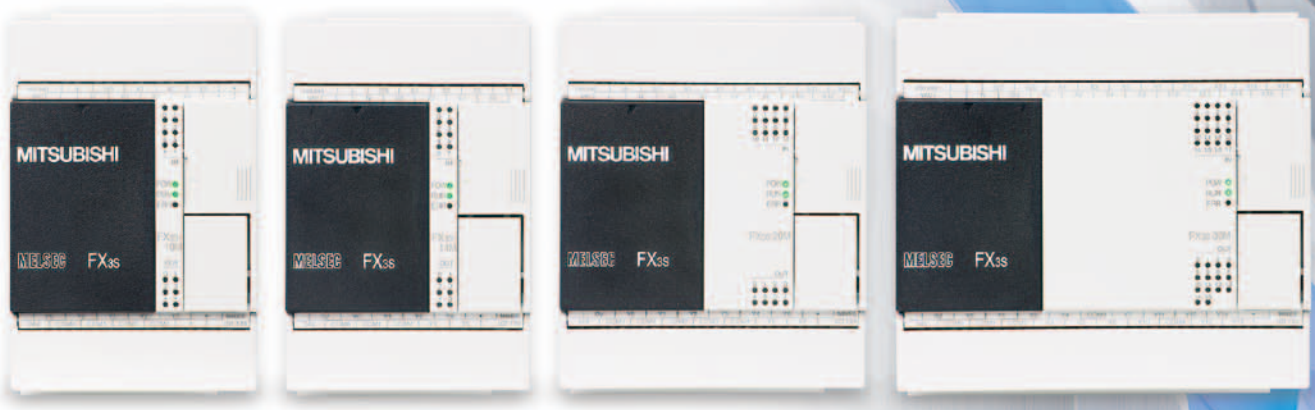
MITSUBISHI ELECTRIC

Changes for the Better

for a greener tomorrow

PROGRAMMABLE CONTROLLERS

MELSEC-F



New possibilities

– Introducing an entry level model for the FX3 series –

NEW FX3S

Empowering Industries

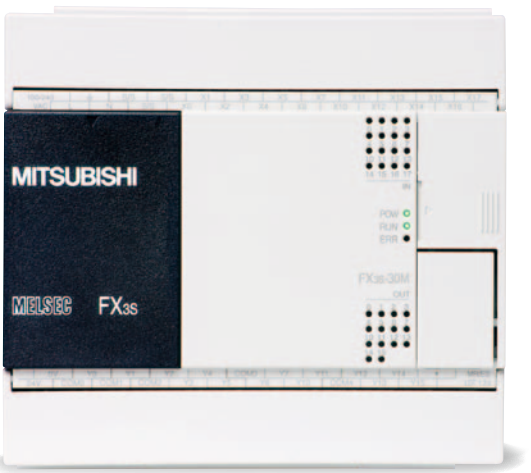
FX3S

NEW

The newly released FX3S adds extra expandability to the high cost performance of the venerable entry-level FX1S.
FX3S makes it possible to utilize analog, Ethernet and MODBUS® functions even in small-scale systems.

New possibilities

Main unit lineup



FX3S-10MR/ES	AC	D	R
FX3S-10MT/ES	AC	D	T1
FX3S-10MT/ESS	AC	D	T2

6 inputs 4 outputs

FX3S-20MR/ES	AC	D	R
FX3S-20MT/ES	AC	D	T1
FX3S-20MT/ESS	AC	D	T2

12 inputs 8 outputs

FX3S-30MR/ES	AC	D	R
FX3S-30MT/ES	AC	D	T1
FX3S-30MT/ESS	AC	D	T2

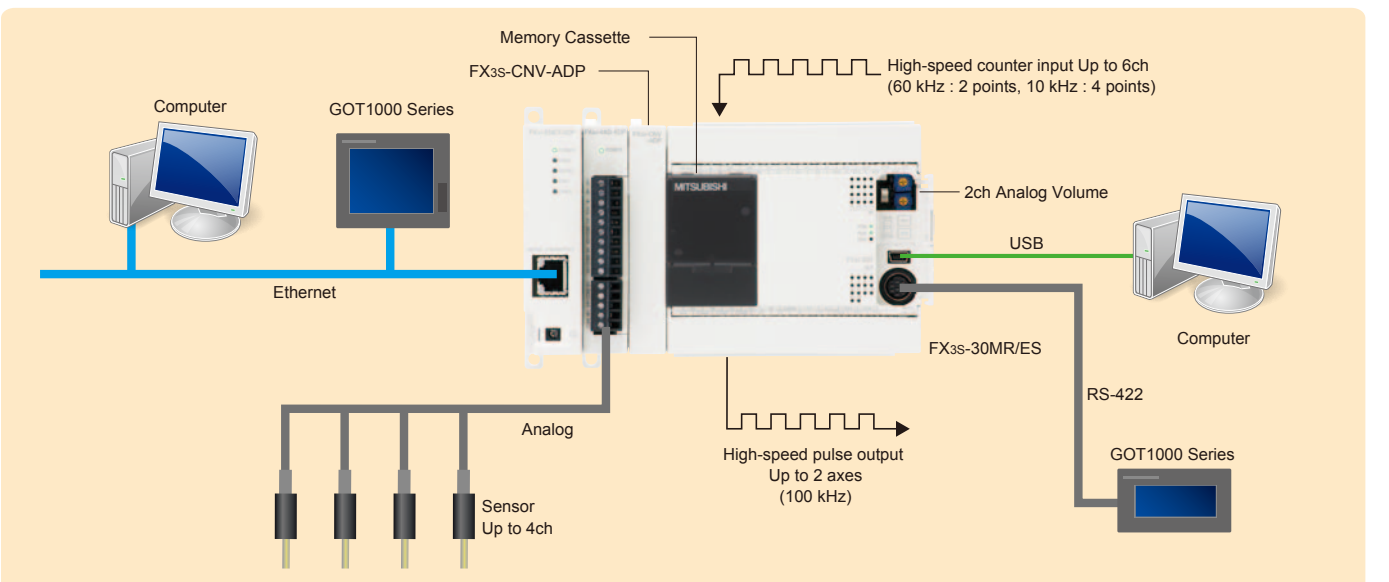
16 inputs 14 outputs

FX3S-14MR/ES	AC	D	R
FX3S-14MT/ES	AC	D	T1
FX3S-14MT/ESS	AC	D	T2

8 inputs 6 outputs

AC AC power supply
D DC input (sink/source)
R Relay output
T1 Transistor output (sink)
T2 Transistor output (source)

System configuration example



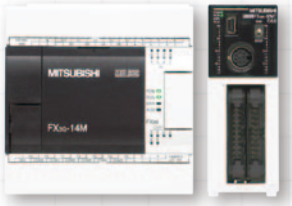
All-inclusive FX3 series

Function and performance

High-end Model

FX3U FX3UC

Superior speed, power, and flexibility.
Realize high speed control, network support, data logging, and more.



Standard Model

FX3G FX3GC

From automation to network, to more advanced control.
Supports features required for basic control and a variety of applications.

Entry level Model

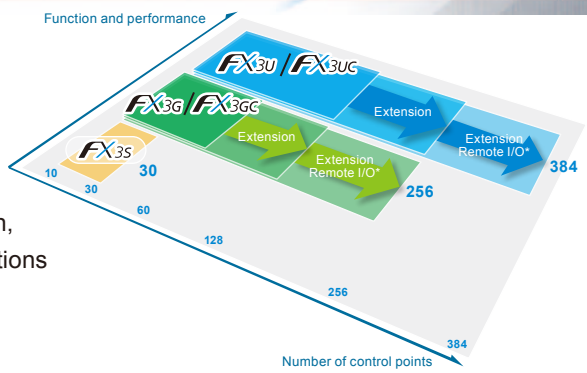
FX3S NEW

Simple and cost effective. Basic model that supports analog and communication expansion.
Perfect for simple automation tasks.

Number of control points

FX3 series is the 3rd generation of micro programmable controllers.

High speed, large capacity, and enhanced performance and functions are assured.
Equipped with excellent expandability for analog, communication, Ethernet, and positioning functions, a whole world of FX applications awaits.



FX3 series feature comparison

		FX3S NEW	FX3G	FX3U
Hardware	Main unit I/O Control size	10/14/20/30 points Max. 30 points	14/24/40/60 points Max. 128 points (Max. 256 with remote I/O*)	16/32/48/64/80/128 points Max. 256 points (Max. 384 with remote I/O*)
	Power supply	AC	AC, DC	AC, DC
	24 V DC input	Sink/Source	Sink/Source	Sink/Source
	Output	Relay Type Transistor Type	Relay Type Transistor Type	Relay Type Transistor Type
Built-in features	Internal memory	16,000 steps EEPROM (program capacity is limited to 4,000 steps.)	32,000 steps EEPROM	64,000 steps RAM (Battery backed)
	Communication port	USB/RS-422	USB/RS-422	RS-422 (USB option)
	High-speed counter	1-phase 60 kHz : 2 points 10 kHz : 4 points	1-phase 60 kHz : 4 points 10 kHz : 2 points	1-phase 100 kHz : 6 points 10 kHz : 2 points
	Positioning control (transistor output type)	2 axes 100 kHz	14/24 Point type : 2 axes 40/60 Point type : 3 axes 100 kHz	3 axes 100 kHz
	Variable analog potentiometer	2 points	2 points	—

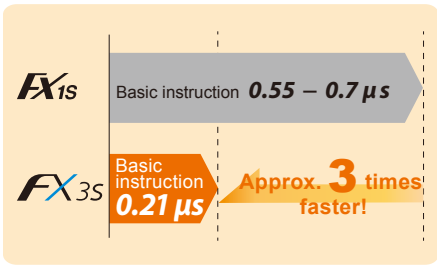
* : Remote I/O is CC-Link I/O.

Excellent cost performance!

Equipped with the performance of FX3 series while maintaining backwards compatibility with FX1S.

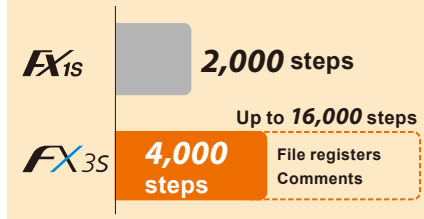
• High-speed operation

- FX3S processes basic instructions in 0.21 μs, which is faster by approximately 3 times compared with FX1S.



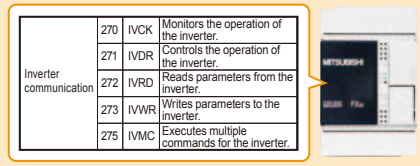
• Increased program capacity

- Up to 4,000 steps program capacity.
- 2,000 steps file register capacity.
- Up to 12,000 steps for comments.
  In total, the built-in EEPROM of the FX3S can store up to 16,000 steps.



• More instructions

- Supports inverter communication instructions.
- Supports floating point instructions.
- Supports 116 applied instructions (31 more instructions than FX1S).

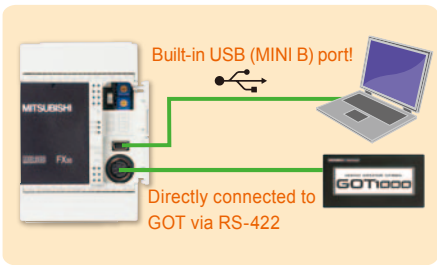


Inverter communication	270	IVCK	Monitors the operation of the inverter.
	271	IVDR	Controls the operation of the inverter.
	272	IVRD	Reads parameters from the inverter.
	273	IVWR	Writes parameters to the inverter.
	275	IVMC	Executes multiple commands for the inverter.

Supports inverter communication instructions!

• Enhanced communication functions

- Built-in USB (MINI B) port and RS-422 port.
- 115.2 kbps serial communication.
  USB port supports 12 Mbps communication speed.



• Enhanced analog expandability

- Analog expansion board can be connected.
- Special analog adapter can be connected.
- Analog input adapter for temperature sensor can be connected.

• Compatibility with global standards

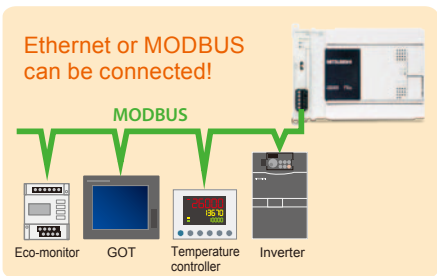
- Conforms to the EC Directive and UL Standard.
- Conforms to the Radio Law in South Korea.
- Select between sink and source inputs.

Unprecedented expandability with optional products!

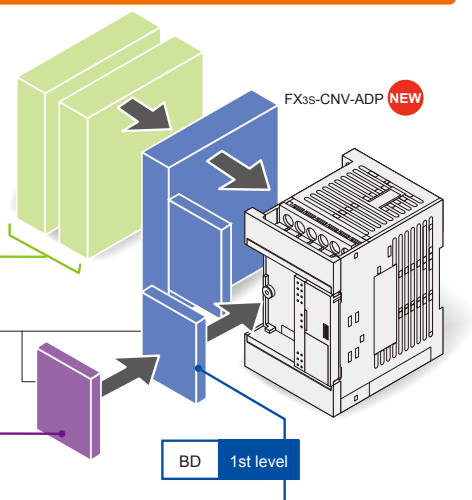
Analog, Ethernet and MODBUS products can be connected.

• Enhanced expandability

- Special adapter for Ethernet can be connected.
- Special adapter for serial communication (compatible with MODBUS) can be connected.



Optional product configuration diagram



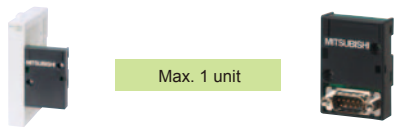
Max. 1 unit + Max. 1 unit

Analog special adapters
FX3U-4AD-ADP
FX3U-4DA-ADP
FX3U-3A-ADP
FX3U-4AD-PT-ADP
FX3U-4AD-PTW-ADP
FX3U-4AD-PNK-ADP
FX3U-4AD-TC-ADP

Communication special adapters
FX3U-232ADP-MB
FX3U-485ADP-MB
FX3U-ENET-ADP*

Memory cassette
FX3G-EEPROM-32L

FX3G-EEPROM-32L can be connected to the second BD level when a communication board, analog expansion board or FX3S-CNV-ADP is connected on the first level.



Max. 1 unit

Connector conversion adapter
FX3S-CNV-ADP NEW

Memory cassette
FX3G-EEPROM-32L

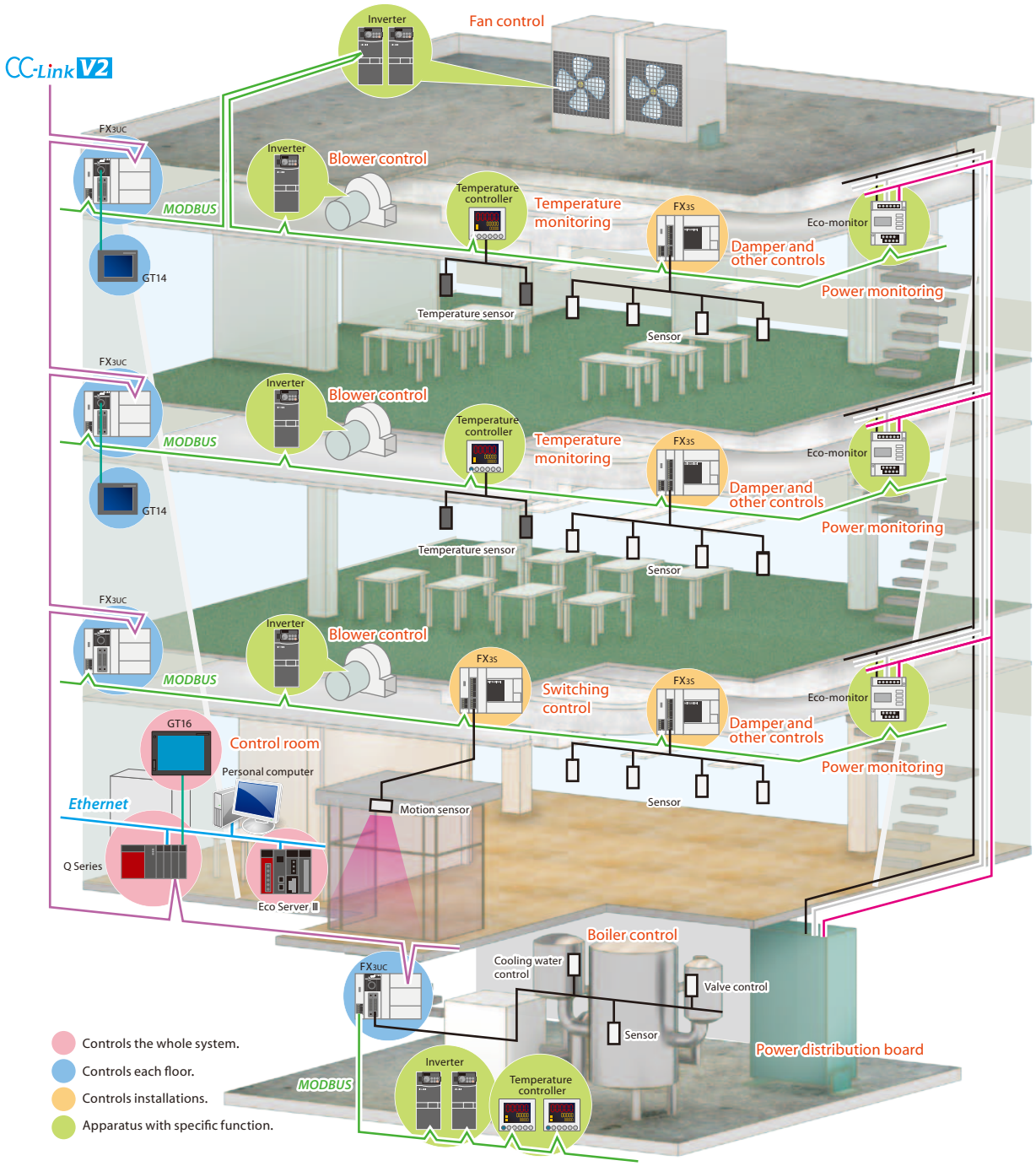
Communication expansion boards
FX3G-232-BD
FX3G-422-BD
FX3G-485-BD

Analog expansion boards
FX3G-2AD-BD
FX3G-1DA-BD
FX3G-8AV-BD

Up to two special adapters (up to one analog adapter and up to one communication adapter) can be connected.
(Restrictions with expansion board connections exist.)
* : When using FX3U-ENET-ADP, connect it at the last stage (left end) of adapters.

New possibilities using FX3S

Achieve extensive cost reductions by flexibly combining FX3S with other PLCs.
For example, by properly distributing PLCs in a network in accordance with the desired application, you can reduce loads on each CPU and costs of the entire system. In addition, you can construct an energy-saving system by combining with power monitoring functions.



Straightforward programming with GX Works2

Powerful, intuitive, and efficient.
GX Works2 reduces program development time with an easy to use interface.

Use GX Works2 also for setting up Ethernet.

FX3U-ENET-ADP

PLC engineering software

GX Works2

PROGRAMMABLE CONTROLLERS

■**Power Supply Specifications**

Item	Specification			
	FX3S-10M□/E□	FX3S-14M□/E□	FX3S-20M□/E□	FX3S-30M□/E□
Supply voltage	100 to 240 V AC			
Allowable supply voltage range	85 to 264 V AC			
Rated frequency	50/60 Hz			
Allowable instantaneous power failure time	Operation can be continued upon occurrence of instantaneous power failure for 10 ms or less.			
Power fuse	250 V 1 A			
Rush current	15 A max. 5 ms or less/100 V AC, 28 A max. 5 ms or less/200 V AC			
Power consumption*1	19 W	19 W	20 W	21 W
24 V DC service power supply	400 mA			

*1 : This item shows values when all 24 V DC service power supplies are used in the maximum configuration connectable to the main unit, and includes the input current (5 or 7 mA per point).

■**24 V DC Input (sink/source) specifications**
(Please see the manual for input circuit configuration.)

Item		Specification			
		FX3S-10M□	FX3S-14M□	FX3S-20M□	FX3S-30M□
Number of input points		6 points	8 points	12 points	16 points
Input connecting type		Fixed terminal block (M3 screw)			
Input form		Sink/Source			
Input signal voltage		24 V DC +10%, -10%			
Input impedance	X000 to X007	3.3 kΩ			
	X010 to X017	—		4.3 kΩ	
Input signal current	X000 to X007	7 mA/24 V DC			
	X010 to X017	—		5 mA/24 V DC	
ON input sensitivity current	X000 to X007	4.5 mA or more			
	X010 to X017	—		3.5 mA or more	
OFF input sensitivity current		1.5 mA or less			
Input response time		Approx. 10 ms			
Input signal form	Sink input	No-voltage contact input NPN open collector transistor			
	Source input	No-voltage contact input PNP open collector transistor			
Input circuit insulation		Photocoupler insulation			
Input operation display		LED on panel lights when photocoupler is driven.			

■**Relay output specifications**
(Please see the manual for output circuit configuration.)

Item		Relay output specification			
		FX3S-10MR/ES	FX3S-14MR/ES	FX3S-20MR/ES	FX3S-30MR/ES
Number of output points		4 points	6 points	8 points	14 points
Output connecting type		Fixed terminal block (M3 screw)			
Output form		Relay			
External power supply		30 V DC or less, 240 V AC or less (250 V AC or less when the unit does not comply with CE, UL or cUL standards.)			
Max. load	Resistance load	2 A/point The total load current of resistance loads per common terminal should be the following value. • 1 output point/common terminal: 2 A or less • 4 output points/common terminal: 8 A or less			
	Inductive load	80 VA (UL and cUL standards approved at 120 and 240 V AC.)			
Min. load		5 V DC, 2 mA (reference value)			
Open circuit leakage current		—			
Response time	OFF→ON ON→OFF	Approx. 10 ms			
Output circuit insulation		Mechanical insulation			
Output operation display		LED on panel lights when power is applied to relay coil.			

■**Transistor output specifications**
(Please see the manual for output circuit configuration.)

Item		Transistor output specification			
		FX3S-10MT□	FX3S-14MT□	FX3S-20MT□	FX3S-30MT□
Number of output points		4 points	6 points	8 points	14 points
Output connecting type		Fixed terminal block (M3 screw)			
Output form		Transistor/sink output (FX3S-□MT/ES) Transistor/source output (FX3S-□MT/ESS)			
External power supply		5 to 30 V DC			
Max. load	Resistance load	0.5 A/point The total load current of resistance loads per common terminal should be the following value. • 1 output point/common terminal: 0.5 A or less • 4 output points/common terminal: 0.8 A or less			
	Inductive load	12 W/24 V DC The total of inductive loads per common terminal should be the following value. • 1 output point/common terminal: 12 W or less/ 24 V DC • 4 output points/common terminal: 19.2 W or less/24 V DC			
Open circuit leakage current		0.1 mA or less/30 V DC			
ON voltage		1.5 V or less			
Response time	OFF→ON ON→OFF	Y000, Y001: 5 µs or less/10 mA or more (5 to 24 V DC) Y002 to Y015: 0.2 ms or less/200 mA or more (at 24 V DC)			
Output circuit insulation		Photocoupler insulation			
Output operation display		LED on panel lights when photocoupler is driven.			

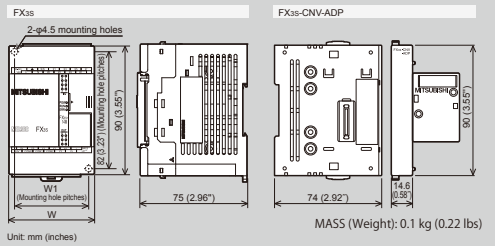
■**Performance specifications**
(General specification is the same as that of FX3U series. Please see the "MELSEC FX-FAMILY" catalog.)

Item		Performance		
Operation control system		Stored program repetitive operation system with interruption function.		
Input/output control system		Batch processing system (when END instruction is executed) Input/output refresh instruction and pulse catch function are provided.		
Programming language		Relay symbol system + step-ladder system (SFC notation possible)		
Program memory	Built-in memory capacity/ type	16,000 steps/EEPROM memory (Program capacity is 4000 steps.) Max. allowable write: 20,000 times		
	Memory cassette (Option)	32,000 steps/EEPROM memory (with loader function) The FX3S series PLC is available only to 16,000 steps. (Program capacity is 4000 steps.) Max. allowable write: 10,000 times		
	Writing function during running	Provided (Program can be modified while the PLC is running.)		
	Keyword function	With keyword/Customer keyword function		
Real-time clock	Clock function*2	Built-in 1980 to 2079 (with correction for leap year) 2- or 4-digit year, accuracy within 45 seconds/month at 25 °C		
Kinds of instructions	Basic instructions	Sequence instructions: 29 Step-ladder instructions: 2		
	Applied instructions	116 kinds		
Processing speed	Basic instructions	0.21 µs/instruction		
	Applied instructions	0.5 µs to several hundred µs/instruction		
Number of input/output points	Input points	16 points or less (Extension is impossible.)		
	Output points	14 points or less (Extension is impossible.)		
Input/output relay	Input relay	X000 to X017	The device numbers are octal.	
	Output relay	Y000 to Y015		
Auxiliary relay	For general	M0 to M383	384 points	
	EEPROM keep	M384 to M511	128 points	
	For general	M512 to M1535	1024 points	
	For special	M8000 to M8511	512 points	
State	For initial state (EEPROM keep)	S0 to S9	10 points	
	EEPROM keep	S10 to S127	118 points	
	For general	S128 to S255	128 points	
Timer (on-delay timer)	100 ms	T0 to T31	32 points	0.1 to 3,276.7 sec
	100 ms/10 ms	T32 to T62	31 points	0.1 to 3,276.7 sec/0.01 to 327.67 sec When M8028 is driven ON, timers T32 to T62 (31 points) are changed to 10 ms resolution.
	1 ms	T63 to T127	65 points	0.001 to 32.767 sec
	1 ms accumulating type	T128 to T131	4 points	0.001 to 32.767 sec
	100 ms accumulating type	T132 to T137	6 points	0.1 to 3,276.7 sec
Variable analog potentiometers		Available as analog timers VR1: D8030 VR2: D8031		
Counter	16 bits up (For general)	C0 to C15	16 points	Counting from 0 to 32,767
	16 bits up (EEPROM keep)	C16 to C31	16 points	Counting from 0 to 32,767
	32 bits up/down (For general)	C200 to C234	35 points	Counting from -2,147,483,648 to +2,147,483,647
High-speed counter	1-phase 1-count input in both directions (32 bits up/down) (EEPROM keep)	C235 to C245	Counting from -2,147,483,648 to +2,147,483,647	
	1-phase 2-count input in both directions (32 bits up/down) (EEPROM keep)	C246 to C250		
	2-phase 2-count input in both directions (32 bits up/down) (EEPROM keep)	C251 to C255		
Data register (32 bits when paired)	For general (16 bits)	D0 to D127	128 points	
	For EEPROM keep (16 bits)	D128 to D255	128 points	
	For general (16 bits)	D256 to D2999	2744 points	
	File register (EEPROM keep)	D1000 to D2999	Max. 2000 points	Can be set as file registers in units of 500 points from D1000 in the program area (EEPROM) using parameters.
	For special (16 bits)	D8000 to D8511	512 points	
	For index (16 bits)	V0 to V7 Z0 to Z7	16 points	
Pointer	For branching of JUMP and CALL	P0 to P255	256 points	For CJ instructions and CALL instructions
	Input interruption	I0□□ to I5□□	6 points	
	Timer interruption	I6□□ to I8□□	3 points	
Nesting	For master control	N0 to N7	8 points	For MC instructions
Constant	Decimal number (K)	16 bits	-32,768 to +32,767	
		32 bits	-2,147,483,648 to +2,147,483,647	
	Hexadecimal number (H)	16 bits	0 to FFFF	
		32 bits	0 to FFFFFFFF	
	Real number (E)	32 bits	-1.0 x 2^{128} to -1.0 x 2^{-126}, 0 , 1.0 x 2^{-126} to 1.0 x 2^{128} Decimal-point and exponential notations are possible.	
Software/peripheral equipment		GX Works2	Version 1.492N or later *3	
		FX-30P	Version 1.50 or later	

*2 : The current time of the clock is backed up by the capacitor built-in the PLC. Supply the power to the PLC for 30 minutes or more to completely charge this large-capacity capacitor.
(The capacitor works for 10 days [atmosphere: 25 °C])

*3 : To program FX3S in GX Developer, select FX3G as the PLC type. Please read the FX3S series user's manual about limitations.

■**External Dimensions**



MASS (Weight): 0.1 kg (0.22 lbs)

Accessories : Dust proof protection sheet
Manual supplied with product
Installation : 35 mm (1.38") wide DIN rail or Direct installation (with M4 screws)

Series	W: mm (inches)	W1: mm (inches) Direct mounting hole pitches	MASS (Weight): kg (lbs)
FX3S-10M	60(2.37")	52(2.05")	0.30(0.66 lbs)
FX3S-14M	60(2.37")	52(2.05")	0.30(0.66 lbs)
FX3S-20M	75(2.96")	67(2.64")	0.40(0.88 lbs)
FX3S-30M	100(3.94")	92(3.63")	0.45(0.99 lbs)

■**Product specification**

Series	Model name	Power Supply	Input Specifications		Output Specifications		
			Number of points	Input type	Number of points	Output type	
Main Units	FX3S-10MR/ES	100 to 240 V AC	6	24 V DC (Sink/ Source)	4	Relay	NEW
	FX3S-10MT/ES		6		4	Transistor (Sink)	NEW
	FX3S-10MT/ESS		6		4	Transistor (Source)	NEW
	FX3S-14MR/ES		8		6	Relay	NEW
	FX3S-14MT/ES		8		6	Transistor (Sink)	NEW
	FX3S-14MT/ESS		8		6	Transistor (Source)	NEW
	FX3S-20MR/ES		12		8	Relay	NEW
	FX3S-20MT/ES		12		8	Transistor (Sink)	NEW
	FX3S-20MT/ESS		12		8	Transistor (Source)	NEW
	FX3S-30MR/ES		16		14	Relay	NEW
	FX3S-30MT/ES		16		14	Transistor (Sink)	NEW
	FX3S-30MT/ESS		16		14	Transistor (Source)	NEW
Connector conversion adapter	FX3S-CNV-ADP	Special adapter connection conversion adapter					NEW
Special adapters	FX3U-232ADP-MB	For RS-232C(MODBUS)communication					
	FX3U-485ADP-MB	For RS-485(MODBUS)communication					
	FX3U-ENET-ADP*4	For Ethernet communication					
	FX3U-4AD-ADP	4-ch voltage/current input					
	FX3U-4DA-ADP	4-ch voltage/current output					
	FX3U-3A-ADP	2-ch voltage/current input 1-ch voltage/current output					
	FX3U-4AD-PT-ADP	4-ch platinum resistance thermometer sensor input (-50 to +250 °C)					
	FX3U-4AD-PTW-ADP	4-ch platinum resistance thermometer sensor input (-100 to +600 °C)					
	FX3U-4AD-PNK-ADP	4-ch Pt1000/Ni1000 resistance thermometer sensor input					
	FX3U-4AD-TC-ADP	4-ch thermocouple (K, J type) temperature sensor input					
Expansion boards	FX3G-232-BD	For RS-232C communication					
	FX3G-422-BD	For RS-422 communication					
	FX3G-485-BD	For RS-485 communication					
	FX3G-8AV-BD	For 8-ch Analog volume					
	FX3G-2AD-BD	2-ch voltage/current input					
	FX3G-1DA-BD	1-ch voltage/current output					
Memory cassette	FX3G-EEPROM-32L	32,000 steps EEPROM memory (with transfer switch)*5					

*4 : FX3U-ENET-ADP Ver. 1.20 or later is applicable to the FX3S series PLC.
*5 : FX3S series PLC can hold 16,000 steps of memory, but user program capacity is limited to 4000 steps.

⚠ Safety Warning

To ensure proper use of the products in this document, please be sure to read the instruction manual prior to use.

Registration

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
http://Global.MitsubishiElectric.com

HIME-L063-A1305(MEE) Printed in Japan

New publication, effective May 2013
Specifications subject to change without notice.