



**MITSUBISHI  
ELECTRIC**

PROGRAMMABLE LOGIC CONTROLLERS

*Changes for the Better*

## *FX3 series* CPU Catalog

***FX3 series***  
All you ever need.



**Empowering  
Industries**

# A tradition in refining excellence.

## Introducing the *FX3 series*...

The ground breaking *FX3 series* is the 3rd generation of compact controller produced by Mitsubishi Electric. Coming from a heritage of pioneering compact controllers, the *FX3 series* continues to build on its cornerstone concepts:

### *Ease of use*



Control systems that require minimum setup and keep program development time to a minimum.

### *Flexible*



A configurable design that permits open communication, large I/O handling, as well as precise positioning and analog control, creating systems that mold to customer requirements.

# *FX3 series*

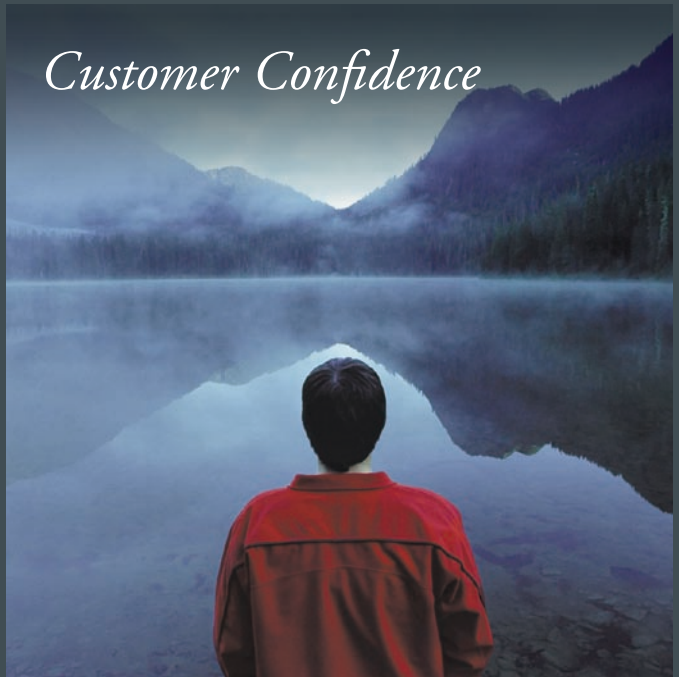
## All you ever need.

## *Affordable*



A high performance to cost ratio makes economical design solutions for a diverse range of applications a reality. These features combined with Mitsubishi Electric's legacy in quality and reliability ensures that the 3rd generation of controller will continue to be at the forefront of the compact PLC market and provide customers with a leading edge.

## *Customer Confidence*



With a design philosophy spanning more than quarter of a century, a customer base spread across the globe, a host of industrial certifications and almost 9 million CPUs sold, the *FX3 series* continues to sustain its position as the compact PLC of choice.







# *FX3 series* control solutions



## Serial Communication

Versatile serial communication of the *FX3 series* allows reliable data exchange with other products such as printers, barcode readers, modems, inverters, other PLCs and PCs.



## Networking

Among the networks supported by the *FX3 series* are CC-Link, Ethernet, Modbus, PROFIBUS-DP and CANopen. Together they provide a wide selection of solutions for interfacing to existing networks.



## Software

MELSOFT software provides scalable solutions for the entire range of Mitsubishi Electric automation products. PLC programming, screen design, and servo and network setup are just a few of the packages available for use with the *FX3 series*.



## Positioning

Built-in high-speed pulse outputs and special instructions enable the *FX3 series* main units to control up to 3 independent axes of servo motion from the main unit itself. Through use of special function blocks, interpolated and networked servo control solutions are also available.



## High Speed Control

With 6 to 8 high speed counters on each model, the *FX3 series* is perfectly suited for applications in need of pulse-catch functions, closed-loop feedback processing, or high-speed sensor use.



## Analog Control

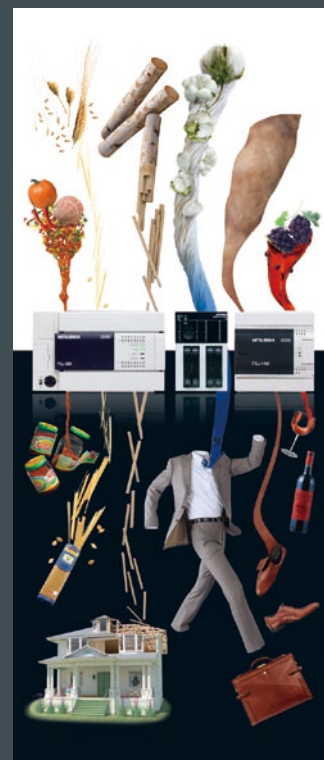
The *FX3 series* features straightforward Analog to Digital and Digital to Analog control for all models, facilitated by an extensive range of Expansion Boards, Special Adapters, and Special Function Blocks.



## Visualization

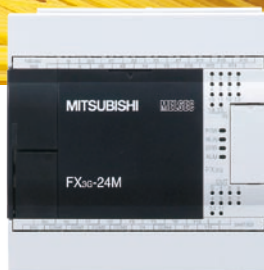
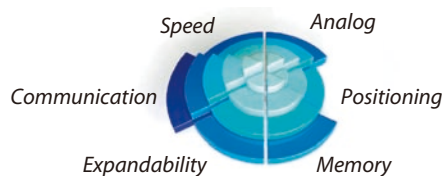
HMI options for the *FX3 series* range from simple text-based Display Units to advanced graphical touch screen displays, otherwise known as the GOT1000 series Graphic Operation Terminals.

With superior built-in functionality and straightforward usability, the *FX series* meets the needs of a variety of user applications.



# FX3G

A basic 3<sup>rd</sup> generation compact PLC



Controllable I/O: 14 - 256 points  
(With CC-Link remote I/O's)  
(Main Unit I/O: 14/24/40/60 points)

## Customized control

The FX3G is an introductory compact PLC and is the newest addition to the FX3 series, designed for simple yet performance-critical applications. Incorporating innovative FX3 series technology the customer is presented with a suite of benefits.

- 3<sup>rd</sup> generation compact PLC
- Highly flexible
- Dual bus architecture
- Control of up to 128 directly connected I/O, or up to 256 I/O with CC-Link remote I/O's.

### Product details

All in one CPU, power supply and I/O. Includes many upgraded features from the FX1N. Especially usage of the FX3 series ADP bus system and new expansion boards (BD).

### Instruction Times

Basic Instructions: 0.21µs / instruction  
(Contact Instruction)

### Large Memory

32,000 steps of built-in program memory. EEPROM memory cassette with loader function is available.

### Applicable Standards

All products support EN and UL/cUL

### Large Device Memory

Auxiliary Relays	7,680 points
Timers	320 points
Counters	235 points
Data Registers	8,000 points
Extension registers	24,000 points
Extension file registers	24,000 points

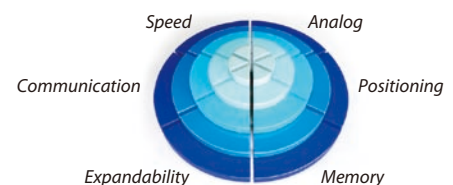


# FX3U

## Flagship model of the 3<sup>rd</sup> generation compact PLC



Controllable I/O: 16 - 384 points  
(with CC-Link remote I/O's)  
(Main Unit I/O: 16/32/48/64/80/128 points)



## Top of the line

The FX3U is the original dual system-bus, high-speed, fully expandable compact PLC designed to seamlessly control communication, networking, analog, and positioning systems. With a maximum of 384 controllable local and networked I/O via CC-Link, the FX3U uses its power and flexibility to provide a solution for a variety of applications.

- 3<sup>rd</sup> generation compact PLC
- High efficiency with more speed, more performance, more memory, and new functions.
- Built-in high speed processing and positioning
- The FX3U can control a maximum of 256 connected I/O, and up to 384 points with CC-Link remote I/O's.

### Product Details

All-in-one CPU, power supply and I/O. Includes many upgraded features from the FX2N, including high expandability using Expansion Boards and Special Adapters to add functionality.

### Fast Instruction Times

Basic Instructions: 0.065µs / instruction  
(Contact Instruction)

### Large Memory

64,000 steps of built-in program memory. Flash Memory Cassettes with loader functionality also available

### Applicable Standards

All products support EN and UL/cUL standards

### Large Device Memory

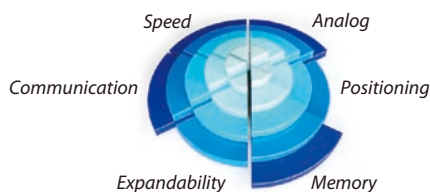
Auxiliary Relays	7,680 points
Timers	512 points
Counters	235 points
Data Registers	8,000 points
Extension Registers	32,768 points
Extension File Registers*	32,768 points

\*With optional Memory Cassette

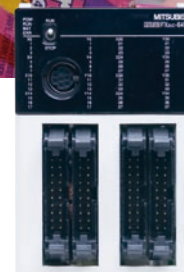


# FX3UC

## Slim fit model of the 3<sup>rd</sup> generation compact PLC



Controllable I/O: 16 - 384 points  
(with CC-Link remote I/O's)  
(Main Unit I/O: 16/32/64/96 points)



### Slim Fit

The FX3UC is the new ultra-compact high speed, fully expandable PLC. Based on 24V DC power and using connector-type transistor I/O, the FX3UC is designed for space conscious and modular applications. Created inline with the FX3U series, the FX3UC incorporates such attributes as built-in high speed I/O and the dual system-bus architecture, optimizing communication, networking, analog, and positioning control.

- 3<sup>rd</sup> generation Super-compact PLC
- Reduced size and wiring using connector-type I/O
- Built-in high speed processing and positioning
- Even with its ultra-compact size, the FX3UC can be expanded to locally control up to 256 I/O, and up to 384 points with CC-Link remote I/O's.

#### Product Details

Ultra-compact size main unit including many upgraded features from the FX2N, including high expandability using Special Adapters to add functionality.

#### Fast Instruction Times

Basic Instructions: 0.065μs / instruction  
(Contact Instruction)

#### Large Memory

64,000 steps of built-in program memory.  
Flash Memory Cassettes with loader functionality also available

#### Large Device Memory

Auxiliary Relays	7,680 points
Timers	512 points
Counters	235 points
Data Registers	8,000 points
Extension Registers	32,768 points
Extension File Registers*	32,768 points

\*With optional Memory Cassette

# Selection Guide

Select System Item		Select Item Specification		Select an Applicable FX Model			
				Terminal-type I/O		Connector-type I/O	
System Item	Item Specification *	<i>FX</i> 3G	<i>FX</i> 3U	<i>FX</i> 3UC			
I/O points	Up to 128 local I/O's	✓	★	★			
	Up to 256 local I/O's		✓	✓			
	Up to 256 local and network I/O's	✓	★	★			
	Up to 384 local and network I/O's		✓	✓			
Power Supply	AC Power	✓	✓				
	DC Power		✓	✓			
Output type	Relay	✓	✓				
	Transistor	✓	✓	✓			
CPU Speed	Standard	✓	★	★			
	Advanced		✓	✓			
Analog I/O (Current / Voltage)	Up to 8 ADP channels	✓*1	★	★			
	Up to 16 ADP channels		✓	✓			
	Up to 64 special function block channels	✓	✓	✓			
Temperature Sensor Input	Up to 8 ADP input channels	✓*1	★	★			
	Up to 16 ADP input channels		✓	✓			
	Up to 64 special function block input channels	✓	✓	✓			
	Temperature control	✓	✓	✓			
Communication	CC-Link (Master/Slave)		✓	✓	✓		
	N:N Network/Parallel Link		✓	✓	✓		
	Computer Link (RS-232C/RS-485)		✓	✓	✓		
	Non-Protocol Communication:	1 Channel (RS-232C/RS-485)	✓	✓	✓		
		Multi-Channel (RS-232C)		✓	✓	✓	
		Multi-Channel (RS-485)		✓	✓	✓	
	Add-on Communication Ports	RS-485	✓	✓	✓		
		RS-232C		✓	✓	✓	
		USB			✓		
	Embedded USB		✓				
	Modbus			✓	✓		
	CANopen		✓	✓	✓		
	Ethernet		✓	✓	✓		
Inverter control	PROFIBUS-DP	Master	✓	✓	✓		
		Slave	✓	✓	✓		
	Analog		✓	✓	✓		
	Pulse width modulation		✓	✓	✓		
Positioning	RS-485 Communication		✓	✓	✓		
	1 - 2 100kHz Axis Built-in Positioning		✓	★	★		
	Up to 3 x 100kHz Axis Built-in Positioning		✓*2	✓	✓		
	Up to 4 x 200kHz Axis with High-Speed Output Adapters			✓			
	Up to 8 x 1MHz Axis with Special Function Blocks			✓	✓		
	Up to 16 SSCNET-III Axis with Special Function Blocks			✓	✓		
	Cam switching			✓	✓		
High-Speed Counters	Up to 6 high speed counters, max 60kHz		✓	★	★		
	Up to 8 high speed counters, max 100kHz			✓	✓		
	Up to 8-high speed counters with 200kHz Adapter			✓			
	Additional Expansion using High-Speed Counter Block			✓	✓		

\* : Some items require additional expansion modules in order to function where other connection rules and requirements may apply. For more details, refer to the respective product manuals.

✓ : Contains required functionality  
 ★ : Higher functionality or more expandability  
 \*1 : 14 and 24 I/O points main units: max 4 channels  
 \*2 : Only for the 40 and 60 I/O points main units



# Software

In today's world, programming software for PLCs is a forever evolving process. Customers place more focus on reusable program code and user friendly software that helps to reduce errors and programming time, and manage the programming process.



GT Designer 2

GT Simulator 2

Communication/Monitoring

GX Simulator

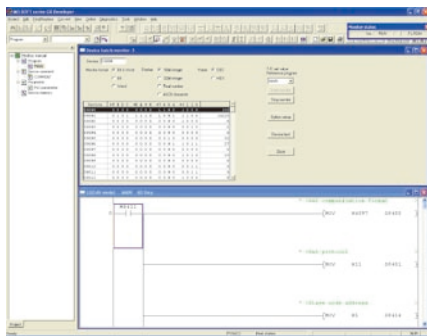
GX Developer

## Programming Software

### GX Developer

The key to any good software is that it is simple to use and intuitive. The GX Developer PLC programming package has achieved this by using a design that is easy to understand yet has access to powerful functions and tools. It also features help functions and an advanced communications setup utility, ensuring safe, reliable data transfer to and from the target PLC.

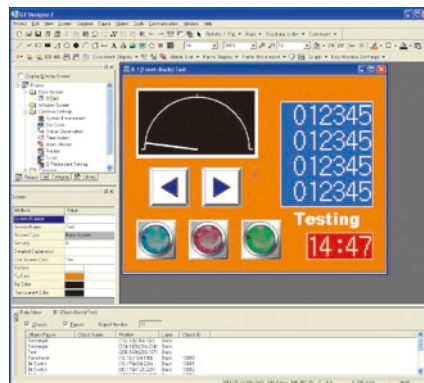
GX Developer has also been designed so that it can interface directly with other FX Programming packages, such as FX Configurator-FP and FX Configurator-EN, allowing customers to access different programs in a straightforward manner.



## Screen Design Software

### GT Designer 2

GT Designer 2 is a screen design program used to create HMI screens for the entire line of Mitsubishi GOTs. A user-friendly Windows® environment provides the customer with a simple and recognizable interface, facilitating a fast learning curve for new users. GT Designer2 is equipped with a parts library, a range of touch-switches and lamps, screen preview functionality, a GOT communication settings utility, and a project consistency check function. Together, these features combine to make GT Designer2 a platform that produces screens that simplify the control interface between the user and the machine.



## Simulation packages

### GX Simulator & GT Simulator 2

To save production cost, application designers are expected to reduce program development time.

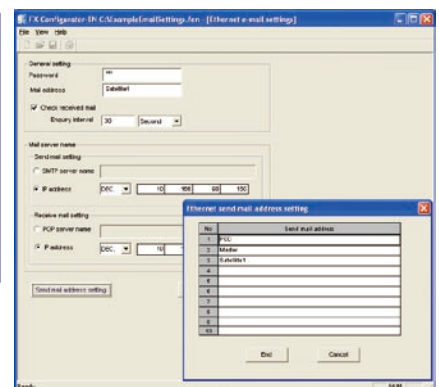
In order to meet this challenge, Mitsubishi Electric has created simulation packages to help designers increase development efficiency. GX Simulator and GT Simulator2 allow users to create a virtual PLC or GOT respectively on their PC. PLC code and GOT programs can be tested and any errors debugged without the need of hardware. GX Simulator and GT Simulator2 have been developed so they can operate simultaneously, allowing a complete application environment to be created within the user's PC.

## FX Programming Packages

### FX Configurator-FP & FX Configurator-EN

When using the FX3U-20SSC-H positioning block, or the FX3U-ENET Ethernet module, these FX programming packages simplify special function block setup and enable dedicated monitoring and testing capabilities between the PC and the module. The FX Configurator-FP configures the FX3U-20SSC-H positioning unit, including the parameter of the connected servos and features extensive monitoring and testing functionalities. The FX Configurator-EN provides an easy setup environment for the FX3U-ENET Ethernet module. Both software packages can be launched independently or as helper applications from GX Developer, promoting PLC ladder and special function block operation integration.

No.	Comment	Address	Speed	Pos. value	Acc. value	Time	Unit	Value
		(hex)	(rpm)	(pulse)	(pulse/s)	(ms)		
1	1st step position	0	2000000	10	1000000			100
2	1st step position	1	2000000	10	1000000			100
3	1st step position	2	2000000	10	1000000			100
4	1st step position	3	2000000	10	1000000			100
5	1st step position	4	2000000	10	1000000			100
6	1st step position	5	2000000	10	1000000			100
7	1st step position	6	2000000	10	1000000			100
8	1st step position	7	2000000	10	1000000			100
9	1st step position	8	2000000	10	1000000			100
10	1st step position	9	2000000	10	1000000			100
11	1st step position	10	2000000	10	1000000			100
12	1st step position	11	2000000	10	1000000			100
13	1st step position	12	2000000	10	1000000			100



# Specifications

## Environmental Specifications

General specifications	FX3G	FX3U	FX3UC
Ambient temperature	0 – 55 °C (storage temperature: -25 – +75 °C)	0 – 55 °C (storage temperature: -25 – +75 °C)	0 – 55 °C (storage temperature: -25 – +75 °C)
Noise durability	1000 Vpp with noise generator; 1 μs at 30 – 100 Hz	1000 Vpp with noise generator; 1 μs at 30 – 100 Hz	1000 Vpp with noise generator; 1 μs at 30 – 100 Hz
Dielectric withstand voltage	1500 V AC, 1 min.	AC PSU: 1500 V AC, 1 min. / DC PSU: 500 V AC, 1 min.	500 V AC, 1 min.
Ambient relative humidity	5 – 95% (non-condensing)	5 – 95% (non-condensing)	5 – 95% (non-condensing)
Shock resistance	Complies to IEC 68-2-27: 147 m/s <sup>2</sup> (3 times each in 3 directions for 11 ms)	Complies to IEC 68-2-27: 15 G (3 times each in 3 directions for 11 ms)	Complies to IEC 68-2-27: 15 G (3 times each in 3 directions for 11 ms)
Vibration resistance	Complies to IEC 68-2-6: 9.8m/s <sup>2</sup> (resistance to vibrations from 57 – 150 Hz for 80 minutes along all 3 axes); 4.9m/s <sup>2</sup> for DIN rail mounting	Complies to IEC 68-2-6: 9.8m/s <sup>2</sup> (resistance to vibrations from 57 – 150 Hz for 80 minutes along all 3 axes); 4.9m/s <sup>2</sup> for DIN rail mounting	Complies to IEC 68-2-6: 9.8m/s <sup>2</sup> (resistance to vibrations from 57 – 150 Hz for 80 minutes along all 3 axes); 4.9m/s <sup>2</sup> for DIN rail mounting
Insulation resistance	500 V DC, 5 MΩ	500 V DC, 5 MΩ	500 V DC, 5 MΩ
Ground	Class D: Grounding resistance 100 Ω or less	Class D: Grounding resistance 100 Ω or less	Class D: Grounding resistance 100 Ω or less
Fuse	For FX3G-14M[] and FX3G-24M[]: 250V 1 A; For FX3G-40M[] and FX3G-60M[]: 250V 3.15 A	From FX3U-16M[] to FX3U-32M[]: 250V 3.15 A; From FX3U-48M[] to FX3U-128M[]: 250V 5 A	125V 3.15A
Environment	Avoid environments containing corrosive gases, install in a dust-free location.	Avoid environments containing corrosive gases, install in a dust-free location.	Avoid environments containing corrosive gases, install in a dust-free location.
Certifications	CE, UL/cUL	CE, UL/cUL, Ship approvals	CE, UL/cUL, Ship approvals

## Electrical Specifications

Power Supply Specifications	FX3G	FX3U AC Powered Models (FX3U-[]M[]/ES/ESS)	DC Powered Models (FX3U-[]M[]/DS/DSS)	FX3UC
Power supply	100–240 V AC (+10 % / -15 %), 50/60 Hz	100–240 V AC (+10 % / -15 %), 50/60 Hz	24 V DC (+20% / -30 %)	24 V DC (+20% / -15 %) Ripple Voltage (p-p)5% or less
Inrush current at ON	30 A / <5 ms (at 100 V AC); 50 A / <5 ms (at 200 V AC)	30 A / <5 ms (at 100 V AC); 65 A / <5 ms (at 200 V AC)	35 A / <0.5 ms (at 24 V DC);	30A / < 0.5ms (at 24V DC)
Allowable momentary power failure time	10 ms	10 ms	5 ms	5 ms
24V DC service power supply	400 mA	FX3U-16/32MR/ES: 400 mA / FX3U-48/64/80/128MR/ES: 600 mA	—	—

Output Specifications	FX3G Relay Models	Transistor Models	FX3U Relay Models	Transistor Models	FX3UC Transistor Models
Switching voltage (max.)	V <240 V AC, <30 V DC	5–30 V DC	<240 V AC, <30 V DC	5–30 V DC	5–30 V DC
Max. output current	- per output A 2	0.5	2	0.5	0.3A (Y0 - Y3), and 0.1A (Y4 or higher)
	- per group* A 8	0.8	8	0.8	0.8
Max. switching current	- inductive load 80VA	12W	80VA	12W	12W (7.2W per point for Y0 - Y3 and 2.4W per point for Y4 or higher)
Response time	ms 10	< 0.2 ( < 5μs for Y0,Y1 )****	10	< 0.2 ( < 5μs for Y0–Y2 )	< 0.2 ( < 5μs for Y0 - Y2)
Life of contacts (switching times)	3,000,000 at 20VA; 1,000,000 at 35VA; 200,000 at 80VA**	—	3,000,000 at 20VA; 1,000,000 at 35VA; 200,000 at 80VA**	—	—***

\* This limitation applies to the maximum output current for each reference terminal (Common), each serving 1 to 4 relay or transistor outputs.

Please observe the reference terminal assignments for group identification.

\*\* Not guaranteed by Mitsubishi Electric.

\*\*\* Refer to the specifications of the Terminal Block being used.

\*\*\*\* The 40 and 60 I/O pints main units supports 0.5 micro seconds for Y2.





## Programming Specifications

System specifications	FX36	FX3U	FX3UC
I/O points	256 total (combined local and CC-Link remote I/O)	384 total (combined local and CC-Link remote I/O)	384 total (combined local and CC-Link remote I/O)
Address range	Max. 128 direct addressing and Max. 128 remote I/O	Max. 256 direct addressing and Max. 256 remote I/O	Max. 256 direct addressing and Max. 256 remote I/O
Program memory	32,000 steps EEPROM (internal), exchangeable EEPROM memory cassette	64,000 steps RAM (internal), exchangeable FLROM memory cassette	64,000 steps RAM (internal), exchangeable FLROM memory cassette
Instruction Time	0.21 µs or 0.42 µs / contact instruction	0.065 µs / contact instruction	0.065 µs / contact instruction
Number of instructions	29 sequence instructions, 2 step ladder instructions, 123 applied instructions	29 sequence instructions, 2 step ladder instructions, 210 applied instructions	29 sequence instructions, 2 step ladder instructions, 210 applied instructions
Programming language	Step ladder, instruction list, SFC	Step ladder, instruction list, SFC	Step ladder, instruction list, SFC
Program execution	Cyclical execution, refresh mode processing	Cyclical execution, refresh mode processing	Cyclical execution, refresh mode processing
Program protection	2 different keywords, maximum password length 16 characters	8 or 16-character keyword protection with 3 protection levels each* <sup>1</sup>	8 or 16-character keyword protection with 3 protection levels each* <sup>1</sup>

\*<sup>1</sup> 8-character keyword protection level depends on the keyword registered; 16-character keyword protection level is set within GX-Developer

System specifications	FX36	FX3U	FX3UC
Auxiliary relays	7,680 total, with 384 general (M0 - M384), 1152 EEPROM latched (M384 - M1535), and 6,144 general/optional latched (M1536 - M7679)	7,680 total, with 500 general (M0 - M499), 524 optional latched (M500 - M1023), and 6,656 latched (M1024 - M7679)	7,680 total, with 500 general (M0 - M499), 524 optional latched (M500 - M1023), and 6,656 latched (M1024 - M7679)
Special auxiliary relays	512 (M8000 - M8511)	512 (M8000 - M8511)	512 (M8000 - M8511)
State relays	4,096 total, with 1,000 EEPROM latched (S0 - S999) and 3,096 general/optional latched (S1000 - S4095)	4,096 total, with 1,000 optional latched (S0 - S999) and 3,096 latched (S1000 - S4095)	4,096 total, with 1,000 optional latched (S0 - S999) and 3,096 latched (S1000 - S4095)
Timers	320 total, with 206 100ms (T0 - T199 and T250 - T255), 46 10ms (T200 - T245), and 68 1ms (T246 - T249 and T256 - T319)	512 total, with 206 100ms (T0 - T191, T192 - T199 and T250 - T255), 46 10ms (T200 - T245), and 260 1ms (T246 - T249 and T256 - T511)	512 total, with 206 100ms (T0 - T191, T192 - T199 and T250 - T255), 46 10ms (T200 - T245), and 260 1ms (T246 - T249 and T256 - T511)
Counters	235 total (16-bit and 32-bit), with 36 general (C0 - C16 and C200 - C219) and 199 EEPROM latched (C16 - C199 and C220 - C234)	235 total (16-bit and 32-bit), with 120 general (C0 - C99 and C200 - C219) and 115 latched (C100 - C199 and C220 - C234)	235 total (16-bit and 32-bit), with 120 general (C0 - C99 and C200 - C219) and 115 latched (C100 - C199 and C220 - C234)
High-speed counters	21 total, with 16 1-phase (C235 - C250) and 5 2-phase (C251 - C255)	21 total, with 16 1-phase (C235 - C250) and 5 2-phase (C251 - C255)	21 total, with 16 1-phase (C235 - C250) and 5 2-phase (C251 - C255)
High-speed counter speed	1 phase, 6 points max: 60 kHz / 4 points, 10 kHz / 2 points 2 phase, 3 points max: 30 kHz / 2 points, 5kHz/1 point	1 phase, 8 points max: 100 kHz / 6 points 10 kHz / 2 points 2 phase, 2 points max: 50 kHz / 2 points	1 phase, 8 points max: 100 kHz / 6 points 10 kHz / 2 points 2 phase, 2 points max: 50 kHz / 2 points
Real-time clock	Year, month, day, hour, minute, second, day of the week	Year, month, day, hour, minute, second, day of the week	Year, month, day, hour, minute, second, day of the week
Data registers	8,000 total, with 128 general (D0 - D127), 972 EEPROM latched (D128 - D1099), and 6,900 general/optional latched (D1100 - D7999)	8,000 total, with 200 general (D0 - D199), 312 optional latched (D200 - D511), and 7,488 latched (D512 - D7999)	8,000 total, with 200 general (D0 - D199), 312 optional latched (D200 - D511), and 7,488 latched (D512 - D7999)
Extension registers	24,000(R0~R23999)	32,768(R0~R32767)	32,768(R0~R32767)
Extension file registers	24,000(ER0~R23999) internal/optional memory	32,768(ER0~R32767) optional memory	32,768(ER0~R32767) optional memory
Index registers	16	16	16
Special data registers	512 (D8000 - D8511)	512 (D8000 - D8511)	512 (D80000 - D8511)
Pointers	2,048	4,096	4,096
Nestings	8	8	8
Interrupt inputs	6	6	6
Constants	16-bit: K: -32,768 to +32,767; H: 0 to FFFF; 32-bit: K: -2,147,483,648 to +2,147,483,647; H: 0 to FFFF FFFF	16-bit: K: -32,768 to +32,767; H: 0 to FFFF; 32-bit: K: -2,147,483,648 to +2,147,483,647; H: 0 to FFFF FFFF	16-bit: K: -32,768 to +32,767; H: 0 to FFFF; 32-bit: K: -2,147,483,648 to +2,147,483,647; H: 0 to FFFF FFFF

Mitsubishi Electric Corporation Himeji Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001(standards for quality assurance management systems)



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