General Specifications

Range-free Multi-controller
FA-M3

FA-M3

GS 34M06A01-01E

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For information on the Discontinued Modules, refer to GS 34M06A01-99E.

YOKOGAWA
Yokogawa Electric Corporation

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General

The Range-free Multi-controller FA-M3 is a next-generation programmable controller, which achieves high performance through its ultra high-speed processing and stable control features. It incorporates a space-saving compact design, supports versatile ranges with cover for up to 8192 input/output points, and is equipped with a variety of advanced modules, which can be used to configure a wide range of applications.
With the FA-M3, decreased total cost of ownership (TCO) can be realized through openness, improved functions and reduction in the size of machines and facilities.

Features

The increased speed of the FA-M3 has been achieved as a result of adopting the concept High Speed IPRS which is based on four factors; **I**nstruction, **P**rocess, **R**esponse and **S**can. This contributed to increased accuracy of instruments and productivity. The FA-M3 has also inherited structured programming and uses an "object ladder*" to create an efficient total design, all the way from planning to maintenance.

*: "Object ladder" is a program development concept aimed at dramatically improving customization efficiency by integrating programs and devices into independent objects (e.g., blocks) on function basis.

● Ultra-high Speed Processing

The high-speed instruction processing capability of the FA-M3 makes it ideal for applications that require high speed and quick response.

- The F3SP22 CPU achieves a scan time of 1 ms for a 6K steps program*.
- The F3SP66 and F3SP67 CPUs achieve a scan time of 1 ms for a 20K steps program*.
- The F3SP71 and F3SP76 CPUs achieve a scan time of 1 ms for a 100K steps program*.

*: The scan times mentioned above can only be a achieved under specific conditions and vary depending on the contents of the program and system configuration.

● Sensor Control Function

This function allows one CPU to perform a parallel operation at a minimum scan time of 200 µs (100 µs for F3SP7☐) while carrying out a main scan during program operation. It enables one block of the program to be executed at high-speed and fixed intervals independently of a main scan, which features high performance and advanced functionalities.

● Built-in Network Function (when using F3SP6☐, F3SP7☐)

These sequence CPU modules have a built-in network function, which complements high-speed control with fast access and storage of large files. With pre-installed support for a wide range of common communication protocols, it enables transfer of large files.

● Built-in Modbus/TCP Slave (Server) Function (when using F3SP7☐)

These sequence CPU modules have a built-in Modbus/TCP slave (server) function, which enables communication with a Modbus master (client) device via the module's communication port without need of programming on the module end.

● Multiple CPUs

The FA-M3 can accommodate up to 4 CPUs in one base module depending on the system size, program size and CPU aptitude. The supported CPU modules include sequence CPU modules, as well as BASIC CPU modules.

● Program Reusability

Object ladder allows integration of programs with devices into components on function basis. This improves the reusability of user software and efficiency of machine custom design.

- **Local Device**
  Devices used as variables in different user blocks or component macros are completely independent, and can be allocated to different devices even if they share the same name so that global analyses and modification of the device structure for reuse of ladders are not necessary.

● Efficient System Maintenance (when using F3SP7☐-☐S)

- **Oscilloscope-like Sampling Trace Function and Live Logic Analyzer**
  The CPU module is capable of acquiring high-speed data, which cannot be acquired using a PC. Various analysis functions, such as inter-point analysis and range adjustment are supported, enabling efficient troubleshooting when equipment fails.

● Open Network

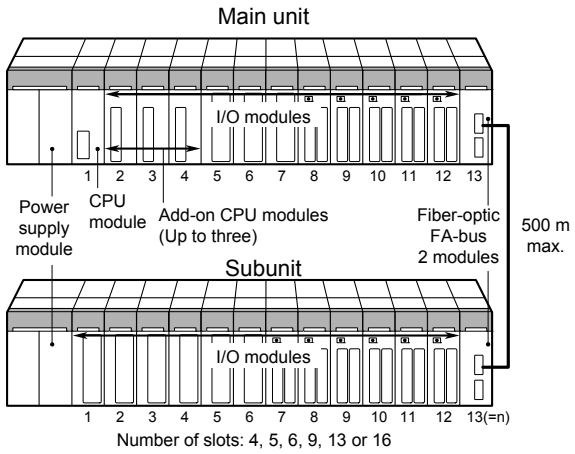
The FA-M3 supports open network protocols such as Ethernet, FL-net, DeviceNet, AS-interface, PROFIBUS-DP, GP-IB, RS-232-C/422 and Automated Distribution Protocol, and provides a range of modules for use on a variety of networks ranging from field networks to system configuration networks.

I/O Configuration

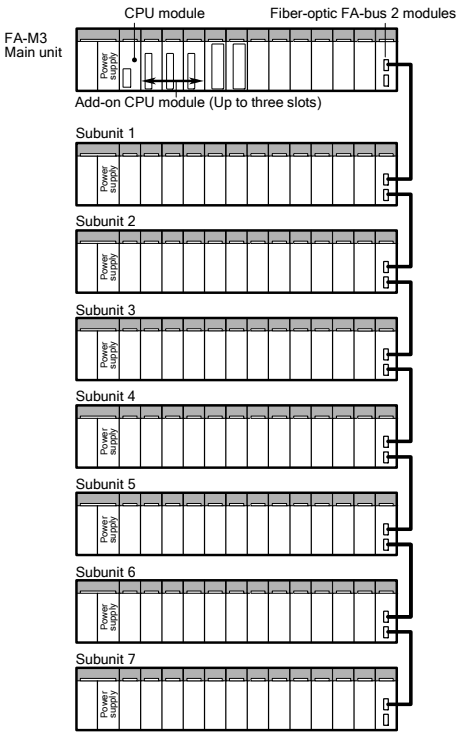
● Up to Seven Additional Subunits for I/O Extension

Up to 8192 inputs and outputs can be processed (for F3SP67 and F3SP76).

● Main Unit and Subunit



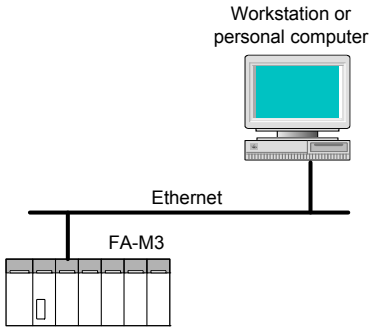
● Subunit Extension



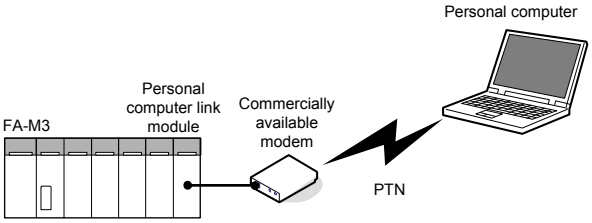
System Configuration

■ Higher Level Communication

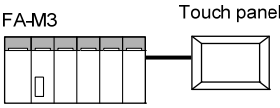
(1) Connecting to a Workstation or PC via Ethernet



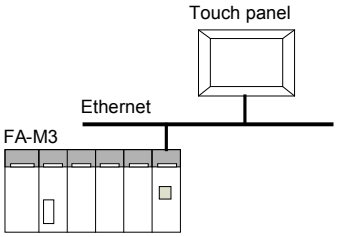
(2) Connecting to a Personal Computer via Public Telephone Network



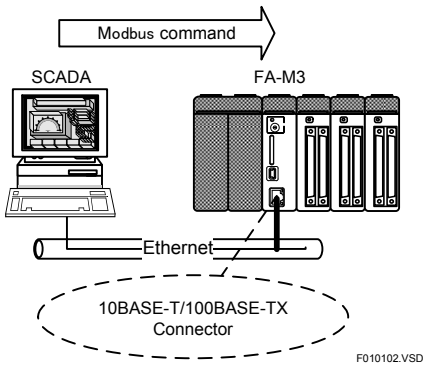
(3) Connecting to a Touch Operation Panel via Personal Computer Link



(4) Connecting to a Touch Operation Panel via Ethernet

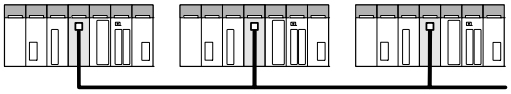


(5) Connecting to a Touch Operation Panel or a Personal Computer via Ethernet (Modbus/TCP protocol)



■ Links between PLCs

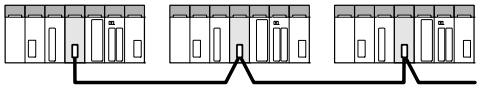
(1) Connecting between FA-M3s via FL-net (OPCN-2) modules



FL-net (OPCN-2) 10 Mbps, maximum of 254 nodes
Maximum of 500 m (2.5 km when repeaters are used)
Communications media: Ethernet (10BASE-T, 10BASE5)

FL-net (OPCN-2) is an open, multi-vendor network, which not only allows high-speed data transfer between FA-M3 units but also connection to third-party FA controllers.

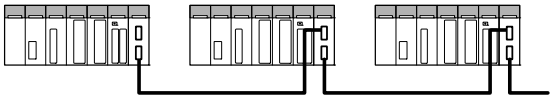
(2) Connecting between FA-M3s via FA link H modules



FA link H: Maximum of 1.25 Mbps
(maximum of 1 km or 32 stations)
Communications media: Shielded twisted-pair cable

Use the FA link H modules for exchanging data between FA-M3s.

(3) Connecting between FA-M3s via Fiber-optic FA link H modules

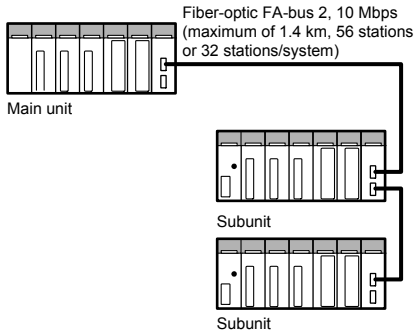


Fiber-optic FA link H: Maximum of 1.25 Mbps
(maximum of 10 km or 32 stations)
Communications media: Fiber-optic cable

The fiber-optic FA link H modules permit high-speed data exchange between FA-M3s.

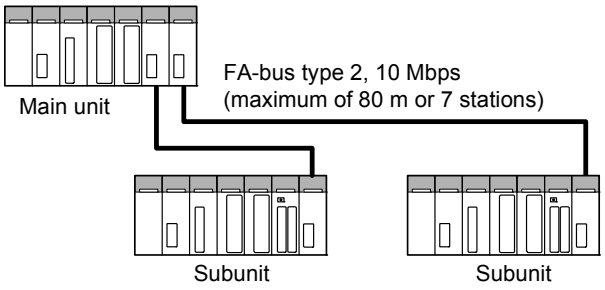
■ PLC Lower Level Communications

(1) Adding FA-M3s via a Fiber-optic FA-bus Type 2 (remote I/O)



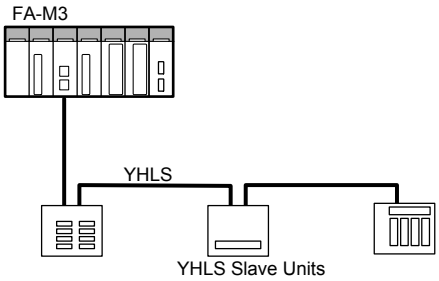
Use a fiber-optic FA-bus Type 2 module when augmenting I/O devices in a multi-station or long distance configuration.

(2) Adding FA-M3s via a FA-bus Type 2 (remote I/O)



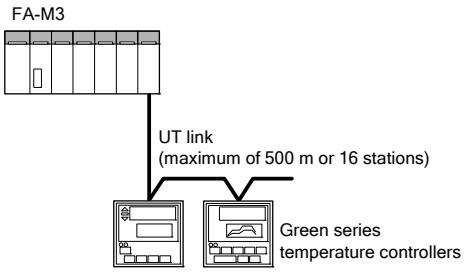
Use a FA-bus Type 2 module when adding subunits.

(3) Connecting to YHLS Slave Units via YHLS

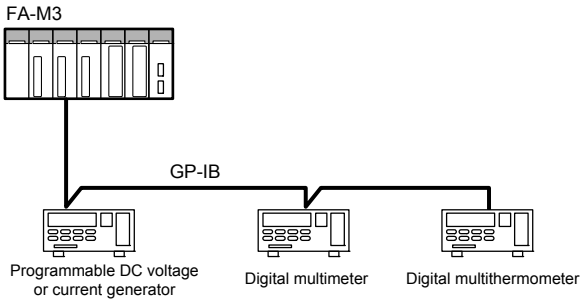


YHLS (Yokogawa Hi-speed Link System) enables easy implementation of high-speed 1:N remote I/O communication systems.

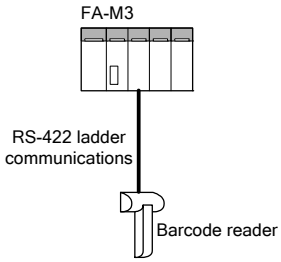
(4) Connecting to a Temperature Controller via a UT Link



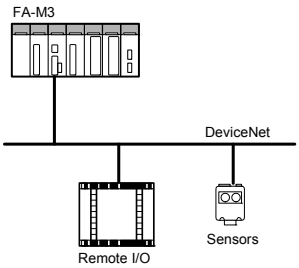
(5) Connecting to Measuring Instruments via a GP-IB



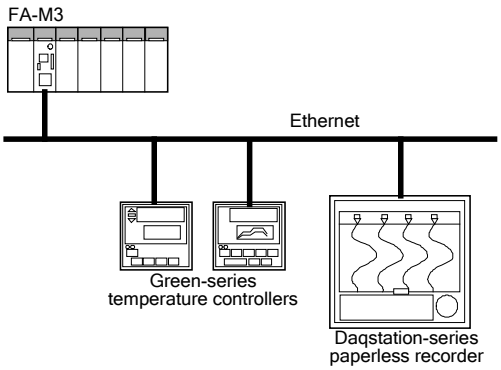
(6) Connecting to a Barcode Reader via RS-422 Ladder Communications



(7) Connecting to Remote I/O and Sensors via DeviceNet



(8) Connecting to Ethernet-enabled Equipment (sequence CPU module with built-in network functions)



Standard Specifications

■ Common Specifications

Item				Specifications
Environment	Surrounding air temperature range			Operating : 0 to 55°C *1
				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.
	Grounding			JIS Class D grounding
	Noise immunity			Tested using a noise simulator with a noise voltage of 1500 Vp-p, pulse width of 1 µs, rise time of 1 ns, and repetition frequency of 25 to 60 Hz. For CE Marking-compliant modules, compliant to EN61326-1, EN61326-2-3*4 and EN61000-6-2
	Vibration resistance			Tested in compliance with JIS C60068-2-6 under the following conditions: - Frequency ranges: 10 to 57 Hz with an amplitude of 0.075 mm 57 to 150 Hz with an acceleration of 9.8 m/s² (1G) - Direction and sweep cycles: 10 times each in the X, Y, and Z directions
	Shock resistance			Tested in compliance with JIS C60068-2-27 under the following conditions: - Direction and sweep cycles: 3 times each in the X, Y, and Z directions with an acceleration of 147 m/s² (98 m/s² with DIN-rail mounting)
Structure & Appearance	Structure			Designed for mounting inside a panel enclosure
	Altitude of installation			Max. of 2000 m above sea level
	Compliance with safety and EMC standards *2	UL		UL508 approved, File No.E188707 (Overvoltage Category*5 : II, Pollution Degree*6 : 2)
		CE	EMC Directive *3	EN 61326-1 Class A, Table 2 (For use in industrial locations) EN 61326-2-3*4 EN 55011 Class A, Group 1 EN 61000-6-2, EN 61000-3-2, EN 61000-3-3 compliance
			Low Voltage Directive	EN 61010-1 compliance (Overvoltage Category*5 : II, Pollution Degree*6 : 2), EN 61010-2-030 compliance (Measurement Category :O) *7
		C-Tick	EMC Framework	EN 61326-1 Class A, Table 2 (for use in industrial locations) EN 55011 Class A, Group 1 compliance
		KC	EMC Regulations	Korea Electromagnetic Conformity Standard (한국 전자파적합성기준) compliance
	Cooling method			Natural-air cooled
	Mounting			Direct mounting with M4-size setscrews *8 or DIN-rail mounting (except for F3BU16-0N module)
	Finish color			Light cobalt blue, equivalent to Munsell 6.2PB 4.6/8.8; Lampblack, equivalent to Munsell 0.8Y 2.5/0.4
	External dimensions			See the dimensional figures in “External Dimensions” of the “Hardware Manual” (IM 34M06C11-01E)

*1: Some FA-M3 modules may have a narrower surrounding air temperature range than 0-55°C. A system incorporating such modules must be used within the narrower surrounding air temperature range for such modules.

*2 For details on conforming modules, see “UL-approved, CE marking and C-Tick mark-compliant Modules” (GS 34M06C11-21E) general specification brochure.

*3: This product is classified as Class A for use in industrial environments.If used in a residential environment, it may cause electromagnetic interference (EMI). In such situations, it is the user's responsibility to adopt the necessary measures against EMI.

*4: EN61326-2-3 is applicable only to F3CU04-0S and F3CU04-1S.

*5: The term Overvoltage Category involves prescriptions on resistance to surge voltage reduction due to lightning and has four categories. Overvoltage Category II applies to systems with a rated voltage of 220/230/240 V and applies to electrical appliances, portable devices, etc.

*6: The term Pollution Degree represents the degree of pollution with foreign matter, solid, liquid or gaseous, that may produce a reduction of dielectric strength or surface resistivity in the operating environment of the equipment. Pollution degree 2 refers to an environment where normally only non-conductive pollution occurs but occasionally temporary conductivity caused by condensation is to be expected.

*7: EN 61010-2-030 is applicable only to modules with analog input terminal.
Don’t use the analog input terminals of FA-M3 for measurement on Main Circuit, since those terminals have no measurement category.

*8: F3BU04, F3BU05, F3BU06, F3BU09 and F3BU13 each uses four mounting screws while F3BU16 uses six mounting screws..

■ Power Supply Specifications

Item	Specification					
	F3PU10-0S	F3PU20-0S	F3PU30-0S	F3PU16-0N	F3PU26-0N	F3PU36-0S
Supply voltage	100 V to 240 V AC, single phase, 50/60 Hz			24 V DC		
Supply voltage fluctuation range	85 V to 264 V AC, 50/60 Hz ±3 Hz			15.6 V to 31.2 V DC		
Power consumption	35 VA	85 VA	100VA	15.4 W	33.1 W	46.2 W
Inrush current	20 A max. (120 V AC, Ta = 25°C) 45 A max. (240 V AC, Ta = 25°C)			20 A max. (31.2 V DC, Ta = 25°C)		
Rated output voltage	5 V DC					
Rated output current	2.0 A	4.3 A	6.0A	2.0A	4.3A	6.0A
Allowable momentary power failure time	20 ms					
FAIL-signal contact output	Provided on the front terminal block on the power supply module; contact rating: 24 V DC, 0.3 A (both normally-open and normally-closed terminals available)					
Allowable common mode voltage of FAIL-signal contact	120 V AC or DC or less (between FAIL OUTPUT COM terminal and FG terminal)					
Leakage current	3.5 mA max.			—		
Insulation resistance	5 MΩ or greater at 500 V DC (between external AC terminals and FG terminal)			5 MΩ or greater at 500 V DC (between external DC terminals and FG terminal)		
Dielectric strength	1500 V AC for 1 minute (between external AC terminals and FG terminal)			1500 V AC for 1 minute (between external DC terminals and FG terminal)		

Note: F3PU□□-0S has the same dimensions, internal circuitry and other specifications as its respective F3PU□□-0N counterpart but uses screw size M4.0 instead of M3.5.

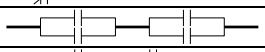
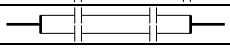
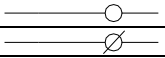
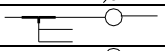
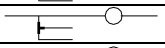
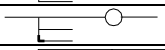
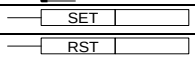
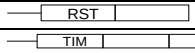
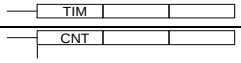
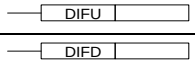
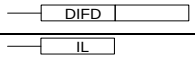
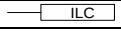
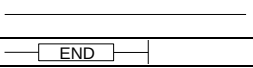
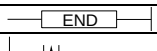
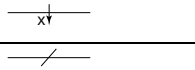
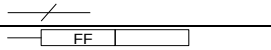
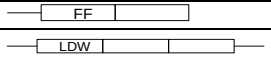
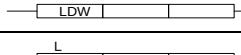
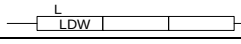
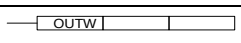
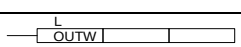
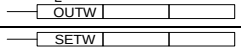
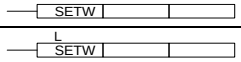
■ Functional Specifications

Item		Specification
		F3SP22-0S
Control mode		Repetitive computation based on stored programs
I/O control mode		Refresh method/Direct I/O instructions
Programming language		Object ladder language, mnemonic language
Number of I/O points		4096 max
Number of instructions	Basic instructions	37 types
	Application instructions	324 types
Instruction processing speed	Basic instructions	0.045-0.18 μs/instruction
	Application instructions	From 0.18 μs/instruction
Program size		10K steps (can be written to ROM)
Number of program blocks		1024 max
Sampling trace		Yes
Link to personal computer		Yes
Scan monitoring time		10 to 200 ms variable
Device	Internal relay	I: 16384 max.
	Shared relay	E: 2048 max.
	Extended shared relay	E: 2048
	Link relay	L: 8192
	Special relay	M: 9984
	Timer	T: 2048 max. (2048 max. for timers and counters combined)
	Counter	C: 2048 max. (2048 max. for timers and counters combined)
	Data register	D: 16384 max.
	File register	B: 32768
	Link register	W: 8192
	Special register	Z: 1024
	Index register	V: 256
	Shared register	R: 1024 max.
	Extended shared register	R: 3072 max.

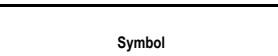
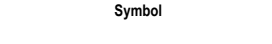
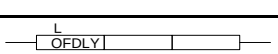
Item		Specification			
		F3SP66-4S	F3SP67-6S	F3SP71-4S	F3SP76-7S
Control mode		Repetitive computation based on stored programs			
I/O control mode		Refresh method/Direct I/O instructions			
Programming language		Object ladder language			
Number of I/O points		4096 max	8192 max	4096 max	8192 max
Number of instructions	Basic instructions	37 types		40 types	
	Application instructions	389 types		445 types	445 types
Instruction processing speed	Basic instructions	0.0175-0.07 µs/instruction		From 0.00375 µs/instruction	
	Application instructions	From 0.07 µs/instruction		From 0.0075 µs/instruction	
Program size		56K steps (can be written to ROM)	120K steps (can be written to ROM)	60K steps (can be written to ROM)	260K steps (can be written to ROM)
Number of program blocks		1024 max			
Sampling trace		Yes			
Live Logic Analyzer		—		Yes*1	
Link to personal computer		Yes		Yes (by Ethernet only)	
Scan monitoring time		10 to 200 ms variable			
Device	Internal relay	I: 16384 max.	I: 32768 max.	I: 16384 max.	I: 65535 max.
	Shared relay	E: 2048 max.			
	Extended shared relay	E: 2048			
	Link relay	L: 8192	L: 16384	L: 8192	L: 16384
	Special relay	M: 9984			
	Timer	T: 2048 max. (2048 max. for timers and counters combined)	T: 3072 max. (3072 max. for timers and counters combined)	T: 2048 max. (2048 max. for timers and counters combined)	T: 3072 max. (3072 max. for timers and counters combined)
	Counter	C: 2048 max. (2048 max. for timers and counters combined)	C: 3072 max. (3072 max. for timers and counters combined)	C: 2048 max. (2048 max. for timers and counters combined)	C: 3072 max. (3072 max. for timers and counters combined)
	Data register	D: 16384 max.	D: 32768 max.	D: 16384 max.	D: 65535 max.
	File register	B: 32768	B: 262144	B: 32768	B: 262144
	Cache register	—	—	F: 131072	F: 524288
	Link register	W: 8192	W: 16384	W: 8192	W: 16384
	Special register	Z: 1024			
	Index register	V: 256			
	Shared register	R: 1024 max.			
	Extended shared register	R: 3072 max.			

*1: Module Date: After Oct. 18, 2013

■ Ladder Sequence Basic Instructions

FUNC No	Instruction	Mnemonic	Symbol	Function	Applicable CPU F3SP22-0S F3SP66-4S F3SP67-6S F3SP71-4S F3SP76-7S
—	Load	LD		Starts a logic operation (contact a).	●
—	Load Not	LDN		Starts a logic NOT operation (contact b).	●
—	And	AND		Performs an AND (serial contact a) connection.	●
—	And Not	ANDN		Performs an AND NOT (serial contact b) connection.	●
—	Or	OR		Performs an OR (parallel contact a) connection.	●
—	Or Not	ORN		Performs an OR NOT (parallel contact b) connection.	●
—	And Load	ANDLD		Performs an AND with the preceding condition.	●
—	Or Load	ORLD		Performs an OR with the preceding condition.	●
—	Out	OUT		Generates a relay output.	●
07	Out Not	OUTN		Generates a NOT output.	●
—	Push	PUSH		Starts a branch.	●
—	Stack	STCRD		Branch.	●
—	Pop	POP		Terminates a branch.	●
01 / 01P	Set	SET		Set a device.	●
02 / 02P	Reset	RST		Resets a device.	●
—	Timer	TIM		Count-down timer.	●
—	Counter	CNT		Count-down counter.	●
03	Differential Up	DIFU		Causes a relay to turn on for 1 scan on the rising edge of the input signal (result of logical operation).	●
04	Differential Down	DIFD		Causes a relay to turn on for 1 scan on the falling edge of the input signal (result of logical operation).	●
05	Interlock	IL		Starts interlock.	●
06	Interlock Clear	ILC		Resets interlock.	●
00	Nop	NOP		Does nothing.	●
999	End	END		Terminates a scan.	●
301	Load Differential Up	LDU		Causes the result signal of a logical operation to turn on for 1 scan on the rising edge of the signal of a specified device.	●
302	Load Differential Down	LDD		Causes the result signal of a logical operation to turn on for 1 scan on the falling edge of the signal of a specified device.	●
303	Logical Differential Up	UP		Causes the result signal of a logical operation to turn on for 1 scan on the rising edge of the input signal (result of logical operation).	●
304	Logical Differential Down	DWN		Causes the result signal of a logical operation to turn on for 1 scan on the falling edge of the input signal (result of logical operation).	●
305	Logical Differential Up Using Specified Device	UPX		Causes the result signal of a logical operation to turn on for 1 scan on the rising edge of the input signal (result of logical operation). A specified device is used for differential operation.	●
306	Logical Differential Down Using Specified Device	DWNX		Causes the result signal of a logical operation to turn on for 1 scan on the falling edge of the input signal (result of logical operation). A specified device is used for differential operation.	●
307	Inverter	INV		Outputs inverted input signal (result of logical operation).	●
308	Flip-Flop	FF		Causes a relay to invert on every rising edge of an input signal.	●
311	Load Specified Bit	LDW		Outputs the status of a specified bit of a 16-bit data item as contact a.	●
311L	Load Specified Bit Long	LDW L		Outputs the status of a specified bit of a 32-bit data item as contact a.	●
312 /312P	Out Specified Bit	OUTW		Outputs the result of the logical operations performed so far to a specified bit of a 16-bit data item.	●
312L/312LP	Out Specified Bit Long	OUTW L		Outputs the result of the logical operations performed so far to a specified bit of a 32-bit data item.	●
313 /313P	Set Specified Bit	SETW		Sets the specified bit of a 16-bit data item to ON.	●
313L/313LP	Set Specified Bit Long	SETW L		Sets the specified bit of a 32-bit data item to ON.	●
314/314P	Reset Specified Bit	RSTW		Sets the specified bit of a 16-bit data item to OFF.	●
314L/314LP	Reset Specified Bit Long	RSTW L		Sets the specified bit of a 32-bit data item to OFF.	●

Note: An instruction indicated with two FUNC Nos. can be either executed one or more times while its input condition is ON or executed only once when its input condition is ON (pulse instruction)."

FUNC No	Instruction	Mnemonic	Symbol	Function	Applicable CPU F3SP71-4S F3SP76-7S
—	Off Delay	OFDLY L		Outputs OFF-delay timer operation result for a specified device	●
—	On Delay	ONDLY L		Outputs ON-delay timer operation result for a specified device	●
—	Pulse	PULSE L		Outputs pulse timer operation result for a specified device	●

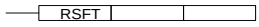
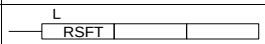
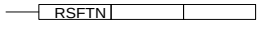
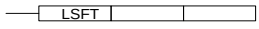
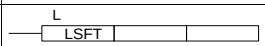
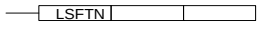
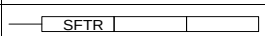
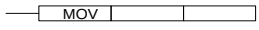
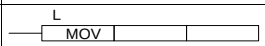
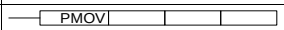
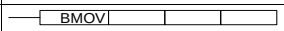
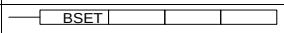
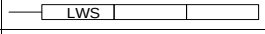
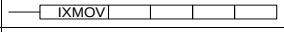
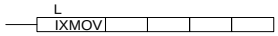
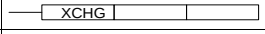
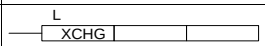
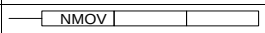
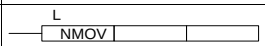
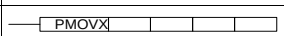
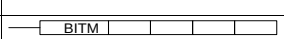
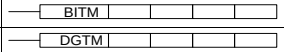
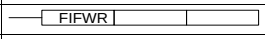
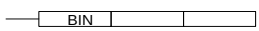
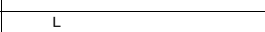
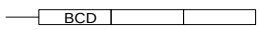
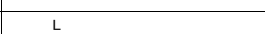
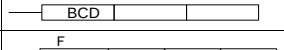
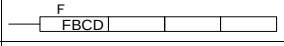
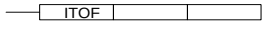
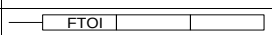
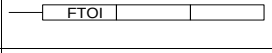
■ Ladder Sequence Application Instructions

Classi-fication	FUNC No.	Instruction		Processing Unit	Mnemonic	Symbol	Function	Applicable CPU F3SP22-0S F3SP66-4S F3SP67-6S F3SP71-4S F3SP76-7S
Comparison	10	Compare	=	16 bits	CMP	=	Compares 1-word data.	●
			< >	16 bits		<>		●
			>	16 bits		>		●
			> =	16 bits		>=		●
			<	16 bits		<		●
			< =	16 bits		<=		●
	10L	Compare Long	=	32 bits	CMP L	L =	Compares 2-word data.	●
			< >	32 bits		L <>		●
			>	32 bits		L >		●
			> =	32 bits		L >=		●
			<	32 bits		L <		●
			< =	32 bits		L <=		●
	904	Compare Float	=	32 bits	FCMP	F =	Compares floating point data.	●
			< >	32 bits		F <>		●
			>	32 bits		F >		●
			> =	32 bits		F >=		●
			<	32 bits		F <		●
			< =	32 bits		F <=		●
	111/111P	Table Compare		16 bits	BCMP	BCMP	Compares 1-word data against range table.	●
	111L/111LP	Table Compare Long		32 bits	BCMP L	L BCMP	Compares 2-word data against range table.	●
	919 /919P	Table Compare Float		32 bits	FBCP L	F FBCP	Compares floating-point data against range table.	●
	112/112P	Table Search		16 bits	TSRCH	TSRCH	Searches for 1-word data in table.	●
	112L/112LP	Table Search Long		32 bits	TSRCH L	L TSRCH	Searches for 2-word data in table.	●
Arithmetic	20 /20P	Add		16 bits	CAL	= +	Adds 1-word data.	●
		Subtract		16 bits		= −	Subtracts 1-word data.	●
		Multiply		16 bits		= *	Multiplies 1-word data.	●
		Divide		16 bits		= /	Divides 1-word data.	●
	20L /20LP	Add Long		32 bits	CAL L	L = +	Adds 2-word data.	●
		Subtract Long		32 bits		L = −	Subtracts 2-word data.	●
		Multiply Long		32 bits		L = *	Multiplies 2-word data.	●
		Divide Long		32 bits		L = /	Divides 2-word data.	●
	903/903P	Add Float		32 bits	FCAL L	F = +	Adds floating-point data.	●
		Subtract Float		32 bits		F = −	Subtracts floating-point data.	●
		Multiply Float		32 bits		F = *	Multiplies floating-point data.	●
		Divide Float		32 bits		F = /	Divides floating-point data.	●

Note: An instruction indicated with two FUNC Nos. can be either executed one or more times while its input condition is ON or executed only once when its input condition is ON (pulse instruction).

Classi-fication	FUNC No.	Instruction	Processing Unit	Mnemonic	Symbol	Function	Applicable CPU F3SP22-0S F3SP66-4S F3SP67-6S F3SP71-4S F3SP76-7S
Arithmetic (cont.)	120/120P	Increment	16 bits	INC	INC	Adds 1 to 1-word data.	●
	120L/120LP	Increment Long	32 bits	INC L	L INC	Adds 1 to 2-word data.	●
	121/121P	Decrement	16 bits	DEC	DEC	Subtracts 1 from 1-word data.	●
	121L/121LP	Decrement Long	32 bits	DEC L	L DEC	Subtracts 1 from 2-word data.	●
	122/122P	Square Root	16 bits	SQR	SQR	Computes square root of 1-word data.	●
	122L/122LP	Square Root Long	32 bits	SQR L	L SQR	Computes square root of 2-word data.	●
	915/915P	Square Root Float	32 bits	FSQR	F FSQR	Computes square root of floating-point data.	●
	907/907P	SIN	32 bits	FSIN L	F FSIN	Computes the sine of a radian angle as a floating-point (SIN) number.	●
	908/908P	COS	32 bits	FCOS L	F FCOS	Computes the cosine of a radian angle as a floating-point (COS) number.	●
	909/909P	TAN	32 bits	FTAN L	F FTAN	Computes the tangent of a radian angle as a floating-point (TAN) number.	●
	910/910P	SIN $^{-1}$	32 bits	FASIN L	F FASIN	Computes the arc sine of a floating-point number in radians (SIN-1).	●
	911/911P	COS $^{-1}$	32 bits	FACOS L	F FACOS	Computes the arc cosine of a floating-point number in radians (COS-1).	●
	912/912P	TAN $^{-1}$	32 bits	FATAN L	F FATAN	Computes the arc tangent of a floating-point number in radians (TAN-1).	●
	913/908P	LOG	32 bits	FLOG L	F FLOG	Computes the logarithm of floating-point data.	●
	914/914P	EXP	32 bits	FEXP L	F FEXP	Computes the exponential of floating-point data.	●
Logical	20 /20P	Logical AND	16 bits	CAL	= &	Performs AND operation on 1-word data.	●
		Logical OR	16 bits		=	Performs OR operation on 1-word data.	●
		Logical XOR	16 bits		= @	Performs XOR operation on 1-word data.	●
		Logical NXOR	16 bits		= @ !	Performs NXOR operation on 1-word data.	●
	20L /20LP	Logical AND Long	32 bits	CAL L	L = &	Performs AND operation on 2-word data.	●
		Logical OR Long	32 bits		L =	Performs OR operation on 2-word data.	●
		Logical XOR Long	32 bits		L = @	Performs XOR operation on 2-word data.	●
		Logical NXOR Long	32 bits		L = @ !	Performs NXOR operation on 2-word data.	●
	21 /21P	Two's Complement	16 bits	NEG	NEG	Calculate two's complement of 1-word data (inverts sign).	●
	21L /21LP	Two's Complement Long	32 bits	NEG L	L NEG	Calculate two's complement of 2-word data (inverts sign).	●
	22 /22P	NOT	16 bits	NOT	NOT	Inverts all bits of 1-word data.	●
	22L /22LP	NOT Long	32 bits	NOT L	L NOT	Inverts all bits of 2-word data.	●
Rotate	30 /30P	Right Rotate	16 bits	RROT	RROT	Rotates 1 word right by 1 bit.	●
	30L /30LP	Right Rotate Long	32 bits	RROT L	L RROT	Rotates 2 words right by 1 bit	●
	130 /130P	Right Rotate with Carry	16 bits	RROTC	RROTC	Rotates 1 word right by 1 bit (with carry).	●
	130L /130LP	Right Rotate with Carry Long	32 bits	RROTC L	L RROTC	Rotates 2 words right by 1 bit (with carry).	●
	31 /31P	Left Rotate	16 bits	LROT	LROT	Rotates 1 word left by 1 bit.	●
	31L /31LP	Left Rotate Long	32 bits	LROT L	L LROT	Rotates 2 words left by 1 bit.	●
	131/131P	Left Rotate with Carry	16 bits	LROTC	LROTC	Rotates 1 words left by 1 bit (with carry).	●
	131L/131LP	Left Rotate with Carry Long	32 bits	LROTC L	L LROTC	Rotates 2 words left by 1 bit (with carry).	●

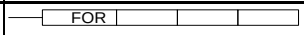
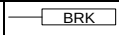
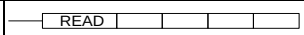
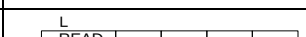
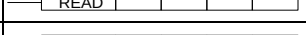
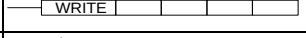
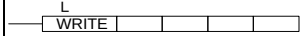
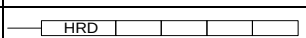
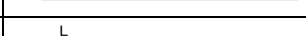
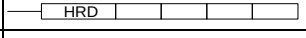
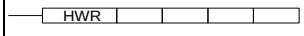
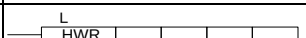
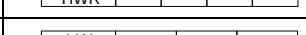
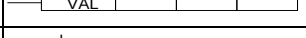
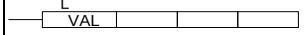
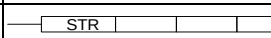
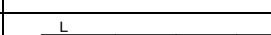
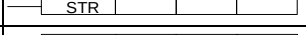
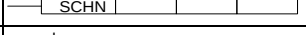
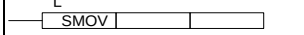
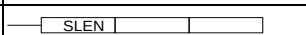
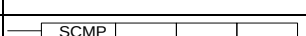
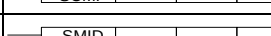
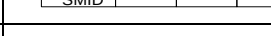
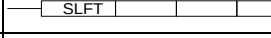
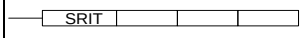
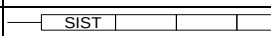
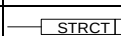
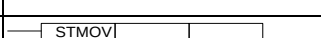
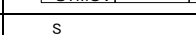
Note: An instruction indicated with two FUNC Nos. can be either executed one or more times while its input condition is ON or executed only once when its input condition is ON (pulse instruction).

Classi-fication	FUNC No.	Instruction	Processing Unit	Mnemonic	Symbol	Function	Applicable CPU F3SP22-0S F3SP66-4S F3SP67-6S F3SP71-4S F3SP76-7S
Shift	32 /32P	Right Shift	16 bits	RSFT		Shifts 1 word right by 1 bit.	●
	32L /32LP	Right Shift Long	32 bits	RSFT L		Shifts 2 words right by 1 bit.	●
	132/132P	Right Shift m-bit Data by n bits	—	RSFTN		Shifts data of specified bit length right by a specified number of bits.	●
	33 /33P	Left Shift	16 bits	LSFT		Shifts 1 word left by 1 bit.	●
	33L /33LP	Left Shift Long	32 bits	LSFT L		Shifts 2 words left by 1 bit.	●
	133/133P	Left Shift m-bit Data by n bits	—	LSFTN		Shifts data of specified bit length left by a specified number of bits.	●
	34	Shift Register	—	SFTR		Shifts data of specified bit length left and right by 1-bit position.	○
Data Transfer	40 /40P	Move	16 bits	MOV		Moves 1-word data.	●
	40L /40LP	Move Long	32 bits	MOV L		Moves 2-word data.	●
	41 /41P	Partial Move	16 bits	PMOV		Moves specified part of 1-word data.	●
	42 /42P	Block Move	16 bits	BMOV		Moves n-word data.	●
	43 /43P	Block Set	16 bits	BSET		Sets data into n words.	●
	44 /44P	Right word Shift	16 bits	RWS		Shifts word right.	●
	45 /45P	Left Word Shift	16 bits	LWS		Shifts word left.	●
	46 /46P	Indexed Move	16 bits	IXMOV		Moves 1-word data with index.	●
	46L /46LP	Indexed Move Long	32 bits	IXMOV L		Moves 2-word data with index.	●
Data Transfer	47 /47P	Exchange	16 bits	XCHG		Exchanges 1-word data.	●
	47L /47LP	Exchange Long	32 bits	XCHG L		Exchanges 2-word data.	●
	140/140P	Negated Move	16 bits	NMOV		Moves 1-word data with inversion.	●
	140L/140LP	Negated Move Long-word	32 bits	NMOV L		Moves 2-word data with inversion.	●
	141/141P	Extended Partial Move	16 bits max.	PMOVX		Moves specified part of 1-word data.	●
	142/142P	Bit Move	16 bits	BITM		Moves 1 bit.	●
	143/143P	Digit Move	16 bits	DGTM		Moves a specified digit of 1-word data.	●
Data Processing	50 /50P	FIFO Read	16 bits	FIFRD		Reads FIFO table.	●
	51 /51P	FIFO Write	16 bits	FIFWR		Writes FIFO table.	●
	52 /52P	Binary Conversion	16 bits	BIN		Converts 1-word data from BCD code to BIN code.	●
	52L /52LP	Binary Conversion Long	32 bits	BIN L		Converts 2-word data from BCD code to BIN code.	●
	53 /53P	BCD Conversion	16 bits	BCD		Converts 1-word data from BIN code to BCD code.	●
	53L /53LP	BCD Conversion Long	32 bits	BCD L		Converts 2-word data from BIN code to BCD code.	●
	916/916P	Float to BCD	32 bits	FBCD L		Converts floating-point data to BCD.	●
	917/917P	BCD to Float	32 bits	BCDF L		Converts BCD to floating-point data.	●
	901/901P	Integer to Float	16 bits	ITOF		Converts 1-word integer to floating-point data.	●
	901L/901LP	Long Integer to Float	32 bits	ITOF L		Converts 2-word integer to floating-point data.	●
	902/902P	Float to Integer	16 bits	FTOI		Converts floating-point data to 1-word integer.	●
	902L/902LP	Float to Long Integer	32 bits	FTOI L		Converts floating-point data to 2-word integer.	●

Note: An instruction indicated with two FUNC Nos. can be either executed one or more times while its input condition is ON or executed only once when its input condition is ON (pulse instruction).
An instruction indicated with "○ " is executed only once when its input condition is ON

Classi-fication	FUNC No.	Instruction	Processing Unit	Mnemonic	Symbol	Function	Applicable CPU F3SP22-0S F3SP66-4S F3SP67-6S F3SP71-4S F3SP76-7S
Data Processing (cont.)	905/905P	Convert Degree to Radian	32 bits	FRAD L	F FRAD	Converts degree (floating-point) data to radian (floating-point) data.	●
	906/906P	Convert Radian to Degree	32 bits	FDEG L	F FDEG	Converts radian (floating-point) data to degree (floating-point) data.	●
	54 /54P	7-Segment Decoder	16 bits	SEG	SEG	Decodes to 7-segment LED data.	●
	55 /55P	Convert ASCII	16 bits	ASC	ASC	Converts to ASCII data.	●
	56 /56P	Bit set	16 bits	BITS	BITS	Sets bit of 1-word data.	●
	56L /56LP	Bit Set Long	32 bits	BITS L	L BITS	Sets bit of 2-word data.	●
	57 /57P	Bit Reset	16 bits	BITR	BITR	Resets bit of 1-word data.	●
	57L /57LP	Bit Reset Long	32 bits	BITR L	L BITR	Resets bit of 2-word data.	●
	151/151P	Carry Set	—	CSET	CSET	Sets carry flag.	●
	152/152P	Carry Reset	—	CRST	CRST	Resets carry flag.	●
	153/153P	Distribute Data	16 bits	DIST	DIST	Distributes 1-word data into 4-bit segments.	●
	153L/153LP	Distribute Data Long	32 bits	DIST L	L DIST	Distributes 2-word data into 4-bit segments.	●
	154/154P	Unit Data	16 bits	UNIT	UNIT	Extracts 4-bit data from 4-word data.	●
	154L/154LP	Unit Data Long	32 bits	UNIT L	L UNIT	Extracts 4-bit data from 8-word data.	●
	155/155P	Decode	16 bits	DECO	DECO	Decodes 8-bit data into 256-bit data.	●
	156/156P	Encode	16 bits	ENCO	ENCO	Decodes 256-bit data into 8-bit data.	●
	157/157P	Bit Counter	16 bits	BCNT	BCNT	1-word bit counter	●
	157L/157LP	Bit Counter Long	32 bits	BCNT L	L BCNT	2-word bit counter	●
	158/158P	Approximate Broken Line	16 bits	APR	APR	Approximates 1-word line segment.	●
	158L/158LP	Approximate Broken Line Long	32 bits	APR L	L APR	Approximates 2-word line segment.	●
	918/918P	Float Approximate Broken Line	32 bits	FAPR L	F FAPR	Approximates floating-point line segment.	●
	951/951P	Extend Sign	32 bits	SIGN L	L SIGN	Provides sign extension.	●
Refresh	60 /60P	Direct Refresh	16 bits	DREF	DREF	Refreshes I/O relay.	●
Program Control	61 /61P	Jump	—	JMP	JMP	Causes a jump to a specified location.	●
	62 /62P	Subroutine Call	—	CALL	CALL	Calls a subroutine.	●
	63	Subroutine Entry	—	SUB	SUB	Begins a subroutine.	●
	64	Subroutine Return	—	RET	RET	Ends a subroutine.	●
	65	Interrupt	—	INTP	INTP	Starts interrupt processing.	●
	66	Interrupt Return	—	IRET	IRET	Returns from interrupt processing.	●
	67	Disable Interrupt	—	DI	DI	Disables interrupts.	●
	68	Enable Interrupt	—	EI	EI	Enables interrupts.	●
	69 /69P	Activate Block	—	ACT	ACT	Activates a block.	●
	70 /70P	Inactivate Block	—	INACT	INACT	Inactivates a block.	●
	71 /71P	Activate Sensor Control Block	—	CBACT	CBACT	Activates a sensor control block.	●
	72 /72P	Inactivate Sensor Control Block	—	CBINA	CBINA	Inactivates a sensor control block.	●
	73	Disable Sensor Control Block	—	CBD	CBD	Disables a sensor control block.	●
	74	Enable Sensor Control Block	—	CBE	CBE	Enables a sensor control block.	●

Note: An instruction indicated with two FUNC Nos. can be either executed one or more times while its input condition is ON or executed only once when its input condition is ON (pulse instruction).

Classi-fication	FUNC No.	Instruction	Processing Unit	Mnemonic	Symbol	Function	Applicable CPU F3SP22-0S F3SP66-4S F3SP67-6S F3SP71-4S F3SP76-7S
Program Control (contt.)	160	For Loop	—	FOR		Begins a loop.	●
	161	Next Loop	—	NEXT		Ends a loop.	●
	162	Break Loop	—	BRK		Breaks a FOR-NEXT loop.	●
	280P	Signal to BASIC	—	SIG		Signals an interrupt to BASIC.	○
Special Module	81 /81P	Read	16 bits	READ		Reads a special module in 1-word units.	●
	81L /81LP	Read Long	32 bits	READ L		Reads a special module in 2-word units.	●
	82 /82P	Write	16 bits	WRITE		Writes a special module in 1-word units.	●
	82L /82LP	Write Long	32 bits	WRITE L		Writes a special module in 2-word units.	●
	83 /83P	High-speed Read	16 bits	HRD		Reads a special module in 1-word units at high speed.	●
	83L /83LP	High-speed Read Long	32 bits	HRD L		Reads a special module in 2-word units at high speed.	●
	84 /84P	High-speed Write	16 bits	HWR		Writes a special module in 1-word units at high speed.	●
	84L /84LP	High-speed Write Long	32 bits	HWR L		Writes a special module in 2-word units at high speed.	●
String Manipu-lation	931/931P	String to Number	16 bits	VAL		Converts character string data into numeric data.	●
	931L/931LP	String to Long Number	32 bits	VAL L		Converts character string data into long-word numeric data.	●
	932/932P	Number to String	16 bits	STR		Converts numeric data into character string data.	●
	932L/932LP	Long Number to String	32 bits	STR L		Converts long-word numeric data into character string data.	●
	933/933P	String Chain	8 bits	SCHN		Concatenates character strings.	●
	934/934P	String Move	8 bits	SMOV L		Moves character strings.	●
	935/935P	String Length Count	8 bits	SLEN		Counts the length of a character string.	●
	936/936P	Compare String	8 bits	SCMP		Compares character strings.	●
	937/937P	String Middle	8 bits	SMID		Extracts a substring from a character string.	●
	938/938P	String Left	8 bits	SLFT		Extracts a substring from the left of a character string.	●
	939/939P	String Right	8 bits	SRIT		Extracts a substring from the right of a character string.	●
	940/940P	String Search	8 bits	SIST		Searches for a character string.	●
Structure and Macro	986	Structure Pointer Declaration	—	STRCT		Declares the type of structures to be passed.	●
	987	Structure Move	—	STMOV		Moves structures.	●
	982/982P	Structure Macro Instruction Call	1/16	SCALL		Executes a registered structure macro instruction.	●
	996/996P	Macro Call	1/16/32	MCALL		Transfers control to a specified macro instruction.	●
	995/995P	Parameter	1/16/32	PARA		Passes parameters to a macro instruction or an input macro.	●
	998	Macro Return	—	MRET		Designates the end of a macro instruction, input macro instruction, or structure macro instruction.	●
	981	Input Macro Instruction Call	1/16/32	NCALL		Executes a registered macro instruction.	●
	309/309P	Output of Input Macro	1/16	NMOUT		Specifies the logical operation result of an input macro instruction.	●

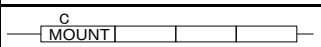
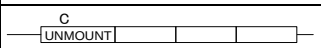
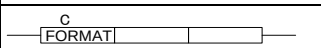
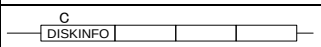
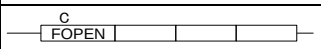
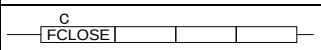
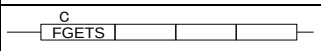
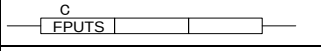
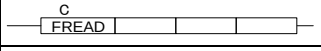
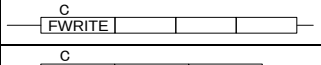
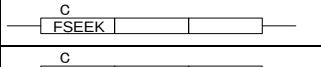
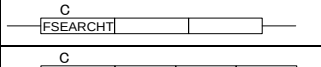
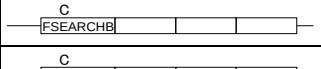
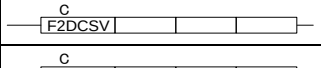
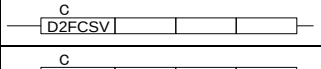
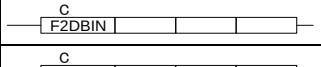
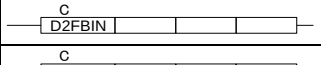
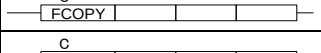
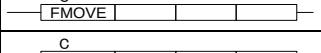
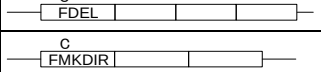
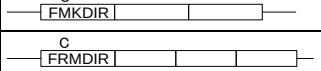
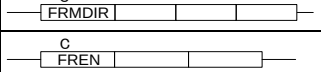
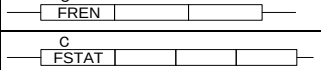
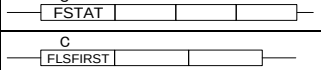
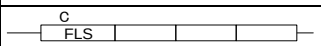
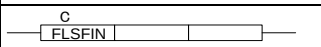
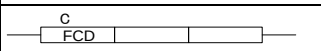
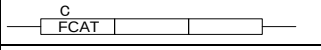
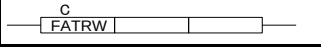
Note: An instruction indicated with two FUNC Nos. can be either executed one or more times while its input condition is ON or executed only once when its input condition is ON (pulse instruction).
An instruction indicated with "O " is executed only once when its input condition is ON

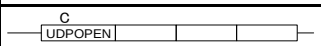
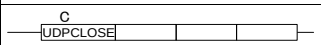
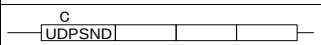
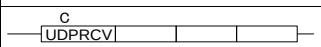
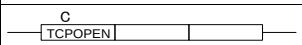
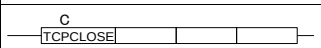
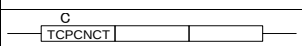
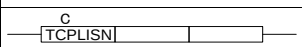
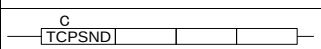
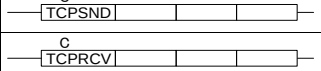
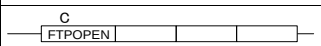
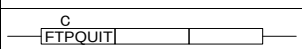
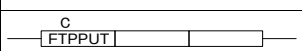
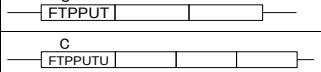
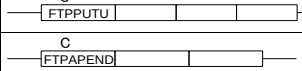
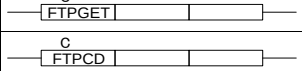
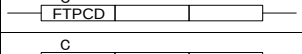
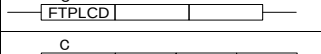
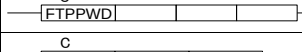
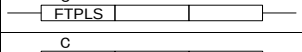
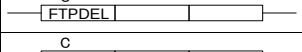
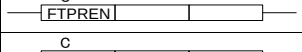
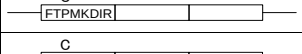
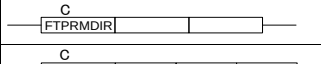
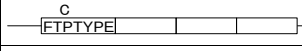
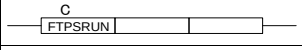
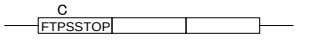
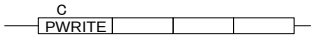
Classi-fication	FUNC No.	Instruction	Processing Unit	Mnemonic	Symbol	Function	Applicable CPU F3SP22-0S F3SP66-4S F3SP67-6S F3SP71-4S F3SP76-7S
Indirect Specifi-cation	510/510P	Indirect Address Set	3 bits	SET@	SET@	Stores the value representing a device address as three-word data.	●
	511/511P	Indirect Address Add	2 bits	ADD@	L ADD@	Adds a long-word value to an address and stores the result as 3-word data.	●
	512/512P	Indirect Address Move	3 bits	MOV@	MOV@	Transfers an indirect address stored as 3-word data.	●
Watchdog	85 /85P	Refresh Watchdog Timer	—	WDT	WDT	Refreshes a watchdog timer.	●
Free Run Timer	186/186P	Read Free Run Timer	16 bits	FTIMR	FTIMR	Reads free-run timer of CPU module	●
Trace	181/181P	Sampling Trace	1 bit 16 bits	TRC	TRC	Acquires sampling trace data and Live Logic Analyzer data.	●*1
User Log	961/961P	Save User Log	8 bits	ULOG	ULOG	Stores user log.	●
	962/962P	Read User Log	8 bits	ULOGR	ULOGR	Reads user log.	●
	963/963P	Clear User Log	8 bits	UCLR	UCLR	Clears user log.	●
Date and Time	520P	Set Date	3 bits	DATE	DATE	Sets the date of the sequence CPU module.	○
	521P	Set Time	3 bits	TIME	TIME	Sets the time of the sequence CPU module.	○
	522P	Set Date String	8 bits	SDATE	SDATE	Sets the date of the sequence CPU module using a specified date string.	○
	523P	Set Time String	8 bits	STIME	STIME	Sets the time of the sequence CPU module using a specified time string.	○

Note: An instruction indicated with two FUNC Nos. can be either executed one or more times while its input condition is ON or executed only once when its input condition is ON (pulse instruction).
An instruction indicated with "○ " is executed only once when its input condition is ON.

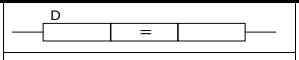
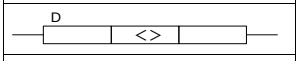
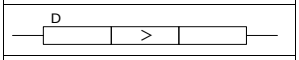
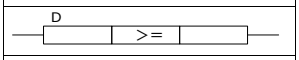
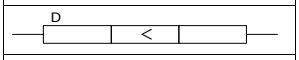
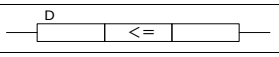
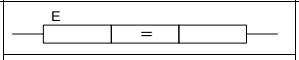
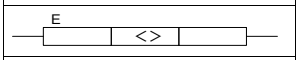
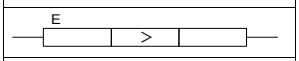
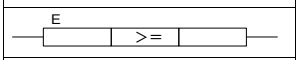
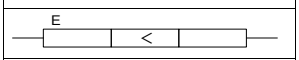
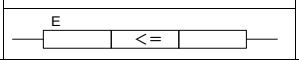
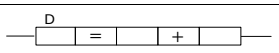
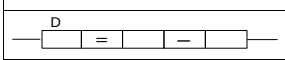
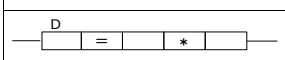
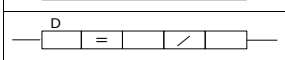
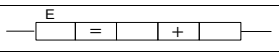
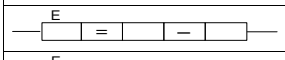
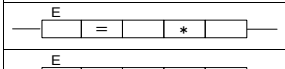
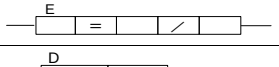
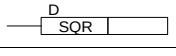
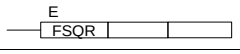
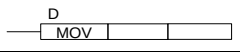
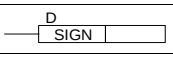
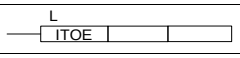
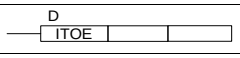
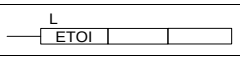
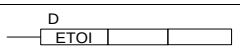
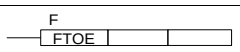
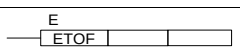
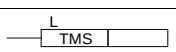
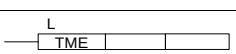
*1: Live Logic Analyzer is compatible with only F3SP71-4S and F3SP76-7S.

■ Ladder Sequence Continuous Type Application Instructions

Classification	FUNC No.	Instruction	Processing Unit	Mnemonic	Symbol	Function	Applicable CPU F3SP66-4S F3SP67-6S F3SP71-4S F3SP76-7S
Disk Operation	—	Mount Memory Card	—	MOUNT		Mounts a memory card.	●
	—	Unmount Memory Card	—	UNMOUNT		Unmounts a memory card.	●
	—	Format Disk	—	FORMAT		Formats a memory card or RAM disk.	●
	—	Disk Info	—	DISKINFO		Gets information about a specified disk.	●
File Access	—	Open File	16 bits	FOPEN		Opens a file.	●
	—	Close File	16 bits	FCLOSE		Closes a file.	●
	—	Read File Line	8 bits	FGETS		Reads one line from a file.	●
	—	Write File Line	8 bits	FPUTS		Writes one line to a file.	●
	—	Read File Block	8 bits	FREAD		Reads data of specified size from a file.	●
	—	Write File Block	8 bits	FWRITE		Writes data of specified size to a file.	●
	—	File Seek	8 bits	FSEEK		Moves the file pointer of a file.	●
	—	File Text Search	8 bits	FSEARCHT		Finds a specified string in a file.	●
	—	File Binary Search	8 bits	FSEARCHB		Finds specified binary data in a file.	●
	—	Convert CSV File to Device	—	F2DCSV		Converts a CSV formatted file into device data.	●
	—	Convert Device to CSV File	—	D2FCSV		Converts device data into a CSV formatted file.	●
	—	Convert Binary File to Device	—	F2DBIN		Converts a binary file into device data.	●
	—	Convert Device to Binary File	—	D2FBIN		Converts device data into a binary file.	●
File Operation	—	Copy File	—	FCOPY		Copies one or more files.	●
	—	Move File	—	FMOVE		Moves one or more files.	●
	—	Delete File	—	FDEL		Deletes one or more files.	●
	—	Make Directory	—	FMKDIR		Creates a directory.	●
	—	Remove Directory	—	FRMDIR		Deletes a directory.	●
	—	Rename File	—	FREN		Renames a file or directory.	●
	—	File Status	—	FSTAT		Gets status information of a file or directory.	●
	—	File List Start	—	FLSFIRST		Declares a file list operation for getting file status information.	●
	—	File List Next	—	FLS		Gets status of the next file in a file list operation.	●
	—	File List End	—	FLSFIN		Declares the end of a file list operation.	●
	—	Change Directory	—	FCD		Changes the current directory.	●
	—	Concatenate File	—	FCAT		Concatenates two files.	●
	—	Change File Attribute	—	FATRW		Changes the attribute of a specified file or directory.	●

Classi-fication	FUNC No.	Instruction	Processing Unit	Mnemonic	Symbol	Function	Applicable CPU F3SP66-4S F3SP67-6S F3SP71-4S F3SP76-7S
UDP/IP Socket Communications	—	UDP/IP Open	—	UDPOPEN		Opens a UDP/IP socket.	●
	—	UDP/IP Close	—	UDPCLOSE		Closes a UDP/IP socket.	●
	—	UDP/IP Send Request	8 bits	UDPSND		Sends data from a using UDP/IP socket.	●
	—	UDP/IP Receive Request	8 bits	UDPRCV		Receives data from a UDP/IP socket to device.	●
TCP/IP Socket Communications	—	TCP/IP Open	—	TCPOPEN		Opens a TCP/IP socket.	●
	—	TCP/IP Close	—	TCPCLOSE		Closes a TCP/IP socket.	●
	—	TCP/IP Connect Request	—	TCPCNCT		Issues a connection request to a TCP/IP server.	●
	—	TCP/IP Listen Request	—	TCPLISN		Waits for a connection request from a TCP/IP client.	●
	—	TCP/IP Send Request	8 bits	TCPSND		Sends data using TCP/IP socket.	●
	—	TCP/IP Receive Request	8 bits	TCPRCV		Receives data from a TCP/IP socket to device.	●
FTP Client	—	FTP Client Open	—	FTPOPEN		Runs FTP client.	●
	—	FTP Client Quit	—	FTPQUIT		Exits from FTP client.	●
	—	FTP Client Put File	—	FTPPUT		Transfers a file to FTP server.	●
	—	FTP Client Put Unique File	—	FTPPUTU		Transfers a file to FTP server to be stored with a unique filename determined automatically by the server.	●
	—	FTP Client Append File	—	FTPAPEND		Transfers a file to FTP server to be appended to a specified file.	●
	—	FTP Client Get File	—	FTPGET		Gets a file from FTP server.	●
	—	FTP Client Change Directory	—	FTPCD		Changes current directory on FTP server.	●
	—	FTP Client Change Local Directory	—	FTPLCD		Changes local current directory on FTP client.	●
	—	FTP Client Current Directory Info	—	FTPPWD		Gets information about current directory of FTP server.	●
	—	FTP Client Get File List	—	FTPLS		Gets directory/file information from FTP server.	●
	—	FTP Client Delete File	—	FTPDEL		Deletes one or more files on FTP server.	●
	—	FTP Client Rename File	—	FTPREN		Renames a file on FTP server.	●
	—	FTP Client Make Directory	—	FTPMKDIR		Creates a directory on FTP server.	●
	—	FTP Client Remove Directory	—	FTPRMDIR		Deletes a directory on FTP server.	●
	—	FTP Client Representation Type	—	FTPTYPE		Selects ASCII or binary for FTP data transfer.	●
FTP Server	—	FTP Server Run Request Service	—	FTPSRUN		Resumes FTP server request service.	●
	—	FTP Server Stop Request Service	—	FTPSSTOP		Stops FTP server request service.	●
Miscella-neous	—	Write CPU Properties	—	PWRITE		Writes CPU property values.	●
	—	Read CPU Properties	—	PREAD		Reads CPU property values.	●

■ 64-bit Arithmetic and Comparison Instructions

Classi-fication	FUNC No.	Instruction		Processing Unit	Mnemonic	Symbol	Function	Applicable CPU F3SP71-4S F3SP76-7S
Comparison	10D	Compare Double	=	64 bits	CMP D		Compares 4-word data.	●
			<>	64 bits				●
			>	64 bits				●
			>=	64 bits				●
			<	64 bits				●
			<=	64 bits				●
	904E	Compare Float Double	=	64 bits	FCMP E		Compares double-precision loating point data.	●
			<>	64 bits				●
			>	64 bits				●
			>=	64 bits				●
			<	64 bits				●
			<=	64 bits				●
Arithmetic	20D	Add Double		64 bits	CAL D		Adds 4-word data.	●
		Subtract Double		64 bits			Subtracts 4-word data.	●
		Multiply Double		64 bits			Multiplies 4-word data.	●
		Divide Double		64 bits			Divides 4-word data.	●
	903E	Add Double Float		64 bits	FCAL E		Adds double-precision floating-point data.	●
		Subtract Double Double		64 bits			Subtracts double-precision floating-point data.	●
		Multiply Double Float		64 bits			Multiplies double-precision floating-point data.	●
		Divide Double Float		64 bits			Divides double-precision floating-point data.	●
	122D	Square Root Double		64 bits	SQR D		Computes square root of 4-word data.	●
	915E	Square Root Double Float		64 bits	FSQR E		Computes square root of double-precision floating-point data.	●
Data Transfer	40D	Move Double		64 bits	MOV D		Moves 4-word data.	●
Data Processing	951D	Extend Sign Double		64 bits	SIGN D		Extends sign of long-word data to double-word data	●
	920L	Long Integer to Double Float		32 bits	ITOE L		Converts 2-word integer to double-precision floating-point data.	●
	921D	Double Long Integer to Double Float		64 bits	ITOE D		Converts 4-word integer to double-precision floating-point data.	●
	922L	Double Float to Long Integer		32 bits	ETOI L		Converts double-precisionfloating-point data to 2-word integer	●
	923D	Double Float to Double Long Integer		64 bits	ETOI D		Converts double-precisionfloating-point data to 4-word integer	●
	925F	Float to Double Float		32 bits	FTOE		Converts floating-point data to double-precision floating-point data.	●
	926E	Double Float to Float		64 bits	ETOF E		Converts double-precision floating-point data to floating-point data.	●
Elapsed Timer	965	Start Elapsed Timer (TMS)		32 bits	TMS L		Start elapsed timer and stores the free-run timer value into a specified device	●
	966	Elapsed Time (TME)		32 bits	TME L		Stores result of elapsed time since timer is started by TMS into a specified device	●

■ Ladder Sequence Application Instructions

Classi-fication	FUNC No.	Instruction	Processing Unit	Mnemonic	Symbol	Function	Applicable CPU F3SP71-4S F3SP76-7S
TCP/IP Socket Communications	–	Socket Option	–	SOCKOPT	C SOCKOPT	Sets socket option	●
Data Processing	58/58P	Binary to Gray	16 bits	BTOG	BTOG	Converts binary code to Gray code	●
	58L/ 58LP	Long Binary to Gray	32 bits	BTOG L	L BTOG	Converts 2-word binary code to 2-word Gray code	●
	59/ 59P	Gary to Binary	16 bits	GTOB	GTOB	Converts Gray code to binary code	●
	59L/ 59LP	Long Gray to Binary	32 bits	GTOB L	L GTOB	Converts 2-word Gray code to 2-word binary code	●
Data Transfer	48/48P	Block Swap and Move	16 bits	BSWAP	BSWAP	Performs 8-bit swap for each word and moves n words	●
	49/49P	Byte Indexed Move	8 bits	BIXMV	BIXMV	Moves n words from byte offset position of source to byte offset position of destination	●

Note: An instruction indicated with two FUNC Nos. can be either executed one or more times while its input condition is ON or executed only once when its input condition is ON (pulse instruction).

REAL-TIME BASIC

■ YM-BASIC/FA Basic Specifications

Type	Interpreter type (with pre-run function)		
Structure Programming	Possible using subprograms (no restriction in number)		
I/O Module Support	Contact inputs, contact outputs, analog inputs, analog outputs, personal-computer link, monitor, serial communication, pulse inputs, positioning, and so on.		
Data Types	Integer	–32,768 to 32,767 (internally 2-byte long)	
	Double-precision integer	–2,147,483,648 to 2,147,483,647 (internally 4 bytes)	
	Single-precision real	Absolute values range from approx. 2.7×10^{-20} to 9.2×10^{18}. The number of significant digits is approx. 7 (internally 4 bytes).	
	Double-precision real	Absolute values range from approx. 2.7×10^{-20} to 9.2×10^{18}. The number of significant digits is approx. 16 (internally 8 bytes).	
	Character string	512 bytes max.	
Array	1- or 2-dimensional arrays are available. The number of elements allowed in an array: 1-dimensional array: 32,767; 2-dimensional array: 32,767 × 32,767		
Operators	(,), ^, +, –, NOT, *, /, =, <, >, >=, <=, <>, AND, OR, EXOR		
Commands	28 (MS-DOS commands: 13)		
Subcommands	10 (used within EDIT)		
Statements	General statements		35
	Subprogram statements		4
	Basic I/O statements		7
	Real-time statements		12
	I/O module support statements		18
	Sequence statements		4
	Exception processing and debugging statements		11
Built-in Functions	Arithmetic built-in functions		13
	Bit manipulation built-in functions		15
	Character string manipulation built-in functions		16
	Other built-in functions		20
Libraries	2		

■ Command List

	Statement	Function
	Commands	
	FREE	Displays the size of the free program area excluding common area (for both FA-M3 and personal computer).
	RENUM	Renumbers lines.
	DEL	Deletes subprograms and high-speed libraries.
	SAVE	Saves into a program file.
	LOAD	Loads a program stored in auxiliary memory into the user area.
	MERGE	Merges a program stored in an auxiliary memory into the program in the user area.
	APPEND (A)	Appends a program stored in auxiliary memory to the current program block in the user area.
	LINKLIB	Loads a high-speed library into a program in the user area.
	LIST (L)	Lists the program in the user area on a specified output device (CRT or printer).
	ERLIST	Lists error lines from program listing (CRT or printer).
	BYE	Exits debugging mode.
△	**CONT**	Resumes the execution of an interrupted program.
△	**RUN**	Executes a program in the user area.
	NEW	Initializes (erases) the program in the user area.
	PROG	Specifies the target program block for command processing.
	AUTO	Causes line numbers to be generated automatically.
	STEP	Single-steps program line.
	EDIT	Starts a line editor.
	LCOPY	Copies lines.
△	**SETMD RUN**	Turns on and off the BYE & RUN mode.
△	**SETMD RES**	Turns on and off program residency.
△	**TRACE**	Disables tracing of the location where a branch occurred.
△	**SCRATCH**	Enables a pause of the program execution.
△	**TRACEP**	Disables a pause of the program execution.
△	**SCRATCHP**	Enables tracing of variables.
△	**TRACEV**	Disables tracing of variables.
△	**SCRATCHV**	Displays the size of the free program area except for common area (for both FA-M3 and personal computer).
	Subcommands (used within EDIT)	
	QUIT(Q)	Quits the editor.
	FIND(F)	Searches for a character string.
	CHG(C)	Substitutes a character string.
	APPEND(A)	Concatenates a specified line.
	DEL	Deletes a specified line.
	RENUM	Renumbers lines.
	LCOPY	Copies lines.
	LIST(L)	Displays program listing.
	EDIT	Displays specified lines.
	ERLIST	Displays error statement and error details.
	MS-DOS Commands	
	!CHDIR	Changes directory and displays the current directory.
	!CLS	Clears the display panel.
	!COPY	Copies specified files.
	!DATE	Sets and displays the date (in the personal computer).
	!DEL	Deletes specified files.
	!DIR	Displays directory information.
	!MKDIR	Creates a directory.
	!PATH	Sets a command search path.
	!REN	Renames a file.
	!RMDIR	Deletes a directory.
	!TIME	Sets and displays the time (clock in the personal computer).
	!TYPE	Displays the contents of a specified file.
	!VOL	Displays a volume label.

△: Cannot be executed if the FA-M3 is not connected to a personal computer.
! : An MS-DOS* command is executed as part of this command.
*: MS-DOS is a registered trademark of Microsoft Corporation.

■ Statement List

	Statement	Function
	Commands	
	REM	Notes on a program.
	DEFINT	Declares an integer type.
	DEFLNG	Declares a long integer.
	DEFSNG	Declares a single-precision real number.
	DEFDBL	Declares a double-precision real number.
	OPTION BASE	Specifies the starting index (lower limit) of an array.
	DIM	Specifies an array.
	ALLOCATE	Specifies an array of variable size.
	DEF FN	Specifies a user function.
	LET	Assigns a number.
	MOVE	Moves an array.
	SWAP	Swaps data.
	READ	Reads data.
	DATA	Defines data.
	RESTORE	Defines a data read pointer.
	GOTO	Causes an unconditional branch.
	GOSUB	Causes a branch to a subroutine.
	RETURN	Returns from a subroutine.
	ON GOTO	Causes a branch according to computation result.
	ON GOSUB	Causes a branch to a subroutine according to computation result.
	IF-THEN-ELSE-ENDIF	Executes statements depending on conditions.
	WHILE-END WHILE	Executes statements while conditions are met.
	FOR-NEXT	Loops through statements.
	STOP	Stops a program.
	PAUSE	Suspends a program temporarily.
	END	Terminates a program.
	RANDOMIZE	Generates random numbers.
□	**NEWL**	Outputs blank lines with program listing.
	CALLLIB	Causes a branch to a library.
	CALL	Causes a branch to a subprogram.
	COM	Declares a common variable.
	SUBCOM	Specifies the beginning of a common area.
	RECOM	Specifies the location of a common variable.
	INIT COM	Initializes a common area.
	Subprogram Statements	
	SUB	Declares the beginning of a subprogram.
	SUBEXIT	Returns from a subprogram.
	SUBEXIT RETRY	Returns from a subprogram and re-execute.
	SUBEND	Declares the end of a subprogram.
	Basic I/O Statements	
□	**PRINT (PR)**	Prints.
□	**PRINT USING (PU)**	Prints with formatting.
	IMAGE	Defines a format.
□	**PRINT NOFORMAT**	Prints without formatting.
□	**DISP (DP)**	Displays on a screen.
□	**DISP USING (DU)**	Displays formatted data on a screen.
	Real-time Statements	
	WAIT	Waiting for program execution.
	ON TIME	Causes a branch at a specified time.
	OFF TIME	Cancels a timed branch.
	ON TIMER	Starts a timer.
	OFF TIMER	Stops a timer.
	DISABLE	Disables interrupts.
	ENABLE	Enables interrupts.

□: Available in debugging mode

■ Statement List

Statement	Function
I/O Module Support Statements	
ASSIGN	Defines I/O module configuration.
ENTER	Inputs from an I/O equipment.
OUTPUT	Outputs to an I/O equipment.
TRANSFER	Starts buffered I/O.
ON EOT	Enables branching at end of transfer.
OFF EOT	Disables branching at end of transfer.
ENABLE INTR	Masks I/O interrupt sources.
ON INT	Enables branching on interrupt.s
OFF INT	Disables branching on interrupts.
SET TIMEOUT	Sets I/O timeout interval.
ON TIMEOUT	Enables branching on I/O timeout.
OFF TIMEOUT	Disables branching on I/O timeout.
RESET	Resets I/O module.
STATUS	Reads status register.
CONTROL	Writes control register.
HALT	Cancels transfer.
SET STATUS	Sets I/O status information variable.
RESET STATUS	Resets I/O status information variable.
Sequence Statements	
COM #S-	Declares a common variable of shared registers.
ON SEQEVT	Declares interrupts from sequences.
OFF SEQEVT	Undeclares interrupts from sequences.
SEQACTV	Starts or stops a sequence program.
Exception Processing and Debugging Statements	
DEFAULT ON	Declares implicit processing to be executed on a computation error.
DEFAULT OFF	Undeclares implicit processing to be executed on a computation error.
ON ERROR	Declares branching on BASIC errors.
OFF ERROR	Undeclares branching on BASIC errors.
RETURN RETRY	Returns from a subroutine and re-executes.
□ TRACE	Enables tracing of the location where a branch occurs.
□ SCRATCH	Disables tracing of the location where a branch occurs.
□ TRACEP	Enables pause processing.
□ SCRATCHP	Disables pause processing.
□ TRACEV	Enables variable tracing.
□ SCRATCHV	Disables variable tracing.

□: Available in debugging mode

■ Built-in Function List

Built-in Function	Function
Arithmetic Functions	
SIN(x)	Gives the sine of x.
COS(x)	Gives the cosine of x.
TAN(x)	Gives the tangent of x.
ATN(x)	Gives the arc tangent of x.
EXP(x)	Gives value of the exponent for the natural number of x.
LOG(x)	Gives the natural logarithm of x.
SQR(x)	Gives the square root of x.
ABS(x)	Gives the absolute value of x.
SGN(x)	Gives the sign of x.
INT(x)	Gives the maximum integer not exceeding x.
RND(x)	Gives a random number in the range 0 < RND (x) < x.
DIV(A, B)	Gives the quotient of A divided by B.
MOD(A, B)	Gives the remainder of A divided by B.
Bit Manipulation Functions	
BINAND(m, n)	Gives bit-by-bit AND of m and n.
LBINAND(m, n)	Gives bit-by-bit AND of long integers m and n.
BINOR(m, n)	Gives bit-by-bit OR of m and n.
LBINOR(m, n)	Gives bit-by-bit OR of long integers m and n.
BINXOR(m, n)	Gives bit-by-bit XOR of m and n.
LBINXOR(m, n)	Gives bit-by-bit XOR of long integers m and n.
BINNOT(m)	Gives one's complement of n.
LBINNOT(m)	Gives one's complement of long integer n.
SHIFT(m, n)	Shifts m by n bits.
LSHIFT(m, n)	Shifts long integer m by n bits.
ROTATE(m, n)	Rotates (shifts) m by n bits.
LROTATE(m, n)	Rotates (shifts) long integer m by n bits.
LASTBIT	Gives the value of LASTBIT.
BIT(m, n)	Gives the value of the nth bit of m.
LBIT(m, n)	Gives the value of the nth bit value of long integer m.

Built-in Function	Function
Character String Manipulation Functions	
MID $ (c, m)	Gives a substring of string c, starting from the m-th to the last character, counted from left to right.
MID $ (c, m, n)	Gives n characters from string c starting at the m-th character, counted from left to right.
LEFT $ (c, m)	Gives m characters from string c starting from its left end.
RIGHT $ (c, m)	Gives m characters from string c starting from its right end.
CHR $ (n)	Generates a character equivalent to code value n.
STR $ (x)	Converts numeric value x to a character string.
VAL (c)	Converts a character string c to a numeric value.
ASC (c)	Gives the code of the first character in a character string c.
LEN (c)	Gives the number of characters in a character string c.
HLEN (c)	Gives the number of characters in a character string c in half size characters.
BLEN (c)	Gives the number of bytes in a character string c.
INSTR (c, m)	Searches a characters string c for substring m and gives the position of the first occurrence of m.
HMID $ (c, m, n)	Gives half-size MID$.
HLEFT $ (c, n)	Gives half-size LEFT$
HRIGHT $ (c, m)	Gives half-size RIGHT$.
HINSTR (c, m)	Gives half-size INSTR.
Other Functions	
PI	Gives the value of pi.
ERRL	Gives the line number of the last error.
ERRC	Gives the error code of the last error.
ERRCE	Gives the detailed error code of an I/O access error.
TIMEMS	Gives the time in milliseconds elapsed since 0:00.
RNPAR	Gives the parameters specified when the program is executed.
SPC (x)	Gives x spaces.
IOSIZE	Gives the number of bytes transferred during the last I/O operation.
HEX $ (x)	Gives the hexadecimal representation of x.
LHEX $ (x)	Gives the hexadecimal representation of x within long integer value range.
BCD (x)	Gives the BCD representation of x.
LBCD (x)	Gives the BCD representation of x within the long integer value range.
TIME $	Gets the time.
DATE $	Gets the date.
NAM (c)	Gets the value of simple variable expressed as c.
ARNAM (c, m)	Gets the value of element m of array c.
FREE	Gives the size of the unused program area

■ Library List

Library	Function
INICOMM3	Initializes (clears) the shared register area of local CPU.
IFPCNV	Converts between the IEEE floating-point representation and YM-BASIC/FA internal representation.

Module Specifications

■ I/O Modules

● Input Modules

Model	Input Type	Number of Points	Isolation Method	Rated Input Voltage	Rated Input Current	Operating Voltage/Current ON	Operating Voltage/Current OFF	Input Response Time OFF→ON	Input Response Time ON→OFF	External Connection	Number of Points/Common
F3XH04-3N	DC voltage	4	Photocoupler isolation	24V DC	11.2 mA/point	16.0 V DC min. 7.2 mA min.	6.0 V DC max. 2.5 mA max	50 μs max.	50 μs max.	10-point terminal block M3.5 screw	All points independent
F3XA08-1N	AC voltage	8		100-120V AC 50/60Hz	5.4-6.5 mA/point 100-120 V AC, 60 Hz	80 V AC min. 5 mA min.	40 V AC max. 1 mA max.	15 ms max or 30 ms,. selectable	25 ms max. or 40 ms, selectable		8 points/common
F3XA08-2N				200-240V AC 50/60Hz	5.1-6.1 mA/point 200-240 V AC, 60 Hz	160 V AC min. 4 mA min.	70 V AC max. 1 mA max.				
F3XA16-1N		16		100-120V AC 50/60Hz	5.4-6.5 mA/point 100-120 V AC, 60 Hz	80 V AC min. 5 mA min.	40 V AC max. 1 mA max.			18-point terminal block M3.5 screw	
F3XD08-6F	DC voltage (sink/ source)	8		12-24V DC	4.1 mA/point (12 V DC) 8.5 mA/point (24 V DC)	8.0 V DC min. 2.6 mA min.	3.4 V DC max. 1.0 mA max.	Input sampling time can be specified for 5steps: Always (0μs), 62.5μs, 250μs, 1ms, and 16ms*1*2	Input sampling time can be specified for 5steps: Always (0μs), 62.5μs, 250μs, 1ms, and 16ms*1*2	10-point terminal block M3.5 screw	
F3XD16-3F		16		24V DC	4.1 mA/point 24 V DC	16.0 V DC min. 3.2 mA min.	5.8 V DC max. 0.9 mA max.			18-point terminal block M3.5 screw	
F3XD16-4F				12V DC	4.1 mA/point 12 V DC	8.0 V DC min. 2.6 mA min.	3.4 V DC max. 1.0 mA max.				
F3XD32-3F		32		24V DC	4.1 mA/point 24 V DC	16.0 V DC min. 3.2 mA min.	5.8 V DC max. 0.9 mA max.			One 40-pin connector	
F3XD32-4F				12V DC	4.1 mA/point 12 V DC	8.0 V DC min. 2.6 mA min.	3.4 V DC max. 1.0 mA max.				
F3XD32-5F				5V DC	4.0 mA/point 5 V DC	3.5 V DC min. 2.0 mA min.	1.0 V DC max. 0.2 mA max.				
F3XD64-3F		64		24V DC	4.1 mA/point 24 V DC	16.0 V DC min. 3.2 mA min.	5.8 V DC max. 0.9 mA max.	Input sampling time can be specified for 4 steps : Always (0μs), 62.5μs, 250μs and 1ms *1*2.	Input sampling time can be specified for 4 steps : Always (0μs), 62.5μs, 250μs and 1ms *1*2.	Two 40-pin connectors	
F3XD64-4F				12V DC	4.1 mA/point 12 V DC	8.0 V DC min. 2.6 mA min.	3.4 V DC max. 1.0 mA max.				
F3XD64-6M	DC voltage (matrix scan)	64		12-24V DC	3.9 mA/point (12 V DC) 8.2 mA/point (28 V DC)	8.0 V DC min. 2.6 mA min.	3.4 V DC max. 1.0 mA max.	16 ms max	16 ms max.	One 40-pin connector	8 × 8 matrix
F3XD16-3H	DC voltage (plus common)	16		24V DC	4.7 mA/point 24 V DC	16.0 V DC min. 3.2 mA min.	5.8 V DC max. 0.9 mA max.	Input sampling time can be specified for 5steps: Always (0μs), 62.5μs, 250μs, 1ms, and 16ms*1*2	Input sampling time can be specified for 5steps: Always (0μs), 62.5μs, 250μs, 1ms, and 16ms*1*2	18-point terminal block M3.5 screw	8 points/common

*1: Indicated values apply to F3SP22, F3SP28, F3SP38, F3SP53, F3SP58, F3SP59, F3SP66, F3SP67, F3SP71 and F3SP76. When other CPU modules are used, the specifications are the same as F3XD□□-□N.
The actual response time can be obtained by adding the following values:
For F3XD□□-□F: 100 μs (OFF → ON)
300 μs (ON → OFF)
For F3XD16-3H: 10 μs

*2: If the input interrupt is to be used with the F3XD□□- □F, set the input sampling period to at least 62.5 μs.

Model	Input Type	Number of Points	Isolation Method	Contact Rating	ON Resistance	OFF Resistance	Input Response Time OFF→ON	Input Response Time ON→OFF	External Connection	Number of Points/Common
F3XC08-0N	No-voltage contact	8	Transformer isolation	5 V DC min. 20 mA min.	200 Ωmax.	100 K Ωmin.	2.0 ms max. or 17 ms, selectable	2.0 ms max. or 17 ms, selectable	10-point terminal block M3.5 screw	18 points/ common
F3XC08-0C							Input sampling time can be specified for 5steps: Always (0μs), 62.5μs, 250μs,1ms, and 16ms *3*4.	Input sampling time can be specified for 5steps: Always (0μs), 62.5μs, 250μs,1ms, and 16ms *3*4.	18-point terminal block M3.5 screw	8 points/ independent common

*3: The actual response time is obtained by adding 1 ms max. to the specified value.

*4: If input interrupt is to be used, set the input sampling time to 62.5 μs or more.

● Output Modules

Model	Output Type	Number of Points	Isolation Method	Rated Load Voltage	Maximum Load Current	Output Response Time		Surge Protector	External Connection	External Power Supply	Number of Points/ Common	HOLD/RESET Output When Program Stops*3
						OFF→ ON	ON→ OFF					
F3YD04-7N	Transistor contact	4	Photocoupler isolation	24V DC	2 A/point	5 ms max.	3 ms max.	Zener diode	10-point terminal blockM3.5 screw	None	All points independent	When a sequence CPU is used: Initial value: RESET Configurable on module basis*2. When a BASIC CPU is used: No setup function is enabled; always HOLD.
F3YA08-2N	TRIAC contact	8		100–240V AC	1 A/point (0-40°C) 0.7 A/point (40-55°C) 3 A/common	1 ms max.	1/2 cycle +1 ms max.	CR absorber varistor			8 points/ common	
F3YC08-0C	Relay contact		Mechanical isolation	24V DC 100-240V AC	2 A/point	10 ms max.	10 ms max.	None	18-point terminal block M3.5 screw		All points Independent	
F3YC08-0N	Relay contact				2 A/point 8 A/common						8 points/ common	
F3YC16-0N	Relay contact	16										
F3YD08-6A	Transistor contact (sink type)	8	Photocoupler isolation	12-24V DC	1 A/point 4 A/common	1 ms max.	1 ms max.	Active clamp	10-point terminal block M3.5 screw	12–24 V DC 10 mA		
F3YD08-6B	Transistor contact (source type)											
F3YD08-7A	Transistor contact (sink type)				2 A/point 8 A/common							
F3YD14-5A	Transistor contact (sink type)	14			0.5 A/point 2 A/common				18-point terminal block M3.5 screw	12–24V DC 20mA	8 points/ common	
F3YD14-5B	Transistor contact (source type)										6 points/ common	
F3YD32-1H*4	Transistor contact (sink type)	32			0.1 A/point 0.5 A/common	0.1 ms max.	0.1 ms max.	Active clamp	One 40-pin connector	12–24 V DC 30 mA	8 points/ common	
F3YD32-1P*4	Transistor contact (sink type)					1 ms max.	1 ms max.			12–24 V DC 55 mA		
F3YD32-1R*4	Transistor contact (source type)							None		12–24 V DC 60 mA		
F3YD32-1T	Transistor contact (TTL output)			5V DC	16 mA/point 128 mA/common			Zener diode		5 V DC 60 mA		
F3YD64-1M	Transistor contact (matrix scan)	64		12–24V DC	0.1 A	16 ms max.	16 ms max.		One 40-pin connector	12–24 V DC 40 mA		
F3YD64-1P*4	Transistor contact (sink type)				0.1 A/point 0.4 A/common	1 ms max.	1 ms max.	Active clamp	Two 40-pin connectors	12–24 V DC 95 mA		
F3YD64-1R*4	Transistor contact (source type)							None		12–24 V DC 110 mA		

*1: Can be configured to HOLD or RESET output in the event of a fatal failure when F3SP22, F3SP28, F3SP38, F3SP53, F3SP58, F3SP59, F3SP66, F3SP67, F3SP71 or F3SP76 is used.
*2: Configurable on 16-terminal basis when F3SP22, F3SP28, F3SP38, F3SP53, F3SP58, F3SP59, F3SP66 , F3SP67, F3SP71 or F3SP76 is used.
*3: For details on the operation in the event of a CPU error, see "Severity of Failures and LED Display."
*4: Provided wtth output short-circuit protector.

● I/O Modules

Model	Input Type	Number of Points	isolation Method	Rated Input Voltage	Rated Input Current	Operating Voltage/Current		Input Response Time		External Connection	Number of Points / Common	HOLD/RESET Output When Program Stops[*4]
						ON	OFF	OFF → ON	OFF → ON			
F3WD64-3P[*5]	DC voltage	32	Photo-Coupler isolation	24 V DC	4.1 mA/point	16 V DC min 3.2 mA min.	5.8 V DC max. 0.9 mA max.	Input sampling time can be specified for 4steps : Always (0µs), 62.5µs, 250µs and 1ms. [*1*2]	Input sampling time can be specified for 4steps : Always (0µs), 62.5µs, 250µs and 1ms. [*1*2]	One 40-pin connector	8 points/ common	—
	Output Type	Number of Points		Rated Load Voltage	Maximum Load Current	Output Response Time		Surge Protector	External Power Supply	External Connection	Number of Points Common	When a sequence CPU is used: Initial value: RESET Configurable on module basis[*3]. When a BASIC CPU is used: No setup function is enabled; always HOLD
						OFF → ON	ON → OFF					
	Transistor contact (sink type)	32		24 V DC	0.1 A/point 0.4 A/common	1 ms max.	1 ms max.	Zener diode	24 V DC 55 mA	One 40-pin connector	8 points/ common	

Model	Input Type	Number of Points	Isolation Method	Rated Input Voltage	Rated Input Current	Operating Voltage/Current		Input Response Time		External Connection	Number of Points / Common	HOLD/RESET Output When Program Stops[*4]
						ON	OFF	OFF → ON	OFF → ON			
F3WD64-4P[*5]	DC voltage	32	Photo-coupler isolation	12 V DC	4.1 mA/point	8 V DCmin. 2.6 mA min.	3.4 V DC max. 1 mA max.	Input sampling time can be specified for 4steps : Always (0µs), 62.5µs, 250µs and 1ms. [*1*2]	Input sampling time can be specified for 4steps : Always (0µs), 62.5µs, 250µs and 1ms. [*1*2]	One 40-pin connector	8 points/ common	—
	Output Type	Number of Points		Rated Load Voltage	Maximum Load Current	Output Response Time		Surge Protector	External Power Supply	External Connection	Number of Points / Common	When a sequence CPU is used: Initial value: RESET Configurable on module basis[*3]. When a BASIC CPU is used: No setup function is enabled; always HOLD
						OFF → ON	ON → OFF					
	Transistor contact (sink type)	32		12 V DC	0.1 A/point 0.4 A/common	1 ms max.	1 ms max.	Zener diode	12 V DC 55 mA	One 40-pin connector	8 points/ common	

*1: Can be configured to HOLD or RESET output in the event of a fatal failure when F3SP22, F3SP28, F3SP38, F3SP53, F3SP58, F3SP59, F3SP66, F3SP67, F3SP71 or F3SP76 is used.
Indicated values apply to F3SP22, F3SP28, F3SP38, F3SP53, F3SP58, F3SP59, F3SP66 F3SP67, F3SP71 and F3SP76. When other CPU modules are used, the specifications are the same as F3XD□□-□N.
The actual response time can be obtained by adding the following values:
100 µs (OFF → ON)
300 µs (ON → OFF)
*2: If the input interrupt is to be used, set the input sampling period to at least 62.5 µs.
*3: Configurable on 16-terminal basis when F3SP28, F3SP38, F3SP53, F3SP58, F3SP59, F3SP66, F3SP67, F3SP71 or F3SP76 is used.
*4: For details on the operation in the event of a CPU error, see "Severity of Failures and LED Display."
*5: Provided with short-circuit protector.

■ Special Modules

● Analog Input Modules

Model	I/O Type	Number of Points	Isolation Method	Input	Output	Resolution	Total Accuracy	Conversion Speed	External Connection	External Power Supply
F3AD04-5V	Analog Input	4	Photocoupler isolation	0 to 5 V DC 1 to 5 V DC -10 to 10 V DC 0 to 10 VDC	-30,000 to 30,000	0 to 5V DC/1 to 5V DC/ 0 to 10V DC : 1.4mV -10 to 10V DC :5 .7mV (12bit A/D)	23±2°C:±0.2% (full scale) 0 to 55°C:±0.5% (full scale)	1 ms × (number of inputs)	18-point terminal block M3.5 screw	—
F3AD08-5V		8		0 to 5 V DC 1 to 5 V DC -10 to 10 V DC 0 to 10 VDC		0 to 5 V DC/1 to 5 V DC/ 0 to 10 V DC : 1.4mV -10 to 10 V DC :5.7mV (12bit A/D)				
F3AD08-4W		8		0 to 20mA DC 4 to 20mA DC		0 to 20 mA DC/4 to 20 mA DC : 5.6µA (12bit A/D)				
F3AD04-5R	Analog Input Module (High resolution type)	4	Photocoupler isolation	0 to 5 V DC 1 to 5 V DC -10 to 10 V DC 0 to 10 VDC	-30,000 to 30,000	0 to 5 V DC/1 to 5 V DC/ 0 to 10 V DC/-10 to 10 V DC : 0.4mV (16bit A/D)	23±2°C:±0.1% (full scale) 0 to 55°C:±0.2% (full scale)	50µs/100µs/250µs/500µs/ 1ms/16.6ms/20ms/100ms × (number of inputs); selectable on module basis	18-point terminal block M3.5 screw	—
F3AD08-6R		8		0 to 5 V DC 1 to 5 V DC -10 to 10 V DC 0 to 10 V DC 0 to 20mA DC 4 to 20mA DC		0 to 5 V DC/1 to 5 V DC/ -10 to 10 V DC/0 to 10VDC : 0.4mV 0 to 20mA DC/4 to 20mA DC : 1.6µA (16bit A/D)				
F3AD08-5R		8		0 to 5 V DC 1 to 5 V DC -10 to 10 V DC 0 to 10 V DC						
F3AD08-4R		8		0 to 20mA DC 4 to 20mA DC						

● Analog output Modules

Model	I/O Type	Number of Points	Isolation Method	Input	Output	Resolution	Total Accuracy	Conversion Speed	External Connection	External Power Supply
F3DA04-6R	Analog output (High resolution type)	4	Digital isolator	-30,000 to 30,000	-10 to 10 V 0 to 10 V 0 to 5 V 1 to 5 V 4 to 20 mA 0 to 20 mA -20 to 20 mA	Voltage output: ≈0.5 mV (for -10 to 10 V or 0 to 10 V range); ≈0.2 mV (for 0 to 5 V or 1 to 5 V range). Current output: ≈0.5 µA (for 4 to 20 mA range); ≈1 µA (for 0 to 20 mA or -20 to 20 mA range). (16-bit A/D)	Voltage output: ± 0.1% of FS (23±2°C with 10 MΩ load); ± 0.3% of FS (0 to 55°C with 10 MΩ load) Current output: ± 0.2% of FS (23±2°C with 100 Ω load); ± 0.3% of FS (0 to 55°C with 100 Ω load)	2µs + 2µs x (number of inputs)	18-point terminal block M3.5 screws	Rated voltage: 24 V DC Allowable range: 19.2 to 30 V DC Currentconsumption: 200 mA (inrush current: 1A)
F3DA08-5R		8	Digital isolator	-30,000 to 30,000	-10 V to 10 V 0 V to 10 V 0 V to 5 V 1 V to 5 V	Voltage output: 0.5 mV (for -10 to 10 V or 0 to 10 V range); 0.2 mV (for 0 to 5 V or 1 to 5 V range). (16-bit A/D)	Voltage output: ± 0.1% of FS (23±2°C with 10 MΩ load); ± 0.3% of FS (0 to 55°C with 10 MΩ load)	2µs + 2µs x (number of inputs)		Rated voltage: 24 V DC Allowable range: 19.2 to 30 V DC Currentconsumption: 200 mA (inrush current: 1A)

● High-speed Data Acquisition Module (Analog input)

Model	I/O Type	Number of Points	Isolation Method	Input	Output	Resolution	Total Accuracy	Input Buffer	Data Acquisition Interval	External Connection
F3HA08-0N	Analog input	8	Photocoupler isolation	0 to 5V DC -10 to 10V DC	-20,000 to 20,000	0 to 5V DC: 1.4mV -10 to 10V DC: 5.7mV (12-bit A/D)	23±2°C: ±0.2% (full scale) 0 to 55°C: ±0.5% (full scale)	24,576 words	50 to 30,000 µs	18-point terminal block M3.5 screw

Model	I/O Type	Number of Points	Isolation Method	Input	Resolution	Total Accuracy	Input Buffer	Data Acquisition Interval	External Connection
F3HA06-1R	High-speed Data Acquisition	6	Capacitive/ inductive coupling	-10 to 10V DC 0 to 10V DC 1 to 5V DC -5 to 5V DC -2.5 to 2.5V DC	-10 to 10 V: Approximately 1/58,000, approximately 0.35 mV 0 to 10 V: Approximately 1/29,000, approximately 0.35 mV 1 to 5 V: Approximately 1/23,000, approximately 0.18 mV -5 to 5 V: Approximately 1/58,000, approximately 0.18 mV -2.5 to 2.5 V: Approximately 1/29,000, approximately 0.18 mV (16-bit A/D)	±0.1%of FS (23±2°C), ±0.01%of FS /°C ±0.3%of FS (0 to 55°C)	Maximum: 2M words	Sampling cycle × n, where n is a natural number from 1 to 4,000.	32-pin spring terminal block
F3HA12-1R		12							

● High-speed Counter Modules

Model	Input Type	Number of Points	Isolation Method	Input Signal				Input Frequency	Count-up Output	Output Condition	Output Contact Rating	External Connection
				Signal	Rated Input Voltage	Operating Voltage/Current ON	Operating Voltage/Current OFF					
F3XP01-0H	DC voltage	1	Photocoupler isolation	A,B, PST	5V DC	3.5 V min. 10 mA min	1.5 V max 2 mA max.	0 to 100 kpps	2 points for each input point	Counter value = Set value	Transistor output: 5 to 24 V DC	One 40-pin connector
					12V DC	8 V min. 10 mA min	2.4 V max 2 mA max					
					24V DC	16 V min 10 mA min	4.8 V max 2 mA max					
				EN	5V DC	3.5 V min 3.2 mA min	1.5 V max 0.9 mA max.					
					12V DC	8 V min. 3.2 mA min.	2.4 V max. 0.9 mA max.					
					24V DC	16 V min 3.2 mA min	4.8 V max. 0.9 mA max					
F3XP02-0H	DC voltage	2	Photocoupler isolation	A,B, PST	5V DC	3.5 V min. 10 mA min	1.5 V max. 2 mA max.	0 to 100 kpps	2 points for each input point	Counter value = Set value	Transistor output: 5 to 24 V DC	Two 40-pin connectors
					12V DC	8 V min. 10 mA min.	2.4 V max. 2 mA max.					
					24V DC	16 V min. 10 mA min	4.8 V max. 2 mA max.					
				EN	5V DC	3.5 V min. 3.2 mA min	1.5 V max. 0.9 mA max					
					12V DC	8 V min. 3.2 mA min	2.4 V max 0.9 mA max					
					24V DC	16 V min. 3.2 mA min	4.8 V max. 0.9 mA max.					

● Pulse Input Modules

Model	Input Type	Number of Points	Isolation Method	Rated Input Voltage	Operating Voltage/Current ON	Operating Voltage/Current OFF	Input Frequency	Count-up Output	Output Condition	Output Contact Rating	External Connection
F3XS04-3N	DC voltage	4	Photocoupler isolation	24 V DC	16 V DC min. 7.2 mA min.	6 V DC max. 2.5 mA min.	0 to 20 kHz	4 independent points	Count value= Set value 1 Count value≥ Set value 1 Count value= Set value 2 Count value≥ Set value 2 Count value= $0 return	Open collector output: 12 to 24 V DC	18-point terminal block M3.5 screw
F3XS04-4N				12 V DC	8.0 V DC min. 6.3 mA min.	3.5 V DC max. 2.4 mA min.					

● Positioning Modules

Model	Type	Number Of Axes	Control Mode	Positioning Command Range	Speed Command Range	Acceleration/ Deceleration	Interpolation Function	Data Backup	External Connection	External Power Supply
F3NC32-0N	With pulse output	2	Position control, speed control	-2,147,483,648 to 2,147,483,648	0.1 to 5Mpps (by servo otor) 0.1 to 1 Mpps (by pulse otor)	Automatic trapezoidal ACC/DEC (starting speed programmable) Automatic S-shaped ACC/DEC (starting speed fixed))	1-axis movement, 2-axis linear Interpolation, 2-axis arc Interpolation	Carried out by flash memory or CPU module	One 48-pin connector	24V DC 80mA
F3NC34-0N		4					1-axis movement, 2/3/4-axis linear Interpolation, 2-axis arc Interpolation, 3/4-axis helical interpolation		Two 48-pin connectors	24V DC 120mA
F3NC51-0N	With analog voltage output (absolute encoder compatible)	1	Position control, speed control	–134,217,728 to 134,217,727	0.1 to 2 Mpps	Automatic tapezoidal ACC/DEC, 2-segment, S-shaped (3-segment)	Multiaxial linear interpolation, 2-axis arc interpolation as specified by CPU instructions	Carried out by CPU module	One 40-pin connector	24 V DC 10 mA
F3NC52-0N		2							Two 40-pin connectors	
F3NC96-0N	With MECHATROLINK-II interface	15	Position control, speed control, torque control	-2,147,483,648 to 2,147,483,647*1	1 to 2,147,483,647*1	Automatic trapezoidal ACC/DEC *1	Linear interpolation as specified by CPU instructions, axis movement as specified by MECHATROLINK-II commands	Carried out by CPU module	One MECHATROLINK-II communication port	—
F3NC97-0N	With MECHATROLINK-III interface	15	Position control, speed control, torque control	-2,147,483,648 to 2,147,483,647*1	1 to 2,147,483,647*1	Automatic trapezoidal ACC/DEC *1	Linear interpolation as specified by CPU instructions, axis movement as specified by MECHATROLINK-III commands	Carried out by CPU module	Two MECHATROLINK-III communication ports	—
F3YP22-0P	With multi-channel pulse output	2	Position control, speed control	–2,147,483,648 to 2,147,483,647	1 to 7,996,000 pps (by servo otor) 1 to 1999,000 pps (by pulse otor)	Automatic trapezoidal ACC/DEC (starting speed programmable) Automatic S-shape ACC/DEC (starting speed fixed)	—	Carried out by flash memory or CPU module	One 48-pin Connector One 14-pin connector	24 V DC 70mA
F3YP24-0P		4					—		One 48-pin Connector One 14-pin connector	24 V DC 110mA
F3YP28-0P		8					—		Two 48-pin Connector One 14-pin connector	24 V DC 200mA

*1: Depends on the connected external instruments and the supported MECHATROLINK commands.

● Communication Modules

Model	Type	Transmission Specification					Protocol	External Power Supply
		Access Control Mode	Transmission Speed	Transmission System	Maximum Segment Length	Maximum Number of Nodes		
F3LE01-0T	Ethernet	CSMA/CD system	10 Mbps	Baseband	100 m	—	TCP/IP UDP/IP ICMP ARP	—
F3LE11-0T	Ethernet	CSMA/CD system	10 Mbps /100 Mbps	Baseband	100 m	—	TCP/IP UDP/IP ICMP ARP	—
F3LE12-0T	Ethernet	CSMA/CD System	10Mbps /100 Mbps	Baseband	100m	—	TCP/IP UDP/IP ICMP ARP	—
F3LX02-1N	FL-net (OPCN-2) Ver2.00	CSMA/CD system	10Mbps	Baseband	10BASE5: 500 m (2.5 km max. with a repeater) 10BASE-T: 100 m	254 nodes	UDP/IP ICMP ARP	12V DC 500mA (when 10BASE5 is used)
F3NX01-1N	Ethernet (Autonomous Distribution)	CSMA/CD system	10 Mbps /100 Mbps	Baseband	100 m	—	UDP/IP ICMP ARP	—

Model	Type	Number of Ports	Insulation	Communication Mode	Transmission Speed	Synchronization	Maximum Transmission Distance	External Connection
F3LC11-1F	Personal computer link (RS-232-C)	1	No	Half-duplex	115K bps max.	Start-stop synchronization	15 m	Dsub 9-pin connector
F3LC12-1F	Personal computer link (RS-232-C)	2	No					
F3LC11-2F	Personal computer link (RS-422-A/RS-485)	1	Yes		115K bps max.		1200 m	6-point terminal block M3.5 screw
F3LC21-1N	Multi link (RS-232-C)	1	No		38400 bps max.		15 m	Dsub 9-pin connector
F3LC51-2N	UT link (RS-422-A/RS-485)	1	Yes		38400 bps max.		1200 m	6-point terminal block M3.5 screw
F3LH01-1N	YHLS	1	Yes	Full-duplex, Half-duplex	12M bps max.	Bit synchronization	300 m	European-type terminal block
F3LH02-1N	YHLS	2	Yes					European-type terminal block
F3LH02-0N	YHLS	2	Yes					8-pin modular plug (RJ-45)
F3LP02-0N	FA link H	1	Yes	Cyclic broadcasting	12M bps max.	Frame synchronization	1 km	4-point terminal block M3.5 screw
F3LP12-0N	Fiber-optic FA link H	1	Yes		1.25M bps		10 km	Optical connector
F3LR01-0N	Fiber-optic FA-bus	1	Yes	Both half-duplex bit serial transmission and cyclic scan are used.	10M bps	Bit synchronization	200 m	Optical connector
F3LR02-0N	Fiber-optic FA-bus type 2	2	Yes				1.4 km	Optical connector
F3LR02-1W	FA-bus type 2	2	Yes				80 m	European-type terminal block
F3RS22-0N	RS-232-C*1	2	No	Full-duplex, Half-duplex	19200 bps max.	Start-stop synchronization	15 m	Two Dsub 9-pin connectors
F3RS41-0N	RS-422-A/RS-485*1	1	Yes				1200 m	6-point terminal block M3.5 screw
F3RZ81-0F	Ladder communication*2 (RS-232-C)	1	No		115K bps max.		15 m	Dsub 9-pin connectors
F3RZ82-0F	Ladder communication*2 (RS-232-C)	2	No		115K bps max.		15 m	Two Dsub 9-pin connectors
F3RZ91-0F	Ladder communication*2 (RS-422-A/RS-485)	1	Yes		115K bps max.		1200m	6-point terminal block M3.5 screw

*1: Compatible with BASIC CPUs.
*2: Compatible with sequence CPUs.

Model	Type	Interface	Number of Ports	Transmission System	Connection Configuration	Number of Devices	Handshake System
F3GB01-0N	GP-IB	ANSI/IEEE standard 488 compliant 24-pin receptacle connector (IEEE-488)	1	8-bit parallel, half-duplex	Star, multidrop	15 units max.	3-wire handshaking

Model	Type	Number of I/O Points	Maximum Message Length	Transmission					Media	Connection Configuration	Number of Nodes	Network Power Source
				Speed	Distance							
					Maximum Trunk Line Cable Length		Branch Line Length					
					Only thick cables used	Only thin cables use	Maximum Length	Total Length				
F3LD01-0N	Device Net	Input: 8000 Output: 8000	Send: 84 bytes Receive: 88 bytes (service data)	125K bps	500 m	100 m	6 m	156 m	5 dedicated cables (Signal: 2 lines Shielded: 1 line Power source: 2 lines)	Multidrop, T-branch	64 (including master)	Voltage: 24 V DC Current consumption: 40 mA max. (supplied via connector)
				250K bps	250 m			78 m				
				500K bps	100 m			39 m				

Model	Type	Interface	Number of I/O Points	Transmission			Number of Stations	Network Power Supply
				Rate	Configuration	Distance		
F3LA01-0N	ASi	AS-interface V2.1 compliant	434 max. (248 inputs, 186 outputs) V2.1 248 max. (124 inputs, 124 outputs) V2.0	167Kbps	Multidrop	Total length: 100 m	One ASi master, 1 power supply, 62 slaves max. (for V2.1) or 31 slaves max. (forV2.0)	Voltage: 30 VDC Current consumption: 200 mA max. (supplied via connector)

Model	Type	Interface	Number of I/O Points	Transmission			Connection Configuration	Number of Nodes
				Rate	Distance	Medium		
F3LB01-0N	PROFIBUS-DP	PROFIBUS-DP DPM1 (class 1) compliant	8192 (4096 inputs, 4096 outputs)	9.6 kbps	1200 m	2 dedicated cables (with 2 signal lines)	Bus connection	125 (including master)
				19.2 kbps	1200 m			
				93.75 kbps	1200 m			
				187.5 kbps	1000 m			
				500 kbps	400 m			
				1500 kbps	200 m			
				3 Mbps	100 m			
				6 Mbps	100 m			
				12 Mbps	100 m			

● Temperature Control and Monitoring Modules/PID Control Module/Temperature Control and PID Module/Temperature Monitoring Module

Model	Number of Loops	Isolation Method	Input	Output	Sampling Interval	Control Mode	External Connection	External Power Supply
F3CU04-0S	4	Photocoupler* and transformer isolation	Thermocouple: K, J, T, B, S, R, N, E, L, U, W, Platinel 2 RTD: JPt 100, Pt 100 DC voltage: 0 to 10 mV, 0 to 100 mV,	Time-proportional PID output (open collector)	0.2 s	PID, ON/OFF, Heating/ cooling	18-point terminal block M3.5 screw	24 V DC 10 mA
F3CU04-1S				Continuous PID output (4 to 20 mA) Time-proportional PID output (open collector)				24 V DC 250 mA
F3CX04-0N				–		–		–

* : - Input and output lines are photocoupler-isolated from internal circuitry.
- Input channels are photocoupler-isolated from each other.
- Output channels are not isolated from each other (shared by a common line, which is floating).

● Terminal Block Unit

Model	Number of Points	Rated Voltage	Operating Voltage Range	Maximum Current	Cable	Terminal Block Screw	Mounting Screw
TA40-0N	40	5-24 V DC	4.5 to 26.4 V DC	0.5 A DC/point	0.08 to 0.26 mm^2	M2 (minus thread)	M2.6 (minus thread)
TA50-0N	40	5-24 V DC	4.5 to 26.4 V DC	0.5 A DC/point	2 mm^2 max.	M3.5	M4 (2 points)
TA50-2N	40	5-24 V DC	4.5 to 26.4 V DC	0.5 A DC/point	1.25 mm^2 max.	M3	M4 (2 points)

■ YHLS Slave Units (TAH Series)

● Input Units

Model	Input Type	Number of Points	Isolation Method	Rated Input Voltage	Rated Input Current	Operating Voltage/Current		Input Response Time		External Connection	Number of Points /Common	External Power Supply
						ON	OFF	OFF→ON	ON→OFF			
TAHXD16-3PEM	DC voltage (+ common)	16	Photo-coupler isolation	24 V DC	4.1 mA/point	16.0 VDC min. 3.2 mA min.	5.8 V DC max 0.9 mA min.	1.0 ms max.	1.0 ms max.	MIL, 26 pins	16 points/ common	20.4-26.4V DC 100 mA
TAHXD16-3NEM	DC voltage (- common)											

● Output Units

Model	Output Type	Number of Points	Isolation Method	Rated Load Voltage	Maximum Load Current	Output Response Time		HOLD/RESET Output on YHLS Communication Error or when Program Stops	External Connection	Number of Points /Common	External Power Supply
						OFF→ON	ON→OFF				
TAHYD16-3EAM	Transistor contact (sink type)	16	Photo-coupler isolation	24 V DC	0.1 A/point	1 ms max.	1 ms max.	Configurable globally by DIP switch HLD:HOLD R:RESET	MIL, 26 pins	16 points/ common	20.4-26.4V DC 100 mA
TAHYD16-3EBM	Transistor contact (source type)										

● I/O Units

Model	Input Type	Number of Points	Isolation Method	Rated Input Voltage	Rated Input Current	Operating Voltage/Current		Input Response Time		External Connection	Number of Points /Common	External Power Supply
						ON	OFF	OFF→ON	ON→OFF			
TAHWD32-3PAM	DC voltage (+ common)	16	Photo-coupler isolation	24 V DC	4.1 mA/point	16.0 VDC min. 3.2 mA min.	5.8 VDC max. 0.9 mA min.	1.0 ms max.	1.0 ms max.	MIL, 26 pins	16 points/ common	20.4-26.4 V DC 100 mA
	Output Type	Number of Points	Isolation Method	Rated Load Voltage	Maximum Load Current	Output Response Time		HOLD/RESET Output on YHLS Communication Error or when Program Stops		External Connection	Number of Points /Common	
						OFF→ON	ON→OFF					
	Transistor contact (sink type)	16	Photo-coupler isolation	24 V DC	0.1 A/point	1 ms max.	1 ms max.	Configurable globally by DIP switch HLD:HOLD R:RESET		MIL, 26 pins	16 points/ common	

Model	Input Type	Number of Points	Isolation Method	Rated Input Voltage	Rated Input Current	Operating Voltage/Current		Input Response Time		External Connection	Number of Points /Common	External Power Supply
						ON	OFF	OFF→ON	ON→OFF			
TAHWD32-3NBM	DC voltage (- common)	16	Photo-coupler isolation	24 V DC	4.1 mA/point	16.0 VDC min. 3.2 mA min.	5.8 VDC max. 0.9 mA min.	1.0 ms max.	1.0 ms max.	MIL, 26 pins	16 points/ common	20.4-26.4 V DC 100 mA
	Output Type	Number of Points	Isolation Method	Rated Load Voltage	Maximum Load Current	Output Response Time		HOLD/RESET Output on YHLS Communication Error or when Program Stops		External Connection	Number of Points /Common	
						OFF→ON	ON→OFF					
	Transistor contact (source type)	16	Photo-coupler isolation	24 V DC	0.1 A/point	1 ms max.	1 ms max.	Configurable globally by DIP switch HLD:HOLD R:RESET		MIL, 26 pins	16 points/ common	

■ Standard Accessories

Module name	Model	Accessory	Quantity
Base module	F3BU04-0N	Connector dust cover	2
	F3BU06-0N	Connector dust cover	2
	F3BU05-0D	Connector dust cover	2
	F3BU09-0N	Connector dust cover	4
	F3BU13-0N	Connector dust cover	4
	F3BU16-0N	Connector dust cover	4

■ Spare Parts

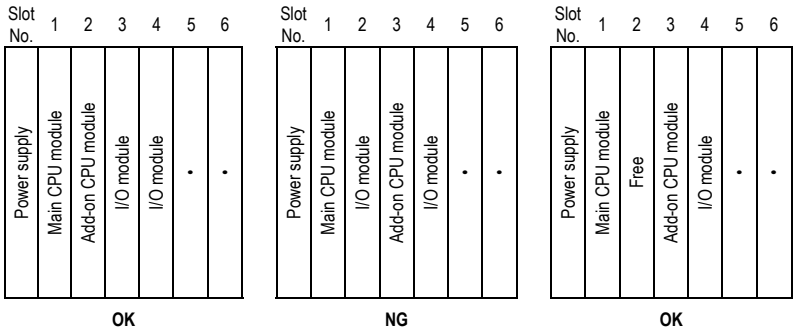
Item	Part No.	Applicable Module
Terminal (10-point terminal block)	A1474JT	F3XH04, F3XA08, F3XD08, F3YD04, F3YA08, F3YC08, F3YD08, F3AD04-0N, F3AD04-0R, F3AD04-0V, F3DA02*2.
Terminal (10-point terminal block) cover	A1472JT	
Terminal (18-point terminal block)	A1496JT	F3YC16, F3XA16, F3XD16, F3YD14, F3CR04*2. F3CV04*2., F3AD04-5R, F3AD04-5V, F3AD08, F3DA04, F3DA08, F3XS04, F3HA08
Terminal (18-point terminal block) cover	A1494JT	
Soldered-type connector (40-pin plug)	A1451JD*1	F3XD32, F3XD64, F3WD64, F3XP01, F3XP02, F3YD32, F3YD64, F3NC11*2., F3NC12*2., F3NC51, F3NC52
Connector (40-pin plug) cover (2 pieces)	A1452JD*1	
Soldered-type connector (48-pin plug)	A1612JD*1	F3YP04*2., F3YP08*2., F3YP14*2., F3YP18*2, F3YP22, F3YP24,F3YP28, F3NC32, F3NC34
Connector (48-pin plug) cover (2 pieces)	A1613JD*1	
Connector dust cover	T9031AS	F3BU04, F3BU06, F3BU05, F3BU09, F3BU13, F3BU16
Rail mount kit	T9031AP*1	F3BU04, F3BU05, F3BU06
	T9031AQ*1	F3BU09, F3BU13

*1: Not supplied with the product.
*2: Discontinued Module

Restrictions on Module Installation

■ Restrictions on Module Location

- The CPU module installed in slot 1 serves as the main CPU module.
- The CPU modules installed in slots 2 to 4 serve as add-on CPU modules.
- I/O modules may be installed in slots 2 to 4. Neither add-on sequence CPU modules nor add-on BASIC CPU modules can be installed in any slots whose slot number is greater than that of the installed I/O modules.
- When two or more CPU modules are to be used, no I/O modules can be installed between CPU modules.



■ Restrictions on CPU Module Installation

- A maximum of four CPU modules can be installed in slots 1 to 4 of the main unit.

Model		Maximum Qty.*1	Add-on CPU Module								
			F3SP22-0S	F3SP28-3S	F3SP38-6S	F3SP53-4S	F3SP58-6S	F3SP6□-□S	F3SP7□-□S	F3BP20-0N	F3BP30-0N
Main CPU Module	F3SP22-0S	4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	F3SP28-3S	4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	F3SP38-6S	4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	F3SP53-4S	4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	F3SP58-6S	4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	F3SP6□-□S	4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	F3SP7□-□S	4	✓	✓	✓	✓	✓	✓	✓	✓*2	✓*2
	F3BP20-0N	1	✓	✓	✓	✓	✓	✓	✓	–	–
	F3BP30-0N	1	✓	✓	✓	✓	✓	✓	✓	–	–

*1: Indicates the maximum number of modules that can be used in total including the main CPU module when CPU modules with the same model name as the main CPU module are used as add-on CPU modules.

*2: A maximum of two modules can be installed in this combination.

*3: The combination of F3SP7□-□N + F3SP7□-□N + F3SP21 (25, 35/ F3BP20, 30) is not possible.
The combination of F3SP7□-□N + F3SP7□-□S + F3SP21 (25, 35/ F3BP20, 30) is not possible.
The combination of F3SP7□-□S + F3SP7□-□S + F3SP21 (25, 35/ F3BP20, 30) is possible.
The combination of F3SP7□-□N + F3SP7□-□S is possible.

■ Restrictions on I/O Module Installation

- The table below summarizes the number of modules that a CPU module can gain direct access to and the number of modules that can be installed. The number of modules that can be installed here refers to I/O modules of the same type.
  - A circle denotes an I/O module that has no restriction as to the number of modules that can be installed.
  - An "×" denotes an I/O module to which the associated CPU module can gain no direct access.
  - A number indicates the number of I/O modules of the same type that can be installed.
- The restrictions to which I/O modules are subject to include those on the number of a particular type that can be installed and those on the total number of I/O modules of all types that can be installed in the entire system.

Modules That Each CPU Can Access Directly and the Maximum Number of Them That Can Be Installed (1/2)

Module Name	Model	Sequence CPU				BASIC CPU	
		F3SP22-0S	F3SP66-4S	F3SP67-6S	F3SP71-4S	F3BP20-0N	F3BP30-0N
Memory card module	F3EM01-0N*	6*1	6*1	6*1	6*1	–	–
Input module	F3XA□□-□N	✓	✓	✓	✓	✓	✓
	F3XH04-3N	16	16	16	16	16*2	16*2
	F3XC08-0□	✓	✓	✓	✓	✓	✓
	F3XD08-6F	✓	✓	✓	✓	✓	✓
	F3XD08-6N	✓	✓	✓	✓	✓	✓
	F3XD16-□F	✓	✓	✓	✓	✓	✓
	F3XD16-3H	✓	✓	✓	✓	✓	✓
	F3XD32-□F	✓	✓	✓	✓	✓	✓
	F3XD16-□N	✓	✓	✓	✓	✓	✓
	F3XD32-□N*	✓	✓	✓	✓	✓	✓
	F3XD64-□□	64	64	✓	64	✓	✓
Output module	F3YA08-2N	✓	✓	✓	✓	✓	✓
	F3YC08-0C	✓	✓	✓	✓	✓	✓
	F3YC08-0N	✓	✓	✓	✓	✓	✓
	F3YC16-0N	✓	✓	✓	✓	✓	✓
	F3YD04-7N	✓	✓	✓	✓	✓	✓
	F3YD08-□□	✓	✓	✓	✓	✓	✓
	F3YD14-5□	✓	✓	✓	✓	✓	✓
	F3YD32-1□	✓	✓	✓	✓	✓	✓
	F3YD64-1□	64	64	✓	64	✓	✓
I/O module	F3WD64-□□	64	64	✓	64	✓	✓
Analog input module	F3AD04-□□	36	36	36	36	36	36
	F3AD08-□□	36	36	36	36	36	36
Analog output module	F3DA02-0N*	36	36	36	36	36	36
	F3DA04-1N*	36	36	36	36	36	36
	F3DA08-5N	36	36	36	36	36	36
High-speed data acquisition module	F3HA08-0N	8	8	8	8	8	8
	F3HA□□-1R	8	8	8	8	8	8
Temperature control and monitoring module	F3CT04-□N*	28	28	28	28	28	28
	F3CR04-□N*	28	28	28	28	28	28
PID control module	F3CV04-1N*	28	28	28	28	28	28
Temperature control and PID module	F3CU04-□□	36	36	36	36	36	36
Temperature monitoring module	F3CX04-0N	36	36	36	36	36	36
ASi Master module	F3LA01-0N	36	36	36	36	36	36
PROFIBUS-DP Interface module	F3LB01-0N	16	16	16	16	16	16
Personal computer link module	F3LC11-1F	6*1	6*1	6*1	6*1	6*1	6*1
	F3LC11-1N*						
	F3LC11-2□						
	F3LC12-1F						
	F3LC12-1F						

Modules That Each CPU Can Access Directly and the Maximum Number of Them That Can Be Installed (2/2)

Module Name		Model	Sequence CPU					BASIC CPU	
			F3SP22-0S	F3SP66-4S	F3SP67-6S	F3SP71-4S	F3SP76-7S	F3BP20-0N	F3BP30-0N
UT link module		F3LC51-2N	4	4	4	4	4	4	4
DeviceNet interface module		F3LD01-0N	16	16	16	16	16	16	16
Ethernet interface module		F3LE01-0T	6*1	6*1	6*1	6*1	6*1	6*1	6*1
		F3LE01-5T*	6*1	6*1	6*1	6*1	6*1	6*1	6*1
		F3LE11-0T	6*1	6*1	6*1	6*1	6*1	6*1	6*1
		F3LE12-0T	6*1	6*1	6*1	6*1	6*1	6*1	6*1
YHLS master module		F3LH0□-0N	15	15	15	15	15	15	15
		F3LH01-1N	28	28	28	28	28	28	28
		F3LH02-1N	28	28	28	28	28	28	28
FL-net (OPCN-2) interface module		F3LX02-1N	–	1	2	1	2	–	–
NX interface module		F3NX01-□N	6*1	6*1	6*1	6*1	6*1	–	–
GP-IB communication module		F3GB01-0N*7	8 | 8	8 | 8	8 | 8	8 | 8	8 | 8	8 | 8	8 | 8
RS-232-C communication module		F3RS22-0N	–	–	–	–	–	36	36
RS-422-A communication module		F3RS41-0N	–	–	–	–	–	36	36
Ladder communication module		F3RZ81-0N*	36	36	36	36	36	–	–
		F3RZ81-0F	28	28	28	28	28	–	–
		F3RZ82-0F	28	28	28	28	28	–	–
		F3RZ91-0□	36	36	36	36	36	–	–
FA link H module		F3LP02-0N	8*3 *8	8*3 *8	8*3 *8	8*3 *8	8*3 *8	–	–
Fiber-optic FA link H module		F3LP12-0N						–	–
Fiber-optic FA-bus module		F3LR01-0N	7*5	7*5	7*5	7*5	7*5	7*5	7*5
Fiber-optic FA-bus type 2 module		F3LR02-0N							
FA-bus type 2 module		F3LR02-1W	7*5	7*5	7*5	7*5	7*5	7*5	7*5
High-speed counter module		F3XP01-0H	64	64	✓	64	✓	✓	✓
		F3XP02-0H	64	64	✓	64	✓	✓	✓
Pulse input module		F3XS04-□N	36	36	36	36	36	36	36
Positioning module	(with multi-channel pulse output)	F3YP04-0N*	36	36	36	36	36	36	36
		F3YP08-0N*	36	36	36	36	36	36	36
		F3YP14-0N*	36	36	36	36	36	36	36
		F3YP18-0N*	36	36	36	36	36	36	36
		F3YP22-0P	16	16	16	16	16	16	16
		F3YP24-0P	16	16	16	16	16	16	16
		F3YP28-0P	16	16	16	16	16	16	16
	(advanced model with pulse output)	F3NC11-0N*	36	36	36	36	36	36	36
		F3NC12-0N*	36	36	36	36	36	36	36
	(with pulse output)	F3NC32-0N	16	16	16	16	16	16	16
		F3NC34-0N	16	16	16	16	16	16	16
	(with analog voltage output)	F3NC51-0N	36	36	36	36	36	36	36
		F3NC52-0N	36	36	36	36	36	36	36
	(MECHATROLIN K-II)	F3NC96-0N	8	8	8	8	8	8	8
	(MECHATROLINK-III)	F3NC97-0N	8	8	8	8	8	8	8

Modules with shaded module names and models must be installed in main units.

* : Discontinued Module

*1: Each number denotes the largest combined number of personal computer link modules, Ethernet interface modules, GP-IB communication modules (when in slave mode), FL-net interface modules and memory card modules that can be installed. If two or more CPU modules having different maximum limits are installed, the smallest limit applies.

*2: The pulse-capture feature is disabled.

*3: Each number denotes the largest combined number of FA link H modules and fiber-optic FA link H modules that can be installed. If two or more CPU modules having different maximum limits are installed, the smallest limit applies.

*4: Configure the module using WideField, WideField2, WideField3 or Ladder Diagram Support Program M3.

*5: Each number denotes the largest combined number of fiber-optic FA-bus, fiber-optic FA-bus type 2 and FA-bus type 2 modules that can be installed in a main unit. If two or more CPU modules having different maximum limits are installed, the smallest limit applies. If subunits are grouped using fiber-optic FA-bus type 2 modules, the maximum limit may be increased depending on the grouping pattern. For more information, see the Fiber-optic FA-bus Module and Fiber-optic FA-bus Type 2 Module, FA-bus Type 2 Module (IM 34M06H45-01E).

*6: FA link H, fiber-optic FA link H, fiber-optic FA-bus type 2 and FA-bus type 2 modules must be used with sequence CPU modules version 8 or later. For information on the version of a sequence CPU module, refer to the mark on its side. There is no usage limitation, however, for F3SP□□-□S.

*7: The maximum number of each module that can be installed depends on the operating mode. The left number and right number in each cell apply when the module is in master mode and slave mode respectively.

*8: Up to 7 modules can be installed if used with FL-net (OPCN-2) interface module, provided link device capacities are not exceeded.

*9: FL-net (OPCN-2) interface module can be used with sequence CPU modules rev. 5 or higher. There is no restriction when used with F3SP□□-□S modules.

*10: FA link, FA link H and fiber-optic FA link H modules cannot coexist with F3SP7□-□N.

Current Consumption

Make sure that the total current consumption (at 5 V DC) in the installed modules does not exceed the 5 V power capacity of the power supply module used. Prepare an appropriate external power supply according to the specifications of the modules used.

■ Power Supply Modules

Model	Internal 5 V Source (mA)	Power Supplied to External Devices (mA)
F3PU10-0☐	2000	No
F3PU16-0N	2000	No
F3PU20-0☐	4300	No
F3PU26-0N	4300	No
F3PU30-0☐	6000	No
F3PU36-0☐	6000	No

■ Basic Modules

Module Name	Model	Maximum Current Consumption (mA) at 5 V DC	External Power Supply	
			Voltage (V DC)	Current (mA)
CPU module	F3SP22-0S	450	—	—
	F3SP66-4S	850	—	—
	F3SP67-6S	850	—	—
	F3SP71-4S	460	—	—
	F3SP76-7S	460	—	—
BASIC CPU module	F3BP20-0N	200	—	—
	F3BP30-0N	200	—	—
Base module	F3BU04-0N	50	—	—
	F3BU06-0N	50	—	—
	F3BU05-0D	50	—	—
	F3BU09-0N	50	—	—
	F3BU13-0N	50	—	—
	F3BU16-0N	50	—	—

■ I/O Modules

Module Name	Model	Maximum Current Consumption (mA) at 5 V DC	External Power Supply	
			Voltage (V DC)	Current (mA)
High-speed input module	F3XH04-3N	30	—	—
AC input module	F3XA08-1N	40	—	—
	F3XA08-2N	40	—	—
	F3XA16-1N	65	—	—
DC input module	F3XD08-6F	40	—	—
	F3XD16-3F	65	—	—
	F3XD16-4F	65	—	—
	F3XD32-3H	65	—	—
	F3XD32-3F	75	—	—
	F3XD32-4F	75	—	—
	F3XD64-5F	75	—	—
	F3XD64-3F	100	—	—
	F3XD64-4F	100	—	—
	F3XD64-6M	110	12-24	70
No-voltage contact input module	F3XC08-0N	75	—	—
	F3XC08-0C	75	—	—
TRIAC output module	F3YA08-2N	130	—	—
Relay output module	F3YC08-0C	205	—	—
	F3YC08-0N	205	—	—
	F3YC16-0N	380	—	—
Transistor output module	F3YD04-7N	85	—	—
	F3YD08-6A	60	12-24	10
	F3YD08-6B	60	12-24	10
	F3YD08-7A	80	12-24	10
	F3YD14-5A	120	12-24	20
	F3YD14-5B	120	12-24	20
	F3YD32-1B	210	12-24	115
	F3YD32-1H	165	12-24	30
	F3YD32-1P	160	12-24	55
	F3YD32-1R	170	12-24	60
	F3YD32-1T	210	5	60
	F3YD64-1M	125	12-24	40
	F3YD64-1P	275	12-24	95
	F3YD64-1R	275	12-24	110
I/O module	F3WD64-3F	200	24	60
	F3WD64-4F	200	12	60
	F3WD64-3N	200	24	60
	F3WD64-4N	200	12	60
	F3WD64-3P	170	24	55
	F3WD64-4P	170	12	55

■ Special Modules

Module Name	Model	Maximum Current Consumption (mA) at 5 V DC	External Power Supply	
			Voltage (V DC)	Current (mA)
Analog input module	F3AD04-5R	210	—	—
	F3AD04-5V	210	—	—
	F3AD08-5V	210	—	—
	F3AD08-4W	210	—	—
	F3AD08-4R	210	—	—
	F3AD08-5R	210	—	—
	F3AD08-6R	210	—	—
Analog output module	F3DA04-6R	60	24	200
	F3DA08-5R	60	24	200
High-speed data acquisition module	F3HA08-0N	450	—	—
	F3HA06-1R	420	—	—
	F3HA12-1R	570	—	—
Temperature control and PID module	F3CU04-0S	460	24	10
	F3CU04-1S	470	24	250
Temperature monitoring module	F3CX04-0N	440	—	—
Personal computer link module	F3LC11-1F	320	—	—
	F3LC11-2F	350	—	—
	F3LC12-1F	350	—	—
UT link module	F3LC51-2N	290	—	—
DeviceNet interface module	F3LD01-0N	200	11-25	40
Ethernet interface module	F3LE01-0T	500	—	—
	F3LE11-0T	500	—	—
	F3LE12-0T	500	—	—
FL-net (OPCN-2) interface module	F3LX02-1N	460	12	500
ASi Master module	F3LA01-0N	330	30	2000
PROFIBUS-DP Interface module	F3LB01-0N	610	—	—
YHLS master module	F3LH01-1N	360	—	—
	F3LH02-1N	480	—	—
	F3LH02-0N	440	—	—
NX interface module	F3NX01-1N	500	—	—
RS-232-C communications module	F3RS22-0N	350	—	—
RS-422A communications module	F3RS41-0N	350	—	—
Ladder communications module	F3RZ81-0N	100	—	—
	F3RZ81-0F	320	—	—
	F3RZ82-0F	350	—	—
	F3RZ91-0F	350	—	—
GP-IB communications module	F3GB01-0N	250	—	—
FA link H module	F3LP02-0N	470	—	—
Fiber-optic FA link H module	F3LP12-0N	495	—	—
Fiber-optic FA-bus module	F3LR01-0N	220	—	—
Fiber-optic FA-bus type 2 module	F3LR02-0N	460	—	—
FA-bus type 2 module	F3LR02-1W	320	—	—
High-speed counter module	F3XP01-0H	100	—	—
	F3XP02-0H	150	—	—
Pulse input module	F3XS04-3N	230	—	—
	F3XS04-4N	230	—	—
Positioning module (with pulse output)	F3NC32-0N	450	24	80
	F3NC34-0N	540	24	120
Positioning module (with analog voltage output)	F3NC51-0N	390	24	10
	F3NC52-0N	400	24	10
Positioning module (with MECHATROLINK-II Interface)	F3NC96-0N	570	—	—
Positioning module (with MECHATROLINK-III Interface)	F3NC97-0N	530	—	—
Positioning module (with multi-channel pulse output)	F3YP22-0P	210	24	70
	F3YP24-0P	240	24	110
	F3YP28-0P	280	24	200

Severity of Failures and LED Display

■ Severity of Failures and LED Display (For F3BP20 and F3BP30 CPU modules)

Error Severity	LED Display	Description	Error Item	FAIL-signal Contact Output		Status of Output Module	
				Between FAIL 1 and COM	Between FAIL 2 and COM	Modules with 32 or less output points	Modules with 64 output points *2
Major	RDY (green) off	The core hardware is disabled.	- CPU error - Memory error	Shorted	Open	Initial value: HOLD Configurable on 8-terminal basis (using the CONTROL statement).	All settings are invalid; always HOLD
Moderate	ERR (red) lit	The user program cannot be started or run any further.	- Program error - I/O module error - BASIC error stop (No ON ERROR declaration)	Open	Shorted	All settings are invalid; always HOLD	All settings are invalid; always HOLD
Minor	ALM (yellow) lit*1	The program can still run in spite of a failure.	- Power failure - I/O module error (during interrupt processing)	Open	Shorted	Operation continues.	Operation continues.

*1: The ALM LED (yellow) is also lit in the debugging mode.
*2: Including F3WD64 and advanced modules that have output relays (Y□□□□□).

■ Severity of Failures and LED Display (For F3SP22, F3SP28, F3SP38, F3SP5□, F3SP6□ and F3SP7□ CPU modules)

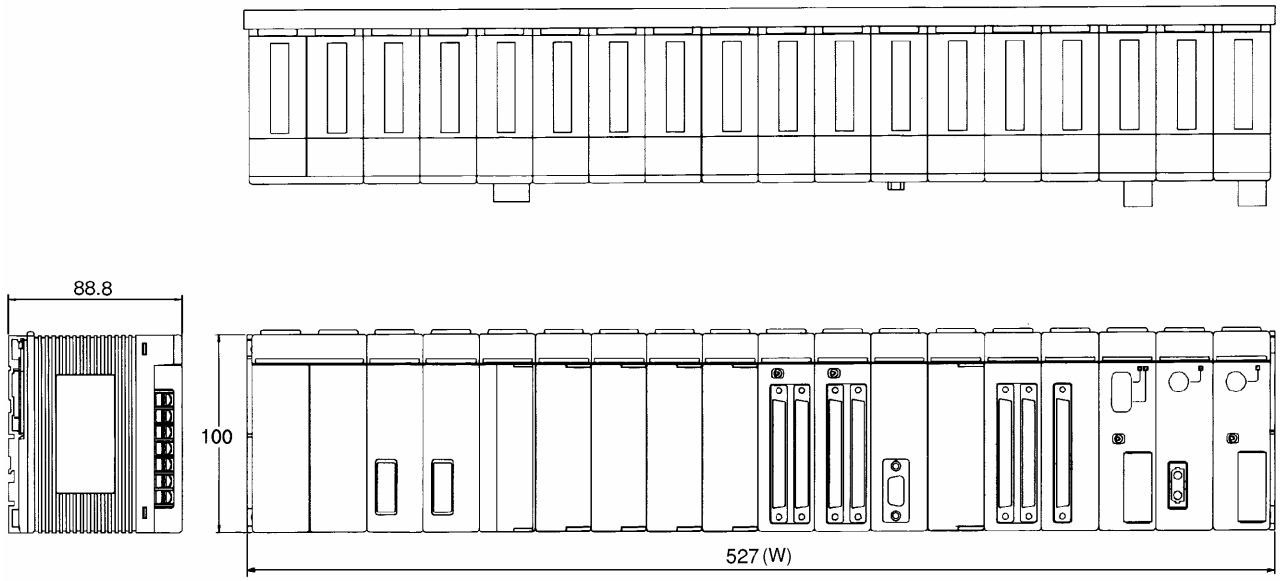
Error Severity	LED Display	Description	Error Item	FAIL-signal Contact Output		Status of Output Module	
				Between FAIL 1 and COM	Between FAIL 2 and COM	Output modules with 32 or fewer outputs, F3YD64-1F, F3YD64-1P, F3YD64-1R, F3WD64-□F and F3WD64-□P	F3YD64-1A, F3YD64-1M, F3WD64-□N, and Y□□□□□*2
Major	RDY (green) off	The core hardware is disabled.	- CPU error - Memory error	Shorted	Open	Initial value: RESET Configurable on 16-point basis.	All settings are invalid; always HOLD
Moderate	ERR (red) lit	The user program cannot be started or run any further.	- Program error - I/O comparison error*1 - I/O module error*1 - Memory error - SPU error - Instruction processing error*1 - Scan timeout*1 - Startup error - Invalid instruction found - Too many I/O points - ROM pack error - Subroutine error*1 - Interrupt error*1 - Subunit communication error*1 - Sensor control scan timeout*1	Shorted	Open	Initial value: RESET Configurable on 16-terminal basis.	Initial value: RESET Configurable on 16-terminal basis.
Minor	ALM (yellow) lit	The program can still run in spite of a failure.	- Momentary power failure - Inter-CPU communication error - Subunit line switchover	Open	Shorted	Operation continues.	Operation continues.

*1: Can be configured as minor failure or moderate failure.
*2: Output relays (Y□□□□□) of advanced modules.

External Dimensions

The figure below shows the external dimensions of the FA-M3 with a 16-slot base module, excluding the power supply module.

Unit: mm



Base Module	Style	Number of Slots	Number of I/O Slots*	Width
F3BU04-0N	—	4	3	147 mm
F3BU06-0N	—	6	5	205 mm
F3BU05-0D	—	5	4	205 mm
F3BU09-0N	—	9	8	322 mm
F3BU13-0N	—	13	12	439 mm
F3BU16-0N	—	16	15	527 mm

*: Number of I/O slots that can be installed in a single CPU module.

- Mounting screw for securing optional modules on the base module: M4 × 12 mm
  Note 1: Mounting screws are not provided with the base module. Four mounting screws are required for F3BU04, F3BU06 and F3BU05 modules. Four or five are required for F3BU09 and F3BU13 modules. Six or seven are required for the F3BU16 module.
  Note 2: Mounting screw specifications:
  M4 binding head screw, 12-15 mm long (14-15 mm when a washer is used).
- These modules, except for the F3BU16 module, can be mounted on a DIN rail using the T9631AP and T9031AQ rail-mount kit.

FA-M3 Approved / Compliant Standard:

For the UL-approved / CE Mark-compliant modules of FA-M3, see the General Specifications (GS 34M06C11-21E).

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