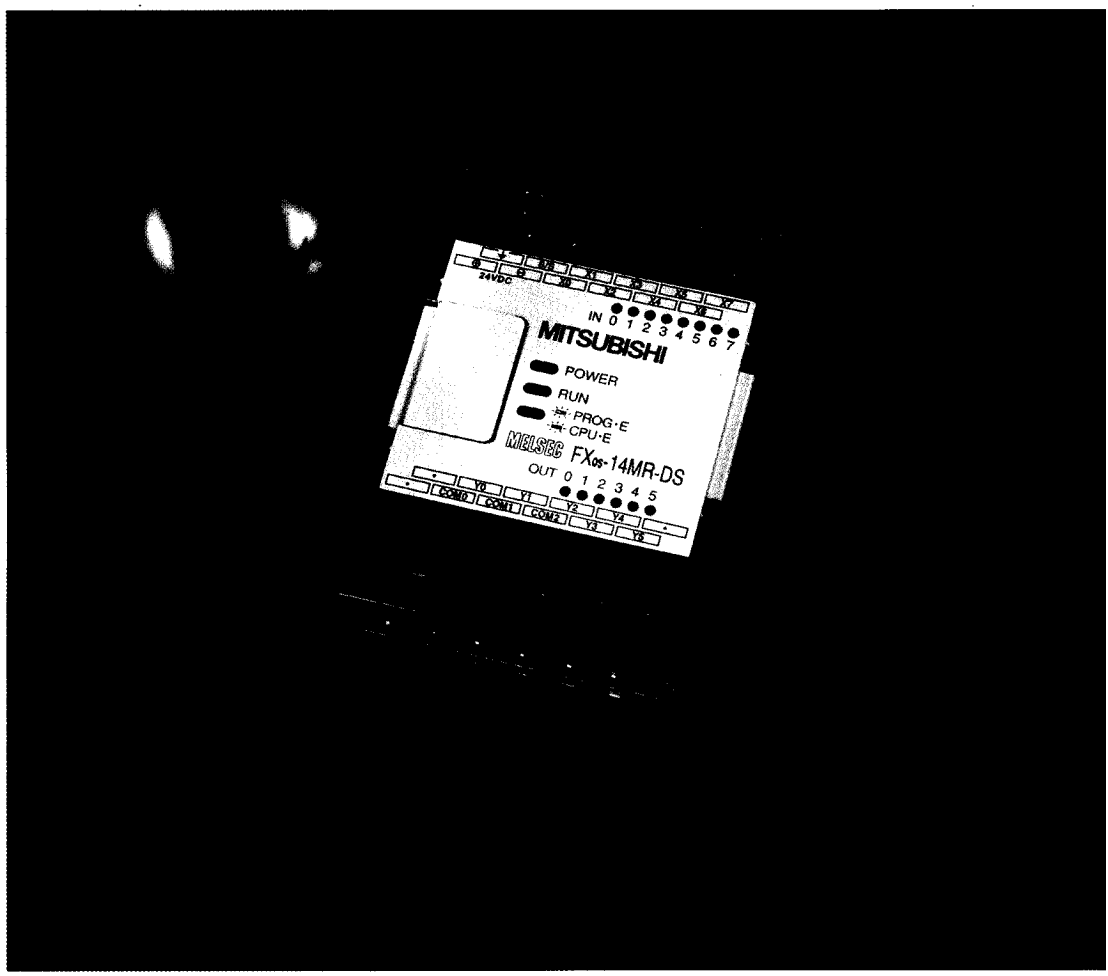
# FXos MICRO CONTROLLER SERIES




***Less soldering***

***more control***

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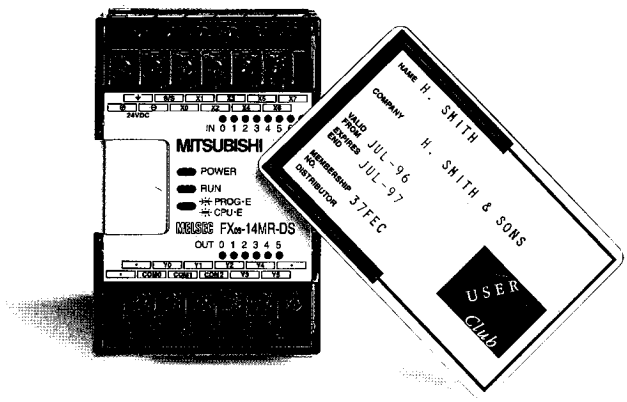
# THE PERFECT FIT FOR EMBEDDED APPLICATIONS

## Smallest Footprint Yet

The FXos range is the latest addition to the FX family of 'brick' type controllers from Mitsubishi. Offering enhancements in functional specification to the market leading FXo, the smallest unit - the FXos-10MR-DS measures only 60mm x 47mm x 90mm - a footprint roughly the size of a credit card.




## Heavy Duty Applications

The FXos represents the perfect balance between advanced control (replacing basic hardwired relay solutions), reduced panel size and great value. High powered relay outputs provide the ability to switch currents of up to 2.5A per point, with an activation time of approximately 10msec. And with EEPROM memory any data requiring storage when the unit is powered down, does not rely on battery back-up. These features and more make the FXos ideal for heavy duty applications, but with a low maintenance overhead.

## A Host Of Features

Available in four I/0 sizes - 10, 14, 20 and 30 points, FXos incorporates a number of leading edge features. FXos is also compatible with the rest of the FX family and programs can be directly interchanged.

## Features Include:

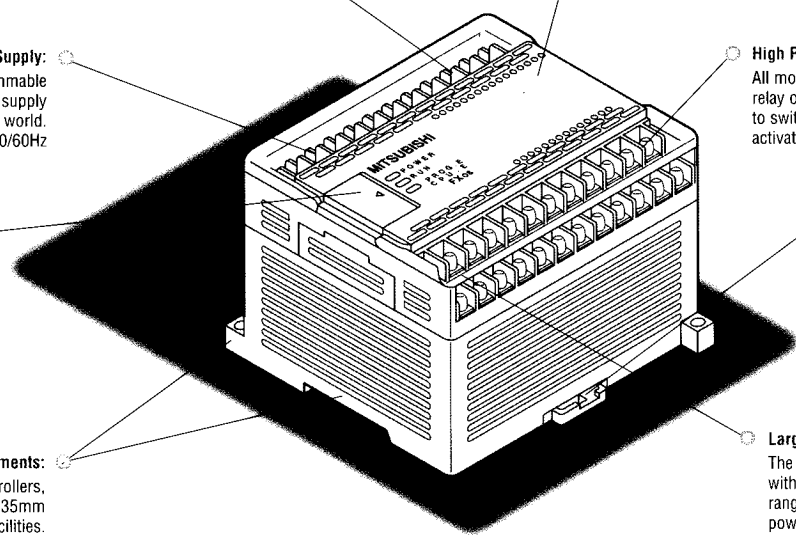
**High Speed Input Devices:**
Users have access to DC transistor inputs providing high speed counting and interrupt services (up to 7kHz).

**Battery-less Backup:**
Because of the use of EEPROM memory in the FXos, any data which requires storage when the unit is powered down does not rely on the quality or availability of a battery to provide back-up This makes FXos user friendly AND a minimal maintenance product.

**Wide Tolerance Power Supply:**
As with all FX Family programmable controllers, a wide tolerance power supply means concern free use anywhere in the world. AC supply: 100-240V, + 10%/-15%, 50/60Hz

**High Powered Relay Outputs:**
All models of the FXos have high powered relay outputs. These devices provide the ability to switch currents of up to 2.5 amps with an activation time of approximately 10msec.

**User Friendly Features:**
The FXos has a useful Run/Stop switch allowing quick and easy operation yet it remains discreetly hidden next to the programming port. In addition there is a single analog potentiometer which can be used to indirectly change data values, timer durations etc.




**Smallest Unit Footprint:**
The FXos products are the smallest footprint programmable controllers available from Mitsubishi Electric. Yet the FXos also has high powered input and output facilities which make it ide for 'Heavy Duty' applications.

**Flexible Mounting Arrangements:**
As with all FX family programmable controllers, users are offered the choice between 35mm DIN rail or the use of direct mounting facilities.

**Large Capacity Service Supply:**
The FXos - ✻✻MR-ES/UL units are equipped with a 200mA, 24V DC service supply. Uses range from sensor supplies to providing power for additional monitoring peripherals.

# ULTRA COMPACT WITH OUTSTANDING FUNCTIONALITY

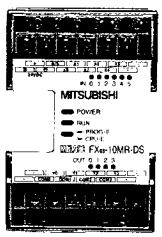
## Software Features:

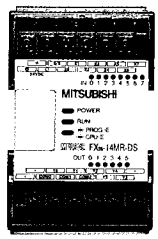
The FXos has the same standard 20 Basic Instructions that are found on all Mitsubishi 'brick' type programmable controllers. It also has an identical set of 35 Applied Instructions as its FXo counterpart. This means programs can be directly interchanged between the two units. In fact, 99.99% of FXos (and FXo) programs can be used directly in the larger, FXON Modular Micros or Compact FX controllers.

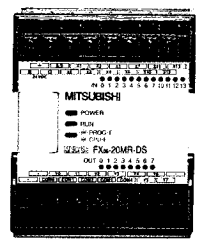
The Applied Instructions used by the FX Family of controllers allows the user to utilise their controller to its best potential.

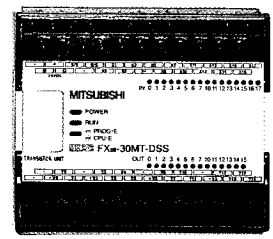
For example, users have the ability to have a single phase high speed counter sensing a maximum 7kHz input pulse. And when there are 4 single phase counters active the combined counting speed can be as high as 14kHz.

To help control these high speed functions, the FXos has dedicated high speed instructions in its Applied Instruction set. These allow output devices to be set ON (HSCS - High Speed Counter Set) or set OFF (HSCR - High Speed Counter Reset) as count values reach preset limits.




| Power Supply | Model | Total Number of I/O | Inputs | | Outputs | | Dimensions (mm) | Dimensions (inches) |
|---|---|---|---|---|---|---|---|---|
| | | | Number of | Type | Number of | Type | | |
| AC | FXos-10MR-ES/UL | 10 | 6 | 24V DC Sink/Source Selectable | 4 | Relay | 75 x 90 x 60 | 2.95 x 3.54 x 2.36 |
| | FXos-14MR-ES/UL | 14 | 8 | | 6 | | 75 x 90 x 60 | 2.95 x 3.54 x 2.36 |
| | FXos-20MR-ES/UL | 20 | 12 | | 8 | | 75 x 90 x 75 | 2.95 x 3.54 x 2.95 |
| | FXos-30MR-ES/UL | 30 | 16 | | 14 | | 75 x 90 x 105 | 2.95 x 3.54 x 4.13 |
| DC | FXos-10MR-DS | 10 | 6 | | 4 | | 47 x 90 x 60 | 1.85 x 3.54 x 2.36 |
| | FXos-14MR-DS | 14 | 8 | | 6 | | 47 x 90 x 60 | 1.85 x 3.54 x 2.36 |
| | FXos-20MR-DS | 20 | 12 | | 8 | | 47 x 90 x 75 | 1.85 x 3.54 x 2.95 |
| | FXos-30MR-DS | 30 | 16 | | 14 | | 47 x 90 x 105 | 1.85 x 3.54 x 4.13 |
| | FXos-10MT-DSS | 10 | 6 | | 4 | Transistor Source | 47 x 90 x 60 | 1.85 x 3.54 x 2.36 |
| | FXos-14MT-DSS | 14 | 8 | | 6 | | 47 x 90 x 60 | 1.85 x 3.54 x 2.36 |
| | FXos-20MT-DSS | 20 | 12 | | 8 | | 47 x 90 x 75 | 1.85 x 3.54 x 2.95 |
| | FXos-30MT-DSS | 30 | 16 | | 14 | | 47 x 90 x 105 | 1.85 x 3.54 x 4.13 |

**Power Supply:** - AC 100-240 V, +10%/-15%, 50/60Hz - DC 24 V, +10%/-15%

## Confidence In Quality and Experience

Mitsubishi Electric has now produced over 2,000,000 FX programmable controllers. In addition, with ISO 9000 systems controlling design, production and distribution, the quality of Mitsubishi products is second to none.

The Mitsubishi FX family of programmable controllers is also produced to the highest industrial standards, and the FXos range is compliant with most world standards including both EMC & LVD directives and UL/CUL standards.

## Functionality at a glance

| | | FXos |
|---|---|---|
| Power Supply | AC | ✓ |
| | DC | ✓ |
| Input Devices | DC | ✓ |
| | AC | – |
| Output Devices | Relay | ✓ |
| | Transistor | ✓ |
| | Triac (SSR) | – |
| Data Registers | General purpose | ✓ |
| | Diagnostic | ✓ |
| Auxilliary relay | General | ✓ |
| | Diagnostic | ✓ |
| State Relays | | ✓ |
| Pointers | Call pointers | ✓ |
| | Interrupt | ✓ |
| Functions built into the MPU and controlled by applied instructions | High Speed counter | ✓ |
| | Pulse train output | ✓ |

# 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 instruction 1.6 to 3.6μs | | | Applied instructions; from 1.6 to several 100μs | |
| Programming language | | Relay symbolic language + Step ladder | | | 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 | X0-3=24V DC, 8mA; X4-17=24V DC, 7mA:opto-isolated | | | X0 to X17 max. | Maximum number of I/O points, 30 |
| | AC input | | | | | |
| Output Spec | Relay | 250V AC, 30V DC, 2.5A per point 8 A per 4 point gang resistive load | | | Y0 to Y15 max. | |
| Auxilliary (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 | 100msec | 0.1 to 3,276.7 sec. | | | T0 to T55 (56 points) | |
| | 10msec | 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 7kHz. (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 ≤ 14kHz
2. Only 1, 2 phase high speed counter may be used at any one time. When 2-phase counters are in use, the Maximum counted speeds must ≤ 14kHz this is calculated as follows: (2-phase counter speed x number of counted edges) + 1 phase counter speeds.

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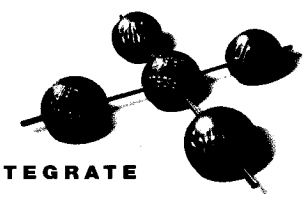

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