General Specifications

GS 34M06H45-01E

FA-M3
FA-bus Modules

FA-M3

Contents

Notice :
KM67 for F3LR02-0N is discontinued by the cable manufacturer in June, 2017.
Therefore, having 500m distance between unit with F3LR02-0N with newly engineering is impossible.

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General Specifications

F3LR01-0N
Fiber-optic FA-bus Module

FA-M3

General

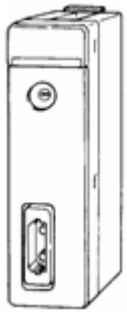
The F3LR01-0N is an interface module for constructing a system that requires distributed placement of multiple modules. The user can build up an efficient remote I/O system by installing F3LR01-0N modules in the FA-M3 main- and sub-units and connecting them via a fiber-optic FA-bus (fiber-optic cable).

- With the 10-Mbps high-speed communications capability of the F3LR01-0N, the user does not have to worry about the I/O refresh time in ladder programming.
- All I/O module types and most special module types* can be installed in sub-units and accessed just like modules installed in the main unit.
  * : See "Restrictions on System Configuration"
- No specific communications setup (environment setup) is required.
- The optical transmission system makes the F3LR01-0N highly immune to noise.

Specifications

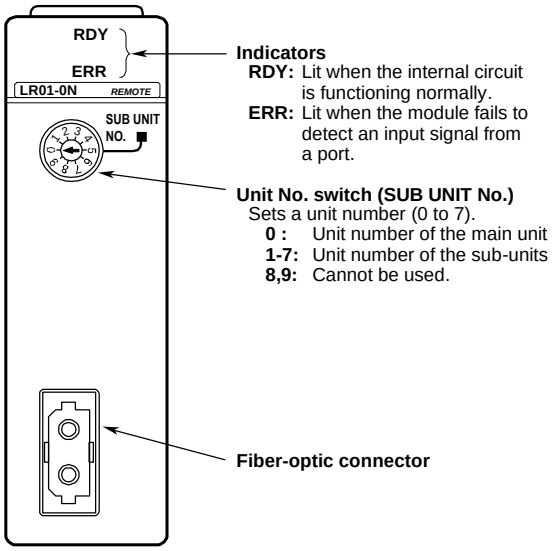
Item	Specification
Transmission speed	10 Mbps
Transmission media	2-core optical fiber (hard plastic clad quartz fiber-optic H-PCF)
Transmission distance	Maximum total distance: 200 m Maximum distance between stations: 200 m
Transmission configuration	Star
Maximum number of sub-units (systems)	7 (systems)
RAS features	Shutdown I/O contact output on transmission channel error, reporting of transmission channel error location
Current consumption	220 mA
External dimensions	28.9 (W) x 100 (H) x 83.2 (D) mm
Weight	100 g
Surrounding air temperature range	Operating : 0 to 55°C
	Storage : -20°C to 75°C
Surrounding humidity range	Operating : 10 to 90% RH (non-condensing)
	Storage : 10 to 90% RH (non-condensing)
Surrounding atmosphere	Must be free of corrosive gases, flammable gases or heavy dust.

Note: The maximum number of systems when µ-bus master station module are used is 1 system less than the value above for each µ-bus master station.

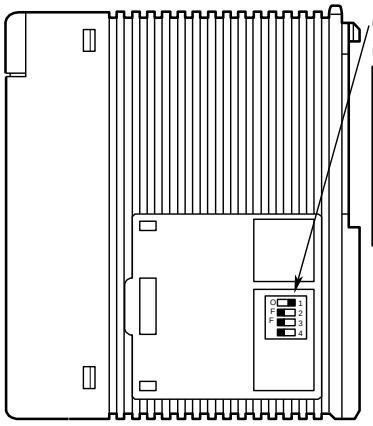


Components and Functions

■ Front View



■ Right Side View



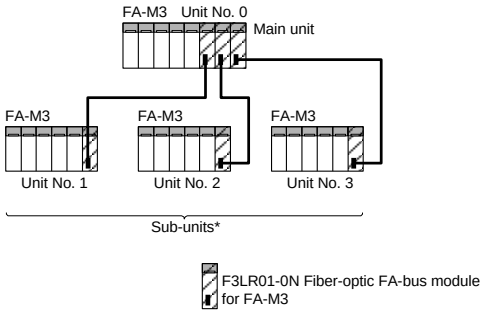
No.	ON	OFF	Factory Setting
1	Shutdown output	Hold output	ON
2		OFF	
3			
4			

*: Valid only for output modules installed in a sub-unit.

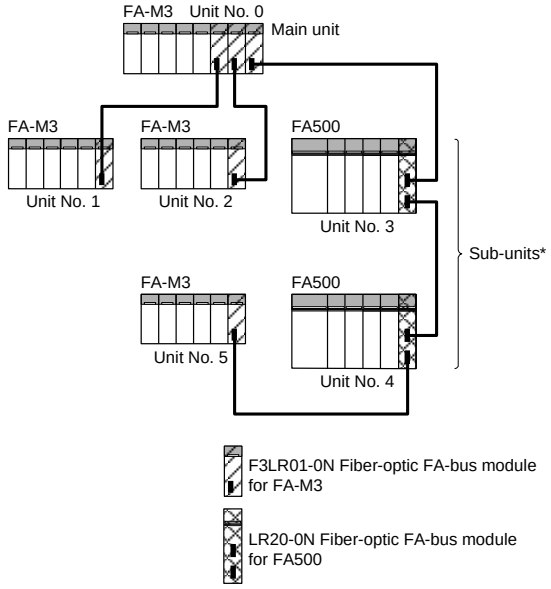
Note: This figure is drawn with the panel cover removed.

System Configuration Example

■ Star Configuration



■ Daisy-chain + Star Configuration



*: Maximum number of sub-units: 7

Restrictions on System Configuration

Item	Description
Maximum total distance	200 m
Number of connectable sub-units	7 max.
Number of fiber-optic FA-bus modules installable in a main unit	7 max. (no restrictions on the installation location)
Number of fiber-optic FA-bus modules installable in a sub-unit	1 (no restrictions on the installation location)
Modules installable in a sub-unit	All I/O modules, and special modules except F3LP□□ , F3LE01, F3LX0□ and F3NX01 modules.

Operating Environment

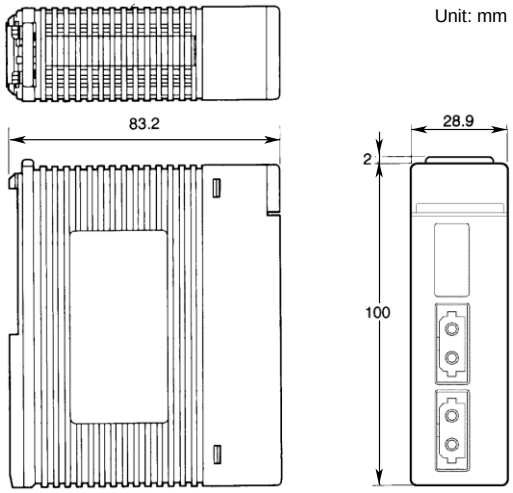
There is no restriction on the type of CPU modules that can be used with this module.

Model and Suffix Codes

Model	Suffix Code	Style Code	Option Code	Description
F3LR01	**-0N**	. . . . .	. . . . .	Maximum total distance: 200 m Maximum distance between stations: 200 m

External Dimensions

Unit: mm



Optional Accessories

Prepare fiber-optic cables satisfying the requirements listed below when connecting Fiber-optic FA-bus modules for extension. See Fiber-optic Cables (GS 34M06C92-01E) for details on fiber-optic cables.

■ Specifications for Fiber-optic Cable Cores

Yokogawa Cable Model Number	KM60	KM60, KM61, KM62, KM65, KM69
Fiber-optic Cable Model No. (Size)	DK-HPF200/230	2×CCV-HC-20/07
Fiber-optic Cable type	SI type※1	SI type※1
Vendor	SWCC Showa Cable Systems	Sumitomo Electric Industries
Core diameter	200±5μm	
Clad diameter	230^{+0}_{-10} μm	
Transmission loss	7.0dB/km Max. (λ=0.85μm, Ta=25℃)	7dB/km Max. (λ=0.81μm, Ta=25℃)

※1 : Step-index optical fiber

■ Specifications for Fiber-optic Cable Connectors

Yokogawa Cable Model Number	KM60	KM65	KM60, KM61 KM62, KM69
Optical connectors Model No.	KF-07	CF-2071	CF-2071H
Vendor	SWCC Showa Cable Systems	Sumitomo Electric Industries	Sumitomo Electric Industries
Specifications	Bi-directional, lever lock bonding, polished	Bi-directional, lever lock, crimping, cut	Bi-directional, lever lock bonding, polished

General Specifications

F3LR02-0N
Fiber-optic FA-bus Type 2 Module

FA-M3

General

The F3LR02-0N is an interface module for constructing a system that requires distributed placement of multiple modules. The user can build up an efficient remote I/O system by installing F3LR02-0N modules in the FA-M3 main- and sub-units and connecting them via a fiber-optic FA-bus (fiber-optic cable).

- With the 10-Mbps high-speed communication capability of the F3LR02-0N, the user does not have to worry about the I/O refresh time in ladder programming.
- All I/O module types and most special module types* can be installed in sub-units and accessed just like modules installed in the main unit.
  * : See "Restrictions on System Configuration"
- No specific communication setup (environment setup) is required.
- The optical transmission system makes the F3LR02-0N highly immune to noise.
- A single sub-unit can be segmented into a maximum of 8 stations.
- A 2-port (send/receive) system allows daisy-chain configuration.
- The loop system is switched into two pairs of daisy-chain systems when a disconnection occurs in the system, thereby improving system reliability.

Specifications

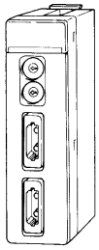
Item	Specification
Transmission speed	10 Mbps
Transmission media	2-core optical fiber (hard plastic clad quartz fiber-optic H-PCF)
Transmission distance	Maximum distance between stations: 500 m Maximum total distance: 1.4 km (3 stations)
Transmission configuration	Star, daisy chain, loop
Maximum number of sub-stations	56
Maximum number of systems	7 (Note)
Maximum number of sub-stations per system	32
Maximum total distance per system*1	1.4 km (3 stations)
Maximum distance between stations*1	500 m
RAS features	Shutdown I/O contact output on transmission channel error, reporting of transmission channel error location
Current consumption	460 mA
External dimensions	28.9 (W) x 100 (H) x 83.2 (D) mm
Weight	120 g
Surrounding air temperature range	Operating : 0 to 55°C
	Storage : -20°C to 75°C
Surrounding humidity range	Operating : 10 to 90% RH (non-condensing)
	Storage : 10 to 90% RH (non-condensing)
Surrounding atmosphere	Must be free of corrosive gases, flammable gases or heavy dust.

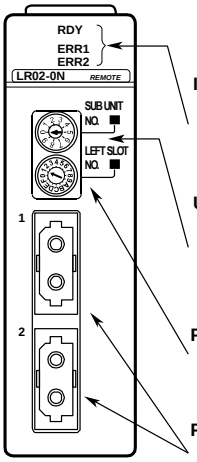
Note: The maximum number of systems when µ-bus master station module are used is 1 system less than the value above for each µ-bus master station.

*1: When using KM67(End of Support) only.

Components and Functions

■ Front View





Indicators
RDY: Lit when the internal circuit is functioning normally.
ERR1, ERR2: Lit when the module fails to detect an input signal from a port.

Unit No. switch (SUB UNIT No.):
Sets a unit number (0 to 7).
0 : Unit number of the main unit
1-7 : Unit number of sub-units
8, 9 : Cannot be used.

First slot number switch (LEFT SLOT NO.)
Used to set the first slot number (hexadecimal) of the base module.

Fiber-optic connector
Attach a dust cap, in not using the port 2.

Condition Switches

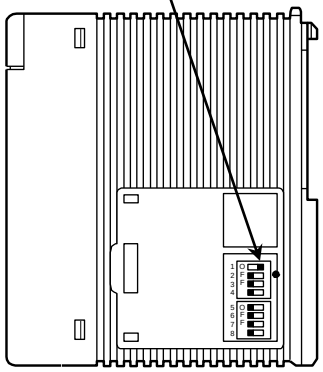
No.	Meaning	OFF	ON	Factory set
1*1	Hold/reset output on communication error	Hold*2 output	Shutdown output	ON
2	Port used	Port 1	Both ports*3	OFF
3	Channel configuration	Daisy chain or star	Loop	OFF
4	Reserved	—	—	OFF

*1: Valid only for output modules installed in a sub-unit.
*2: Continues operation if transmission channel has been secured and system operation is continued.
*3: Both port 1 and port 2 are used.

Light Power Setup Switches

No.	Meaning	Distance between stations (Fiber-optic cable length) (m)							
5	Port 1 intensity	OFF	0 - 200	ON	200 - 300	OFF	300 - 400	ON	400 - 500
6		OFF		OFF		ON		ON	
7	Port 2 intensity	OFF	0 - 200	ON	200 - 300	OFF	300 - 400	ON	400 - 500
8		OFF		OFF		ON		ON	

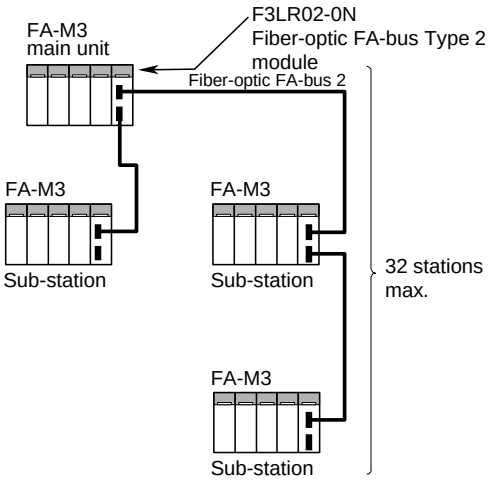
■ Right Side View



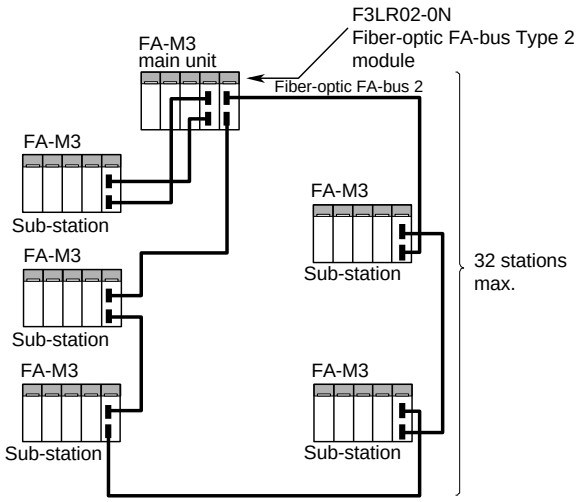
Note: This figure is drawn with the panel cover removed.

System Configuration Example

■ Daisy-chain configuration



■ Loop configuration



Restrictions on System Configuration

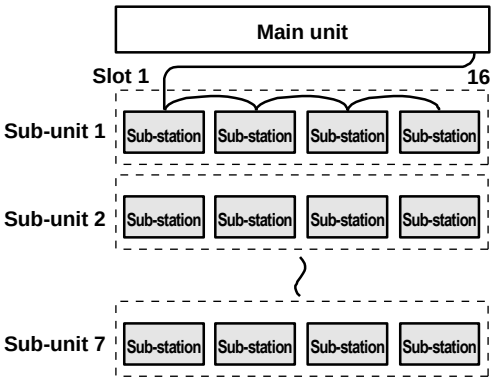
Item	Description
Number of Fiber-optic FA-bus Type 2 modules installable in a master station	7 (In case of subunit split : 15)
Number of Fiber-optic FA-bus Type 2 modules installable in a sub-station	1
Modules installable in a sub-station	All I/O modules, and special modules except F3LP□□, F3LE01, F3LX0□ and F3NX01 modules.

Substation Configuration

- Substation Configuration Example

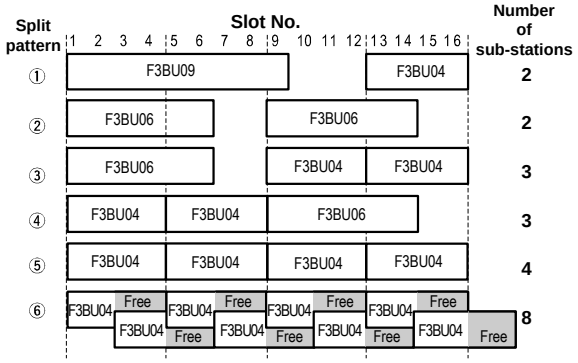
The user can configure two or more sub-stations by splitting a sub-unit using the fiber-optic FA-bus type 2. A sub-unit logically consists of 16 slots.

A maximum of 7 sub-units can be used with the main unit.



- Subunit Split Patterns

Sub-units can be split in several patterns. Select an appropriate pattern according to the configuration of your system.



When pattern (3) is used, for example, it is possible to connect together up to 7 sub-units, providing a maximum of 21 stations. A 32-station system (maximum configurable system) can be configured by combining 6 sets of pattern (5) and 1 set of pattern (6). The number of I/O modules that can be installed in pattern (6) is 1 module per sub-station.

Number of Sub-stations and Maximum Total Distance (m)

Number of Sub-stations	Maximum Total Distance (m)	
	Daisy-chain configuration	Loop configuration
1	500	1000
2	1000	1500
3	1420	
4	1380	
5	1340	
6	1300	
7	1260	
8	1230	
9	1190	
10	1150	
11	1110	
12	1070	
13	1030	
14	1000	
15	960	
16	920	

Number of Sub-stations	Maximum Total Distance (m)
	Daisy-chain・Loop configuration
17	880
18	840
19	800
20	760
21	730
22	690
23	650
24	610
25	570
26	530
27	500
28	460
29	420
30	380
31	340
32	300

Do not lay cables such that the actual fiber-optic cable length exceeds the Maximum total distance, or the distance between two stations exceeds the maximum distance allowed between stations (500 m).

Operating Environment

- The following table lists the type of CPU modules that can be used with this module.

CPU Module	Style No. and ROM Rev. *1
F3SP21, F3SP25 and F3SP35	S1 Rev. 8 or later*2
F3SP05/08, F3SP22, F3SP28, F3SP38, F3SP53/58/59, F3SP66/67, F3SP71/76	—
F3BP20, F3BP30 and F3FP36	—

*1: For the revision number of a CPU module, see the revision number label on the side panel.

*2: Supports logging of transmission channel error location.

- The following table summarizes the requirements for the Ladder Diagram Support Program M3, which can be used to set up the communications conditions of this module. All versions of the Ladder Programming Tool WideField2 and WideField3 can be used with this module.

Ladder Diagram Support Program M3	Revision
SF510-E3□	Rev. 1.08 or later

*: Supports logging of transmission channel error location.

- The following table lists the type of base modules that can be used with this module.

Base Module	ID Mark
F3BU04	R 01 or later
F3BU05	—
F3BU06	R 01 or later
F3BU09	—
F3BU13	—
F3BU16	—

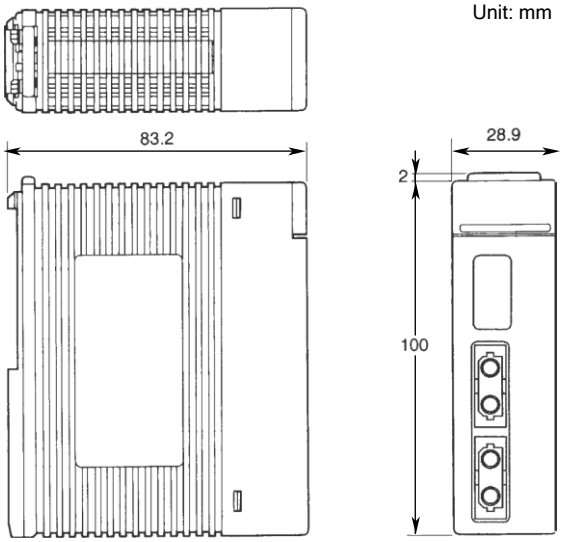
Model and Suffix Codes

Model	Suffix Code	Style Code	Option Code	Description
F3LR02	-0N	.....	.....	Maximum total distance: 1.4 km*1 Maximum distance between stations: 500 m*1

*1: When using KM67(End of Support) only.

External Dimensions

Unit: mm



Optional Accessories

Prepare fiber-optic cables satisfying the requirements listed below when connecting Fiber-optic FA-bus Type 2 modules for extension. See Fiber-optic Cables (GS 34M06C92-01E) for details on fiber-optic cables.

■ Specifications for Fiber-optic Cable Cores

Yokogawa Cable Model Number	KM60	KM60, KM61, KM62, KM65, KM69	KM67
Fiber-optic Cable Model No. (Size)	DK-HPF200/230	2×CCV-HC-20/07	2×CCV-HG-20/08
Fiber-optic Cable type	SI type※1	SI type※1	GI type※2
Vendor	SWCC Showa Cable Systems	Sumitomo Electric Industries	
Core diameter	200±5μm		
Clad diameter	230^{+0}_{-10} μm		
Transmission loss	7.0dB/km Max. (λ=0.85μm, Ta=25℃)	7dB/km Max. (λ=0.81μm, Ta=25℃)	8dB/km Max. (λ=0.81μm, Ta=25℃)

※1 : Step-index optical fiber
※2 : Graded-index optical fiber

■ Specifications for Fiber-optic Cable Connectors

Yokogawa Cable Model Number	KM60	KM65	KM60, KM61 KM62, KM67, KM69
Optical connectors Model No.	KF-07	CF-2071	CF-2071H
Vendor	SWCC Showa Cable Systems	Sumitomo Electric Industries	Sumitomo Electric Industries
Specifications	Bi-directional, lever lock bonding, polished	Bi-directional, lever lock, crimping, cut	Bi-directional, lever lock bonding, polished

General Specifications

F3LR02-1W
FA-bus Type 2 Module

FA-M3

General

The F3LR02-1W is an interface module for constructing a system that requires distributed placement of multiple modules. The user can build up an efficient remote I/O system by installing F3LR02-1W modules in the FA-M3 main- and sub-units and connecting them via a FA-bus.

- With the 10-Mbps high-speed communication capability of the F3LR02-1W, the user does not have to worry about the I/O refresh time in ladder programming.
- All I/O module types and most special module types* can be installed in sub-units and accessed just like modules installed in the main unit.
  * : See "Restrictions on System Configuration"
- Both daisy-chain and loop configuration options are supported.
- The loop system is switched into two pairs of daisy-chain systems when a disconnection occurs in the system.

Specifications

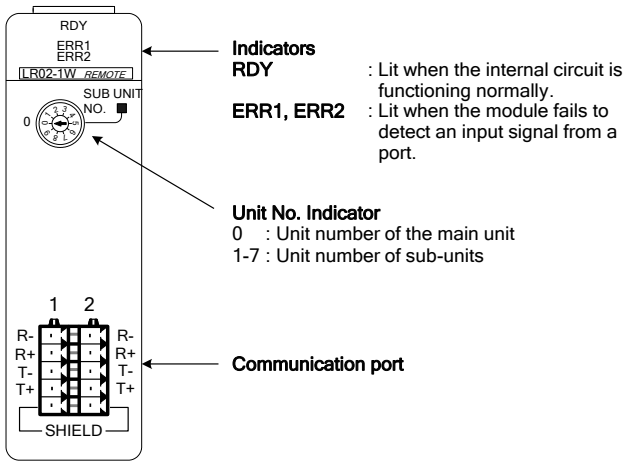
Item	Specification
Transmission speed	10 Mbps
Transmission media	two-pair (4-wire) shielded cable (impedance 100Ω)
Transmission distance	Maximum total distance:70m Maximum distance between stations: 10 m
Transmission configuration	Star, daisy chain, loop
Maximum number of subunits (systems)	7 (Note)
RAS features	Shutdown I/O contact output on transmission channel error, reporting of transmission channel error location
Installation location	Must be installed inside panel enclosure or system
Current consumption	320 mA
External dimensions	28.9 (W) x 100 (H) x 83.2 (D) mm
Weight	105 g
Surrounding air temperature range	Operating : 0 to 55°C
	Storage : -20°C to 75°C
Surrounding humidity range	Operating : 10 to 90% RH (non-condensing)
	Storage : 10 to 90% RH (non-condensing)
Surrounding atmosphere	Must be free of corrosive gases, flammable gases or heavy dust.

Note: The maximum number of systems when µ-bus master station modules are used is 1 system less than the value above for each µ-bus master station.

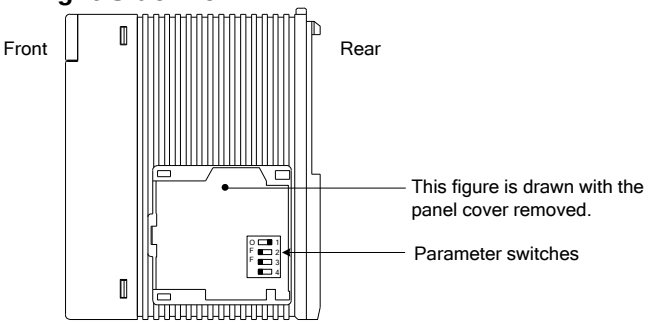
The combined maximum number of systems is 7 when FA bus-2 modules are used with Fiber-optic FA bus-2 modules and Fiber-optic FA bus modules.

Components and Functions

■ Front View



■ Right Side View



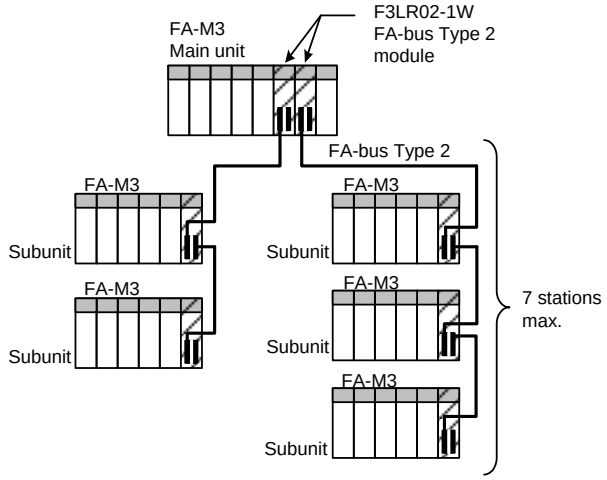
Condition Switches

SW No.	Meaning	OFF	ON	Factory setting
1*1	Hold/reset output on communication error	Hold output *2	Shutdown output	ON
2	Port used	Port 1	Both ports *3	OFF
3	Channel configuration	Daisy chain or star	Loop	OFF
4	Reserved	—	—	OFF

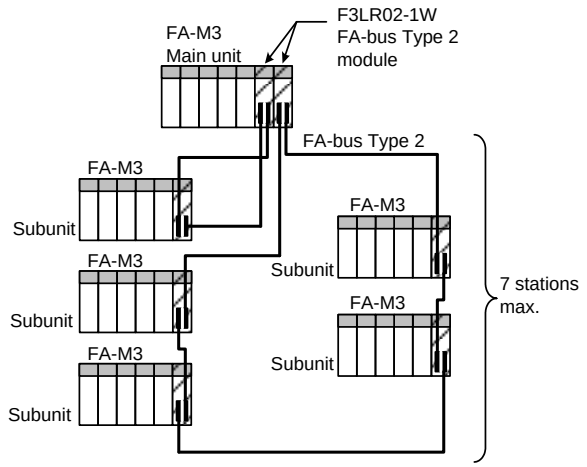
*1: Valid only for output modules installed in a sub-unit.
*2: Continues operation if transmission channel has been secured and system operation is continued.
*3: Both port 1 and port 2 are used.

System Configuration Example

■ Daisy-chain configuration



■ Loop configuration



Restrictions on System Configuration

Item	Description
Number of FA-bus Type 2 modules installable in a main unit	7
Number of FA-bus Type 2 modules installable in a subunit	1
Modules installable in a subunit	All I/O modules, and special modules except F3LP□□, F3LE01, F3LX0□ and F3NX01 modules,

Cables

Use two-pair (4-wire) shielded cable (impedance 100Ω) when connecting FA-bus Type 2 modules.

Recommended cable: KM80-□□□ (tested for noise immunity, to be purchased separately)

* For details on KM80-□□□, see GS34M6H46-03E.

Operating Environment

- The following table lists the type of CPU modules that can be used with this module.

CPU Module	Style No. and ROM Rev.*1
F3SP21, F3SP25 and F3SP35	S1 Rev. 8 or later*2
F3SP05, F3SP08, F3SP22, F3SP28, F3SP38, F3SP53, F3SP58/59, F3SP66/67, F3SP71/76	—
F3BP20, F3BP30 and F3FP36	—

*1: For the revision number of a CPU module, see the revision number label on the side panel.
*2: Supports logging of transmission channel error location.

- The following table summarizes the requirements for the Ladder Diagram Support Program M3 that can be used with the module. All versions of the Ladder Programming Tool WideField3, WideField2 and WideField can be used with this module.

Ladder Diagram Support Program M3	Revision
SF510-E3□	Rev. 1.08 or later*3

*3: Supports logging of transmission channel error location.

- All versions of the Ladder Programming Tool WideField2 can be used with this module.

Model and Suffix Codes

Model	Suffix Code	Style Code	Option Code	Description
F3LR02	**-1W**	.....	.....	Maximum total distance: 70 m Maximum distance between stations: 10 m

External Dimensions

Unit: mm