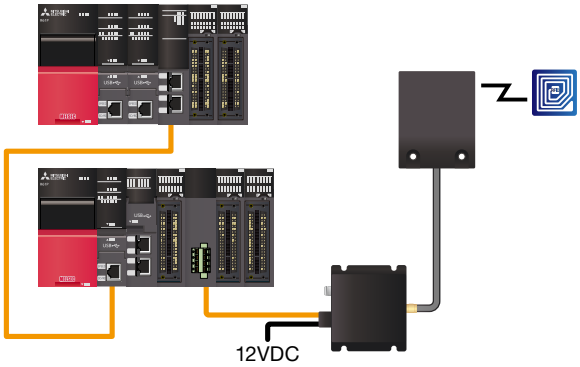
(1) Normal configuration

A sample program that executes read and write on channel 1.



(2) Remote head module configuration

A configuration using a remote head module and a sample program that executes read and write on channel 1.

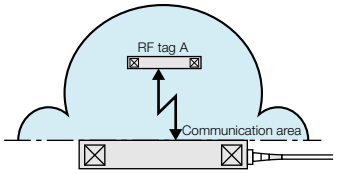


Communication mode

There are two methods of communicating with RF tags.
You can select a communication method that matches your use case.

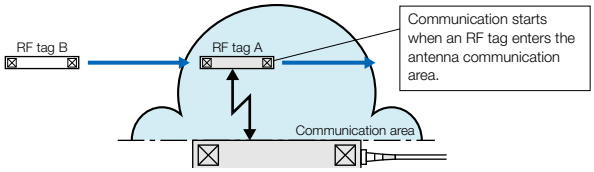
(1) Trigger

Communicates with RF tags stopped in the antenna communication area using an external trigger.
There must be only one RF tag in the antenna communication area.



(2) Auto

Automatically detects and communicates with RF tags coming into the antenna communication area. There must be only one RF tag in the antenna communication area.



Communication speed

Processing time when using the ER-1CM1NT-01 (baud rate: 230400 bps)

RF tag Capacity / No. of processing points	1K		2K		8K	
	Write	Read	Write	Read	Write	Read
2 bytes	66ms	50ms	58ms	43ms	77ms	52ms
32 bytes	113ms	71ms	56ms	57ms	52ms	52ms
500 bytes	1,125ms	477ms	370ms	354ms	323ms	268ms
992 bytes	2,188ms	899ms	660ms	659ms	544ms	487ms
2,000 bytes	-	-	1,294ms	1,292ms	1,092ms	950ms

* The communication processing time differs depending on the environment the product is being used in, the communication distance, and the number of connected reader/writer units. The ER-1CM1NT-01 has the shortest communication processing time out of the ER-1CM1NT-01, ER-1CM1NT-02, and ER-1CM1NT-04.

Function list

No.	Function			Description
1	RUN mode	Command	Read	Reads data from an RF tag.
2			Write	Writes data to an RF tag.
3			Fill data	Initializes data of an RF tag by using specified data.
4			Read UID	Reads the UID (unit identification number) of an RF tag.
5			Read DSFID and UID	Reads the DSFID and UID of an RF tag.
6			Reader/writer connection check	Checks the connection with reader/writer.
7		Communication type	Trigger	Communicates with an RF tag and outputs the result when command execution is requested with the RF tag stopped within the antenna communication area.
8			Auto	Automatically starts to communicate with an RF tag coming into the antenna communication area and outputs the result.
9		Option function	Communication speed *1	The communication speed for read, write, and fill command execution can be selected.
10			Write verify	Reads the data written to the RF tag with the write/data fill command to guarantee the data has been written to the tag.
11			UID mask selection	The reader/writer will not communicate with an RF tag which has a specified UID.
12			RSSI threshold selection	The reader/writer will communicate with the RF tag once a specified RSSI value has been reached.
13			RSSI value acquisition	Acquires an RSSI value once the command is executed.
14	Test mode		Reader/writer connection check test	Executes the reader/writer connection check command for the enabled channels on channels 1 to 4.
15			Read test	Executes the number of specified bytes and the read command with the number of processing points when testing the enabled channels on channels 1 to 4.
16	Reader/writer settings mode		Reader/writer settings	Writes the set values to the reader/writer.
17	Other		Processing time acquisition	Acquires the processing time of the executed command.

*1: Only the ER-1CM1NT-01 can be selected. The ER-1CM1NT-02 and ER-1CM1NT-04 are always enabled.

Connection with the OMRON V680 series

The lineup includes the slot-in type for the MELSEC iQ-R/Q series manufactured by Mitsubishi Electric and the CC-Link IE Field/CC-Link-compatible network distribution type. Devices can be selected for the site.

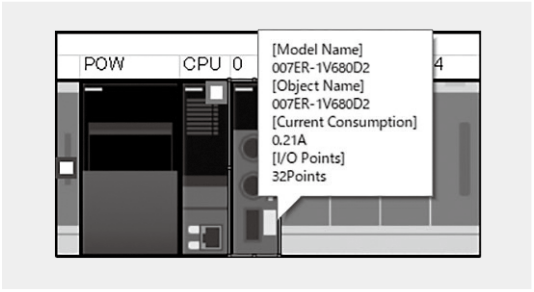
In this manual, **MELSEC iQ-R** is indicated for the descriptions related to the MELSEC iQ-R series-compatible slot-in type module, **MELSEC-Q** is indicated for the descriptions related to the MELSEC-Q series-compatible slot-in type module, **CC-Link IE Field** is indicated for the descriptions related to the CC-Link IE Field-compatible module, and **CC-Link** is indicated for the descriptions related to the CC-Link-compatible module.

Easy system start-up

The MELSEC iQ-R series-compatible slot-in type module has the three features that utilize the features of the MELSEC iQ-R series programmable controller, enabling initial settings on the graphical user interface.
If the MELSEC-Q series-compatible slot-in type module (EQ-V680D1 or EQ-V680D2) is currently used, it can be easily replaced with the MELSEC iQ-R series-compatible slot-in type module (ER-1V680D1 or ER-1V680D2) because the same program can be applied.
For other models, programs can be easily created using the FB (function block) libraries for Mitsubishi Electric MELSOFT, programmable controller engineering software. They can be downloaded on MEEFAN site or Mitsubishi Electric FA site.

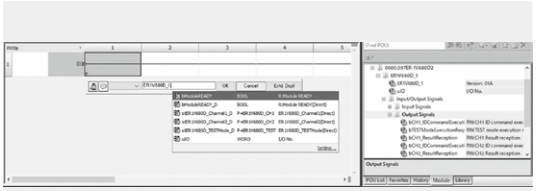
Three new features

MELSEC iQ-R



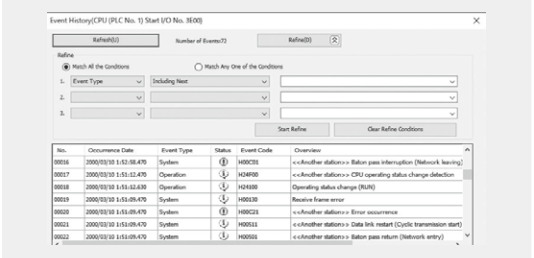
Initial setting on GUI

- Graphically configurable initial setting
- Module assignments by dragging and dropping



Module label

- Supporting label programming
- Enabling device selection from lists
- Auto-tracking of module assignments



Event history

- Managing CPU module event history
- Displaying error occurrence, causes, and corrective actions

Applying the same program

MELSEC iQ-R

Using an existing system

- Program for the MELSEC-Q series-compatible slot-in type module can be applied to the MELSEC iQ-R series-compatible slot-in type module.

FBs (function block) for easier program creation

MELSEC iQ-R | MELSEC-Q | CC-Link IE Field | CC-Link

By downloading the FB (function block) libraries for Mitsubishi Electric MELSOFT, programmable controller engineering software, on MEEFAN site or Mitsubishi Electric FA site, programs can be easily created.

FB library list

MELSEC iQ-R series slot-in type

FB name	Function
E_MEE-ER-1V680D_ParameterSet_R	Parameter setting
E_MEE-ER-1V680D_Read_R	RF tag read
E_MEE-ER-1V680D_Write_R	RF tag write
E_MEE-ER-1V680D_BitSet_R	RF tag bit set
E_MEE-ER-1V680D_BitClear_R	RF tag bit clear
E_MEE-ER-1V680D_MaskBitWrite_R	RF tag mask bit write
E_MEE-ER-1V680D_CalculationWrite_R	RF tag mask bit write
E_MEE-ER-1V680D_Fill_R	RF tag data fill
E_MEE-ER-1V680D_DataCheck_R	RF tag data check
E_MEE-ER-1V680D_CounterWrite_R	RF tag overwrite count control
E_MEE-ER-1V680D_Copy_R	Copy between RF tags (Available with EQ-V680D2 only)
E_MEE-ER-1V680D_ErrorCorrectionRead_R	RF tag read with error correction
E_MEE-ER-1V680D_ErrorCorrectionWrite_R	RF tag write with error correction
E_MEE-ER-1V680D_UIDRead_R	RF tag read UID
E_MEE-ER-1V680D_MeasureNoise_R	Measure noise
E_MEE-ER-1V680D_StatusRead_R	Module status read

*: FBs (function block) and sample ladders can be download on our website.

MELSEC-Q series slot-in type

FB name	Function
P+EQ-V680D_ParameterSet	Parameter setting
P+EQ-V680D_Read	RF tag read
P+EQ-V680D_Write	RF tag write
P+EQ-V680D_BitSet	RF tag bit set
P+EQ-V680D_BitClear	RF tag bit clear
P+EQ-V680D_MaskBitWrite	RF tag mask bit write
P+EQ-V680D_CalculationWrite	RF tag calculation write
P+EQ-V680D_Fill	RF tag data fill
P+EQ-V680D_DataCheck	RF tag data check
P+EQ-V680D_CounterWrite	RF tag overwrite count control
P+EQ-V680D_Copy	Copy between RF tags (Available with EQ-V680D2 only)
P+EQ-V680D_ErrorCorrectionRead	RF tag read with error correction
P+EQ-V680D_ErrorCorrectionWrite	RF tag write with error correction
P+EQ-V680D_UIDRead	RF tag read UID
P+EQ-V680D_MeasureNoise	Measure noise
P+EQ-V680D_StatusRead	Module status read

*: Sample ladders provided in the User's Manual (Detailed) can be download on our website.

CC-Link IE Field-compatible network distributed type

FB name	Function
P+MEE-ECLEF-V680D2_InitDateSet	Parameter setting
P+MEE-ECLEF-V680D2_Read	RF tag read
P+MEE-ECLEF-V680D2_Write	RF tag write
P+MEE-ECLEF-V680D2_Fill	RF tag data fill
P+MEE-ECLEF-V680D2_Copy	Copy between RF tags
P+MEE-ECLEF-V680D2_UIDRead	RF tag read UID
P+MEE-ECLEF-V680D2_MeasureNoise	Measure noise
P+MEE-ECLEF-V680D2_InitDateRead	Parameter setting status read
P+MEE-ECLEF-V680D2_StatusRead	Module status read

*: CSP+, FBs (function block), and sample ladders can be download on our website.

CC-Link-compatible network distributed type

FB name	Function
P+MEE-ECL2-V680D1_InitDateSet	Parameter setting
P+MEE-ECL2-V680D1_Read	RF tag read
P+MEE-ECL2-V680D1_Write	RF tag write
P+MEE-ECL2-V680D1_Fill	RF tag data fill
P+MEE-ECL2-V680D1_UIDRead	RF tag read UID
P+MEE-ECL2-V680D1_MeasureNoise	Measure noise
P+MEE-ECL2-V680D1_InitDateRead	Parameter setting status read
P+MEE-ECL2-V680D1_StatusRead	Module status read

*: CSP+, FBs (function block), and sample ladders can be download on our website.

A wealth of test and measurement functions

MELSEC iQ-R | MELSEC-Q | CC-Link IE Field | CC-Link

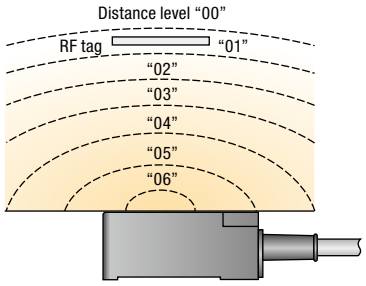
Diagnosis, such as "communication test" and "noise level measurement", between the antenna and an RF tag can be performed during start-up and maintenance.

Communication test

This function reads data from an RF tag without running a program.
If an error occurs while the data is read from the RF tag, this function shows whether the error is caused by the program, antenna, or RF tag.

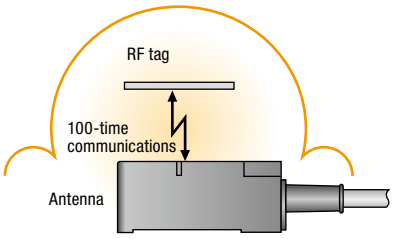
Distance level measurement

This function measures distance (level) at which an RF tag is present in the antenna communication area.
Measurement results are shown with seven levels, 00 to 06.



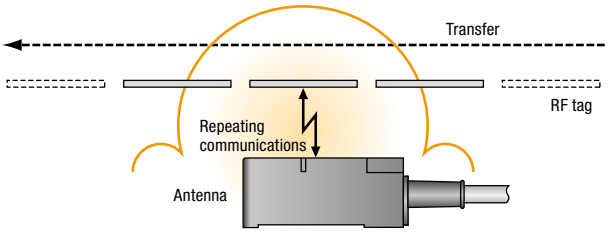
Communication success rate calculation

This function calculates the communication success rate that communications are performed 100 times with an RF tag stationary.
Measurement results are shown with 0 to 100%.



Speed level measurement

This function measures the number of times that an RF tag can communicate continuously while it is moving.
Measurement results are shown with 0 to 99 (times).

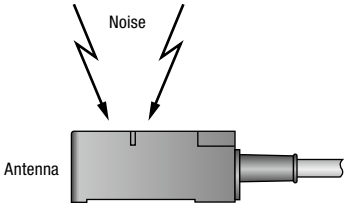


Noise level measurement

This function measures a noise level around an antenna.
Measurement results are shown with 0 to 99. (Regard them as a guide value.)

The measurement results show current noise levels at antenna installation sites. This function allows users to monitor any changes in noise reduction measures for the occurrence of an RF tag communication error.
Noise levels measured do not guarantee the communication performance.

*: The measurement results can be checked by reading them on HMI (Human Machine Interface) of the amplifier, from buffer memory in the RFID interface module, or from a remote register.



Function list

Function			Description	MELSEC iQ-R ER-1V680D1 ER-1V680D2	MELSEC-Q EQ-V680D1 EQ-V680D2	CC-Link IE Field ECLEF-V680D2	CC-Link ECL2-V680D1
Command	Read	Read	Reads data from an RF tag.	○	○	○	○
		Read with error correction	Reads data and check codes from an RF tag, inspects data reliability, and corrects any 1-bit errors.	○	○	–	–
		Read UID	Reads the UID (unit identification number) of an RF tag.	○	○	○	○
		Read initial data setting value	Reads setting values set for the initial data setting.	–	–	○	○
	Write	Write	Writes data to an RF tag.	○	○	○	○
		Set bit	Sets 1 to the specified bit in data of an RF tag.	○	○	–	–
		Clear bit	Sets 0 to the specified bit in data of an RF tag.	○	○	–	–
		Write mask bit	Protects the RF tag data that you do not want overwritten and writes other data.	○	○	–	–
		Write calculation	Writes an addition or subtraction calculation result (data) to data of an RF tag.	○	○	–	–
		Write with error correction	Writes data and check codes for inspecting data reliability to an RF tag.	○	○	–	–
	Duplicate	Copy	Copies data of an RF tag between the channel 1 and channel 2. (Available with ER-1V680D2, EQ-V680D2, and ECLEF-V680D2 only)	○	○	○	–
	Initialize	Fill data	Initializes data of an RF tag by using specified data.	○	○	○	○
	Management	Check data	Checks whether or not an error occurred in data of an RF tag.	○	○	–	–
		Manage number of writes	Judges whether or not the number of RF tag writes exceeds the specified number of EEPROM-type RF tag writes.	○	○	–	–
		Noise level	Measures the noise level around an antenna.	○	○	○	○
Test function	Test/ measure	Communication test	Reads data from RF tag.	○	○	○	○
		Distance level	Measures distance (level) at which an RF tag is present in the antenna communication area.	–	○	–	○
		Communication success rate	Performs communications 100 times, and calculates a success rate.	○	○	–	–
		Speed level	Measures the number of times that an RF tag passing through an antenna communication area can communicate continuously.	○	○	–	–
		Noise level	Measures the noise level around an antenna.	○	○	○	○

Date read time and write time

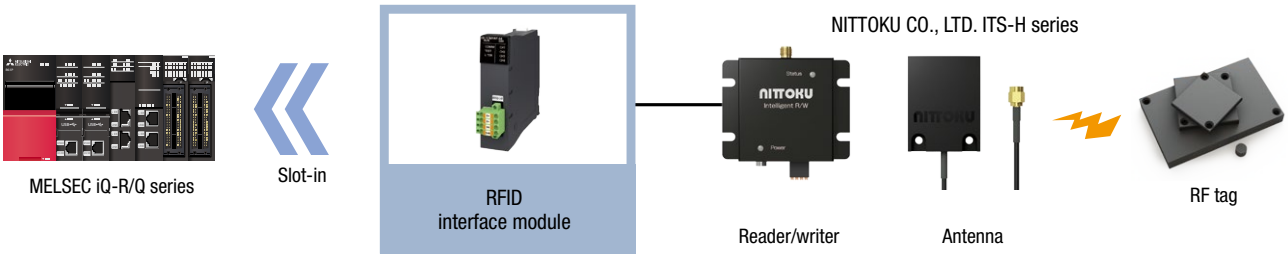
MELSEC iQ-R | MELSEC-Q | CC-Link IE Field | CC-Link

RFID interface module	Conditions	Read	Write
MELSEC iQ-R series slot-in type MELSEC-Q series slot-in type	Communication speed: Standard mode Memory tag: 1k byte	100 bytes: 169ms + 2 scans*1 1000 bytes: 1339ms + 2 scans*1	100 bytes: 289ms + 2 scans*1 1000 bytes: 2296ms + 2 scans*1
CC-Link IE Field-compatible network distributed type	Communication speed: Standard mode Memory tag: 1k byte	100 bytes: 161ms + transmission delay time 1*2 + transmission delay time 2*3 1000 bytes: 1331ms + transmission delay time 1*2 + transmission delay time 2*3	100 bytes: 278ms + transmission delay time 1*2 + transmission delay time 2*3 1000 bytes: 2258ms + transmission delay time 1*2 + transmission delay time 2*3
CC-Link-compatible network distributed type	Communication speed: Standard mode Memory tag: 1k byte CC-Link transmission speed: 10Mbps Number of connected modules: 1	10 bytes: 59ms + 2 scans*1 (Remote net Ver.1 mode 2 stations occupied setting) 122 bytes: 309ms + 2 scans*1 (Remote net Ver.2 mode 2 stations occupied setting, Octuple setting)	10 bytes: 93ms + 2 scans*1 (Remote net Ver.1 mode 2 stations occupied setting) 122 bytes: 407ms + 2 scans*1 (Remote net Ver.2 mode 2 stations occupied setting, Octuple setting)

*1: Maximum number of scans from turning on the ID command execution request signal of the programmable controller until receiving the execution completion signal ON.
*2: Maximum time from turning on the ID command execution request signal of the programmable controller until a first communication between the RFID interface module and the amplifier/antenna starts.
For details, refer to the User's Manual (Detailed).
*3: Maximum time from the end of communications between the RFID interface module and the amplifier/antenna until the ID command completion signal of the programmable controller turns on.
For details, refer to the User's Manual (Detailed).

Selection chart

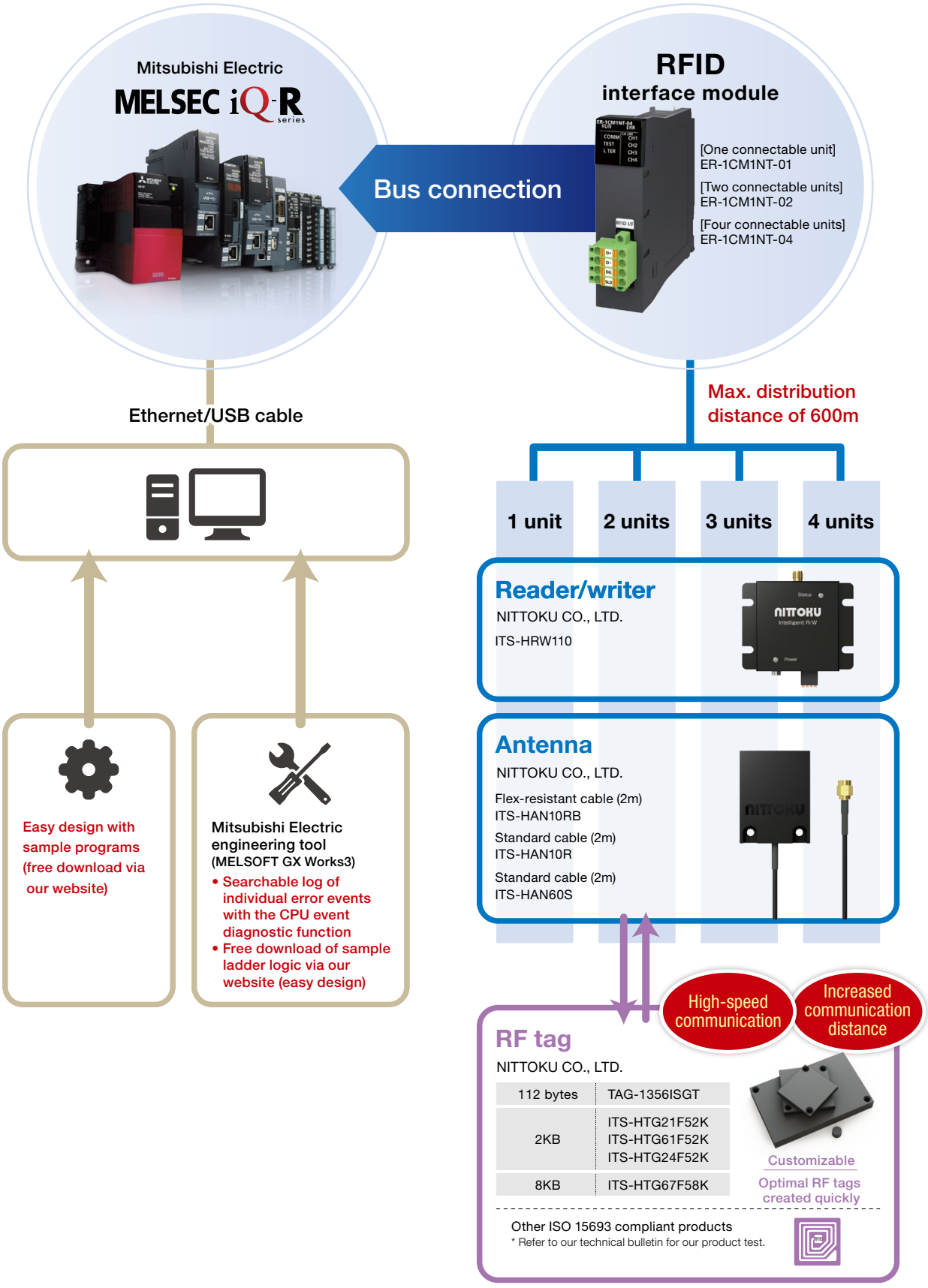
Connection with the NITTOKU ITS-H series



Controller	Programmable controller module		
MELSEC iQ-R series	Programmable controller CPU	R00CPU, R01CPU, R02CPU, R04CPU, R08CPU, R16CPU, R32CPU, R120CPU, R04ENCPU, R08ENCPU, R16ENCPU, R32ENCPU, R120ENCPU	ER-1CM1NT-01 (one-channel connection) ER-1CM1NT-02 (two-channel connection) ER-1CM1NT-04 (four-channel connection)
	Process CPU *1	R08PCPU, R16PCPU, R32PCPU, R120PCPU	
	Safety CPU *2	R08SFCPU, R16SFCPU, R32SFCPU, R120SFCPU	
	CC-Link IE Field Network remote head module	RJ72GF15-T2	

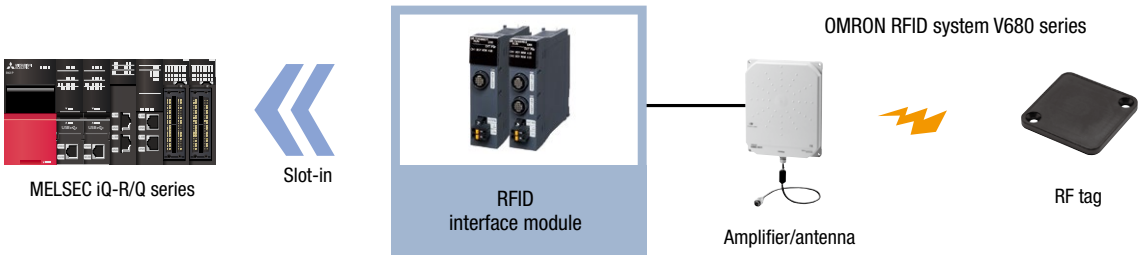
*1: The CPU is available only in process mode. (The CPU is not available in redundant mode.)
*2: The CPU is available only for standard programs. (The CPU is not available for safety programs.)

Example configuration



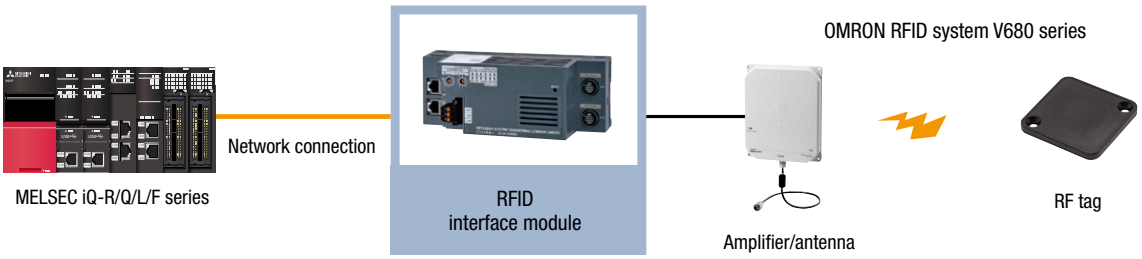
Connection with the OMRON system V680 series

Slot-in type



Controller	Programmable controller module		RFID	
MELSEC iQ-R series	Programmable controller CPU	R00CPU, R01CPU, R02CPU, R04CPU, R08CPU, R16CPU, R32CPU, R120CPU, R04ENCPU, R08ENCPU, R16ENCPU, R32ENCPU, R120ENCPU	MELSEC iQ-R series-compatible RFID interface module	ER-1V680D1 (one-channel connection) ER-1V680D2 (two-channel connection)
	Process CPU	R08PCPU, R16PCPU, R32PCPU, R120PCPU		
	Safety CPU	R08SFCPU, R16SFCPU, R32SFCPU, R120SFCPU		
	CC-Link IE Field Network remote head module	RJ72GF15-T2		
MELSEC-Q series	Universal model	Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, QnUDVCPU, QnUDPVCPU	MELSEC-Q series-compatible RFID interface module	EQ-V680D1 (one-channel connection) EQ-V680D2 (two-channel connection)
	Process CPU	Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU		
	Redundant CPU	Q12PRHCPU, Q25PRHCPU		
	Basic model	Q00JCPU, Q00CPU, Q01CPU		
	High performance model	Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU		
	MELSECNET/H network module	QJ72LP25-25, QJ72LP25G, QJ72BR15		

Network distributed type



Controller	Programmable controller module		RFID	
MELSEC iQ-R series	Ethernet module	RJ71EN71	CC-Link IE Field-compatible RFID interface module	ECLEF-V680D2 (two-channel connection)
	CC-Link IE Field Network manager/local module	RJ71GF11-T2		
MELSEC-Q series	Motion module	QD77GF16		
	CC-Link IE Field Network manager/local module	QJ71GF11-T2		
	CC-Link manager/local module	QJ61BT11N, QJ61BT11	CC-Link-compatible RFID interface module	ECL2-V680D1 (one-channel connection)
MELSEC-L series	CC-Link IE Field Network manager/local module	LJ71GF11-T2	CC-Link IE Field-compatible RFID interface module	ECLEF-V680D2 (two-channel connection)
	CPU module	L26CPU-BT		
	CC-Link manager/local module	LJ61BT11	CC-Link-compatible RFID interface module	ECL2-V680D1 (one-channel connection)
MELSEC-F series	CC-Link system manager block	FX3U-16CCL-M		

Combination chart: OMRON RFID system V680 series, amplifier, antenna, and RF tag

RF tag / Amplifier, antenna, extension cable			Separate amplifier type antenna								Built-in amplifier type antenna
			Maximum cable length: 62.5m								Maximum cable length: 30.5m
			Amplifier extension cable[*1]								Model: V680-H01 Antenna extension cable[*2]
			Length (2/3/5/10/20/30)m								Length (2/5/10/20/30)m
			Model: V700-A40/41/42/43/44/45								Model: V700-A40-W
			Amplifier								
			Length 0.5/5/10m								Built-in type
			For 1-kbyte RF tag Model: V680-HA63A				For 2-/8-kbyte RF tag Model: V680-HA63B				
			Antenna (separate amplifier type)								Antenna (built-in amplifier type)
			Length: 2/12.5m								Length: 0.5m
			Model: V680-HS52	Model: V680-HS51	Model: V680-HS63	Model: V680-HS65	Model: V680-HS52	Model: V680-HS51	Model: V680-HS63	Model: V680-HS65	Model: V680-H01-V2
1 kbyte	EEPROM type	Model: V680-D1KP52MT	○	○	○						
		Model: V680-D1KP53M	○	○							
		Model: V680-D1KP54T	○		○	○					
		Model: V680-D1KP66MT	○		○	○					
		Model: V680-D1KP66T	○		○	○					○
		Model: V680-D1KP66T-SP	○		○	○					
		Model: V680-D1KP58HTN				○					○
		Model: V680-D1KP52M-BT01	○	○							
		Model: V680-D1KP52M-BT11	○	○							
2 kbytes	FRAM type	Model: V680-D2KF52M					○	○	○		
		Model: V680-D2KF52M-BT01					○	○			
		Model: V680-D2KF52M-BT11					○	○			
		Model: V680S-D2KF67M					○		○	○	
		Model: V680S-D2KF68M							○	○	
		Model: V680S-D2KF67					○		○	○	○
		Model: V680S-D2KF68							○	○	○
8 kbytes		Model: V680-D8KF67M					○		○	○	
		Model: V680S-D8KF67M					○		○	○	
		Model: V680-D8KF67					○		○	○	○
		Model: V680S-D8KF67					○		○	○	○
		Model: V680S-D8KF68M							○	○	
		Model: V680-D8KF68							○	○	○
		Model: V680S-D8KF68							○	○	○

*1: The maximum cable length is 40m (not including the amplifier). Two extension cables (maximum) can be connected to each other.
*2: The maximum cable length is 30m (not including the amplifier). Connection of the extension cables is not possible.

Model list

Connection with the NITTOKU ITS-H series

Type	Specifications	No. of channel connections	Model
MELSEC iQ-R series slot-in type	• Module • User's Manual (Hardware)	One-channel connection	ER-1CM1NT-01
		Two-channel connection	ER-1CM1NT-02
		Four-channel connection	ER-1CM1NT-04

Connection with the OMRON system V680 series

Type	Specifications	No. of channel connections	Model
MELSEC iQ-R series slot-in type	• Module • User's Manual (Hardware)	One-channel connection	ER-1V680D1
		Two-channel connection	ER-1V680D2
MELSEC-Q series slot-in type		One-channel connection	EQ-V680D1
		Two-channel connection	EQ-V680D2
CC-Link IE Field-compatible network distributed type		Two-channel connection	ECLEF-V680D2
CC-Link-compatible network distributed type		One-channel connection	ECL2-V680D1

Specifications

Connection with the NITTOKU ITS-H series

MELSEC iQ-R series-compatible RFID interface module

ER-1CM1NT-01 (one-channel connection)
ER-1CM1NT-02 (two-channel connection)
ER-1CM1NT-04 (four-channel connection)

- ISO compliant RF tags can be used.
- Dispersed installation of an RFID interface module and a reader/writer is possible up to 600m.
- High-speed communications with RF tags and extended communication distance are possible.
- Large-capacity RF tags can be used.
- RF tags can be customized.
- Easy start-up with a sample program is possible.

Specifications

Item		Specifications
Connectable reader/writer	Manufacturer	NITTOKU
	Separated antenna type	ITS-HRW110
	Firmware version	2.76 or later
Number of connectable devices		1/2/4
Antenna interface specifications		RS-485 compliant
Communication method		Half-duplex
Transmission speed		9600/19200/38400/57600/115200/230400 (bps)
Transmission distance		Total distance: 600m (when the connection cable is 20 AWG)
External interface connector		Two-piece spring clamp terminal block
Insulation	Insulation method	Between the interface part and the programmable controller power supply: Digital isolator
	Withstand voltage	500VAC for 1 minute
	Insulation resistance	5MΩ or higher (measured with 500VDC insulation resistance tester)
Number of occupied I/O points		32
Data transfer volume		8192 bytes max.
Internal power supply current consumption 5VDC (Supplied internally from the programmable controller)		0.33A
Terminating resistor		120Ω (built-in, enable/disable setting available)
External dimension	Height	106mm (Installation base unit mounting side: 98mm)
	Width	27.8mm
	Depth	125mm (including terminal block) / 110mm (excluding terminal block)
Weight		200g

Connection with the OMRON system V680 series

MELSEC iQ-R series-compatible RFID interface module

ER-1V680D1 (one-channel connection)
ER-1V680D2 (two-channel connection)

- Either one of the separate amplifier type antenna or the built-in amplifier type antenna can be connected to the one-channel connection module.
- Two separate amplifier type antennas can be connected to the two-channel connection module.
- Direct connection to a bus of the MELSEC iQ-R series programmable controller enables the high-speed communications of the large-volume data (2048 bytes) with the programmable controller CPU.
- The maximum cable length between the RFID interface module and the antenna is 62.5m. (When the built-in amplifier type antenna is used, it is 30.5m.)
- The three features that utilize the features of the MELSEC iQ-R series programmable controller are equipped.
  "Initial setting on GUI", "Module label", "Event history"
- If the MELSEC-Q series-compatible slot-in type module (EQ-V680D1 or EQ-V680D2) is currently used, it can be easily replaced with the MELSEC iQ-R series-compatible slot-in type module because the same ladder diagram can be applied.

Specifications

Item	Specifications	
	ER-1V680D1	ER-1V680D2
No. of connectable antennas	1	2
Operating ambient temperature	0 to 55°C	
Operating ambient humidity	5 to 95%RH, non-condensing	
24VDC external power supply current consumption (20.4 to 28.8VDC)	0.20A	0.32A
5VDC internal current consumption	0.18A	0.21A
External dimensions	106 (H) × 27.8 (W) × 125 (D)mm (excluding a connection antenna cable)	
Weight	200g	210g
Data transfer volume	2048 bytes max.	
No. of occupied I/O points	32 points	

MELSEC-Q series-compatible RFID interface module

EQ-V680D1 (one-channel connection)
EQ-V680D2 (two-channel connection)

- Either one of the separate amplifier type antenna or the built-in amplifier type antenna can be connected to the one-channel connection module.
- Two separate amplifier type antennas can be connected to the two-channel connection module.
- Direct connection to a bus of the MELSEC-Q series programmable controller enables the high-speed communications of the large-volume data (2048 bytes) with the programmable controller CPU.
- The maximum cable length between the RFID interface module and the antenna is 62.5m. (When the built-in amplifier type antenna is used, it is 30.5m.)
- The FBs (function blocks) are available to make program creation easier.
- The test and measurement functions required for the system start-up and maintenance are equipped as standard.

Specifications

Item	Specifications	
	EQ-V680D1	EQ-V680D2
No. of connectable antennas	1	2
Operating ambient temperature	0 to 55°C	
Operating ambient humidity	5 to 95%RH, non-condensing	
24VDC external power supply current consumption (20.4 to 26.4VDC)	0.25A	0.37A
5VDC internal current consumption	0.42A	0.52A
External dimensions	98 (H) × 27.4 (W) × 106.5 (D)mm (excluding a connection antenna cable)	
Weight	200g	210g
Data transfer volume	2048 bytes max.	
No. of occupied I/O points	32 (I/O assignment: 32 for intelligent device station)	

CC-Link IE Field Network-compatible RFID interface module

ECLEF-V680D2 (two-channel connection)

- Either two separate amplifier type antennas or one built-in amplifier type antenna can be connected to this module.
- This module can be installed distributedly 12000-meter (maximum) away from the CC-Link IE Field Network manager station.
- The test and measurement functions required for the system start-up and maintenance are equipped as standard.
- The FBs (function block) are available to make program creation easier.

Specifications

Item		Specifications
		ECLEF-V680D2
No. of connectable antennas		2 (1 antenna when the built-in amplifier type antenna is used)
Operating ambient temperature		0 to 55˚C
Operating ambient humidity		5 to 95%RH, non-condensing
CC-Link IE Field Network side	Station type	Intelligent device station
	Station number selection	1 to 120
	Network number	1 to 239
	Communication speed	1Gbps
	Data transfer volume	Data volume that can be written and read with one ID command Set 8 to 1016 bytes (variable) with the parameters.
	Connection cable	Ethernet cable that satisfies 1000BASE-T Category 5e or higher, (Double shielded/STP) straight cable
External power supply		20.4 to 28.8VDC (24VDC-15%, +20%) (ripple ratio: within 5%) Current consumption: 0.60A or less
External dimension		55 (H) × 180 (W) × 70 (D)mm (excluding a connection antenna cable)
Weight		300g

CC-Link-compatible RFID interface module

ECL2-V680D1 (one-channel connection)

- Either one of the amplifier-isolated type antenna or the amplifier-built-in type antenna can be turned connection.
- This module can be installed distributedly 1200-meter (maximum) away from the CC-Link manager station.
- The test and measurement functions required for the system start-up and maintenance are equipped as standard.
- The FBs (function block) are available to make program creation easier.
- Mitsubishi Electric iQSS (iQ Sensor Solution) is available soon.

Specifications

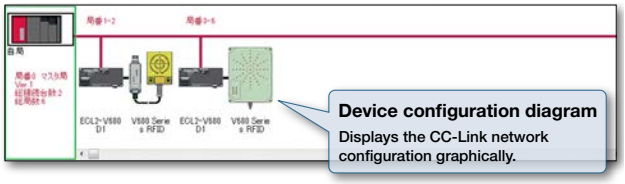
Item		Specifications				
		ECL2-V680D1				
No. of connectable antennas		1				
Operating ambient temperature		0 to 55°C				
Operating ambient humidity		10 to 90%RH, non-condensing				
CC-Link specifications	CC-Link station type	Remote device station				
	CC-Link version	Ver. 1.10 or Ver. 2.0				
	Station number selection	2 stations occupied: Station numbers 1 to 63 4 stations occupied: Station numbers 1 to 61				
	Transmission speed	156kbps/625kbps/2.5Mbps/5Mbps/10Mbps (selectable)				
	No. of occupied stations and data transfer volume	CC-Link version	No. of occupied stations	Extended cyclic setting	Data transfer volume	Data volume that can be written and read with one ID command
		Ver.1.10	2 stations occupied		8 words	10 bytes
			4 stations occupied		16 words	26 bytes
		Ver.2.0	2 stations occupied	Double setting	16 words	26 bytes
				Quadruple setting	32 words	58 bytes
				Octuple setting	64 words	122 bytes
	Connection cable	Ver. 1.10 compatible CC-Link dedicated cable CC-Link dedicated cable (Ver. 1.00 compatible) CC-Link dedicated high performance cable (Ver. 1.00 compatible)				
External power supply		20.4 to 26.4VDC (24VDC-15%, +10%) (ripple ratio: within 5%) Current consumption: 0.33A or less				
External dimension		65 (H) × 150 (W) × 45 (D)mm (excluding a connection antenna cable)				
Weight		300g				

Compatible with iQSS (iQ Sensor Solution)

This module is compatible with Mitsubishi Electronic iQSS, and reduces development, debugging, and start-up time, achieving easy start-up, monitoring, and programming of the RFID system.

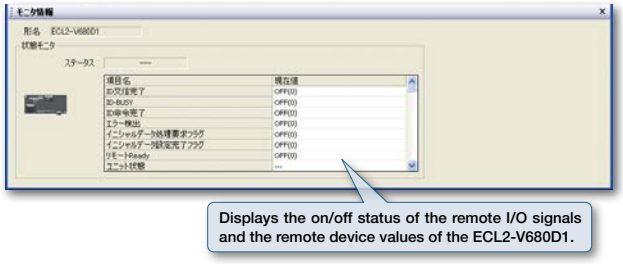
Easy system start-up

During system start-up or modification, the RFID interface module detects the device stations connected to the CC-Link manager/local modules in the actual system configuration, and reflects the detected data in the "CC-Link Configuration" window of the programmable controller engineering software. In this window, the "communication test", "distance level measurement" and other tests are easily performed.



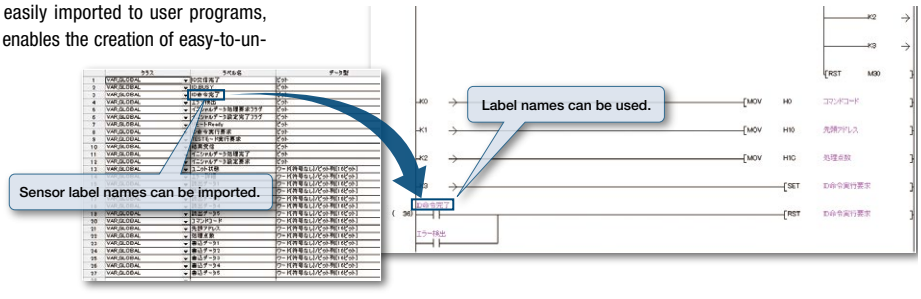
Monitoring sensors

The status of the iQSS-compatible devices, connected to the CC-Link manager/local modules, is displayed in the "monitor information" window of the programmable controller engineering software. In this window, the status of the module (on/off status of each signal, device values, and other parameters) can be easily checked.



Easy programming

Since the label information of the ECL2-V680D1 can be easily imported to user programs, device numbers can be specified by the label names. This enables the creation of easy-to-understand programs.

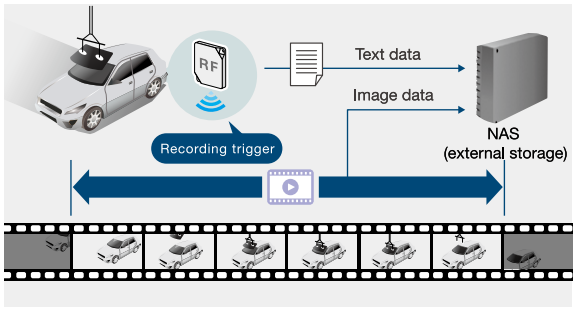


Related system

Traceability enhancement using drive recorder images

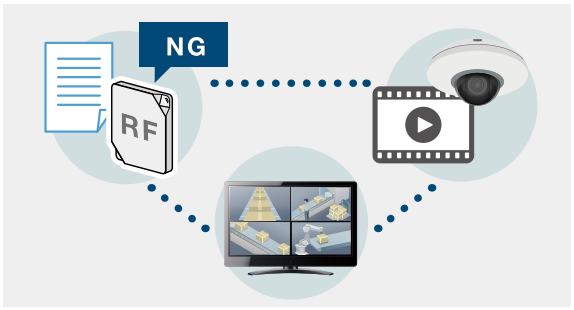
Building further advanced traceability system by combining RF tag data and camera images

Images and data to control production status



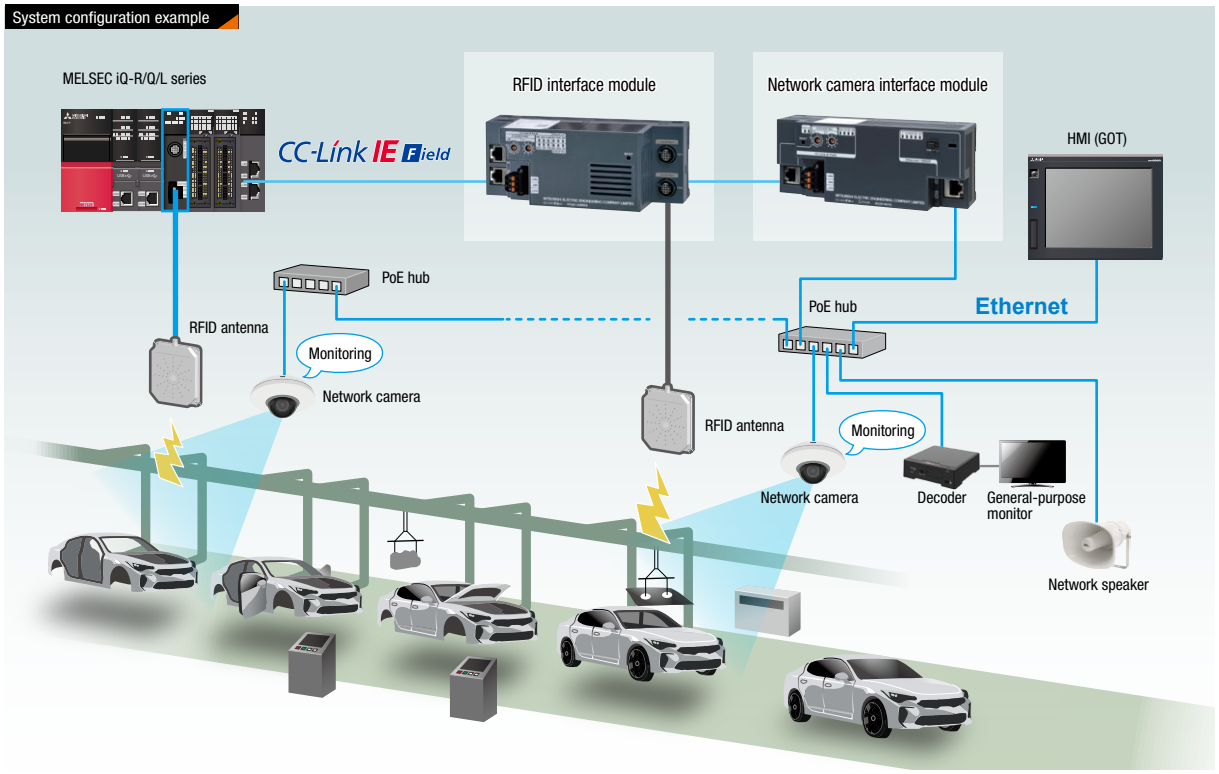
By recording production status before and after a trouble occurrence with RF tag data as a trigger using drive recorders, recorded images can be used for the trouble analysis.

Data associated with individual products



Data read from RF tags can be associated with data for individual management of products and images recorded by cameras. Associated data can be sent through a network and analyzed at remote locations.

System configuration example



Products for system maintenance

Products for system maintenance

INDEX

Overview

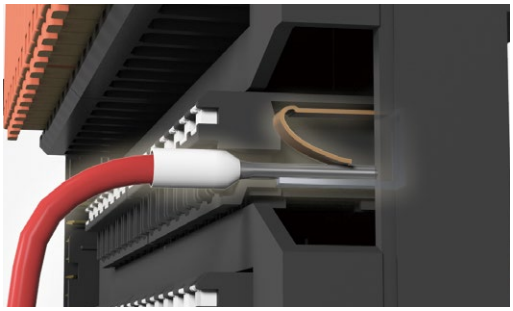
Voice alerts

Panel mount HMI speaker

Voice alerts are given so that an operator away from the system can notice the alerts. Voice volume and language can be selected according to the operating environment.

For details, refer to page 92.

No need for periodic screw retightening



Spring clamp junction terminal block, which does not require screws, eliminates risk of screw-loosening due to vibration. Therefore, screw tightening during maintenance is not required, reducing work load of workers.

For details, refer to page 96.

Facility status monitoring

Collecting information from sensors and visualizing the facility status reduce the workload of on-site workers.

For details, refer to page 104.

Preventive maintenance by managing the number of uses

Network camera interface module

Managing the number of uses of the life-expired parts by RFID and replacing the parts before the production line stops can reduce the risk of production line downtime.

For details, refer to page 68.

Visualization of production sites using camera monitoring

Network camera interface module

Using this product with an HMI (GOT) enables checking images recorded by cameras, controlling camera shooting directions, or recording images when a downtime occurs.

For details, refer to page 60.

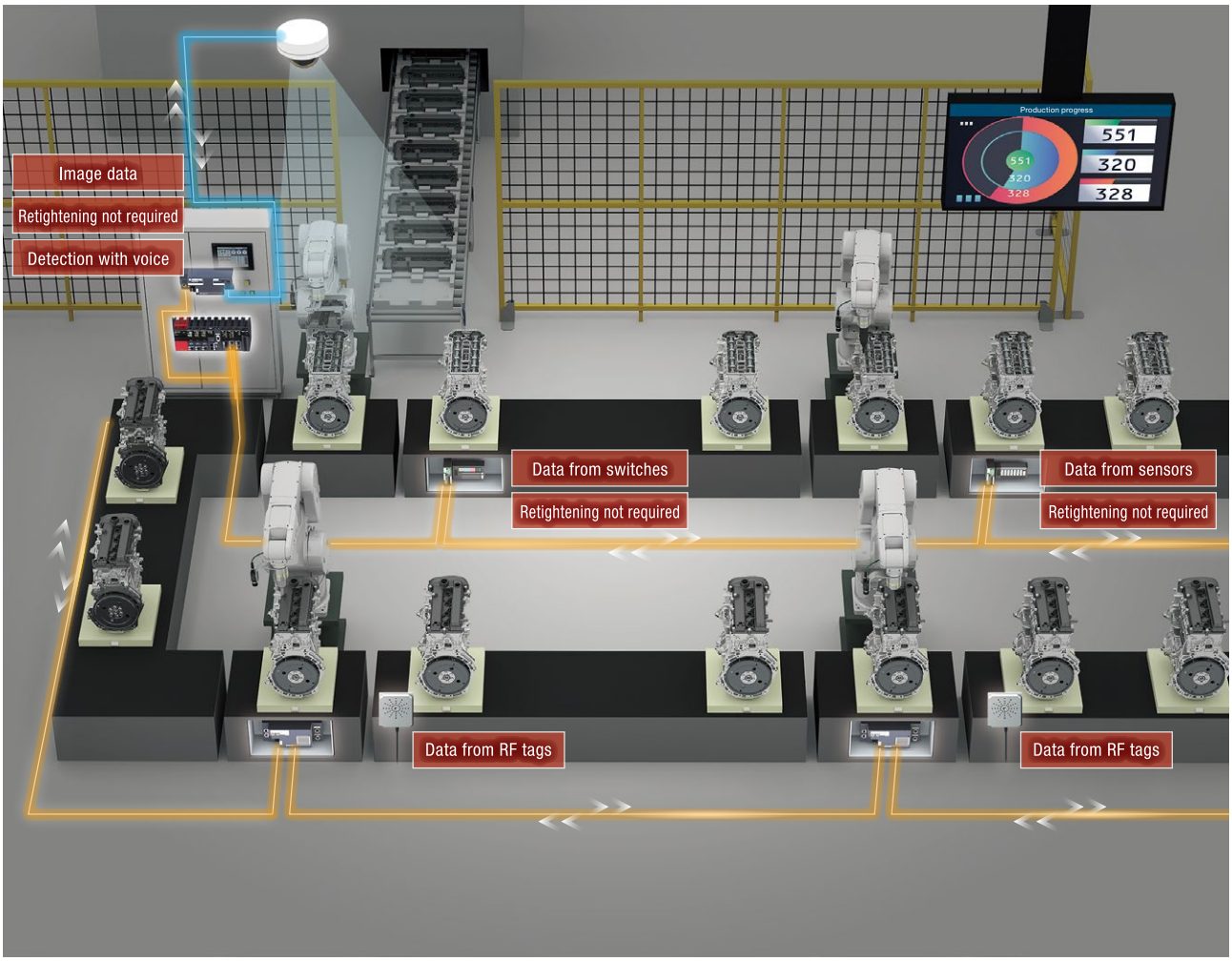
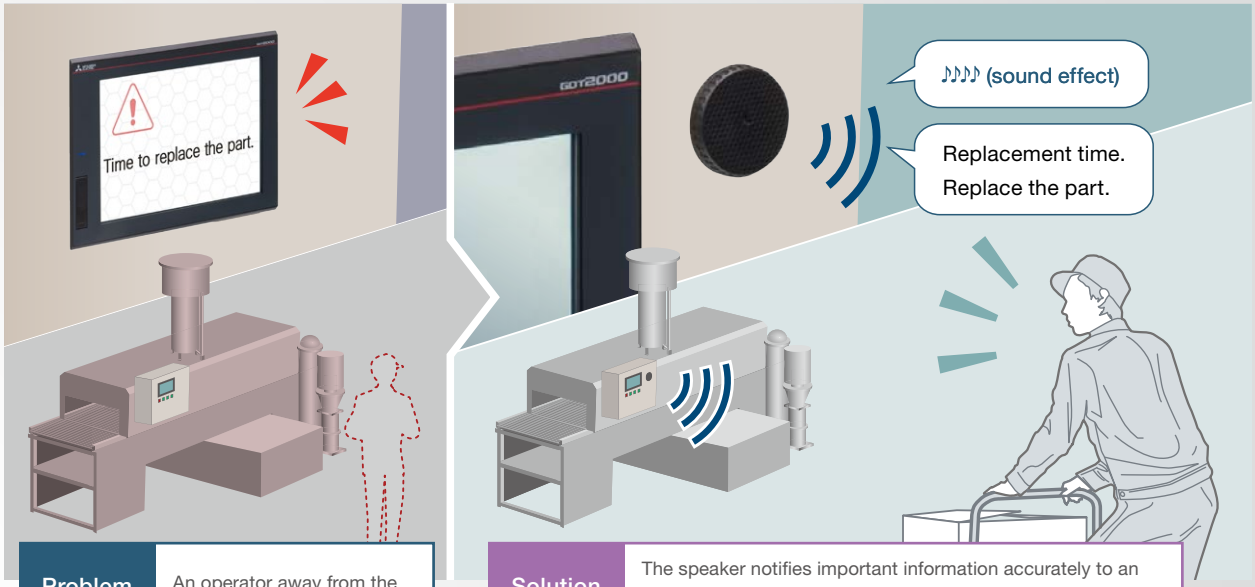


Image data
Retightening not required
Detection with voice
Production progress
551
320
328
Data from switches
Retightening not required
Data from sensors
Retightening not required
Data from RF tags
Data from RF tags

Voice messages (panel mount HMI speaker)

Improving the servicing/maintenance/work efficiency

Notifying important information by voice as well as by on-screen display



Problem

An operator away from the HMI may not notice information on the display.

Solution

The speaker notifies important information accurately to an operator away from the HMI.
Servicing/maintenance/work efficiency will be improved.
(Sounds can be output in screen saver mode.)

P. 93

Various applications depending on the conditions

Optimum use is possible depending on the installation environment.

P. 94

Easy installation and wiring

- Just attach the speaker from the front and back of the panel.
- Easy wiring using the audio cable

P. 94

Environmental resistance

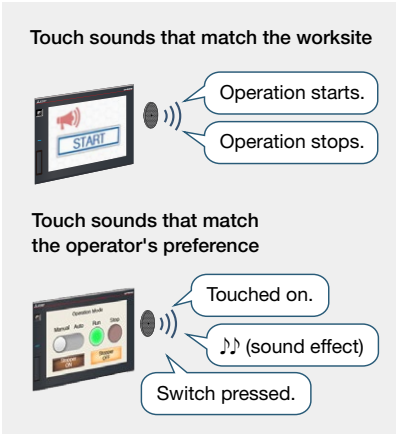
The speaker can be used in an environment suitable for factories*.

*: For details, refer to the specifications

Various applications depending on the conditions

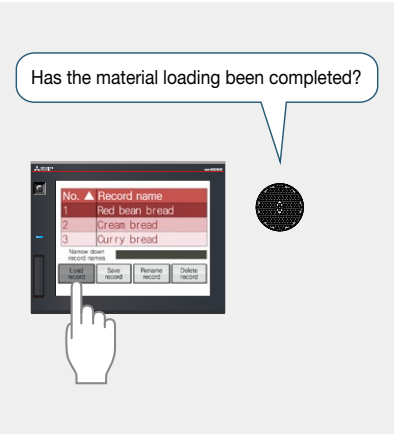
The product can be optimized to suit the customers' needs.

Change the touch sound



Touch sounds can be changed depending on the worksite and operator's preference.

Use as voice guidance



When a touch switch is pressed, the next operation and precautions are voiced, which prevents incorrect operation.

Use during the screen saver

The announcement in multiple languages in order is available at a worksite where the operators speak in different languages.

Multiple languages

Announcements are given in order in multiple languages to support operators who speak different languages.

Registrable sounds

Messages

The speech synthesis function produces and outputs sound from any text.*2
The speaker (male/female), language, speaking speed, tone of voice, and volume can be selected in 6 languages.

Supported languages

Male	Japanese	English	Chinese (Simplified)	Korean	Spanish	
Female	Japanese	English	Chinese (Simplified)	Chinese (Traditional)	Korean	Spanish

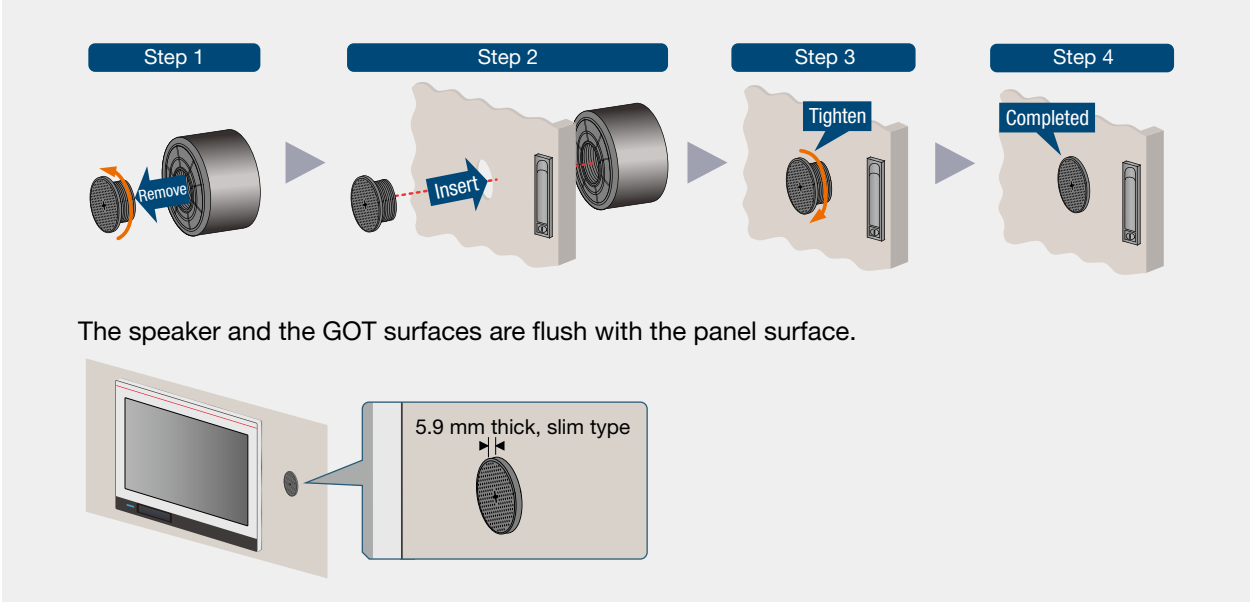
Sound effect / Melody	Sound sources registered in GT Designer3 GOT screen design software
File	WAV format sound files

*2: To register or update messages, the speech synthesis license (SW1DND-GTVO-M manufactured by Mitsubishi Electric Corporation) must be purchased and registered.

Easy installation and wiring

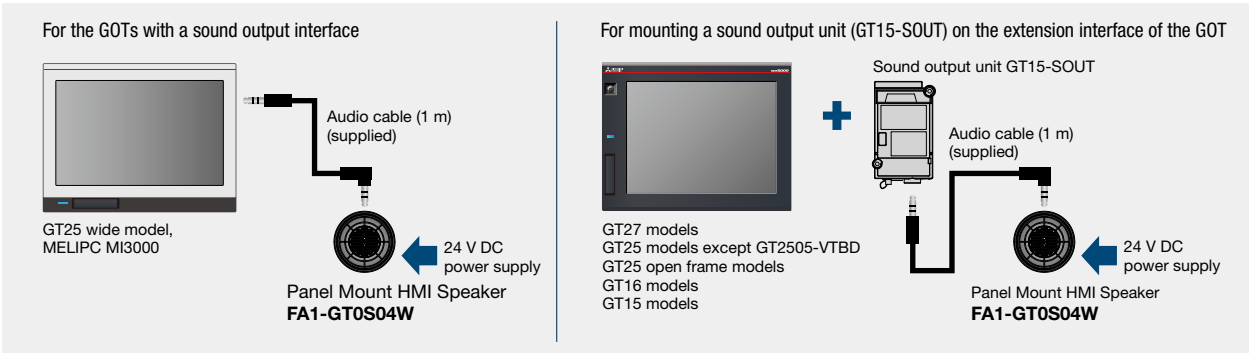
Installing the speaker is easy. Sound notifications through a speaker enhance the efficiency of service, maintenance, and work processes.

Easy installation



Just attach the speaker from the front and back of the panel.

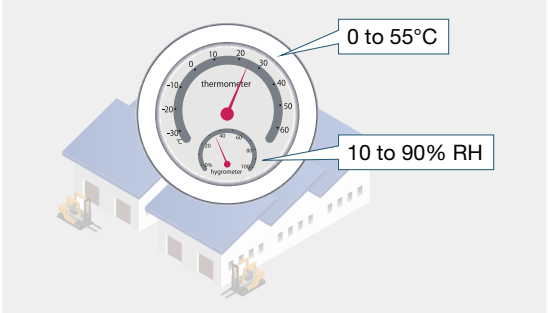
Easy wiring



The speaker can be easily connected with an audio cable. (GOT and MELIPC MI3000)

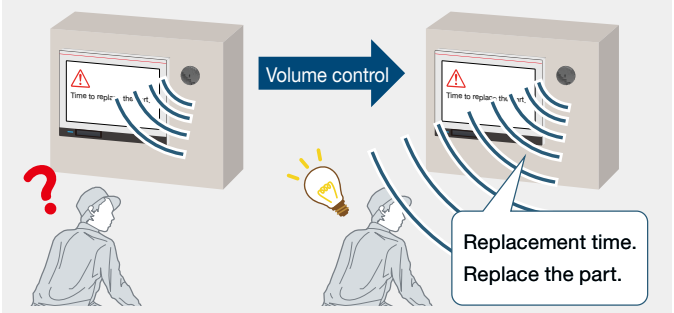
Environmental resistance

Rugged



Usable at factory temperature and humidity
For the details, refer to the specifications.

Volume control function

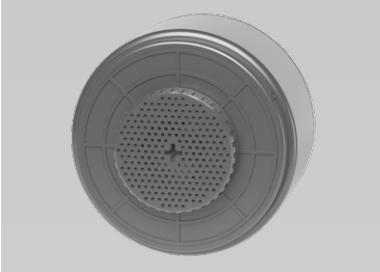


The volume is adjustable in 10 levels (90 dB max.)
depending on the noise environment.

Model list

Item	Remarks	Type
Panel mount HMI speaker	Speaker, audio cable (1m), power supply connector, cable clamp, user's manual	FA1-GT0S04W

Specifications



Panel Mount HMI Speaker

FA1-GT0S04W

■ Incorrect operation prevention
When a touch switch is pressed, operation guidance or precautions are given by voice.

■ Easy installation
The speaker just needs to be attached from the front and back of the panel. Only one audio cable is required to connect the speaker and the HMI.

■ Environmental resistance
The speaker can be used at temperatures and humidities in factories.

■ Volume control function
The volume can be selected from10 levels (max. 90dB) to suit the work environment.

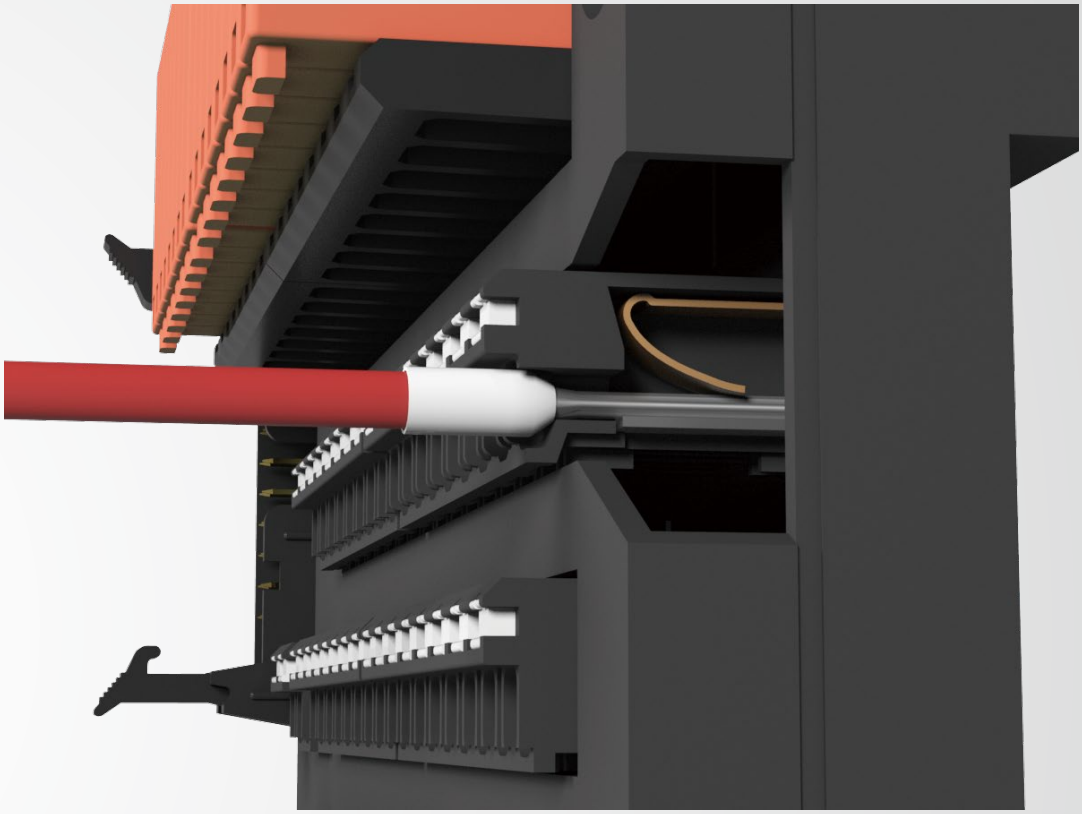
Specifications

Item		Specifications			
Operating ambient temperature		0 to 55°C			
Operating ambient humidity		10 to 90% RH, non-condensing			
IP protection level		IP2X			
Weight		175 g			
Installation	Installation method	Interposing the panel			
	Installation hole processing dimensions	$\phi 30^{+1}_{-0}$ mm			
	Applicable panel thickness	1.5 to 6 mm			
Power supply to the built-in amplifier	Power supply voltage	24 V DC +20%, -15%			
	Current consumption	0.28 A			
	Wiring method	Wiring to the supplied power supply connector			
	Applicable wire size	0.2 to 2.5 mm^2 (AWG 12 to 24)			
	Applicable ferrule terminal, tool	Applicable wire size (mm^2/AWG)	Applicable ferrule terminal type (sleeve length)	Crimping tool model	Manufacturer
		0.25/24	AI 0,25-10 YE (10 mm), AI 0,25-8 YE (8 mm)	CRIMPFOX 6	PHOENIX CONTACT GmbH & Co. KG
		0.3, 0.34/22	AI 0,34-10 TQ (10 mm), AI 0,34-8 TQ (8 mm)		
		0.5/20	AI 0,5-10 WH (10 mm), AI 0,5-8 WH (8 mm)		
		0.75/18	AI 0,75-10 GY (10 mm), AI 0,75-8 GY (8 mm)		
		0.08 to 0.34/28 to 22	216-302 (8 mm)	206-220	WAGO Company of Japan, Ltd
		0.34/24, 22	216-302 (8 mm)	206-1204	
		0.5/22, 20	216-201 (8 mm)		
		0.75/20, 18	216-202 (8 mm)		
Sound	Input terminal	ϕ3.5 minijack			
	Maximum output	3.5W			
	Sound pressure level	90 dB max. at 1 m[*1] Equivalent to the noise of railroad underpasses			
	Volume control	10 levels (Use the rotary switch of the speaker.)			
Connectable GOTs (manufactured by Mitsubishi Electric Corporation)	GOT2000 series	GT25 wide models with a built-in sound output interface Rugged GT25 model used where a panel mount speaker is usable.			
		GT27 models, GT25 models except GT2505-VTBD, GT25 open frame models[*2]		Sound output unit (GT15-SOUT) needs to be mounted on the extension interface.	
	GOT1000 series	GT16 models, GT15 models[*2]			
Connectable MELIPCs (manufactured by Mitsubishi Electric Corporation)	MELIPC series	MELIPC MI3000 with a built-in sound output interface			
		MELIPC MI5000, MI1000[*3]		HDMI splitter with an aux. port needs to be connected.	
Applicable standard		CE, KC			

*1: For GT25 wide models: The sound pressure level varies with the sound source and usage environment.
*2: Sound output unit (GT15-SOUT) needs to be mounted on the extension interface.
*3: HDMI splitter with an aux. port needs to be connected.

Spring clamp terminals with no need for retightening

The screwless terminal block enables easy wiring, stable connection, and reduction in costs and time for maintenance.



P. 97

Features of spring clamp terminal block

The terminal block without screws can improve work efficiency.

P.98

Various products available

As well as the terminal block, cables with pre-wired spring clamp terminals are also included in the product lineup.

P. 100

Spotlight product

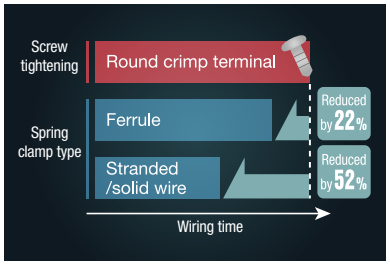
Introducing our highly recommended products.

Features of spring clamp terminal block

The product can be optimized to suit the customers' needs.

Features of spring clamp terminal specification

Easy wiring



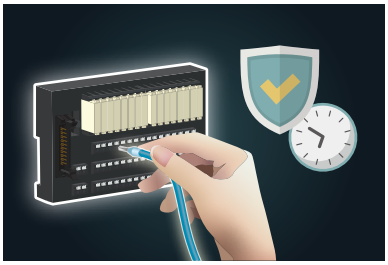
Wiring time can be significantly reduced by push-in connection.

* Calculated by comparing the time taken by non-experts with two years of experience (Data sourced from Japan Switchboard & control system Industries Association)

Stable connection

Screws are vibration resistant. Uniform quality is guaranteed for wiring since no special skills are required.

Less maintenance

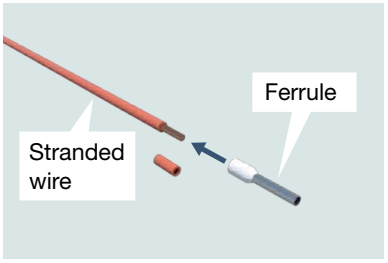


Screw tightening during maintenance is not required, reducing work load of workers. Rewiring work is also facilitated by push-in connection.

Wiring of the spring clamp terminal block

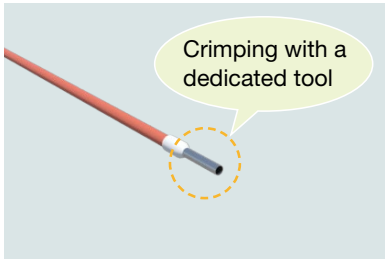
When using ferrule terminals

Step.1



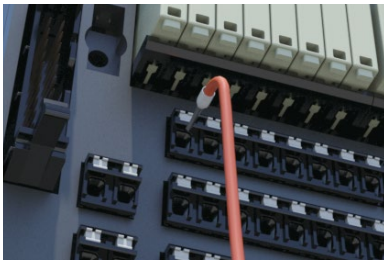
Strip the stranded wire sheath, and then insert the ferrule solderless terminal.

Step.2



Crimp the terminal with a dedicated tool.

Step.3



Wiring is completed by simply inserting the ferrule solderless terminal into a conductive terminal without using a screwdriver.

Various products available

Terminal blocks for programmable controllers

Specifications					Model
Junction terminal block 	I/O module	32 points	Vertical/horizontal type		FA1-TE2SD32XY
		16 points	Vertical type, 2 common points + 2 (0V) common points		FA1-TE2SV16XY
	I/O module Analog module High-speed counter module	40 points	Vertical/horizontal type		FA1-TE2SD40P
		20 points	Vertical type		FA1-TE2SV20P
	Common terminal block	40 points	Vertical type		FA1-TE2SV40EX
Spring clamp terminal block conversion adapter 		40 points	Vertical type		FA1-TE40PA
Digital signal converter (terminal module) 	Input module	4 points	Installation base unit (module selectable type)	Positive/negative shared	FA1-TH4X2SC20S1E
		8 points			FA1-TH8X2SC20S1E
		4 points	Module pre-mounted type (N/O contact)	Positive common	FA1-TH4X24RA1L20S1E
				Negative common	FA1-TH4X24RA1H20S1E
		8 points		Positive common	FA1-TH8X24RA1L20S1E
				Negative common	FA1-TH8X24RA1H20S1E
		16 points		Positive common	FA1-TH16X24RA1L20S1E
				Negative common	FA1-TH16X24RA1H20S1E
	Output module	4 points	Installation base unit (module selectable type)	Sink	FA1-TH4Y2SC20S1E
				Source	FA1-TH1E4Y2SC20S1E
		8 points		Sink	FA1-TH8Y2SC20S1E
				Source	FA1-TH1E8Y2SC20S1E
		16 points	Installation base unit (module selectable type)	Sink	FA1-TH16Y2SC20S1E
				Source	FA1-TH1E16Y2SC20S1E
			Module pre-mounted type (N/O contact)	Sink	FA1-TH16Y2RA20S1E
				Source	FA1-TH1E16Y2RA20S1E
			Module pre-mounted type (triac)	Sink	FA1-TH16Y1SR20S1E
				Source	FA1-TH1E16Y1SR20S1E
			Module pre-mounted type (transistor)	Sink	FA1-TH16Y1TR20S1E
				Source	FA1-TH1E16Y1TR20S1E
Analog signal converter 	Voltage input	4 points	Installation base unit (module selectable type)	Input to programmable controller: 1-5V	FA1-AT1B4X1TE
		8 points			FA1-AT1B8X1TE
	Current/voltage output	4 points	Installation base unit (module selectable type)	Output from programmable controller: 1 to 5V, 4 to 20mA	FA1-AT1B4Y1TE
		8 points			FA1-AT1B8Y1TE

Cables for programmable controllers

Specifications					Model
Connection cable: discrete cable	18-pin		0.3mm² (4A)	1m	FA1-CB3L03SQ10E1F18
				2m	FA1-CB3L03SQ20E1F18
				3m	FA1-CB3L03SQ30E1F18
			0.75mm² (8A)	1m	FA1-CB3L07SQ10E1F18
				2m	FA1-CB3L07SQ20E1F18
				3m	FA1-CB3L07SQ30E1F18
	34-pin		0.3mm² (4A)	1m	FA1-CB3L03SQ10E1F34
				2m	FA1-CB3L03SQ20E1F34
				3m	FA1-CB3L03SQ30E1F34
			0.75mm² (8A)	1m	FA1-CB3L07SQ10E1F34
				2m	FA1-CB3L07SQ20E1F34
				3m	FA1-CB3L07SQ30E1F34
	40-pin		0.3mm² (4A)	1m	FA1-CB3L03SQ10E1F40
				2m	FA1-CB3L03SQ20E1F40
				3m	FA1-CB3L03SQ30E1F40
			0.75mm² (8A)	1m	FA1-CB3L07SQ10E1F40
				2m	FA1-CB3L07SQ20E1F40
				3m	FA1-CB3L07SQ30E1F40

Specifications					Model
Connection cable: cable with connectors	18-pin		MELSEC iQ-R I/O module	1m	FA1-CB1L10EM1F18
				2m	FA1-CB1L20EM1F18
				3m	FA1-CB1L30EM1F18
			MELSEC iQ-F I/O module (sink)	1m	FA2-CB1L10EM1F18
				2m	FA2-CB1L20EM1F18
				3m	FA2-CB1L30EM1F18
			MELSEC iQ-F I/O module (source)	1m	FA2-CB1L10EM1F18E
				2m	FA2-CB1L20EM1F18E
				3m	FA2-CB1L30EM1F18E
			CC-Link IE TSN input module	1m	FA3-CB1L10EM1F18X
				2m	FA3-CB1L20EM1F18X
				3m	FA3-CB1L30EM1F18X
			CC-Link IE TSN output module	1m	FA3-CB1L10EM1F18Y
				2m	FA3-CB1L20EM1F18Y
				3m	FA3-CB1L30EM1F18Y
	34-pin		MELSEC iQ-R I/O module	1m	FA1-CB1L10EM2F34
				2m	FA1-CB1L20EM2F34
				3m	FA1-CB1L30EM2F34
			CC-Link IE TSN/ CC-Link IE Field Basic input module	1m	FA3-CB1L10EM2F34X
				2m	FA3-CB1L20EM2F34X
				3m	FA3-CB1L30EM2F34X
			CC-Link IE TSN/ CC-Link IE Field Basic output module	1m	FA3-CB1L10EM2F34Y
				2m	FA3-CB1L20EM2F34Y
				3m	FA3-CB1L30EM2F34Y
Connection cable: cable with ferrules	2-pin		Analog shielded cable	1m	FA1-CB2L10S1B2-4
				2m	FA1-CB2L20S1B2-4
				3m	FA1-CB2L30S1B2-4

For servo systems

Specifications			Model
Junction terminal block for servo motors with brakes 	1-axis	Screw installation available	DG2BK1TB
		DIN rail installation only	DG2BK1TB-D
General-purpose interface amplifier junction terminal block 	1-axis	Full signal	DG2SV1TB
Network amplifier junction terminal block 	1-axis	Full signal	DG2SV3TB
FLS/RLS/DOG signal-specialized network amplifier terminal block 	1-axis	FLS/RLS/DOG signal	DG2SV2TB
	2-axis		DG2SV2TB2
	3-axis		DG2SV2TB3

For computerized numerical controllers (CNCs)

Specifications				Model
Junction terminal block 	Remote I/O	40 points	Vertical/horizontal type	FA1-TE2SD40P

SPOTLIGHT

Junction terminal block (spring clamp terminal type)

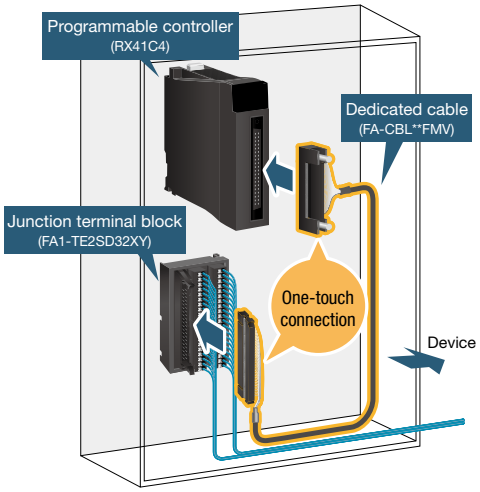
FA1-TE2SV16XY

Features of the spring clamp type

- The product can be installed in both horizontal and vertical positions to fill dead space in the control panel.
- Retightening work is not required at periodic inspection, as screws do not come loose due to vibration.
- Use of ferrules enables push-in connections.

Less cost and time for wiring by using a dedicated cable

Dedicated cables with connectors supporting each connected device are available.
Using a dedicated cable reduces wiring time required for each point.



Using a dedicated cable easily reduces wiring time.

	No. of points	Wiring time
Spring clamps on both sides	32	About 16* minutes (about 30s/point)
Screws on both sides	32	About 19* minutes (about 35s/point)

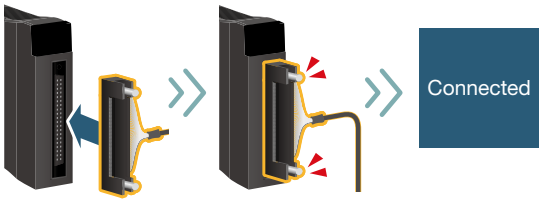
Wiring time: Approx. 12s* / Reduced by approx. 99%

* Result of in-house testing

Wiring image (when a 32-point module is used)

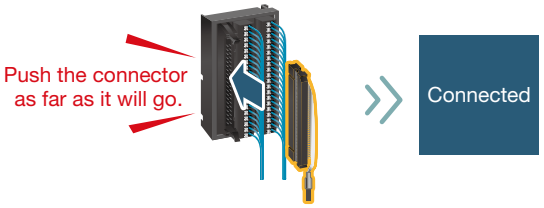
Connecting to the programmable controller side (FCN connector)

1) Insert the connector. 2) Fix two locations.



Connecting to the terminal block side (MIL connector)

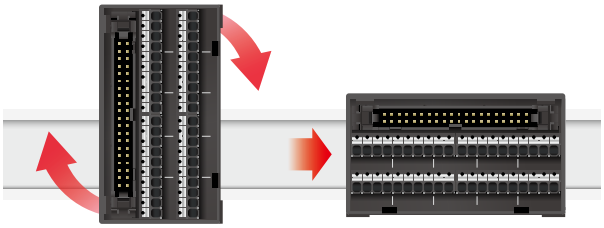
1) Insert the connector.



Effective use of space in the control panel

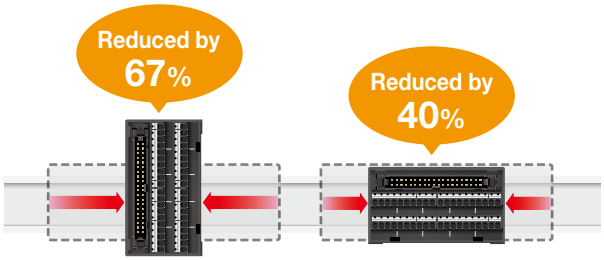
To use dead space in the control panel, the junction terminal block can be installed in both vertical and horizontal positions.
Space above and below the DIN rail, which can often be dead space, is effectively used by installing the junction terminal block in the vertical position.

One junction terminal block offers vertical and horizontal installation positions



It needed to select a junction terminal block in accordance with the installation position, but now one junction terminal block supports the both installation positions (vertical and horizontal positions).
Model: FA1-TE2SD40P, FA1-TE2SD32XY

Effective use of dead space in the control panel



The installation width is reduced by approx. 67% (vertical type) and approx. 40% (horizontal type) comparing to our screw terminal block (7mm pitch).
Model: FA1-TE2SD40P, FA1-TE2SD32XY

SPOTLIGHT »

Cable with spring clamp terminal block

FA1-CB3L03SQ10E1F18, etc.

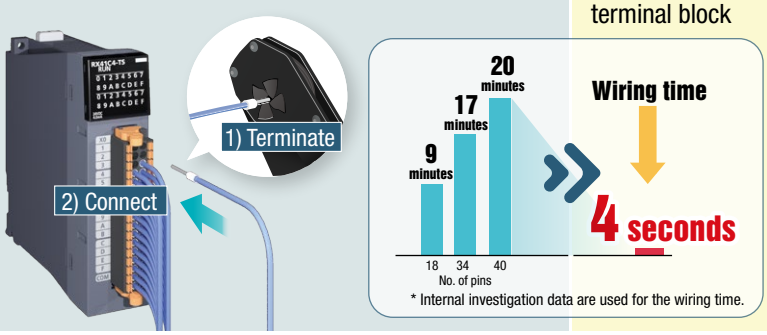
Features of the junction terminal block for servo motors with brakes

Our recommended brake sequence circuit is built in the junction terminal block for servo motors with brakes. The brake circuit of the servo motor with brake can be smaller.

Two processes improved for innovative wiring solutions

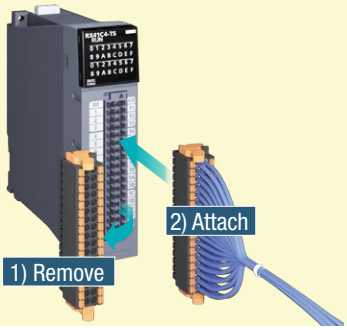
Before

Wire ends terminated / wires connected one by one



After

Just remove and attach the cable with spring clamp terminal block

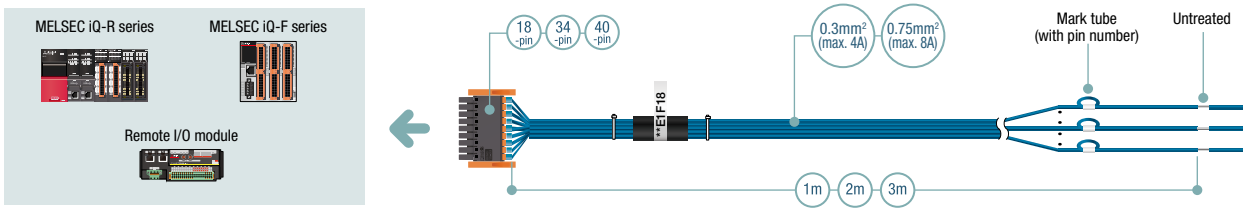


Wiring work is reduced by 99% as cables need not be terminated or connected individually (according to our investigation).

Lineup

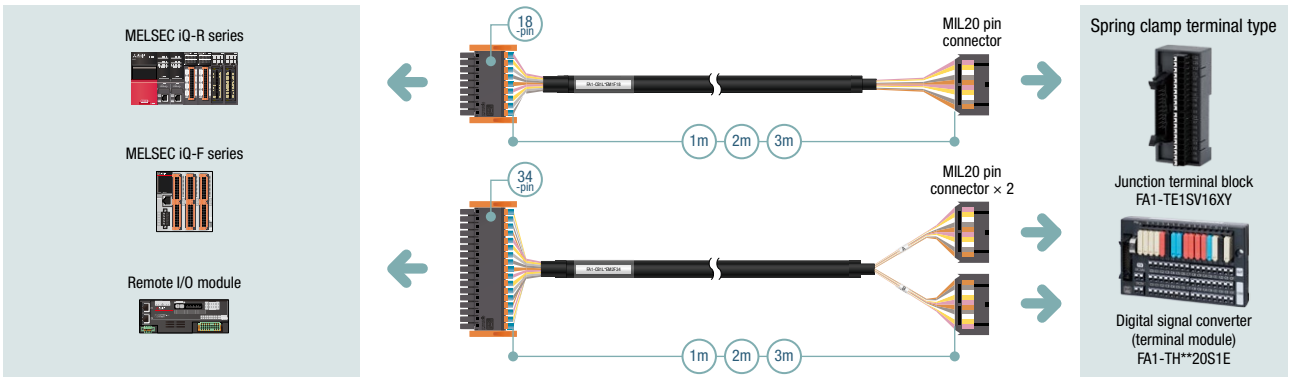
Discrete cable

The cables are used to connect a programmable controller and desired devices.
As the cables are provided for each ampere capacity and not terminated, they can be used freely.



Cable with connector

The cables are used to connect a programmable controller, a junction terminal block, and a digital signal converter.
Using the cables for our products further reduces wiring work.



SPOTLIGHT »

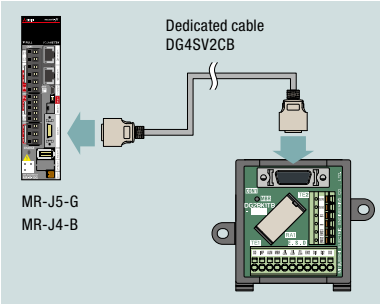
Junction terminal block for servo motors with brakes

DG2BK1TB

Features of the junction terminal block for servo motors with brakes

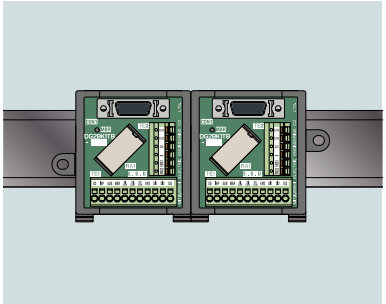
Our recommended brake sequence circuit is built in the junction terminal block for servo motors with brakes. The brake circuit of the servo motor with brake can be smaller.

Less wiring



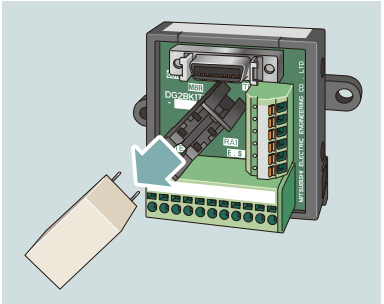
- Easy and reliable wiring connection with a servo amplifier using a dedicated cable
- No need for a screwdriver due to push-in connection

Space saving



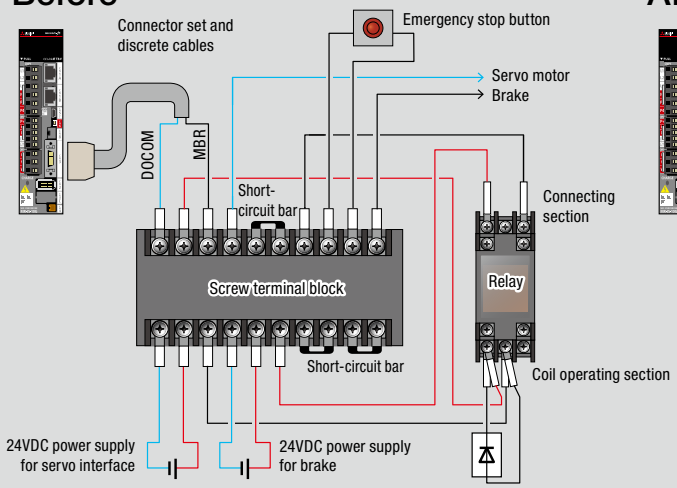
- Compact body with a built-in relay for the brake sequence circuit
- Less installation space due to side-by-side installation on the DIN rail

Easy maintenance

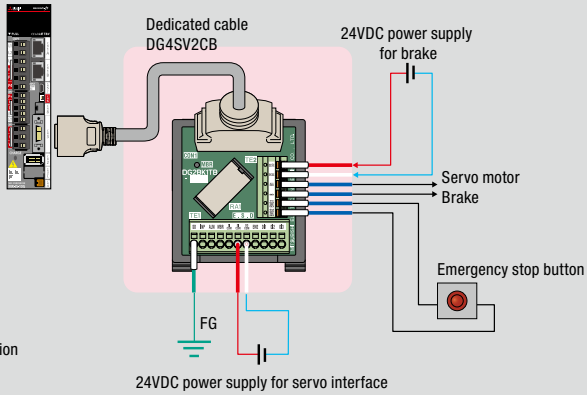


The built-in relay can be replaced without tools.

Before



After



Wiring work for **14** terminals reduced

Wiring with screws for **24** terminals

Push-in connection for **10** terminals (Retightening not required)

When the existing terminal block does not have a built-in relay

When an external relay is used, wiring is required to connect a servo amplifier, junction terminal block, and terminal block of the relay. The junction terminal block for servo motors with brakes has a built-in relay, which enables wire and space savings.

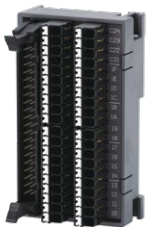
SPOTLIGHT »

Junction terminal block (spring clamp terminal type)

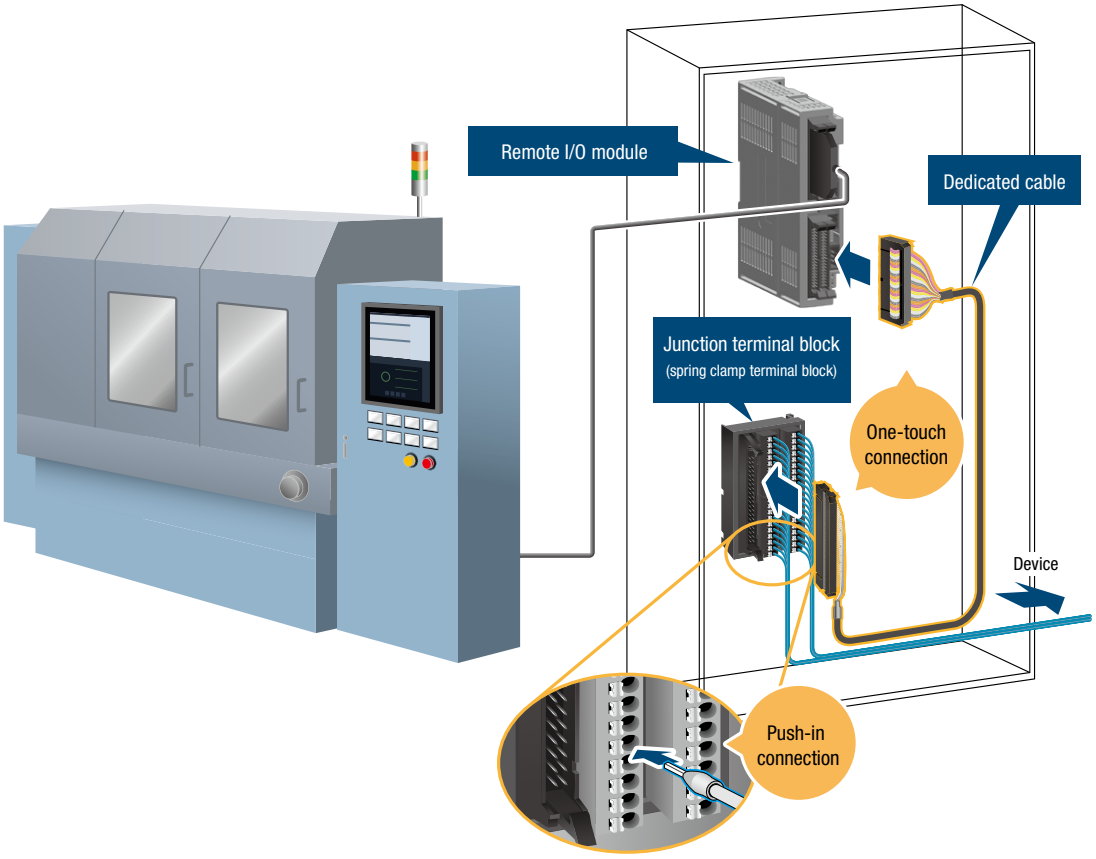
FA1-TE2SD40P

Features of the spring clamp type

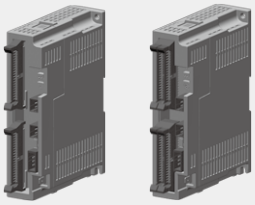
- The product can be installed in both horizontal and vertical positions to fill dead space in the control panel.
- Retightening work is not required at periodic inspection, as screws do not come loose due to vibration.
- Use of ferrules enables push-in connections.



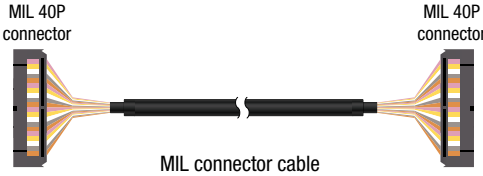
One-touch connection with a dedicated



Remote I/O module

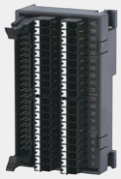


FCU8-DX220 FCU8-DX230 FCU8-DX231



Junction terminal block

Spring clamp terminal type



FA1-TE2SD40P

Screw terminal type

FA-TBS40P

The remote I/O module can be connected to a junction terminal block in a single step using a dedicated cable. Wiring work can be reduced significantly. (Approx. 5 seconds are required for one connection.)

Related system

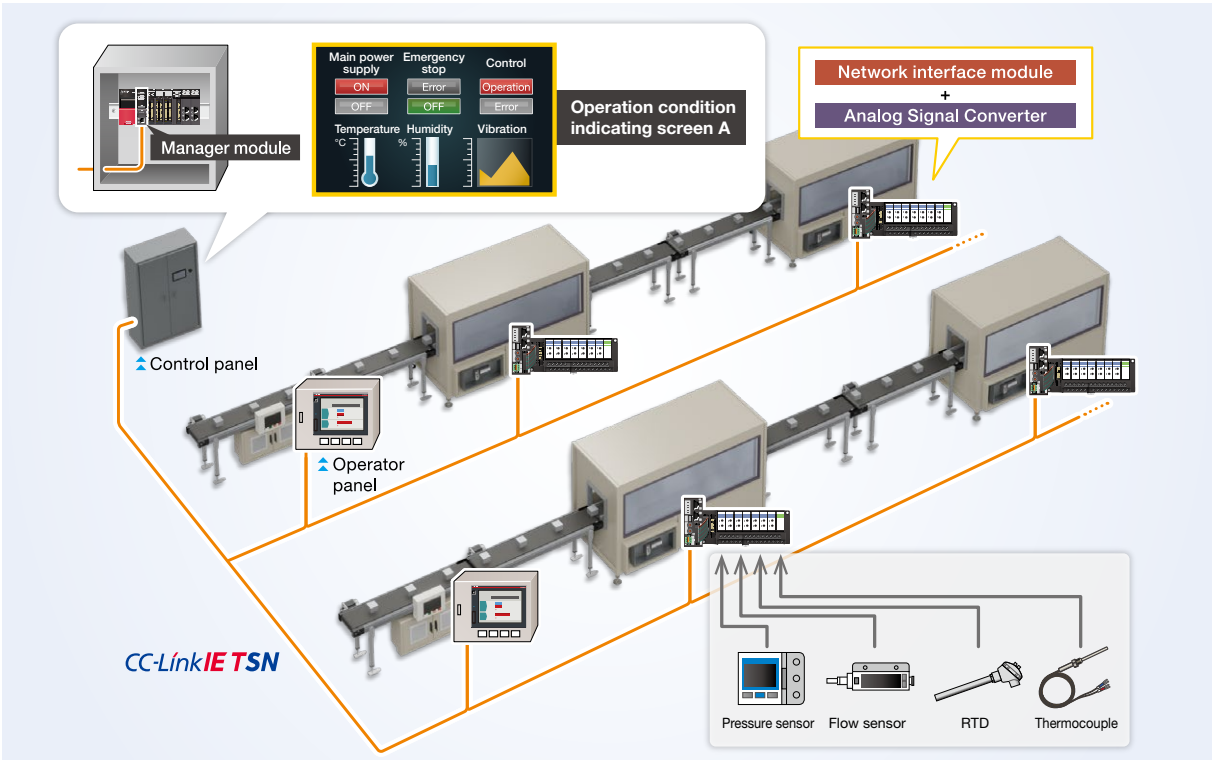
Facility status monitoring

Automation of facilities is essential to achieve "standardized work procedures" and "improved productivity". However, if the facility stops working, there will be a loss of time and production while the system is restored.
Understanding facility status is a step towards achieving an error-free production site.

Application examples

Parts production line: Labor saving for collecting information such as temperature, pressure, and flow rate from sensors

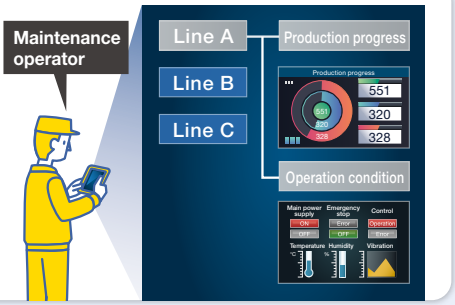
Problem	The entire number of sensors were visually inspected several times a day, and the condition of the production line was checked.
What you want to achieve	● Visualizing the sensor information that is being visually inspected, as a part of the visualization of the production line ● Using the sensor information for preventive maintenance by digitizing and storing it into the programmable controller to output an alarm
Point	● Dispersed installation via network connection allows installation of products near sensors, thereby easy maintenance. ● Analog signal converters can be selected individually according to the optimal configuration. By having unused points left, even if a sensor is added, it is only needed to install the module in the empty slot.



point **Downtime reduction by remote monitoring and quick maintenance**

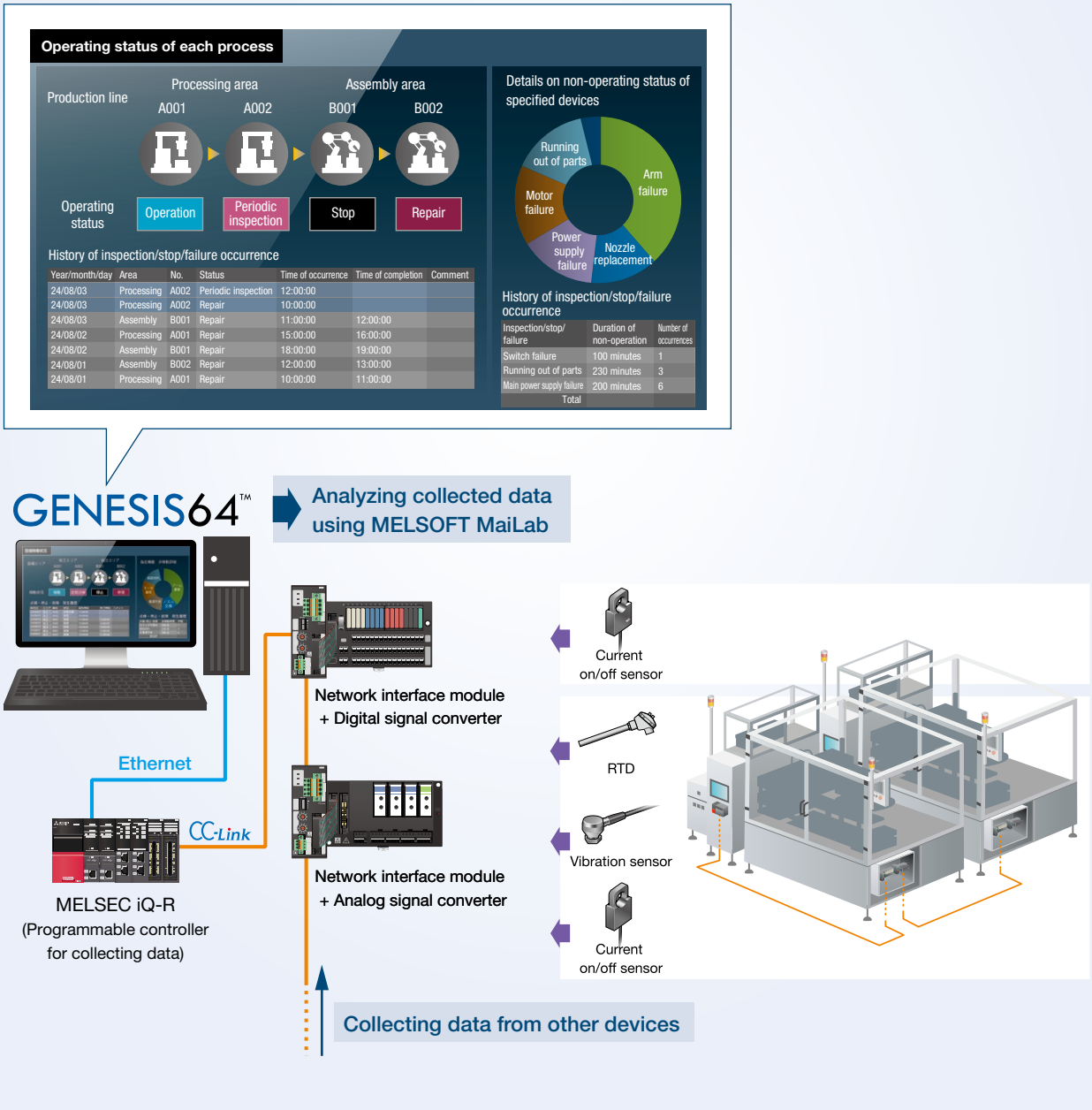
Maintenance operator can identify facility failures on a tablet in real time even during factory patrol.
Finding and dealing with failures as soon as possible can reduce the production line downtime.

* The "GOT Mobile" function for HMIs (GOTs) manufactured by Mitsubishi Electric is used.



Solution by visualizing the machine status

Problem	• It is essential to visualize the operating status of each machine, but there is no idea of where to start. • Major renovation work is difficult.
What you want to achieve	• Easily installing sensors to collect data • Displaying sensor information in graphs to visualize the facility status • In the future, using collected data to improve production efficiency and diagnose machine failures
Point	• A single network cable is used for wiring and sensor data is collected to programmable controllers. • External measurement data is used via a network, eliminating the need for machine modification. • An applicable module can be selected for each sensor. • Various networks, including CC-Link family networks and MODBUS/TCP network, are supported.



Supporting the trouble prevention and troubleshooting with the operation information recording function

Preventive maintenance is possible because information such as the life of relays can be visualized.

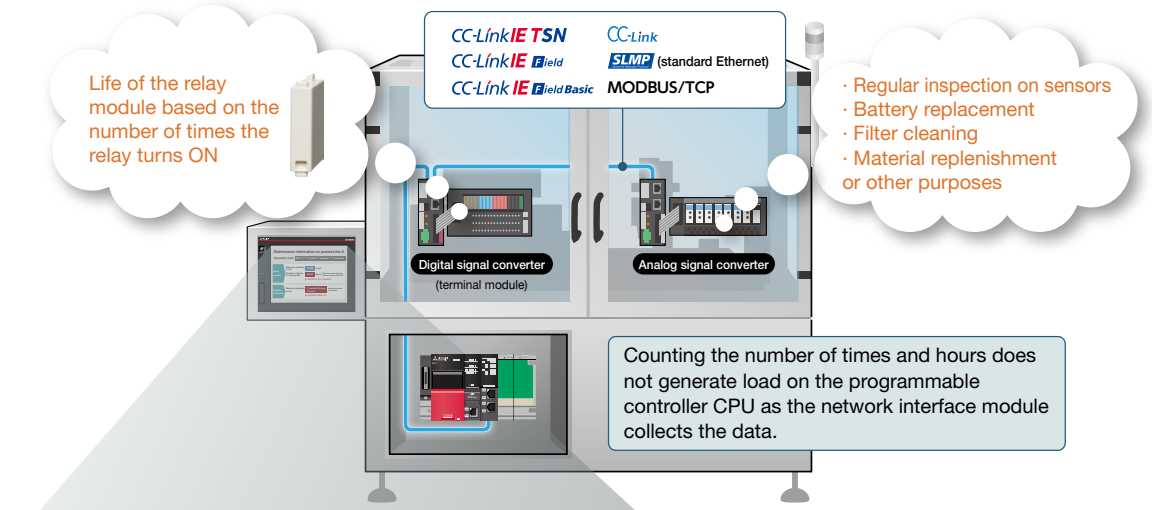
Maintenance time notification is based on how many times relay signals turn ON and operating hours. This helps prevent troubles.

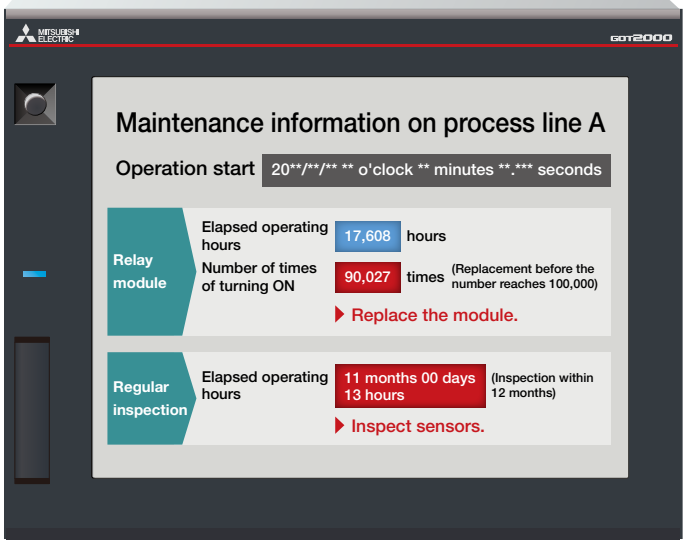
Maintenance information recording function

This function records the operation start date*1 and elapsed operating hours*1 of the network interface module and the number of times I/O signal relays of the digital signal converter turn ON*2.

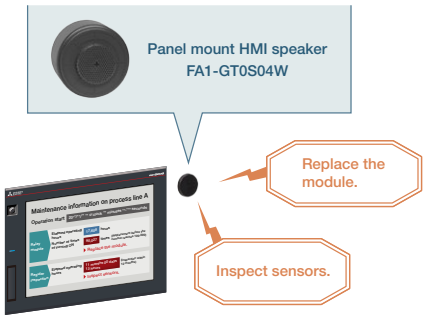
Maintenance alarm function

This function outputs an alarm signal to the manager station when the specified operating hours*1 have elapsed or the number of times a relay turns ON*2 has exceeded the preset value.





Using the panel mount HMI speaker allows you to hear important information accurately in addition to visual information.



*1: Recording of the operation start date (year, month, and day) and elapsed operating hours is available when the modules are used in the CC-Link IE TSN, CC-Link IE Field Network, or CC-Link IE Field Network Basic.
*2: Available for network interface modules for digital signal converters.

The cause of troubles can be investigated through analysis of operation history.

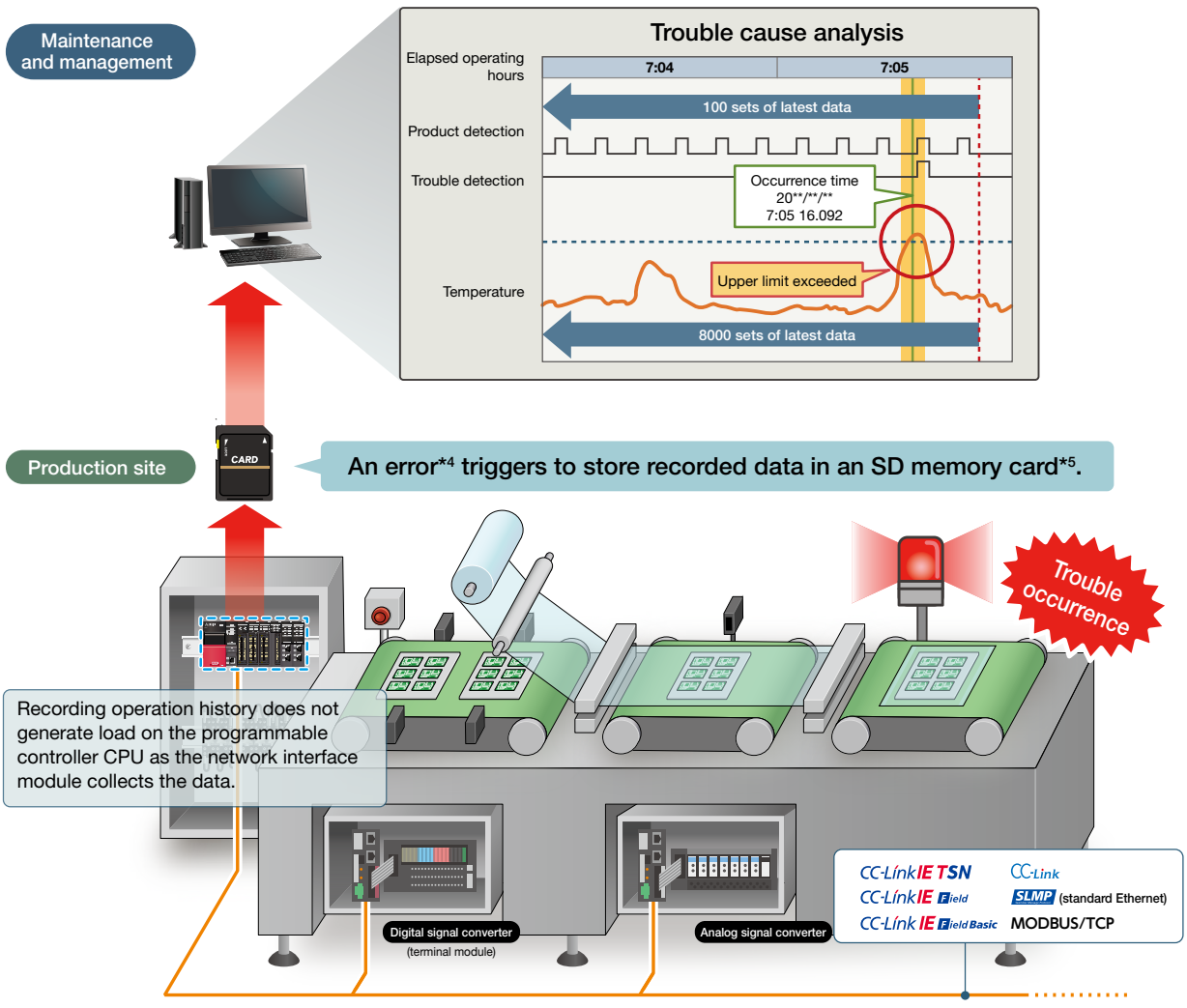
Recording the status history of digital and analog signals allows you to investigate the cause of troubles.

Operation history recording function (digital signal converters)

This function records the times at which I/O signals turn ON or OFF*1 (up to 100 data sets per signal).

Logging function*2 (analog signal converters)

For analog input, this function records digital values at intervals specified with a digital conversion value*3 (1 ms to 3600 s) and occurrence times. For analog output, it records the digital value settings and occurrence times*1 (a total of 8000 data sets in all I/O channels).



*1: Recording of occurrence times is available when the modules are used in the CC-Link IE TSN, CC-Link IE Field Network, or CC-Link IE Field Network Basic.
*2: The logging function is available when the modules are used in the CC-Link IE TSN or CC-Link IE Field Network Basic.
*3: Numerical data digitally converted by the network interface module
*4: Configure your system so that it detects errors.
*5: The sequence program (function block) saves data in the SD memory card inserted into the programmable controller CPU as a CSV file.

Network devices

Common Elements

Common elements

INDEX

Network interface module

Supported network	Specifications		Dedicated cable	Model
CC-Link IE TSN CC-Link IE Field CC-Link IE Field Basic SLMP (standard Ethernet) MODBUS/TCP	For digital signal converter	Input type	Included	FA3-TH1M16XC-01C
		Output type (sink)		FA3-TH1M16Y-01C
		Output type (source)		FA3-TH1M16YE-01C
		Input type	Not included Use an optional cable.	FA3-TH1M16XC
		Output type (sink)		FA3-TH1M16Y
		Output type (source)		FA3-TH1M16YE
	For analog signal converter	Input type	Included	FA3-AT1M8X-01C
		Output type		FA3-AT1M8Y-01C
		Input type	Not included Use an optional cable.	FA3-AT1M8X
		Output type		FA3-AT1M8Y
CC-Link IE TSN CC-Link IE Field CC-Link IE Field Basic SLMP (standard Ethernet)	For digital signal converter	Input type	Included	FA3-TH1T16XC-01C
		Output type (sink)		FA3-TH1T16Y-01C
		Output type (source)		FA3-TH1T16YE-01C
		Input type	Not included Use an optional cable.	FA3-TH1T16XC
		Output type (sink)		FA3-TH1T16Y
		Output type (source)		FA3-TH1T16YE
	For analog signal converter	Input type	Included	FA3-AT1T8X-01C
		Output type		FA3-AT1T8Y-01C
		Input type	Not included Use an optional cable.	FA3-AT1T8X
		Output type		FA3-AT1T8Y
CC-Link	For digital signal converter	Input type	Included	FA3-TH1C16XC-01C
		Output type (sink)		FA3-TH1C16Y-01C
		Output type (source)		FA3-TH1C16YE-01C
		Input type	Not included Use an optional cable.	FA3-TH1C16XC
		Output type (sink)		FA3-TH1C16Y
		Output type (source)		FA3-TH1C16YE
	For analog signal converter	Input type	Included	FA3-AT1C8X-01C
		Output type		FA3-AT1C8Y-01C
		Input type	Not included Use an optional cable.	FA3-AT1C8X
		Output type		FA3-AT1C8Y

*: Only the modules are compliant. The enclosed cables are not compliant.

Network interface module dedicated cable

Connected to	Specifications	Cable length	Model
Dedicated cable	Included with the product (FA3-□□-01C)	0.1m	-
Signal converter	Extension cable for signal converter	1m	FA3-CB2L10MM1H20
		2m	FA3-CB2L20MM1H20
		3m	FA3-CB2L30MM1H20

*: For information on other cables, contact your sales representative.

CC-Link simple type T-branch module

Specifications			Model
Simple type	Built-in 110Ω terminating resistor (Switching between on and off)	M3 screw	FA-TK72

CC-Link terminated cable

Supported version	Specifications	Cable length	Model
Ver.1.00	Round solderless terminal	0.3m	FA-CBL03CC
		0.5m	FA-CBL05CC
		1m	FA-CBL10CC
		2m	FA-CBL20CC
	Y-shaped solderless terminal	0.3m	FA-CBL03CCY
		0.5m	FA-CBL05CCY
		0.7m	FA-CBL07CCY
		1m	FA-CBL10CCY
		2m	FA-CBL20CCY
Ver.1.10	Round solderless terminal	0.3m	FA-CBL03CCPH
		0.4m	FA-CBL04CCPH
		1m	FA-CBL10CCPH
		2m	FA-CBL20CCPH
	Y-shaped solderless terminal	0.2m	FA-CBL02CCPHY
		0.3m	FA-CBL03CCPHY
		0.5m	FA-CBL05CCPHY
		0.7m	FA-CBL07CCPHY
		1m	FA-CBL10CCPHY
		1.5m	FA-CBL15CCPHY
		2m	FA-CBL20CCPHY
	Cylindrical bar terminal	0.2m	FA-CBL02CCPHF
		0.5m	FA-CBL05CCPHF
		0.7m	FA-CBL07CCPHF
	One-touch connector	0.2m	FA-CBL02CCPHP

CC-Link cable

Supported version	Specifications	Cable length	Model
Ver.1.00	Standard cable	200m*1	FA-CBL200SB
	High-performance cable		FA-CBL200SBH
	Vibration-resistant cable (for movable part)		FA-CBL200SBZ
	Cable with a built-in 24VDC power cable	100m*2	FA-CBL100PWSB
Ver.1.10	Standard cable	200m*1	FA-CBL200PSBH
	Vibration-resistant cable (for movable part)		FA-CBL200PSBZ
	Cold-resistant cable		FA-CBL200LTPSBH
	Cable with a built-in 24VDC power cable	100m*2	FA-CBL100PWPSBH

*1: Custom lengths are not available, but a 1000-meter option is available.
*2: Custom lengths are not available, but a 500-meter option is available.

CC-Link cable terminated parts set

Specifications	Model
Round solderless terminal type, Quantity: 100	FA-R100SET
Y-shaped solderless terminal type, Quantity: 100	FA-Y100SET

CC-Link waterproof type T-branch module

Specifications			Model
Waterproof type	Dedicated to communication cables	4-pin connector	FA-TW43
	For cables with a built-in power cable	7-pin connector	FA-TW73

Cable with CC-Link waterproof connector

Supported version	Specifications	Cable length	Model
Ver.1.10	With a female connector (FA-204-PF8) on one end	5m	FA-CBL05PSBH4F
	With a male connector (FA-204-PM8) on one end	5m	FA-CBL05PSBH4M
Ver. 1.00, Cable with a built-in power cable	With a female connector (FA-207-PF12) on one end	10m	FA-CBL10PWSB7F
	With a male connector (FA-207-PM12) on one end	10m	FA-CBL10PWSB7M
	Male connector (FA-207-PM12) With a male connector (FA-207-PF12)	1m	FA-CBL01PWSB7MF

CC-Link waterproof connector

Specifications			Model
4-pin adapter	Female (connecting to the plug FA-204-PM*)	Packing diameter: ϕ6	FA-204-AdF6
		Packing diameter: ϕ8	FA-204-AdF8
		Packing diameter: ϕ10	FA-204-AdF10
		Packing diameter: ϕ12	FA-204-AdF12
	Male (connecting to the plug FA-204-PF*)	Packing diameter: ϕ6	FA-204-AdM6
		Packing diameter: ϕ8	FA-204-AdM8
		Packing diameter: ϕ10	FA-204-AdM10
		Packing diameter: ϕ12	FA-204-AdM12
7-pin adapter	Female (connecting to the plug, FA-207-PM*)	Packing diameter: ϕ6	FA-207-AdF6
		Packing diameter: ϕ8	FA-207-AdF12
	Male (connecting to the plug, FA-207-PF*)	Packing diameter: ϕ6	FA-207-AdM6
		Packing diameter: ϕ8	FA-207-AdM8
		Packing diameter: ϕ12	FA-207-AdM12
4-pin plug	Female	Packing diameter: ϕ6	FA-204-PF6
		Packing diameter: ϕ8	FA-204-PF8
		Packing diameter: ϕ10	FA-204-PF10
		Packing diameter: ϕ12	FA-204-PF12
	Male	Packing diameter: ϕ6	FA-204-PM6
		Packing diameter: ϕ8	FA-204-PM8
		Packing diameter: ϕ10	FA-204-PM10
		Packing diameter: ϕ12	FA-204-PM12
7-pin plug	Female	Packing diameter: ϕ6	FA-207-PF6
		Packing diameter: ϕ8	FA-207-PF8
		Packing diameter: ϕ10	FA-207-PF10
		Packing diameter: ϕ12	FA-207-PF12
	Male	Packing diameter: ϕ8	FA-207-PM8
		Packing diameter: ϕ10	FA-207-PM10
		Packing diameter: ϕ12	FA-207-PM12
4-pin receptacle	Female		FA-204-RF
	Male		FA-204-RM
7-pin receptacle	Female		FA-207-RF
	Male		FA-207-RM
Built-in 110Ω terminating resistor (4-pin)	Male		FA-CONW4P110E
Built-in 110Ω terminating resistor (7-pin)	Male		FA-CONW7P110E

Dustproof cap for CC-Link waterproof connector

Specifications		Model
For adapter	Used for FA-204-AdM*/AdF*, FA-207-AdM*/AdF* (IP67 non-compliant)	FA-NRW-20-AdCa
For plug	Used for FA-204-PM*/PF*, FA-207-PM*/PF* (IP67 non-compliant)	FA-NRW-20-PCa1
For receptacle	Used for FA-204-RM/RF, FA-207-RM/RF (IP67 non-compliant)	FA-NRW-20-RCa

SSCNET-compatible hydraulic control unit

Product	Specifications		Model
SSCNET-compatible hydraulic control unit	Two-axis control of two SSCNET III/H stations per unit *: Power supply connector provided with the unit	Analog input voltage specifications	DG2AF3N
		Analog input current specifications	DG2AF3N-P01

SSCNET-compatible hydraulic control unit

Junction terminal block

Product	Specifications	Model
General-purpose interface amplifier junction terminal block	· Our general-purpose interface amplifier junction terminal block can be used. · Sink/source shared type, full signal	DG2SV1TB

Connection cable

Specifications	Cable length	Model
· A dedicated cable to connect an SSCNET-compatible hydraulic control unit and our general-purpose interface amplifier junction terminal block	0.5m	DG4AF3CB05
	1m	DG4AF3CB10

FL-net (OPCN-2) interface module

Product	Specifications	Model
MELSEC iQ-R series-compatible FL-net (OPCN-2) interface module	· Module · User's Manual (Hardware)	ER-1FL2-T

Network camera interface module

Product	Specifications	No. of devices to be registered	Model
Network camera interface module	· Module · CD-ROM: Configuration tool, User's Manual (Detailed) in PDF format, Function blocks (GX Works3/GX Works2), CSP+ file · User's Manual (Hardware)	2	ECLEF-NV1G-02
		4	ECLEF-NV1G-04
		8	ECLEF-NV1G-08
		16	ECLEF-NV1G-16

RFID interface module

Connection with the NITTOKU ITS-H series

Type	Specifications	No. of channel connections	Model
MELSEC iQ-R series slot-in type	· Module · User's Manual (Hardware)	1	ER-1CM1NT-01
		2	ER-1CM1NT-02
		4	ER-1CM1NT-04

Connection with the OMRON V680 series

Type	Specifications	No. of channel connections	Model
MELSEC iQ-R series slot-in type	· Module · User's Manual (Hardware)	1	ER-1V680D1
		2	ER-1V680D2
MELSEC-Q series slot-in type	· Module · User's Manual (Hardware)	1	EQ-V680D1
		2	EQ-V680D2
CC-Link IE Field-compatible network distributed type	· Module · User's Manual (Hardware)	2	ECLEF-V680D2
CC-Link-compatible network distributed type	· Module · User's Manual (Hardware)	1	ECL2-V680D1

Panel mount HMI speaker

Type	Specifications	Model
Panel mount HMI speaker	Speaker, audio cable (1m), power supply connector, cable clamp, user's manual	FA1-GT0S04W

Spring clamp terminal type

▼ For programmable controllers

Junction terminal block

No. of points	Connection method	Model
32	1-wire type, vertical/horizontal type	FA1-TE2SD32XY
16	1-wire type, vertical type	FA1-TE2SV16XY
40	1-wire type, vertical/horizontal type	FA1-TE2SD40P
20	1-wire type, vertical type	FA1-TE2SV20P

Common terminal block

No. of points	Connection method	Model
40	Common terminal block, vertical type	FA1-TE2SV40EX

Spring clamp terminal block conversion adapter

No. of points	Connection method	Model
40	Spring clamp, programmable controller module front connection type	FA1-TE40PA

Digital signal converter (input)

Connection method		Module	Model
		Mixing	
Installation base unit (module selectable type)	4 points, independent	Possible	FA1-TH4X2SC20S1E
	8 points, independent	Possible	FA1-TH8X2SC20S1E
Module pre-mounted type (24VDC, N/O contact)	4 points, independent (positive common)	1)	FA1-TH4X24RA1L20S1E
	4 points, independent (negative common)	1)	FA1-TH4X24RA1H20S1E
	8 points, independent (positive common)	1)	FA1-TH8X24RA1L20S1E
	8 points, independent (negative common)	1)	FA1-TH8X24RA1H20S1E
	16 points, independent (positive common)	1)	FA1-TH16X24RA1L20S1E
	16 points, independent (negative common)	1)	FA1-TH16X24RA1H20S1E

1): Only N/O contact and N/C contact modules can be mixed. 2): Only N/O contact, N/C contact, triac, transistor, and signal pass-through modules can be mixed. 3): Only N/O contact, N/C contact, triac, and transistor modules can be mixed.

Digital signal converter (output)

Connection method		Module	Model
		Mixing	
Installation base unit (module selectable type)	4 points, independent (sink)	2)	FA1-TH4Y2SC20S1E
	8 points, independent (sink)	2)	FA1-TH8Y2SC20S1E
	4 points, independent (source)	2)	FA1-TH1E4Y2SC20S1E
	8 points, independent (source)	2)	FA1-TH1E8Y2SC20S1E
	16 points, independent (sink)	2)	FA1-TH16Y2SC20S1E
	16 points, independent (source)	3)	FA1-TH1E16Y2SC20S1E
Module pre-mounted type (N/O contact relay)	16 points, independent (sink)	2)	FA1-TH16Y2RA20S1E
	16 points, independent (source)	3)	FA1-TH1E16Y2RA20S1E
Module pre-mounted type (triac)	16 points, independent (sink)	2)	FA1-TH16Y1SR20S1E
	16 points, independent (source)	3)	FA1-TH1E16Y1SR20S1E
Module pre-mounted type (transistor)	16 points, independent (sink)	2)	FA1-TH16Y1TR20S1E
	16 points, independent (source)	3)	FA1-TH1E16Y1TR20S1E

1): Only N/O contact and N/C contact modules can be mixed.
2): Only N/O contact, N/C contact, triac, transistor, and signal pass-through modules can be mixed.
3): Only N/O contact, N/C contact, triac, and transistor modules can be mixed.

Analog signal converter (input)

Type		Model
Installation base unit	4-channel, module mixing possible	FA1-AT1B4X1TE
	8-channel, module mixing possible	FA1-AT1B8X1TE

Analog signal converter (output)

Type		Model
Installation base unit	4-channel, module mixing possible	FA1-AT1B4Y1TE
	8-channel, module mixing possible	FA1-AT1B8Y1TE

▼ For servo systems

FLS/RLS/DOG signal-specialized network amplifier terminal block

No. of points	Connection method	No. of control axes	Model
15	Dedicated for FLS/RLS/DOG signals	1	DG2SV2TB
24	Dedicated for FLS/RLS/DOG signals	2	DG2SV2TB2
33	Dedicated for FLS/RLS/DOG signals	3	DG2SV2TB3

Junction terminal block for servo motors with brakes

No. of points	Connection method	No. of control axes	Model
15	For motors with brakes	1	DG2BK1TB
	For motors with brakes, DIN rail installation only		DG2BK1TB-D

Network amplifier junction terminal block

No. of points	Connection method	No. of control axes	Model
26	For network-based servo amplifiers	1	DG2SV3TB

General-purpose interface amplifier junction terminal block

No. of points	Connection method	No. of control axes	Model
60	For general-purpose interface servo amplifiers	1	DG2SV1TB

Connection cable

Connected device	Specifications	Programmable controller side connector	Terminal block side connector	Cable length	Model
MELSEC iQ-R/ MELSEC iQ-F series, remote I/O module	For sink/source, cross sectional area 0.3mm^2, allowable current 4A	Spring clamp terminal block	Discrete cable, 18P	1m	FA1-CB3L03SQ10E1F18
				2m	FA1-CB3L03SQ20E1F18
				3m	FA1-CB3L03SQ30E1F18
	For sink/source, cross sectional area 0.75mm^2, allowable current 8A	Spring clamp terminal block	Discrete cable, 18P	1m	FA1-CB3L07SQ10E1F18
				2m	FA1-CB3L07SQ20E1F18
				3m	FA1-CB3L07SQ30E1F18
	For sink/source, cross sectional area 0.3mm^2, allowable current 4A	Spring clamp terminal block	Discrete cable, 34P	1m	FA1-CB3L03SQ10E1F34
				2m	FA1-CB3L03SQ20E1F34
				3m	FA1-CB3L03SQ30E1F34
	For sink/source, cross sectional area 0.75mm^2, allowable current 8A	Spring clamp terminal block	Discrete cable, 34P	1m	FA1-CB3L07SQ10E1F34
				2m	FA1-CB3L07SQ20E1F34
				3m	FA1-CB3L07SQ30E1F34
	For sink/source, cross sectional area 0.3mm^2, allowable current 4A	Spring clamp terminal block	Discrete cable, 40P	1m	FA1-CB3L03SQ10E1F40
				2m	FA1-CB3L03SQ20E1F40
				3m	FA1-CB3L03SQ30E1F40
	For sink/source, cross sectional area 0.75mm^2, allowable current 8A	Spring clamp terminal block	Discrete cable, 40P	1m	FA1-CB3L07SQ10E1F40
				2m	FA1-CB3L07SQ20E1F40
				3m	FA1-CB3L07SQ30E1F40
MELSEC iQ-R series	For sink/source	Spring clamp terminal block	MIL20P	1m	FA1-CB1L10EM1F18
				2m	FA1-CB1L20EM1F18
				3m	FA1-CB1L30EM1F18
	For sink/source	Spring clamp terminal block	MIL20P × 2	1m	FA1-CB1L10EM2F34
				2m	FA1-CB1L20EM2F34
				3m	FA1-CB1L30EM2F34
MELSEC iQ-F series	For sink input/output	Spring clamp terminal block	MIL20P	1m	FA2-CB1L10EM1F18
				2m	FA2-CB1L20EM1F18
				3m	FA2-CB1L30EM1F18
	For source input/output	Spring clamp terminal block	MIL20P	1m	FA2-CB1L10EM1F18E
				2m	FA2-CB1L20EM1F18E
				3m	FA2-CB1L30EM1F18E
CC-Link IE TSN	For input	Spring clamp terminal block	MIL20P	1m	FA3-CB1L10EM1F18X
				2m	FA3-CB1L20EM1F18X
				3m	FA3-CB1L30EM1F18X
	For output	Spring clamp terminal block	MIL20P	1m	FA3-CB1L10EM1F18Y
				2m	FA3-CB1L20EM1F18Y
				3m	FA3-CB1L30EM1F18Y
CC-Link IE TSN/CC-Link IE Field Basic	For input	Spring clamp terminal block	MIL20P × 2	1m	FA3-CB1L10EM2F34X
				2m	FA3-CB1L20EM2F34X
				3m	FA3-CB1L30EM2F34X
	For output	Spring clamp terminal block	MIL20P × 2	1m	FA3-CB1L10EM2F34Y
				2m	FA3-CB1L20EM2F34Y
				3m	FA3-CB1L30EM2F34Y

Analog shielded cable with ferrules

Connected device	Specifications	Cable length	Model
MELSEC iQ-R/MELSEC iQ-F series CC-Link IE TSN CC-Link IE Field	Analog shielded cable with ferrules, 2P	1m	FA1-CB2L10S1B2-4
		2m	FA1-CB2L20S1B2-4
		3m	FA1-CB2L30S1B2-4

Junction terminal blocks for DC I/O modules

Spring clamp terminal type

No. of points	Connection method	Model
40	Spring clamp (1-wire type), vertical/horizontal type	FA1-TE2SD40P

Please confirm the following product warranty details prior to product use.

Gratis Warranty Term and Gratis Warranty Coverage

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi Electric Engineering Company Limited (hereinafter "MEE") occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the distributor from whom you made your purchase.

■ Gratis Warranty Term

The gratis warranty term of the product shall be for one (1) year after the date of purchase or delivery to a designated place.
Note that the maximum distribution period shall be six (6) months, and the gratis warranty term after shipment from MEE shall be limited to eighteen (18) months. Additionally, the gratis warranty term for repaired product shall not exceed the gratis warranty term of the product prior to repair.

■ Gratis Warranty Range

(1) The gratis warranty Coverage shall be limited to normal use within the usage state, methods and environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1) Failure occurring from inappropriate storage or handling, carelessness or negligence by the user, or Failure caused by the user's hardware or software design.
2) Failure caused by unapproved modifications, etc., to the product by the user.
3) When the MEE product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4) Failure that could have been avoided if consumable parts designated in the instruction manual had been correctly serviced or replaced.
5) Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6) Failure caused by reasons unpredictable by scientific technology standards at the time of shipment from MEE.
7) Any other failure found not to be the responsibility of MEE or that admitted not to be so by the user.

Paid Repair Term after Production Discontinuation

(1) MEE shall offer product paid repair services for seven (7) years after production of the product has been discontinued.
Discontinuation of production shall be reported via distributors.
(2) Product supply (including spare parts) is not possible after production has been discontinued.

Overseas Service

Please consult your dealer where you purchased the products.

Exclusion of Opportunity Loss and Secondary Loss from Warranty Liability

Regardless of the gratis warranty term, MEE shall not be liable for compensation for damages arising from causes not attributable to MEE, opportunity losses or lost profits incurred by the user due to Failures of the products, damages or secondary damages arising from special circumstances, whether foreseen or unforeseen by MEE, compensation for accidents, compensation for damages to products other than the products, or compensation for replacement work, readjustment of onsite machinery and equipment, startup test runs or other duties carried out by the user.

Changes in Product Specifications

The specifications given in the catalogs, user's manuals, and technical documents are subject to change without notice.

CONDITIONS OF USE FOR THE PRODUCT

(1) This Mitsubishi Electric Engineering Company Limited (hereinafter "MEE") product ("the PRODUCT") shall be used in conditions:

i) where any problems, faults, or failures occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe functions are systematically or automatically provided outside of the PRODUCT in case of any problems, faults, or failures occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries. MEE SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MEE USER'S, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT. ("Prohibited Application")Prohibited Applications include, but not limited to, the use of the PRODUCT in:

1) Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problems or faults occur in the PRODUCT.
2) Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
3) Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above restrictions, MEE may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by MEE and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the MEE representative in your region.

(3) MEE shall have no responsibility or liability for any problems involving the PRODUCT trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

MEMO

MEEFAN (FAgoods)

MEEFAN is the information web portal on which product information and technical information of our FAgoods products are provided and catalogs can be downloaded.
Selection tool which helps select the products from a wide lineup is also provided.

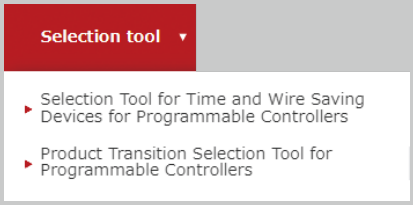
Home page of MEEFAN

Our products are introduced at the top of the homepage.
As FA related products, for example, information on solutions to issues with devices and situations are provided.

Access

www.mitsubishielectricengineering.com/sales/fa/meefan/

contents

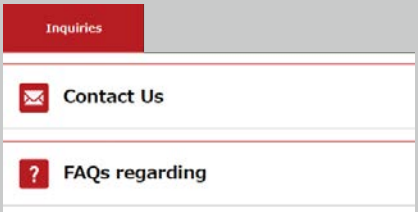


Selection Tool for Time and Wire Saving Devices for Programmable Controllers

The connectable models are displayed by entering/selecting the model name of the programmable controller or HMI without login.

Product Transition Selection Tool for Programmable Controllers

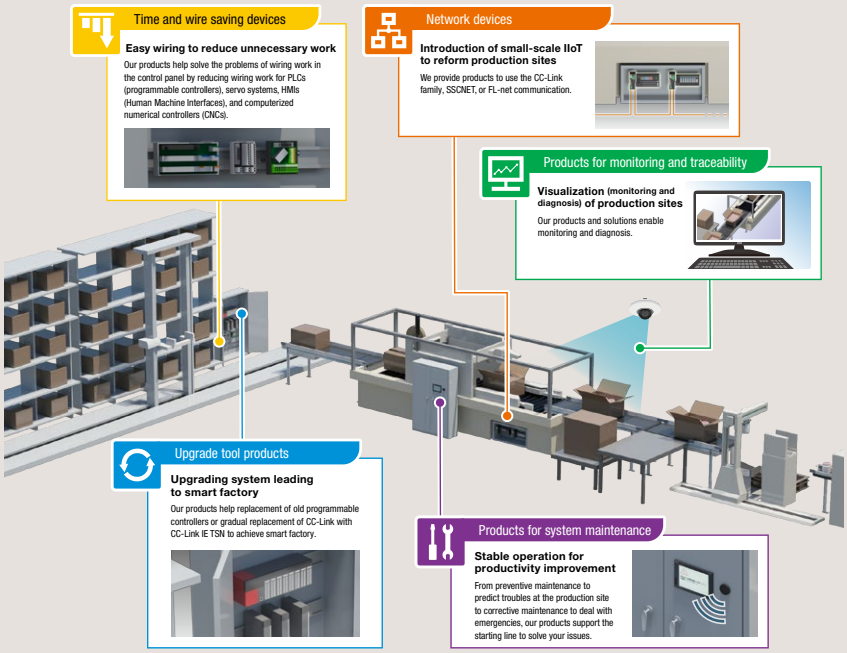
Required products are displayed by selecting the model name of the existing programmable controller without login.



Inquiries

You can contact us for inquiries about "Product purchase", "Products and services", and "Technical contents".
Frequently asked questions are found in FAQs regarding.

Five methods for smart factory

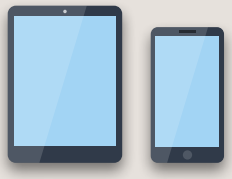


Five categories

Products are categorized into five groups. You can select a category and access product pages.
Product pages are also accessed from the model name search or the product list.

Personal computer

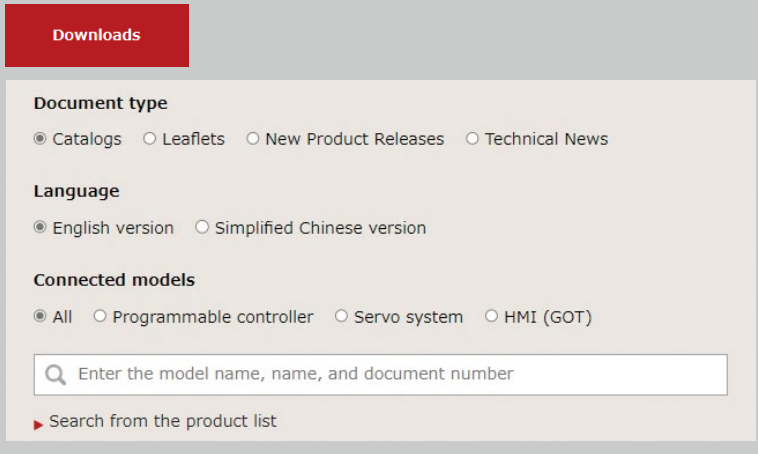
Tablet



Display suitable for device

The website display size is automatically adjusted in accordance with the device such as a personal computer and a tablet including a smartphone.

contents



Downloads

The search can be narrowed down by selecting the document type, language, and connected models.
The search by entering a keyword is also available.

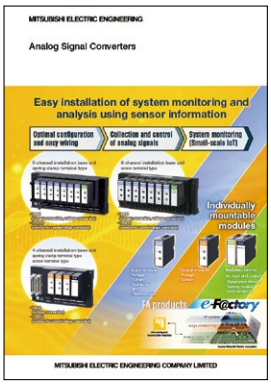
Related products

Leaflets

Network interface module

Digital signal converter (Terminal Module)

Analog signal converter



Spring clamp junction terminal block for Mitsubishi Electric AC servo system

SSCNET-compatible hydraulic control unit

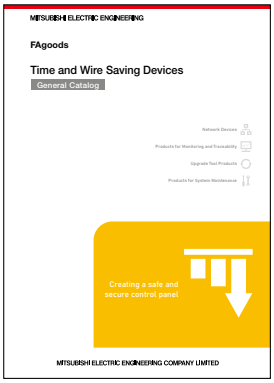
CC-Link IE TSN - CC-Link Bridge Module

MEMO

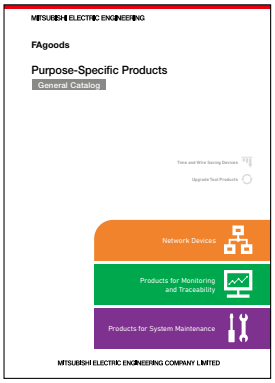
Catalogs

Digest edition

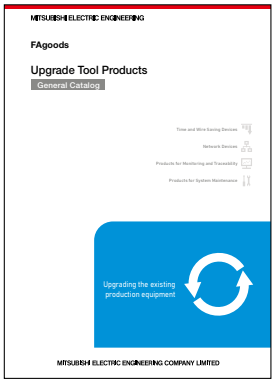
Time and Wire Saving Devices



Network Devices



Upgrade Tool Products



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www.mitsubishielectricengineering.com/sales/fa/meefan/ ►

Precautions for Choosing the Products

Mitsubishi Electric Engineering will not be held liable for damage caused by factors found not to be the cause of Mitsubishi Electric Engineering; opportunity losses or lost profits caused by faults in the Mitsubishi Electric Engineering products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi Electric Engineering; damages to products other than Mitsubishi Electric Engineering products; and to other duties.

For safe use

- To use the products given in this publication properly, always read the relevant manuals before beginning operation.
- The products have been manufactured as general-purpose parts for general industries, and are not designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the products for special purposes such as nuclear power, electric power, aerospace, medicine or passenger-carrying vehicles, consult with Mitsubishi Electric Engineering.
- The products have been manufactured under strict quality control. However, when installing the products where major accidents or losses could occur if the products fail, install appropriate backup or fail-safe functions in the system.

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Specifications are subject to change without notice.