

FX0-14/20/30 the Micro Controllers

General Overview

The FX0 range of products are stand alone, programmable controllers. The FX0 offers all necessary components such as power supply, Central Processing Unit (CPU), Input/Output (I/O) control and switch gear built in as standard. This makes the FX0 easy to configure and easy to use. Maintenance of the FX0 is also very easy - there are no batteries to change or rely upon for backing up active data. This is automatically taken care of by the FX0's internal EEPROM memory.

Features Include

Wide Tolerance Power Supplies:

Allows ease of use anywhere in the world.

AC Models: 100-240V
+10%/-15%
50/60Hz

DC Models: 24V
+10%/-15%
(including ripple)

Transistor Inputs:

Inputs X0 to X5 on all FX0 models are high speed devices. They can be utilized when they are used with the built in single phase counters (max. 5kHz) or with any of the dual phase counters (max. 2kHz). Additional uses include actions as interrupt triggers.

Hidden Feature's:

Under this programming port door, find not only the programming port but also a Run/Stop switch and an analog potentiometer to directly adjust the value of a special data device.

Micro Size:

The FX0 AC models are certainly micro sized controllers, but the DC versions are astonishingly small. They are only 60 % of the height of their AC counterparts! That's 47mm (1.85 inches) compared to 75mm (2.95 inches).

Optional Mounting:

The FX0 range of controllers allows users to select their favourite mounting system - Direct mounting can be achieved with two M4 (0.16 inch) screws/bolts or Snap-on mounting can be achieved by use of the 35mm DIN rail clips.

Free Service Supply:

A regulated 24V DC (100mA) service supply is available on every AC powered FX0 for use as a sensor supply etc.

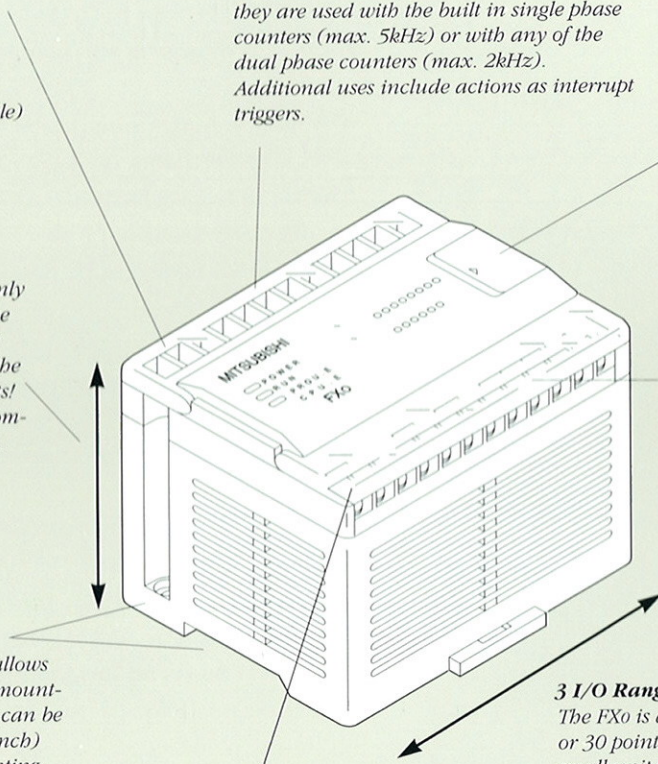
3 I/O Ranges:

The FX0 is available in three I/O ranges, 14, 20 or 30 points. Each model offers an exceptionally small unit length.

FX0-14☆☆ = 100mm (3.94 inches)

FX0-20☆☆ = 130mm (5.12 inches)

FX0-30☆☆ = 170mm (6.69 inches)



Choice of Output Devices:

Choose between transistor outputs or relay outputs to provide either high speed responses or system flexibility.

Software Features

The FX0 has the standard 20 Basic Instructions that all Mitsubishi 'brick' type programmable controllers possess. In addition it also has a sub-set of 35 of the most popular Applied Instructions found in the FX range of controllers. This makes the FX0 a powerful 'tool' which is an absolute asset in basic control applications and has the potential to provide a good solution to more complex problems. Many of the Applied Instructions provide dedicated control features, i.e. PLSY or Pulse Y Output allows the FX0 to act as a pulse train generator with capabilities of frequencies between 10 and 2000Hz.

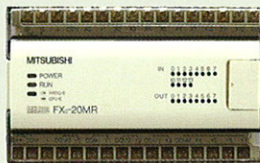
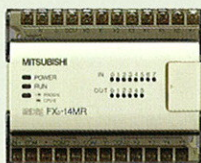
See page 37 for further software details.

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Available Models

| Power supply | Model | Total Number of I/O | Inputs | | Outputs | | Dimensions (mm) | Dimensions (inches) | Availability |
|--------------|----------------|---------------------|-----------|------------------------|---------------|-------------------|--------------------|---------------------|---------------|
| | | | Number of | Transistor Type | Number of | Type | | | |
| AC | FX0-14MR-ES/UL | 14 | 8 | Sink/Source selectable | 6 | Relay | 75 × 80 × 100 | 2.95 × 3.15 × 3.94 | World model |
| | FX0-20MR-ES/UL | 20 | 12 | | 8 | | 75 × 80 × 130 | 2.95 × 3.15 × 5.12 | |
| | FX0-30MR-ES/UL | 30 | 16 | | 14 | | 75 × 80 × 170 | 2.95 × 3.15 × 6.69 | |
| | FX0-14MT-E/UL | 14 | 8 | Sink Only | 6 | Sink Transistor | 75 × 80 × 100 | 2.95 × 3.15 × 3.94 | North America |
| | FX0-20MT-E/UL | 20 | 12 | | 8 | | 75 × 80 × 130 | 2.95 × 3.15 × 5.12 | |
| | FX0-30MT-E/UL | 30 | 16 | | 14 | | 75 × 80 × 170 | 2.95 × 3.15 × 6.69 | |
| DC | FX0-14MR-DS | 14 | 8 | Sink/Source selectable | 6 | Relay | 47 × 80 × 100 | 1.85 × 3.15 × 3.94 | World model |
| | FX0-20MR-DS | 20 | 12 | | 8 | | 47 × 80 × 130 | 1.85 × 3.15 × 5.12 | |
| | FX0-30MR-DS | 30 | 16 | | 14 | | 47 × 80 × 170 | 1.85 × 3.15 × 6.69 | |
| | FX0-14MT-DSS | 14 | 8 | Sink Only | 6 | Source Transistor | 47 × 80 × 100 | 1.85 × 3.15 × 3.94 | World model |
| | FX0-20MT-DSS | 20 | 12 | | 8 | | 47 × 80 × 130 | 1.85 × 3.15 × 5.12 | |
| | FX0-30MT-DSS | 30 | 16 | | 14 | | 47 × 80 × 170 | 1.85 × 3.15 × 6.69 | |
| | FX0-14MT-D/E | 14 | 8 | Sink Only | 6 | Sink Transistor | 47 × 80 × 100 | 1.85 × 3.15 × 3.94 | North America |
| | FX0-20MT-D/E | 20 | 12 | | 8 | | 47 × 80 × 130 | 1.85 × 3.15 × 5.12 | |
| FX0-30MT-D/E | 30 | 16 | 14 | | 47 × 80 × 170 | | 1.85 × 3.15 × 6.69 | | |

Power Supply: AC 100-240V, +10%/-15%, 50/60Hz, DC24V, +10%/15% (including ripple).



Environmental Specifications

| ENVIRONMENTAL SPECIFICATIONS (SUMMARY) | | |
|--|--|--------------------|
| ITEM | AC POWERED UNITS | DC POWERED UNITS |
| Dielectric withstand voltage | 1500V AC for 1 min. | 500V AC for 1 min. |
| Insulation resistance | 5MΩ or larger by 500V DC insulation resistance tester | |
| Noise durability | Noise voltage: 1000Vp-p, width: 1μs, frequency: 30 to 100Hz, tested by noise simulator | |
| Grounding | Class 3 grounding(100Ω or less) | |
| Ambient operating temperature/humidity | 0 to 55°C(32 to 131°F), 35 to 85% RH(no condensation), to be free from corrosive gas and dust | |
| Vibration resistance | JIS C0911, 10 to 55 Hz, 0.5mm/0.02in.(max. 2G, 0.5G if mounted on DIN rail), 2hrs. in 3 directions | |
| Shock resistance | JIS C0912, 10G, 3 times in 3 directions | |

FX0-14/20/30 Specifications

| ITEM | | GENERAL SPECIFICATION | | REMARK | |
|------------------------------|-------------------------------|---|---|--|---|
| Operation control method | | Cyclic operation by stored program | | | |
| I/O control method | | Batch processing (takes place after END instruction is executed) | | Direct I/O control, refresh and input filter adjustment is available | |
| Operation process time | | Basic instructions 1.6 to 3.6 μ s | | Applied instructions; from 1.6 to several 100 μ s | |
| Programming language | | Relay symbolic language + Stepladder | | SFC expression is possible | |
| Program capacity/memory type | | 800 step EEPROM - built into the unit | | | |
| Number of instructions | | Sequence (basic) instructions; 20, Stepladder instructions; 2, Applied instructions; 35 | | | |
| Input Spec. | DC input | 24V DC, 7mA, opto-isolated | | X0 to X17 max. | Maximum number of I/O points, 30 |
| | - | - | | | |
| Output Spec. | Relay | 250V AC, 30V DC, 2A per point (resistive load) | | Y0 to Y15 max. | |
| | Transistor | 30V DC, 0.5A per point, 0.8A max. per 4 point gang | | | |
| Auxiliary (internal) relay | General use | - | | M0 to M511 (512 points) | |
| | Latched | Automatically backed up by the internal EEPROM | | M496 to M511 (16 points- subset of above) | |
| | Special purpose | - | | M8000 to M8254 (56 points) | |
| State relay | General use | - | | S0 to S63 (64 points) | |
| | Initialization states | Can be used to start/initialize a sequence of STL program | | S0 to S9 (10 points - subset of above) | |
| Timer | 100 msec | 0.1 to 3,276.7 sec. | | T0 to T55 (56 points) | |
| | 10 msec | 0.01 to 327.67 sec. | | T32 to T55 (24 points) when M8028 is ON | |
| Counter | Up counter | 16 bits (1 to 32,767 counts) | General use | C0 to C15 (16 points) | |
| | | | Backed up by EEPROM | C14 to C15 (2 points - subset of above) | |
| | High speed counter | 32 bits up/down (-2,147,483,648 to +2,147,483,647 counts) | Counters which use input X000 are backed up by EEPROM | 4 points if 1-phase counters are used, C235 to C249. Max 1-phase count 5kHz. (see note 1) 1 point if 2-phase counters are used, C251 to C254. Max 2-phase count 2kHz (see note 2) | |
| Data registers | General purpose data register | 16 bits | Pair for 32 bit data register | General use | D0 to D31 (32 points) |
| | | 16 bits | | Backed up by EEPROM | D30 to D31 (2 points - subset of above) |
| | Special register | 16 bits | | D8000 to D8069 (27 points [☆]) | |
| | Index register | 16 bits | | V and Z (2 points) | |
| | Manual 'analog pot' | Available range 0 to 255, typically used as a timer control | | Data is moved into register D8013 (1 point-included in [☆]) | |
| Pointer | For JUMP/CALL | For use with conditional jump (CJ, FNC00) applied instr. | | P0 to P63 (64 points) | |
| | Interrupt | Interrupts can be triggered by inputs X000 to X003 | | I0 to I3 (4 points) | |
| Nesting | | For use with master control(MC) basic ladder instruction | | Nest levels, N0 to N7 (8 points) | |
| Constant | Decimal | 16 bits: -32,768 to +32,767 | | 32 bits: -2,147,483,648 to +2,147,483,647 | |
| | Hexadecimal | 16 bits: 0 to FFFFH | | 32 bits: 0 to FFFFFFFFH | |

Note 1: When multiple 1-phase high speed counters are used, the sum of the counted frequencies must \leq 5kHz.

Note 2: Only 1, 2 phase high speed counter may be used at any one time. When 2-phase counters are in use, 1-phase counters cannot be used.