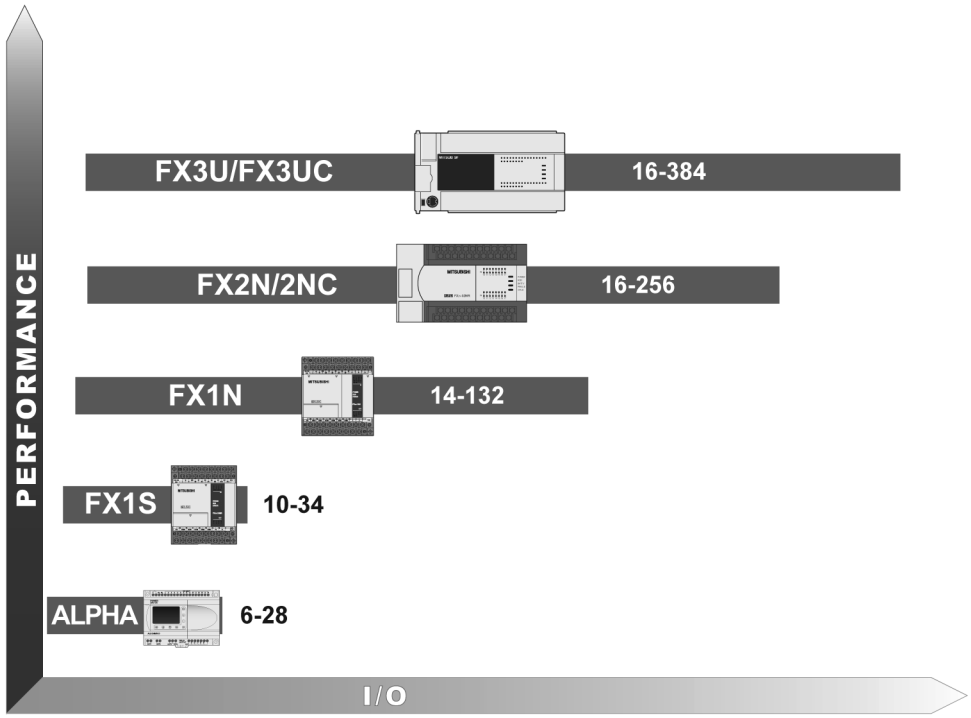
# Programmable Logic Controllers
# FX Family






**Stock Product:** Stock product is product MEAU makes every effort to have on hand for immediate shipment. There may be instances when we are out of stock due to unexpected large requirements. All stock product will be indicated in this book by an "S" in the Stocked Item columns/rows.

**Non-Stock Product:** Non-stock product is product supplied on an "as-needed" basis. Standard lead times of 12 – 16 weeks apply, product is non-returnable and non-cancelable. Product listed as non-stock may change to stock product subject to increases in sales and usage. All non-stock product will be indicated in this book by a dash "–" in the Stocked Item columns/rows.

## Common Peripherals

FX family products offer unparalleled compatibility. Common peripheral devices such as programming tools, and operator interface products can be used across all of the ranges.

## Common Instruction Set

With a common instruction set of 20 basic instructions and 35 applied instructions (over 100 applied instructions on some product ranges), it is possible to write programs which will operate on any FX programmable controller in applications of varying size and complexity.

## Confidence in Quality and Experience

Mitsubishi Electric has now produced over 6,000,000 micro and nano programmable controllers. In addition, with ISO 9000 systems controlling design, production and distribution, the quality of Mitsubishi products is second to none. The complete FX family of programmable controllers are compliant to the highest industrial standards including; European Standards and Directives (CE), specialist shipping approvals, and North American Industrial Standards as specified by Underwriter's Laboratories (UL and cUL).

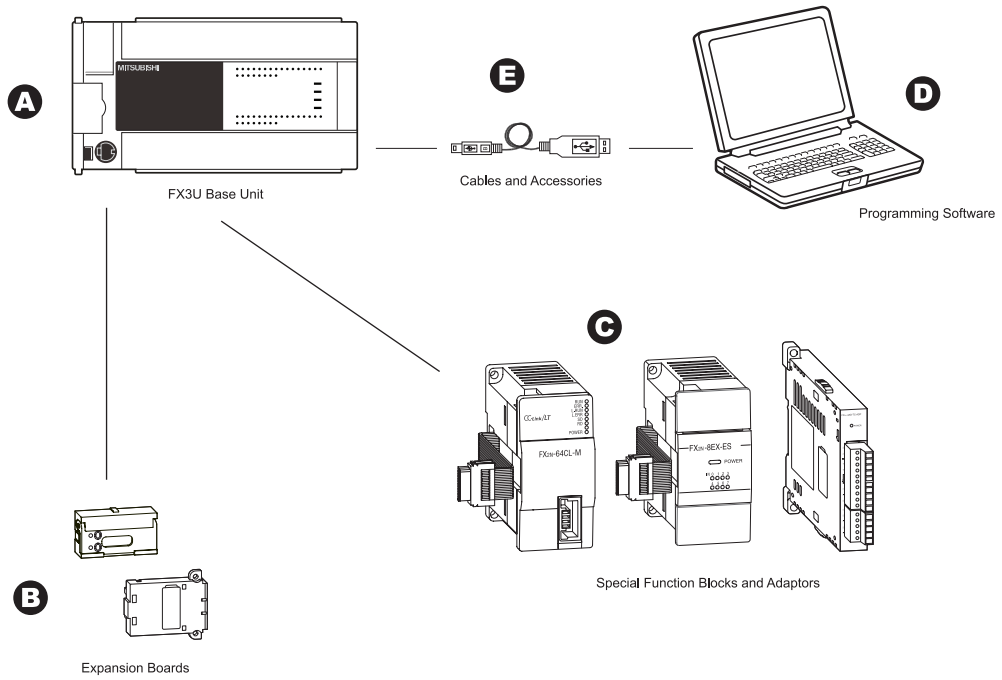
| Model | | FX1S | FX1N | FX3U | FX2N | FX2NC |
|---|---|---|---|---|---|---|
| Power Supply | AC | ✓ | ✓ | ✓ | ✓ | N/A |
| | 24VDC | ✓ | ✓ | ✓ | ✓ | ✓ |
| Input Types | 24VDC | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 120VAC | N/A | (external I/O block) | ✓ | ✓ | ✓ (external I/O block) |
| Output Types | Relay | ✓ | ✓ | ✓ | ✓ | ✓ (external I/O block) 16 I/O Base |
| | Source Transistor | ✓ | ✓ | ✓ | ✓ | ✓ (external I/O block) |
| | Sink Transistor | ✓ | ✓ | ✓ | ✓ | ✓ (external I/O block) |
| | Triac | N/A | ✓ (external I/O block) | — | ✓ | ✓ (external I/O block) |
| Expansion Options | | Digital I/O Boards<br>Serial Communications | Discrete I/O<br>High Speed Counter<br>Remote I/O<br>Serial Communications<br>Analog<br>RTD<br>Thermocouple | Discrete I/O<br>High Speed Counter<br>Motion Control<br>Programmable Cam Switch<br>Remote I/O<br>Serial Communications<br>Analog<br>RTD<br>Thermocouple | Discrete I/O<br>High Speed Counter<br>Motion Control<br>Programmable Cam Switch<br>Remote I/O<br>Serial Communications<br>Analog<br>RTD<br>Thermocouple | Discrete I/O<br>High Speed Counter<br>Motion Control<br>Programmable Cam Switch<br>Remote I/O<br>Serial Communications<br>Analog<br>RTD<br>Thermocouple |
| Maximum I/O | | 30 | 128 | 384 | 256 | 256 |
| Communication Options | | RS-232<br>RS-485<br>RS-422 | RS-232<br>RS-485<br>RS-422 | RS-232 • RS-485<br>RS-422<br>USB | RS-232<br>RS-485<br>RS-422 | RS-232<br>RS-485<br>RS-422 |
| Open Network Options | | N/A | Profibus-DP<br>DeviceNet, AS-i<br>CC-Link | Profibus-DP<br>DeviceNet, AS-i<br>CC-Link, SSCNET III | Profibus-DP<br>DeviceNet, AS-i<br>CC-Link | Profibus-DP<br>DeviceNet, AS-i<br>CC-Link |
| Mitsubishi Engineered Network Options | | Multi-drop<br>Master/slave | Multi-drop<br>I/O Link<br>Master/slave | Multi-drop<br>I/O Link<br>Master/slave | Multi-drop<br>I/O Link<br>Master/slave | Multi-drop<br>I/O Link<br>Master/slave |
| CPU Functions | | High speed counters<br>Pulse train output<br>32 bit math<br>Serial communications<br>Auto tuning PID, Networking<br>Two axis motion control | High speed counters<br>Pulse train output<br>32 bit math<br>Serial communications<br>Auto tuning PID, Networking<br>Two axis motion control | High speed counters<br>Two axis motion control<br>32 bit floating point math<br>Serial communications<br>Networking<br>Auto-tuning PID | High speed counters<br>Two axis motion control<br>32 bit floating point math<br>Serial communications<br>Networking<br>Auto-tuning PID | HIgh speed counters<br>Two axis motion control<br>32 bit floating point math<br>Serial communications<br>Networking<br>Auto-tuning PID |
| Program Memory Byte (Step) | | 4 K (2000) | 16 K (8000) | 128 K max. (64,000) | 32 K max. (16,000) | 32 K max. (16,000) |
| Typical Applications | | Relay replacement<br>Stand-alone embedded control<br>Motion Control<br>Process Control | General purpose medium scale machine control<br>Local control for distributed systems | Sophisticated medium scale machine control<br>Complex local control for distributed systems<br>High Speed Communication | Sophisticated medium scale machine control<br>Complex local control for distributed systems | Sophisticated medium scale machine control<br>Complex local control for distributed systems<br>Distributed I/O system |

**FX Standards Compliance:** All FX products are manufactured under ISO 9000 quality assurance and 14001 environmental management standards. In addition, most FX PLC products are certified by internationally recognized standards agencies. The "Ratings" section of the specifications tables lists the approvals for each product. The approval agencies are as follows:

**UL, cUL:** Underwriter's Laboratories and corresponding Canadian approvals
**CE:** Complies to the European EMC and LVD directives
**DNV:** Det Norske Veritas
**LR:** Lloyd's Register
**GL:** Germanischer Lloyd
**ABS:** American Bureau of Shipping
**RINA:** Registro Italiano Navale
**BV:** Bureau Veritas
**NK:** Nippon Kaiji Kyokai

# Programmable Logic Controllers FX3U SuperMicro™

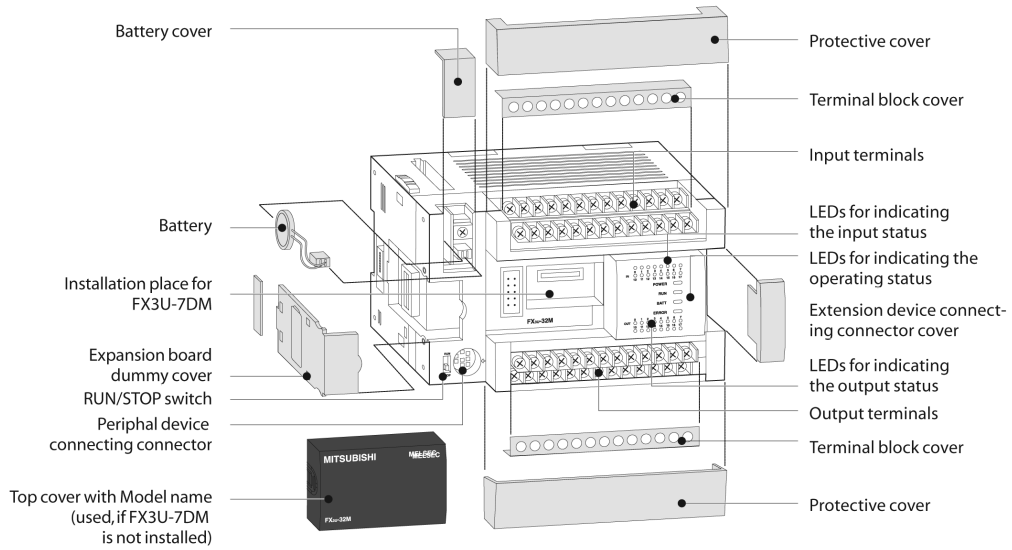
The FX3U SuperMicro™ brings a new combination of greater flexibility and increased performance to the FX Family. The FX3U sets the industry standard for programming memory, CPU processing speed, motion capabilities, instruction set, and flexibility in networking.



## FX3U – A New Concept for Compact PLCs

Mitsubishi Electric has shipped over 7 million FX series PLCs in the last 25 years. The FX3U continues the tradition leading the industry in technological innovation and providing users with the highest cost/performance ratio in the world. The FX3U SuperMicro is the perfect choice for small to mid-sized applications where speed, programming memory, and 1–3 axes of machine control are required.

- Windows programming: Ladder, List or SFC languages, with GPP-WIN (in common with FX2N, FX1S & FX1N)
- Easy Migration: Programs and development tools interchange with FX2N, FX1N, and FX1S
- Operator Interfaces: Selections to match any application
- Unmatched Program Memory: 64K steps
- Massive Data Memory: 42,726 data registers
- Enhanced Throughput: 65 nanoseconds/step
- Better Process Control: Improved auto-tuning PID
- Sophisticated High-Speed Processing: 100 kHz counters, 10 ms and 50µs hardware interrupts
- Year 2000 Compliant: Real-time clock/calendar (4-digit year) for scheduling and time stamping
- Flexible configurations: From 16 to 384 I/O and extensive special function I/O capabilities
- Cost-Effective Communications: Up to three channels of RS communication is possible (RS-422, RS-232, RS-485) and PLC-PLC networking
- Open Network Connectivity: Modules for Ethernet, CC-Link Master and Slave, Profibus DP Master and Slave, DeviceNet, and AS-i




## FX3U Base Unit Extension Rules

In general, the FX3U PLC system can support extension I/O, special function blocks and still have a reserve of 24VDC power remaining to power sensors, etc. via the service power supply. Tables 1, 2, 3 show you how to calculate how many special function blocks you can add to a FX3U base unit, and how much current the service power supply can provide when extension I/O is added.

Note that once I/O extension units and blocks are connected to the base unit, the I/O numbering of these peripherals continues from the next whole group of 8 I/O from where the I/O on the base unit ends. Extension I/O numbering always repeats in groups of 8 (X000-X007, Y000-Y007, octal numbers), to allow it to be added anywhere in the sequence of I/O points for the system without causing a number conflict. For example, if the system consists of 32 I/O with a 16 I/O base unit, an 8 point input block, and an 8 point output block, the numbering would work as follows.

| | |
|---|---|
| Base Unit | Inputs: X000-X007 |
| | Outputs: Y000-Y007 |
| 8 point input block: | Inputs: X010-X017 (actually numbered X000-X007 on the block) |
| | Outputs: None |
| 8 point output block: | Inputs: None |
| | Outputs: Y010-Y017 (actually numbered Y000-Y007 on the block) |

Note: From a software point of view, the application program would see a seamless range of physical I/O from X000-X017 and Y000-Y017

## Table 1: 5V Bus Supply

The FX3U base unit supplies 5VDC to special function blocks via its expansion bus. This is used to operate the special function blocks' CPUs. The specifications in this section guide show how much of this 5V supply current each special function block consumes. To ensure your configuration falls within the limits of the base unit's supply, total the 5V current consumed by all special function blocks. For a permissible configuration, this should be equal to or less than the total in the table. Note that it is possible to add extra 5V power to a system by using a powered expansion unit or the FX3U-1PSU-5V.

**Table 1**

| Module | Max. Current on 5V Bus |
|---|---|
| FX3U-□□M□-ES/UL (ESS/UL) | 500 mA |

## Tables 2 and 3: Service Power Supply

The FX3U base unit has a built-in 24VDC service power supply intended to power sensors and other peripheral equipment.
The amount of current available from this supply is dependent on the number of extension I/O that has been added to the base unit.

**Table 2: 24VDC Power For 16 – 32 I/O Units**

| Product | 24VDC Value | Max. Input Extension | Max. Output Extension |
|---|---|---|---|
| **FX3U-16M*<br>FX3U-32M*** | 400mA | 32 points | 24 points |

**Table 3: 24VDC Power For 48 – 128 I/O Units**

| Product | 24VDC Bus Supply | Max. Input Extension | Max. Output Extension |
|---|---|---|---|
| **FX3U-48M*<br>FX3U-64M*<br>FX3U-80M*<br>FX3U-128M*** | 600mA | 64 points | 48 points |

*Refers to any base PLC or powered extension module

## Sample Extension Calculation

See the examples below for sample power calculations.
The current values for the special function blocks can be found in the specifications on the following pages and in the FX3U Hardware Manual.

| Module | No. | 24VDC Calculation | | 5VDC Calculation | |
|---|---|---|---|---|---|
| | | Current / Module | Calculation | Current / Module | Total Current |
| **FX3U-80MR/ES** | 1 | +600 mA | +600 mA | +500 mA | +500 mA |
| **FX2N-4AD** | 3 | (-50 mA) | (-150 mA) | (-30 mA) | (-90 mA) |
| **FX2N-4DA** | 1 | (-200 mA) | (-200 mA) | (-30 mA) | (-30 mA) |
| **FX2N-232IF** | 1 | (-80 mA ) | (-80 mA) | (-40 mA) | (-40 mA) |
| | | | +170 mA | | 500 – 160 mA |
| | | | | | Result: 340 mA (OK) |

| Module | No. | Number of I/Os | | | 24VDC Calculation* | | 5VDC Calculation | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | X/Y | Current / Module | Total Current | Current / Module | Total Current |
| **FX3U-48MR/ES** | 1 | 24 | 24 | — | +600 mA | +600 mA | +500 mA | +500 mA |
| **FX2N-16EYR-ES/UL** | 1 | — | 16 | — | (-150 mA) | (-150 mA) | — | 0 mA |
| **FX2N-8EX-ES/UL** | 1 | 8 | — | — | (-50 mA) | (-50 mA) | — | 0 mA |
| **FX2N-8EYR-ES/UL** | 1 | — | 8 | — | (-75 mA) | (-75 mA) | — | 0 mA |
| **FX0N-3A** | 1 | — | — | 8 | (-90 mA) | (-90 mA) | (-30 mA) | (-30 mA) |
| | | | | | | +235 mA (OK) | | +470 mA (OK) |
| **FX2N-32ER-ES/UL** | 1 | 16 | 16 | — | +250 mA | +250 mA | +690 mA | +690 mA |
| **FX2N-16EX-ES/UL*** | 2 | 16 | — | — | (-100 mA) | (-200 mA) | — | 0 mA |
| **FX2N-4AD** | 1 | — | — | 8 | (-30 mA) | (-30 mA) | (-55 mA) | (-55 mA) |
| **FX2N-1HC** | 1 | — | — | 8 | 0 mA | 0 mA | (-90 mA) | (-90 mA) |
| | Result: 64 + 64 + 24 + = 152 (<256) OK | | | | | +20 mA (OK) | | +545mA (OK) |

*See maximum extension Input and Output tables.

## FX3U Performance Specifications

| Model Number | | FX3U | REMARK |
|---|---|---|---|
| Operation Control Method | | Cyclic operation by stored program | |
| I/O Control Method | | Batch processing (takes place after END instruction is executed) | I/O refresh instruction is available |
| Operation Process Time | | Basic instructions: 0.065μs - Applied instructions: 1.52 - several 100μs per instruction | |
| Programming Language | | Relay symbolic language + Stepladder | Stepladder can be used to produce an SFC style program |
| Program Capacity | | 64K step standard | |
| Number of Instructions | | Basic sequence instructions: 27 – Step ladder instructions: 2 – Applied instructions: 209 | |
| I/O Configuration | | Max hardware I/O config. pts. 384, dependent on user selection (Max. software addressable inputs & outputs 384) | |
| Auxiliary Relay (M Coils) | General | 3072 points | M0 to M3071 |
| | Latched | 2572 points (subset) | M500 to M3071 (Battery backed) |
| | Special | 256 points | From the range M8000 to M8255 |
| | Special Type | 512 points | From the range M8000 to M8511 |
| State Relays (S Coils) | General | 1000 points | S0 to S999 |
| | Latched | 500 points (subset) | S500 to S999 (Battery backed) |
| | Initial | 10 points | S0 to S9 |
| | Annunciator | 100 points | S900 to S999 |
| | Latched Battery Backed | 2097 points | S1000 to S3096 |
| Timers (T) | 100 msec | Range: 0 to 3,276.7 sec. 200 points | T0 to T199 |
| | 10 msec | Range: 0 to 327.67 sec. 46 points | T200 to T245 |
| | 1 msec Retentive | Range: 0 to 32.767 sec. 4 points | T246 to T249 (Battery backed) |
| | 100 msec Retentive | Range: 0 to 3,276.7 sec. 6 points | T250 to T255 (Battery backed) |
| | 1 ms | — | T256 to T511 |
| Counters (C) | General 16 bit | Range: 1 to 32,767 counts 200 points | C0 to C199 Type: 16 bit up counter |
| | Latched 16 bit | 100 points (subset) | C100 to C199 Type: 16 bit up counter (Battery backed) |
| | General 32 bit | Range:-2,147,483,648 to 2,147,483,647 35 points | C200 to C234 Type: 32 bit up/down counter |
| | Latched 32 bit | 15 points (subset) | C219 to C234 Type: 32 bit up/down counter (Battery backed) |
| High-Speed Counters (C) A/B Phase | 1 Phase | Range:-2,147,483,648 to +2,147,483,647 counts Note: All high speed counters are latched | C235 to C240 6 points (Battery backed) |
| | 1 ph., c/w start/stop Input | | C241 to C245 5 points (Battery backed) |
| | 2 Phase | | C246 to C250 5 points (Battery backed) |
| | A/B Phase | | C251 to C255 5 points (Battery backed) |
| Data Registers (D) | General | 8000 points | D0 to D7999 Type: 16 bit data storage register, pair for 32 bit device |
| | Latched | 7800 points (subset) | D200 to D7999 Type: 16 bit data storage register, pair for 32 bit device |
| | File Registers | 7000 points (subset) | D1000 to D7999 set by parameter in 14 blocks of 500 program steps: Type: 16 bit data storage register |
| | Special | 256 points | From the range D8000 to D8255 Type: 16 bit data storage register |
| | Index | 16 points | V0 to V7 and Z0 to Z7 Type: 16 bit data storage register |
| Extension Registers | | 32768 points | R0 to R32767 |
| Pointers (P) | For Use w/ CALL | 4096 points | P0 to P4095 |
| | For Use w/ Interrupts | 6 input points, 3 timers, 6 counters | I00□ to I50□ and I6P☆ to I8P☆ I010 to I060 (rising trigger p=1, falling trigger p=0, PP= time in msec) (Battery backed) |
| Nest Levels | | 8 points for use with MC and MCR | N0 to N7 |
| Numbers | Decimal K | 16 bit: -32,768 to +32,767 32 bit: -2,147,483,648 to +2,147,483,647 | |
| | Hexadecimal H | 16 bit; 0000 to FFFF 32 bit: 00000000 to FFFFFFFF | |
| | Floating Point | 32 bit: 0, -1.175 x 10-38, -3.403 x 1038 | |
| Environmental | | | |
| Ambient Temperature | | 0-55° C (in operation) -20 ±70° C (in storage) | |
| Ambient Humidity | | 5-95% RH, no condensation (in operation) | |
| Vibration Resistance | | Conforms to JIS C0911. 10-55Hz 0.5mm (0.02 in.) (Max. 2G) 2 hours in each of 3 axis directions (0.5G on DIN rail) | |
| Shock Resistance | | Conforms to JIS C0912 (10G 3 times in 3 directions) | |
| Noise Immunity | | 1000 Vpp noise voltage, 1 μs pulse width at 30-100Hz | |
| Dielectric Withstand Voltage | | 1500VAC for 1 minute between all terminals and ground | |
| Insulation Resistance | | 5MΩ or larger by 500VDC insulation resistance tester between all terminals and ground | |
| Ground | | Class 3 ground, where available. (100Ω or less) | |
| Operating Environment | | Must be free from corrosive gases. Dust should be minimal. | |

**Battery Backup:** Parameters for scope of battery backup adjustable.
**Note:** Fixed battery backup for M1024-M3071, D512 – D7999.

# Ⓐ FX3U Base Units

## FX3U Base Unit Hardware Specifications

| Specifications | | DC Powered Base Units, Relay Output | | | | | DC Powered Base Unit, Source Transistor Output | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FX3U-16MR/DS | FX3U-32MR/DS | FX3U-48MR/DS | FX3U-64MR/DS | FX3U-80MR/DS | FX3U-16MT/DSS | FX3U-32MT/DSS | FX3U-48MT/DSS | FX3U-64MT/DSS | FX3U-80MT/DSS |
| Stocked Item | | S | S | S | S | – | S | S | S | S | – |
| Integrated Inputs / Outputs | | 16 | 32 | 48 | 64 | 80 | 16 | 32 | 48 | 64 | 80 |
| Rating | | UL • cUL • CE | | | | | UL • cUL • CE | | | | |
| Power Supply | AC Range (+10%, -15%) | N/A | | | | | N/A | | | | |
| | Frequency at AC Hz | N/A | | | | | N/A | | | | |
| | DC Range (+20%, -15%) | 24V DC | | | | | 24V DC | | | | |
| Max. Input Apparent Power | | 25 W | 30 W | 35 W | 40 W | 45 W | 25 W | 30 W | 35 W | 40 W | 45 W |
| Inrush Current | | 35 A Max for 0.5 ms or less/ 24VDC | | | | | 35 A Max for 0.5 ms or less/ 24VDC | | | | |
| Allowable Momentary Power Failure Time (ms) | | 5 ms or less | | | | | 5 ms or less | | | | |
| Service Power Supply (24VDC) mA | | N/A | | | | | N/A | | | | |
| Power Supply Int. Bus (5VDC) mA | | 500 mA | | | | | 500 mA | | | | |
| Integrated Inputs (24VDC) | | 8 | 16 | 24 | 32 | 40 | 8 | 16 | 24 | 32 | 40 |
| Min. Current for Logical 1 (mA) (X0 - X7 / X10 Onwards) | | See Hardware Manual JY997D16501 | | | | | See Hardware Manual JY997D16501 | | | | |
| Max. Current for Logical 0 (mA) | | 1.5 mA or less | | | | | 1.5 mA or less | | | | |
| Response Time for Inputs (ms) | | Approx. 10 ms | | | | | Approx. 10 ms | | | | |
| Integrated Outputs | | 8 | 16 | 24 | 32 | 40 | 8 | 16 | 24 | 32 | 40 |
| Output Type | | Relay | | | | | Source Transistor | | | | |
| Max. Output Current | Per Output (A) | 2 | | | | | 0.5 | | | | |
| | Per Group* (A) | 8 | | | | | 4 outputs/common = 0.8 A | | | | |
| | | | | | | | 8 outputs/common = 1.6 A | | | | |
| Max Switching Load | Inductive Load | 80 VA | | | | | 12W/24VDC | | | | |
| Response Time for Outputs (ms) | | Approx. 10 ms | | | | | Y00-Y02: 5 µs | | | | |
| | | | | | | | Y03 and higher: 0.2 ms | | | | |
| Life of Contacts (Switching Times) | | For all base units of the MELSEC FX3U series values: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 300,000 at 80 VA | | | | | Data Not Provided | | | | |
| Weight (kg) | | 0.6 | 0.65 | 0.85 | 1.00 | 1.20 | 0.6 | 0.65 | 0.85 | 1.00 | 1.20 |
| Dimensions (W x H x D) mm | | 130 x 90 x 86 | 150 x 90 x 86 | 182 x 90 x 86 | 220 x 90 x 86 | 285 x 90 x 86 | 130 x 90 x 86 | 150 x 90 x 86 | 182 x 90 x 86 | 220 x 90 x 86 | 285 x 90 x 86 |
| Required Manuals | | FX3U Series User's Manual - Hardware Edition - JY997D16501, FX3U Series Hardware Manual - JY997D18801B | | | | | | | | | |

***Note:** Sink/Source except for MT & MS units: Sink only. All products UL listed.

## FX3U Base Unit Hardware Specifications

| Specifications | | AC Powered Base Units, Sink Transistor Output | | | | | |
|---|---|---|---|---|---|---|---|
| | | FX3U-16MT/ES | FX3U-32MT/ES | FX3U-48MT/ES | FX3U-64MT/ES | FX3U-80MT/ES | FX3U-128MT/ES |
| Stocked Item | | S | S | S | S | S | – |
| Integrated Inputs / Outputs | | 16 | 32 | 48 | 64 | 80 | 128 |
| Rating | | UL • cUL • CE | | | | | |
| Power Supply | AC Range (+10%, -15%) | 100-240VAC | | | | | |
| | Frequency at AC Hz | 50/60 Hz | | | | | |
| | DC Range (+10%, -15%) | N/A | | | | | |
| Max. Input Apparent Power | | 30 W | 35 W | 40 W | 45 W | 50 W | 65 W |
| Inrush Current at ON | 100VAC | 30 A < 5 ms | | | | | |
| | 200VAC | 65 A < 5 ms | | | | | |
| Allowable Momentary Power Failure Time (ms) | | 10 ms or less | | | | | |
| Service Power Supply (24VDC) mA | | 400 mA | | 600 mA | | | |
| Power Supply Int. Bus (5VDC) mA | | 500 mA | | | | | |
| Integrated Inputs | | 8 | 16 | 24 | 32 | 40 | 64 |
| Min. Current for Logical 1 (mA) (X0 - X7 / X10 Onwards) | | See Hardware Manual JY997D16501 | | | | | |
| Max. Current for Logical 0 (mA) | | 1.5 mA or less | | | | | |
| Response Time for Inputs (ms) | | Approx. 10 | | | | | |
| Integrated Outputs | | 8 | 16 | 24 | 32 | 40 | 64 |
| Output Type | | Sink Transistor | | | | | |
| Max. Output Current | Per Output (A) | 0.5 | | | | | |
| | Per Group* (A) | 4 outputs/common = 0.8 A8 outputs/common = 1.6 A | | | | | |
| Max Switching Load | Inductive Load | 12W/24V DC | | | | | |
| Response Time for Outputs (ms) | | Y00-Y02: 5 µs Y03 and higher: 0.2 ms | | | | | |
| Life of Contacts (Switching Times) | | Data not provided | | | | | |
| Weight (kg) | | 0.6 | 0.65 | 0.85 | 1.00 | 1.20 | 1.80 |
| Dimensions (W x H x D) mm | | 130 x 90 x 86 | 150 x 90 x 86 | 182 x 90 x 86 | 220 x 90 x 86 | 285 x 90 x 86 | 300 x 90 x 86 |
| Required Manuals | | FX3U Series User's Manual - Hardware Edition - JY997D16501, FX3U Series Hardware Manual - JY997D18801B | | | | | |

***Note:** Sink/Source except for MT & MS units: Sink only. All products UL listed.

## FX3U Base Unit Hardware Specifications

| Specifications | | DC Powered Base Unit, Sink Transistor Output | | | | |
|---|---|---|---|---|---|---|
| | | FX3U-16MT/DS | FX3U-32MT/DS | FX3U-48MT/DS | FX3U64MT/DS | FX3U-80MT/DS |
| Stocked Item | | S | S | S | S | – |
| Integrated Inputs / Outputs | | 16 | 32 | 48 | 64 | 80 |
| Rating | | UL • cUL • CE | | | | |
| Power Supply | AC Range (+10%, -15%) | N/A | | | | |
| | Frequency at AC Hz | N/A | | | | |
| | DC Range (+10%, -15%) | 24V DC | | | | |
| Max. Input Apparent Power | | 25 W | 30 W | 35 W | 40 W | 45 W |
| Inrush Current at ON 100VAC, 200VAC | | 35 A Max for 0.5 ms or less / 24VDC | | | | |
| Allowable Momentary Power Failure Time (ms) | | 5 ms or less | | | | |
| Service Power Supply (24VDC) mA | | N/A | | | | |
| Power Supply Int. Bus (5VDC) mA | | 500 mA | | | | |
| Integrated Inputs | | 8 | 16 | 24 | 32 | 40 |
| Min. Current for Logical 1 (mA) (X0 – X7 / X10 Onwards) | | See Hardware Manual JY997D16501 | | | | |
| Max. Current for Logical 0 (mA) | | 1.5 mA or less | | | | |
| Response Time for Inputs (ms) | | Approx.10 | | | | |
| Integrated Outputs | | 8 | 16 | 24 | 32 | 40 |
| Output Type | | Sink Transistor | | | | |
| Max. Output Current | Per Output (A) | 0.5 | | | | |
| | Per Group* (A) | 4 outputs/common = 0.8 A<br>8 outputs/common = 1.6 A | | | | |
| Max Switching Load | Inductive Load | 12W/24VDC | | | | |
| Response Time for Outputs (ms) | | Y00-Y02: 5 µsY03 and higher: 0.2 ms | | | | |
| Life of Contacts (Switching Times) | | Data not provided | | | | |
| Weight (kg) | | 0.6 | 0.65 | 0.85 | 1.00 | 1.20 |
| Dimensions (W x H x D) mm | | 130 x 90 x 86 | 150 x 90 x 86 | 182 x 90 x 86 | 220 x 90 x 86 | 285 x 90 x 86 |
| Required Manuals | | FX3U Series User's Manual – Hardware Edition – JY997D16501, FX3U Series Hardware Manual – JY997D18801B | | | | |

***Note:** Sink/Source except for MT & MS units: Sink only. All products UL listed.

## FX3U Base Unit Hardware Specifications

| Specifications | | AC Powered Base Unit, Relay Output | | | | | |
|---|---|---|---|---|---|---|---|
| | | FX3U-16MR/ES | FX3U-32MR/ES | FX3U-48MR/ES | FX3U-64MR/ES | FX3U-80MR/ES | FX3U-128MR/ES |
| Stocked Item | | S | S | S | S | S | S |
| Integrated Inputs / Outputs | | 16 | 32 | 48 | 64 | 80 | 128 |
| Rating | | UL• cUL • CE | | | | | |
| Power Supply | AC Range (+10%, -15%) | 100-240VAC | | | | | |
| | Frequency at AC Hz | 50/60 Hz | | | | | |
| | DC Range (+10%, -15%) | N/A | | | | | |
| Max. Input Apparent Power | | 30 W | 35 W | 40 W | 45 W | 50 W | 65 W |
| Inrush Current at ON | 100VAC | 30 A < 5 ms | | | | | |
| | 200VAC | 65 A < 5 ms | | | | | |
| Allowable Momentary Power Failure Time (ms) | | 10 ms or less | | | | | |
| Service Power Supply (24VDC) mA | | 400 mA | | | 600 mA | | |
| Power Supply Int. Bus (5VDC) mA | | 500 mA | | | | | |
| Integrated Inputs* (24 VCD) | | 8 | 16 | 24 | 32 | 40 | 64 |
| Min. Current for Logical 1 (mA) (X0 - X7 / X10 Onwards) | | See Hardware Manual JY997D16501 | | | | | |
| Max. Current for Logical 0 (mA) | | 1.5 mA or less | | | | | |
| Response Time for Inputs (ms) | | Approx. 10 ms | | | | | |
| Integrated Outputs* | | 8 | 16 | 24 | 32 | 40 | 64 |
| Output Type | | Relay | | | | | |
| Max. Output Current | Per Output (A) | 2 | | | | | |
| | Per Group* (A) | 8 | | | | | |
| Max. Switching Load | Inductive Load | 780 VA | | | | | |
| Response Time for Outputs (ms) | | Approx. 10 ms | | | | | |
| Life of Contacts (Switching Times) | | For all base unites of the MELSEC FX3U series values:<br>3,000,000 at 20 VA: 1,000,000 at 35 VA; 300,000 at 80 VA | | | | | |
| Weight (kg) | | 0.6 | 0.65 | 0.85 | 1.00 | 1.20 | 1.80 |
| Dimensions (W x H x D) mm | | 130 x 90 x 86 | 150 x 90 x 86 | 182 x 90 x 86 | 220 x 90 x 86 | 285 x 90 x 86 | 300 x 90 x 86 |
| Required Manuals | | FX3U Series User's Manual - Hardware Edition - JY997D16501, FX3U Series Hardware Manual - JY997D18801B | | | | | |

***Note:** Sink/Source except for MT & MS units: Sink only. All products UL listed.

### FX3U Base Unit Hardware Specifications

| Specifications | | AC Powered Base Unit, Source Transistor Output | | | | | |
|---|---|---|---|---|---|---|---|
| | | FX3U-16MT/ESS | FX3U-32MT/ESS | FX3U-48MT/ESS | FX3U-64MT/ESS | FX3U-80MT/ESS | FX3U-128MT/ESS |
| Stocked Item | | S | S | S | S | S | – |
| Integrated Inputs / Outputs | | 16 | 32 | 48 | 64 | 80 | 128 |
| Rating | | UL • cUL • CE | | | | | |
| Power Supply | AC Range (+10%, -15%) | 100-240VAC | | | | | |
| | Frequency at AC Hz | 50/60 Hz | | | | | |
| | DC Range (+10%, -15%) | N/A | | | | | |
| Max. Input Apparent Power | | 30 W | 35 W | 40 W | 45 W | 50 W | 65 W |
| Inrush Current at ON | 100VAC | 30 A < 5 ms | | | | | |
| | 200VAC | 65 A < 5 ms | | | | | |
| Allowable Momentary Power Failure Time (ms) | | 10 ms or less | | | | | |
| Service Power Supply (24VDC) mA | | 600 mA | | | | | |
| Power Supply Int. Bus (5VDC) mA | | 400 mA | | 600 mA | 500 mA | | |
| Integrated Inputs | | 8 | 16 | 24 | 32 | 40 | 64 |
| Min. Current for Logical 1 (mA) (X0 - X7 / X10 onwards) | | See Hardware Manual JY997D16501 | | | | | |
| Max. Current for Logical 0 (mA) | | 1.5 mA or less | | | | | |
| Response Time for Inputs (ms) | | Approx. 10 | | | | | |
| Integrated Outputs | | 8 | 16 | 24 | 32 | 40 | 64 |
| Output Type | | Source Transistor | | | | | |
| Max. Output Current | Per Output (A) | 0.5 | | | | | |
| | Per Group* (A) | 4 outputs/common = 0.8 A<br>8 outputs/common = 1.6 A | | | | | |
| Max Switching Load | Inductive Load | 12W/24V DC | | | | | |
| Response Time for Outputs (ms) | | Y00-Y02: 5 µs • Y03 and higher: 0.2 ms | | | | | |
| Life of Contacts (Switching Times) | | Data not provided | | | | | |
| Weight (kg) | | 0.6 | 0.65 | 0.85 | 1.00 | 1.20 | 1.80 |
| Dimensions (W x H x D) mm | | 130 x 90 x 86 | 150 x 90 x 86 | 182 x 90 x 86 | 220 x 90 x 86 | 285 x 90 x 86 | 300 x 90 x 86 |
| Required Manuals | | FX3U Series User's Manual - Hardware Edition - JY997D16501, FX3U Series Hardware Manual - JY997D18801B | | | | | |

***Note:** Sink/Source except for MT & MS units: Sink only. All products UL listed.

## Ⓑ Expansion Boards and Memory Cassettes

### FX3U Expansion Boards

| Specifications | FX3U-232-BD | FX3U-422-BD | FX3U-485-BD |
|---|---|---|---|
| Stocked Item | S | S | S |
| Rating | CE | CE | CE |
| Applicable PLCs | FX3U | FX3U | FX3U |
| Interface | RS-232 with 9 pole D-SUB male connector | RS-422 8 pole mini DIN female connector | RS-485 / RS-422 |
| Power Supply | 5VDC / 20 mA (from base unit) | 5VDC / 20 mA (from base unit) | 5VDC / 40 mA from base unit |
| Communication Speed (bit/s) | 300, 600, 1200, 2400, 4800, 9600, 19200 | — | 300 - 384000 (Various Settings) |
| Communication Distance | Max. 15 m (49 ft) | Max. 50 m (164 ft) | Max. 50 m (164 ft) |
| Communication Mode | Full duplex | Half duplex | Half duplex |
| Protocols | Freely programmable via PLC / protocol 1 or 4 / No Protocol mode | Freely programmable via PLC/ Use as 2nd prog. port | Computer Link Protocol 1 or 4 / No Protocol mode / Parallel Link / N:N network |
| Related I/O Points | — | — | — |
| Weight (kg) | 0.02 | 0.02 | 0.02 |
| Dimensions (mm) | 46 x 63 x 19 | 46 x 63 x 19 | 46 x 63 x 19 |
| Function | General purpose RS-232 Communications | Duplicate programming port for HMI/PC connections | Multi-drop network/master/slave general purpose RS-485/422 communications / VFD Communication |
| Required Manuals | JY997D12901 | JY997D13101 | JY997D13001 |

## FX3U Expansion Boards

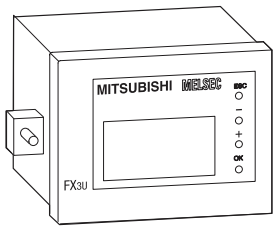
| Specifications | FX3U-USB-BD | FX3U-CNV-BD |
|---|---|---|
| Stocked Item | S | S |
| Rating | CE | CE |
| Applicable PLCs | FX3U | |
| Interface | USB Mini B Plug (female) | — |
| Power Supply | 15mA from PLC<br>30mA from PC | — |
| Baud Rate | 9600/19200/38400/57600/115200 | — |
| Communication Distance (m) | 5 m (197 inch) | — |
| Communication Mode | USB Version 2.0 | — |
| Related I/O Points | — | — |
| Weight (kg) | 0.02 | 0.01 |
| Dimensions (mm) | 46 x 54 x 20 | 46 x 54 x 20 |
| Function | Program/Monitor FX3UPLC programs and data | Allows connection of FX3U Analog and Communication Adaptors |
| Required Manuals | JY997D13501 | JY997D13601 |

## FX3U Memory Cassettes

| Specifications | FX3U-FLROM-16 | FX3U-FLROM-64 | FX3U-FLROM-64L |
|---|---|---|---|
| Stocked Item | S | S | S |
| Rating | — | — | — |
| Applicable PLCs | FX3U/FX3UC | FX3U/FX3UC | FX3U/FX3UC |
| Memory Type | EEPROM | EEPROM | EEPROM |
| Memory Size (k byte) | 32K | 128K | 128K |
| Number of Program Steps | 16K | 64K | 64K |
| Calendar Function | Yes | Yes | Yes |
| Non Volatile Storage | Yes | Yes | Yes |
| Program Read/Write | No | No | Yes |
| Required Manuals | JY992D45801 | JY992D45901 | JY992D45801 |

## Simple Display

| Specifications | FX3U-7DM | FX3U-7DM-HLD |
|---|---|---|
| Stocked Item | S | S |
| Applicable PLCs | FX3U | FX3U |
| Display | 16 letters x 4 lines | — |
| Resolution | — | — |
| Power Supply | 5VDC (from base unit) | — |
| Current Consumption mA | 20 | — |
| Extension Cable | — | Included |
| Weight (kg) | 0.02 | 0.01 |
| Dimensions (W x H x D) (mm) | 48 x 35 x 11.5 | 66.3 x 41.8 x 13 |



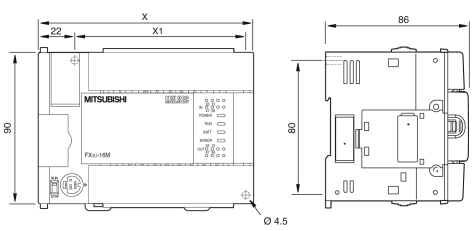

## FX3U Base Unit Dimensions

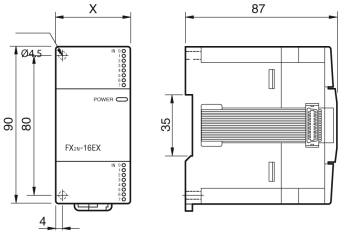
| Type | X (mm) | X1 (mm) |
|---|---|---|
| FX3U-16M | 130 | 103 |
| FX3U-32M | 150 | 123 |
| FX3U-48M | 182 | 155 |
| FX3U-64M | 220 | 193 |
| FX3U-80M | 285 | 258 |

## I/O Extension Blocks/Units

| Type | X (mm) |
|---|---|
| FX2N-16E | 40 |
| FX2N-32E | 150 |
| FX2N-48E | 182 |

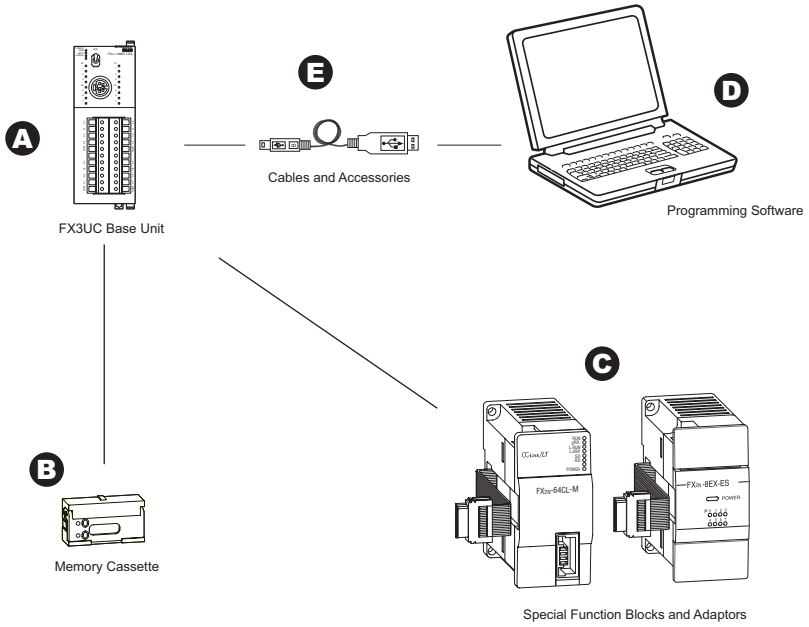
**Note:** All extension I/O units and blocks of same I/O count are the same length regardless of type



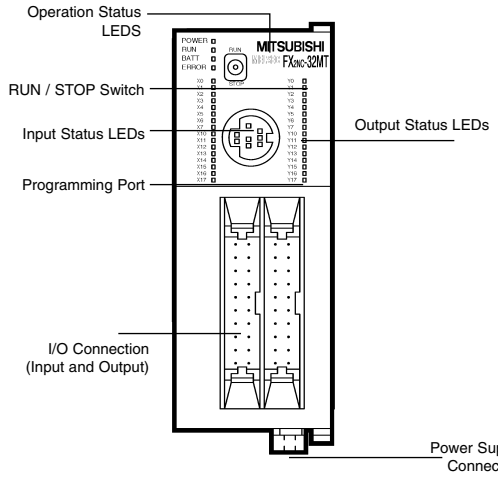
# Programmable Logic Controllers FX3UC SuperMicro™

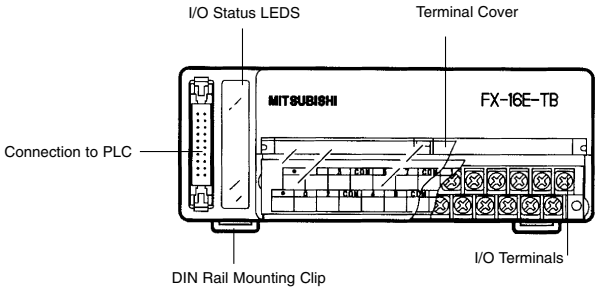
The FX3UC SuperMicro™ offers all the features of the FX3U, but in an ultra compact format. By using distributed terminal block I/O, the FX3UC offers machine and panel builders significant productivity benefits. The FX3UC allows the cost and labor of regular wire harness construction and installation to be reduced by up to 80% by using Mitsubishi Electric or third party terminal block I/O systems.



# FX3UC

- Conventional panels require several layers of wiring, termination, and labeling. The FX3UC uses high-density cables that connect the PLC directly to the field terminals by locking IDC connectors.
- Panel size can be decreased, and construction time/effort associated with wiring, terminating, and labeling are greatly reduced, allowing faster and more cost-effective panel construction.
- Wires in groups of 16 circuits, via distributed terminal blocks, or connect directly to custom-designed harnesses. Use Mitsubishi or third party terminal products.
- Tiny — 16 and 32 I/O CPUs are about the size of a cassette tape case.
- Compatibility with all other Mitsubishi FX2N SuperMicro™ and FX0N products including software, operator interfaces, CPU performance, options, software and connectivity.
- CPU same as FX2N; 64K word program memory, 40K data memory, 65 nanosecond execution, embedded twin axis motion control, floating point math, and auto-tuning PID control, etc.
- The real time clock feature is standard for FX3UC CPUs.




## FX3UC Base Unit Extension Rules

The FX2NC series input extension I/O blocks and FX2NC series output extension I/O blocks can be directly connected to the FX2NC series base unit. These input/output extension blocks can be connected in the desired order. After connection, octal numbers will be assigned to the input/output points of the extension blocks. These octal numbers are regarded as the input/output numbers, and the smallest number will be assigned to the input/output point next to the main unit, and then sequentially increased for the subsequent input/output points.

### Rules

**1.** Add the input/output points of the extension blocks and special function blocks to the input/output points of the main unit. The total number of input points should be 184 points or less, and the total number of output points should be 184 points or less also. The total number of input and output points should be 256 points.
**2.** The FX3UC series base unit supplies the control power (5VDC) to the extension blocks and special function blocks. For this reason, the total current consumption of all the blocks connected to the main unit should not exceed the current capacity of the main unit.
**3.** Next to the FX3UC-CNV-IF, up to 4 blocks can be connected. To connect a special function unit, such as the FX3UC-1RM-E-SET, refer to the instruction manual of the corresponding special function block. To connect the FX3UC series main unit to the FX3U/2N/0N series extension blocks, be sure to connect the FX3UC-CNV-IF connector conversion adapter first. Following the adapter, you can connect up to 4 blocks. In addition, one communication adapter can be connected to the left side of the base unit.

### Example System Configuration Using FX2NC Series Extension I/O

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | X020 | X040 | | X060 | | | X100 | |
| X000-X017 | X037 | X057 | | X077 | | | X117 | |
| FX3UV-32MT/DSS<br>X: 16 Points<br>Y: 16 Points | 16EX<br>16 Points | 16EX<br>16 Points | 16EYT<br>16 Points | 16EX<br>16 Points | 16EYT<br>16 Points | 16EYT<br>16 Points | 16EX<br>16 Points | 16EYT<br>16 Points |
| | | | Y020 | | Y040 | Y060 | | Y100 |
| Y000-Y017 | | | Y037 | | Y057 | Y077 | | Y117 |

### Example System Configuration Using FX2NC, FX0N and FX2N Series Extension I/O

FX3U-232ADP (Communication adapter)  FX3UC-CNV-IF (Connector conversion adapter)

| | FX3UC-32MT/DSS | FX3CU Series extension blocks | FX2N-16EYR-ES/UL relay output block | FX2N-232IF RS-232C block | FX2N-1PG pulse output block | FX3U-4AD analog block |
|---|---|---|---|---|---|---|
| | | | 4 blocks, maximum | | | |

## 5V Current Consumption and I/O Totals

The following tables show the 5V current consumption and input/output points of various types of FX3UC series base units, I/O extension blocks in general and special function blocks. Use these tables to determine the total 5V current being drawn from the base unit and the total system I/O. This will allow you to remain within the specified limits.

### FX3UC Base Units (all types)

| Model | Current Capacity 5VDC | Input X | Output Y | Total |
|---|---|---|---|---|
| FX3UC-16M | 600mA | 8 | 8 | 16 |
| FX3UC-32M | 560mA | 16 | 16 | 32 |
| FX3UC-64M | 480mA | 32 | 32 | 64 |
| FX3UC-96M | 400mA | 48 | 48 | 96 |

### I/O Extension Blocks (all types)

| Model | Current Consumption 5VDC | Input X | Output Y | Total |
|---|---|---|---|---|
| FX2NC-16EX-DS | 30mA | 16 | — | 16 |
| FX2NC-16EYT-DSS | 50mA | — | 16 | 16 |
| FX2NC-32EX-DS | 60mA | 32 | — | 32 |
| FX2NC-32EYT-DSS | 100mA | — | 32 | 32 |
| FX2NC-16EX-T-DS | 30mA | 16 | — | 16 |
| FX2NC-16EYR-T-DS | 50mA | — | 16 | 16 |
| FX2N-8ER-ES/UL | 25mA | 4(8) | 4(8) | 16* |
| FX2N-8EX-ES/UL | 25mA | 8 | — | 8 |
| FX2N-8EX-UA1/UL | 25mA | 8 | — | 8 |
| FX2N-8EYR-ES/UL | 30mA | — | 8 | 8 |
| FX2N-8EYT-ESS/UL | 30mA | — | 8 | 8 |
| FX2N-16EX-ES/UL | 40mA | 16 | — | 16 |
| FX2N-16EYT-ESS/UL | 40mA | — | 16 | 16 |
| FX2N-16EX-ES/UL | 45mA | 16 | — | 16 |
| FX2N-16EYR-ES/UL | 40mA | — | 16 | 16 |
| FX2N-16EYT-ESS/UL | 180mA | — | 16 | 16 |

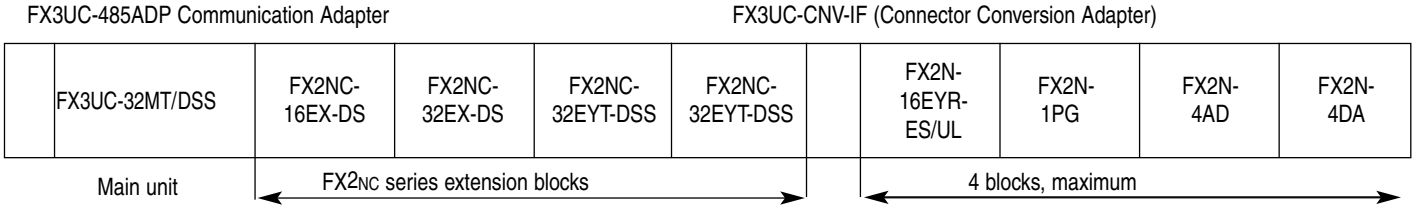
*8 points are used for actual input/output, however, this block occupies 16 input/output points

### Special Function Blocks and Communication Adapters

| Model | Current Consumption 5VDC | Input X | X/Y | Output Y | Total |
|---|---|---|---|---|---|
| FX0N-3A | 30mA | — | 8 | — | 8 |
| FX0N-16NT | 20mA | 8 | — | 8 | 16 |
| FX0N-32NT-DP | 170mA | — | 8 | — | 8 |
| FX2N-2AD | 20mA | — | 8 | — | 8 |
| FX2N-4AD | 30mA | — | 8 | — | 8 |
| FX2N-4AD-PT | 30mA | — | 8 | — | 8 |
| FX2N-4AD-TC | 30mA | — | 8 | — | 8 |
| FX2N-2DA | 30mA | — | 8 | — | 8 |
| FX2N-4DA | 30mA | — | 8 | — | 8 |
| FX2N-1HC | 90mA | — | 8 | — | 8 |
| FX2N-1PG | 55mA | — | 8 | — | 8 |
| FX2N-232IF | 40mA | — | 8 | — | 8 |
| FX2N-32CCL | 130mA | — | 8 | — | 8 |
| FX2N-16LNK-M | 200mA | * | 8 | * | * |
| FX0N-232ADP | 200mA | — | — | — | — |
| FX0N-485ADP | 30mA | — | — | — | — |
| FX-2PIF | 290mA | — | — | — | — |
| FX2NC-232ADP | 100mA | — | — | — | — |
| FX2NC-485ADP | 150mA | — | — | — | — |
| FX2NC-4AD | 50mA | — | 8 | — | 8 |
| FX2NC-4DA | 30mA | — | 8 | — | 8 |

* I/O Link Master: Value depends on number of remote I/O being used.

## FX3UC System Configuration Example




## Example Calculation

| Block | Model | Current Consumption | Number of Blocks Connected | Current Consumption x Number of Blocks | Input X | X/Y | Output Y |
|---|---|---|---|---|---|---|---|
| FX2NC Series Input Extension Block | FX2NC-16EX-DS | 30 mA | 1 blocks | 30 mA | 16 points | | 0 points |
| | FX2NC-32EX-DS | 60 mA | 1 blocks | 60 mA | 32 points | | 0 points |
| FX2NC Series Output Extension Block | FX2NC-16EYT-DSS | 50 mA | 0 blocks | 0 mA | 0 points | | 0 points |
| | FX2NC-32EYT-DSS | 100 mA | 2 blocks | 200 mA | 0 points | | 64 points |
| FXON/FX2N Series Extension Block (4 Block Maximum) | FX2N-16EYR-ES/UL | 40 mA | 1 blocks | 40 mA | 0 points | points | 16 points |
| | FX2N-1PG | 55 mA | 1 blocks | 55 mA | 0 points | 8 points | 0 points |
| | FX2N-4AD | 30 mA | 1 blocks | 30 mA | 0 points | 8 points | 0 points |
| | FX2N-4DA | 30 mA | 1 blocks | 30 mA | 0 points | 8 points | 0 points |
| Function Adapter | FX2N-485ADP | 30 mA | 1 blocks | 30 mA | — | | |
| 2-Port Interface | FX-2PIF | 310 mA | 0 blocks | 0 mA | — | | |
| | | | | 5 Total current consumption: 475 mA | Total input points: | | 48 points |
| | | | | | Total output points: | | 80 points |
| | | | | | Total input/output common points: | | 24 points |
| | | | | | Total I/O points: | | 152 points |

## Judgment (Example)

### a) 5VDC Control Current Capacity Check

5VDC current capacity of main unit: 560 mA ≥ Total current consumption of all connected blocks (from table above): 475 mA

### b) Input/Output Point Connection Upper Limit Check

Input point connection Upper limit: 184 points ≥ (Input points of main unit (from table above): 16 points + Total input points of all connected blocks (from table above): 48 points) = 64 points

Output point connection Upper limit: 184 points ≥ (Output points of main unit (from table above): 16 points + Total output points of all connected blocks (from table above): 80 points) = 96 points

Total I/O points Upper limit: 256 points ≥ (Input/Output points of main unit (from table above): 32 points + Total I/O points of all connected blocks from table above): 152 points) = 184 points

**Calculation results:**
The 5VDC power total current consumption value and total input/output points are in the specified ranges, therefore the above system configuration is possible.

## FX3UC Performance Specifications

| Model Number | | FX3UC | REMARKS |
|---|---|---|---|
| Operation Control Method | | Cyclic operation by stored program | |
| I/O Control Method | | Batch processing<br>(takes place after END instruction is executed) | I/O refresh instruction is available |
| Operation Process Time | | Basic instructions: 0.08µs — Applied instructions: 1.52 - several 100µs per instruction | |
| Programming Language | | Relay symbolic language + Stepladder | Stepladder can be used to produce an SFC style program |
| Program Capacity | | 16K (8000 step) standard | Expandable to 32K (16000 steps) using addl. memory cassette |
| Number of Instructions | | Basic sequence instructions: 27 — Step ladder instructions: 2 — Applied instructions: 125 | |
| I/O Configuration | | Max hardware I/O config. pts. 256, dependent on user selection (Max. software addressable inputs & outputs 256) | |
| Auxiliary Relay (M Coils) | General | 3072 points | M0 to M371 |
| | Latched | 2572 points (subset) | M500 to M3071 (Battery backed) |
| | Special | 256 points | From the range M8000 to M8255 |
| State Relays (S Coils) | General | 1000 points | S0 to S999 |
| | Latched | 500 points (subset) | S500 to S999 (Battery backed) |
| | Initial | 10 points | S0 to S9 |
| | Annunciator | 100 points | S900 to S999 |
| Timers (T) | 100 Msec | Range: 0 to 3,276.7 sec. 200 points | T0 to T199 |
| | 10 Msec | Range: 0 to 327.67 sec. 46 points | T200 to T245 |
| | 1 Msec Retentive | Range: 0 to 32.767 sec. 4 points | T246 to T249 (Battery backed) |
| | 100 Msec Retentive | Range: 0 to 3,276.7 sec. 6 points | T250 to T255 (Battery backed) |
| Counters (C) | General 16 Bit | Range: 1 to 32,767 counts 200 points | C0 to C199 Type: 16 bit up counter |
| | Latched 16 Bit | 100 points (subset) | C0 to C199 Type: 16 bit up counter (Battery backed) |
| | General 32 Bit | Range:-2,147,483,648 to 2,147,483,647 35 points | C200 to C234 Type: 32 bit up/down counter |
| | Latched 32 Bit | 15 points (subset) | C219 to C234 Type: 32 bit up/down counter (Battery backed) |
| High Speed Counters (C) | 1 Phase | Range:-2,147,483,648 to +2,147,483,647 counts<br>Note: All high speed counters are latched | C235 to C240 6 points |
| | 1 Ph., C/W Start/Stop Input | | C241 to C245 5 points |
| | 2 Phase | | C246 to C250 5 points |
| | A/B Phase | | C251 to C255 5 points |
| Data Registers (D) | General | 8000 points | D0 to D7999 Type: 16 bit data storage register, pair for 32 bit device |
| | Latched | 7800 points (subset) | D200 to D7999 Type: 16 bit data storage register, pair for 32 bit device |
| | File Registers | 7000 points (subset) | D1000 to D7999 set by parameter in 14 blocks of 500 program steps:<br>Type: 16 bit data storage register |
| | Special | 256 points | From the range D8000 to D8255 Type: 16 bit data storage register |
| | Index | 16 points | V0 to V7 and Z0 to Z7 Type: 16 bit data storage register |
| Pointers (P) | For Use w/ CALL | 128 points | P0 to P127 |
| | For Use w/ Interrupts | 6 input points, 3 timers, 6 counters | I00❒ to I50❒ and I6☆☆ to I8☆☆<br>I010 to I060 (rising trigger ❒=1, falling trigger ❒=0, ☆☆= time in msec) |
| Nest Levels | | 8 points for use with MC and MCR | N0 to N7 |
| Numbers | Decimal K | 16 bit: -32,768 to +32,767 32 bit: -2,147,483,648 to +2,147,483,647 | |
| | Hexadecimal H | 16 bit; 0000 to FFFF 32 bit: 00000000 to FFFFFFFF | |
| | Floating Point | 32 bit: 0, $-1.175 \times 10^{-38}$, $-3.403 \times 10^{38}$ | |
| Environment | | | |
| Ambient Temperature | | 0–55° C (in operation) –20 +70° C (in storage) | |
| Ambient Humidity | | 35–85% RH, no condensation (in operation) | |
| Vibration Resistance – Direct Mounting | | Conforms to JIS C0040; 10-57 Hz: 0.75 mm Half Amplitude 57-150 Hz: 9.8m/s² Acceleration | |
| Vibration Resistance – DIN Rail Mounting | | Conforms to JIS C0040; 10-57 Hz: 0.035 mm Half Amplitude 57-150 Hz: 4.9m/s² Acceleration | |
| Shock Resistance | | Conforms to JIS C0041: 147m/s² Acceleration, Action Time: 11 ms 3 times in each direction X, Y, and Z | |
| Noise Immunity | | 1000 Vpp noise voltage, 1 µs pulse width at 30–100Hz | |
| Dielectric Withstand Voltage | | 500VAC for 1 minute | Between all terminals and ground |
| Insulation Resistance | | 5MΩ or larger by 500VDC insulation resistance tester | Between all terminals and ground |
| Ground | | Class 3 ground, where available. (100Ω or less) | |
| Operating Environment | | Must be free from corrosive gases. Dust should be minimal. | |

# Ⓐ FX3UC Base Unit Hardware Specifications

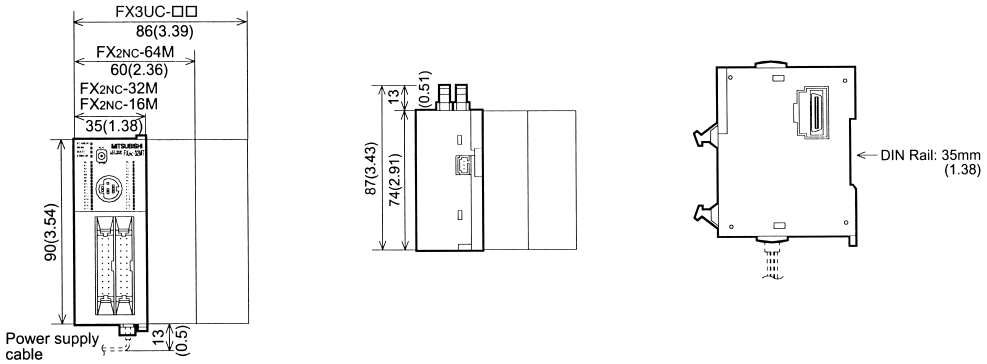
| Specifications | | FX3UC -16MT/D | FX3UC-16MT/DSS | FX3UC-32MT-D/UL | FX3UC-32MT-DSS | FX3UC-64MT-D/UL | FX3UC-64MT-DSS | FX3UC-96MT-D/UL | FX3UC-96MT-DSS |
|---|---|---|---|---|---|---|---|---|---|
| Stocked Item | | – | S | – | S | S | – | – | S |
| Rating | | UL • cUL | UL • cUL • CE | UL • cUL | UL • cUL | UL • cUL | UL • cUL • CE | UL • cUL | UL • cUL • CE |
| Integrated Inputs / Outputs | | 16 | 16 | 32 | 32 | 64 | 64 | 96 | 96 |
| Power Supply | AC Range (+10%, -15%) | — | | | | | | | |
| | Frequency at AC Hz | — | | | | | | | |
| | DC Range (+10%, -15%) | 24VDC | | | | | | | |
| Max. Apparent Input Power | | 6 W | 6 W | 8 W | 8 W | 11 W | 11 W | 14 W | 14 W |
| Inrush Current at ON | 100VAC | — | | | | | | | |
| | 200VAC | — | | | | | | | |
| | 24VDC | 30 A/0.5 ms | | | | | | | |
| Allowable Momentary Power Failure Time (ms) | | 5 | | | | | | | |
| External Service Power Supply (24VDC) mA | | — | | | | | | | |
| Integrated Inputs* | | 8 (24VDC) | 8 (24VDC) | 16 (24VDC) | 16 (24VDC) | 32 (24VDC) | 32 (24VDC) | 48 (24VDC) | 48 (24VDC) |
| Min. Current for Logical 1 (mA) (X0-X7/X10 onwards) | | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 |
| Max. Current for Logical 0 (mA) | | 1.5 | | | | | | | |
| Response Time (ms) | | 0 to 60 X000-X007 All other inputs 10 | 0 to 60 X000-X007 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 |
| Integrated Outputs | | 8 | 8 | 16 | 16 | 32 | 32 | 48 | 48 |
| Output | | Sink Trans. | Source Trans. | Sink Trans. | Source Trans. | Sink Trans. | Source Trans. | Sink Trans. | Source Trans. |
| Switching Voltage (Max.) VDC | | 30 | | | | | | | |
| Max. Output | Per Output (A) | 0.1 (0.3 A/pt Y0 to Y3) | | | | | | | |
| Current | Per 4 Outputs (A) | 0.8 | | | | | | | |
| Max Switching Current | Inductive Load (W) | 2.4 (7.2 [Y0 to Y3]) | | | | | | | |
| | Lamp Load (W) | 0.3 (0.9 [Y0 to Y3]) | | | | | | | |
| Response Time (ms) | OFF→ON | <0.2 (<15 µs, Y0, Y1) | | | | | | | |
| | ON→OFF | <0.2 (<30 µs, Y0, Y1) | | | | | | | |
| Life of Relay Contacts (Cycles) | | — | | | | | | | |
| Weight (kg) | | 0.20 | 0.20 | 0.20 | 0.20 | 0.35 | 0.35 | 0.45 | 0.45 |
| Dimensions (W x H x D) mm | | 35 x 90 x 87 | 35 x 90 x 87 | 35 x 90 x 87 | 35 x 90 x 87 | 60 x 90 x 87 | 60 x 90 x 87 | 86 x 90 x 87 | 86 x 90 x 87 |

# Ⓑ Memory Cassettes

| Specifications | FX3U-FLROM-16 | FX3U-FLROM-64 | FX3U-FLROM-64L |
|---|---|---|---|
| Stocked Item | S | S | S |
| Rating | — | — | — |
| Applicable PLCs | FX3U/FX3UC | FX3U/FX3UC | FX3U/FX3UC |
| Memory Type | EEPROM | EEPROM | EEPROM |
| Memory Size (k byte) | 32K | 128K | 128K |
| Number of Program Steps | 16K | 64K | 64K |
| Calendar Function | Yes | Yes | Yes |
| Non Volatile Storage | Yes | Yes | Yes |
| Program Read/Write | No | No | Yes |
| Required Manuals | JY992D45801 | JY992D45901 | JY992D45801 |

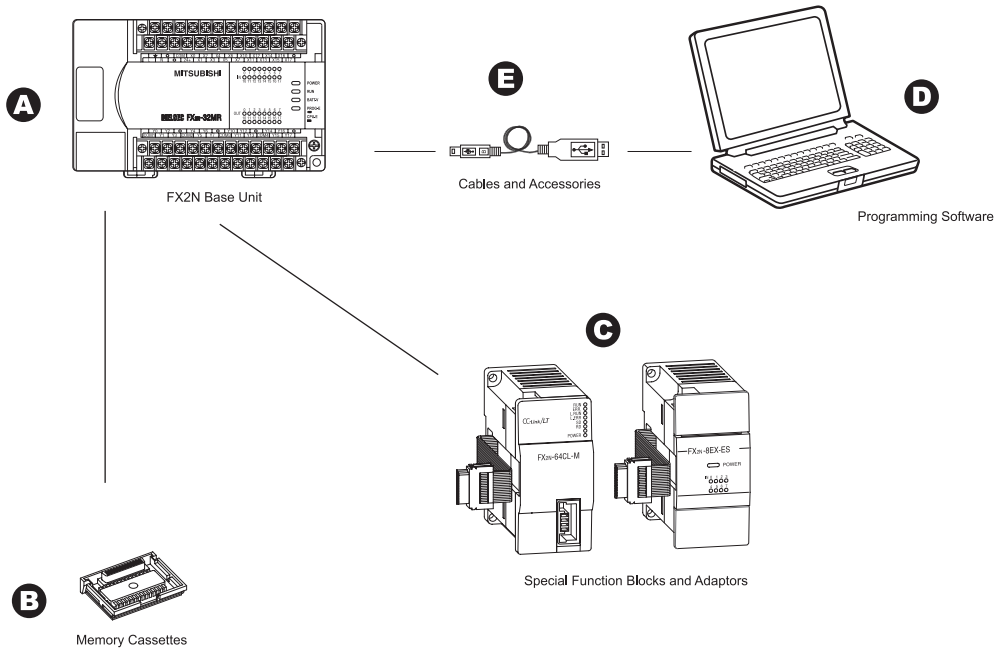
## FX3UC Base Unit Dimensions

**Units: mm (inches)**



# Programmable Logic Controllers • FX2N SuperMicro™

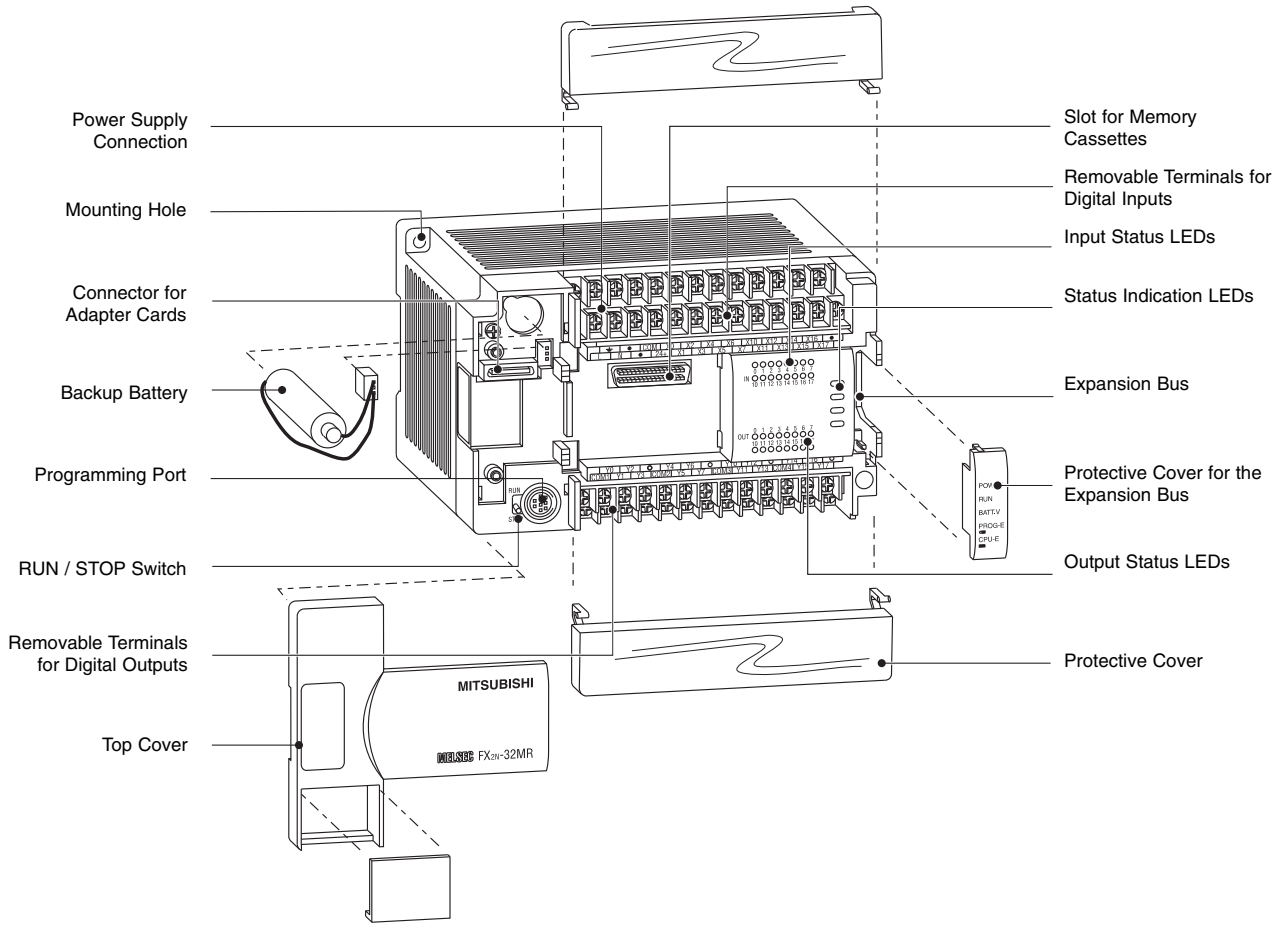
The FX2N SuperMicro™ has set the standard for micro PLC performance over the past 10 years. Superior performance and reliability are the hallmarks of the FX Family of PLCs. Excellent memory, data processing, networking and serial communications, and blazing fast instruction execution speed make the FX2N the perfect choice for many industrial automation applications.



# FX2N

The FX2N SuperMicro leads the way in performance, features and value, making it the perfect choice for small and mid-sized applications. It remains price competitive in lower performance applications and truly stands apart when used on the most demanding projects.

- Windows programming: Ladder, List or SFC languages, (in common with FX0S, FX0N, FX1S & FX1N)
- Easy Migration: Programs and development tools interchange with FX, FX0S, FX0N, FX1N, FX1S, and FX3U
- Operator Interfaces: Selections to match any application
- Unmatched Program Memory: 16/32K (8,000/16,000 steps)
- Massive Data Memory: 8,000 data registers
- Enhanced Throughput: 80 nanoseconds/step
- Better Process Control: New, auto-tuning PID
- Sophisticated High-Speed Processing: 60 kHz counters, 10 ms timed and 50µs hardware interrupts
- High-Function Mathematics: 32 bit floating point, Square Root and Trigonometry
- Embedded Motion Control: Two 20 kHz pulse trains, Trapezoidal ramp instructions
- Real-time clock/calendar (4-digit year) for scheduling and time stamping
- Flexible configurations: From 16 to 256 I/O and extensive special function I/O capabilities
- Cost-Effective Communications: Built-in 2nd port (RS-232/RS-422/RS-485) and PLC-PLC networking
- Open Network Connectivity: Modules for Profibus DP, Profibus DP I/O, DeviceNet, AS-i and CC-Link



## FX2N Base Unit Extension Rules

In general, the FX2N PLC system can support extension I/O, special function blocks and still have a reserve of 24VDC power remaining to power sensors, etc. via the service power supply. The tables on this page show you how to calculate how many special function blocks you can add to a FX2N base unit, and how much current the service power supply can provide when extension I/O is added.

Note that once I/O extension units and blocks are connected to the base unit, the I/O numbering of these peripherals continues from the next whole group of 8 I/O from where the I/O on the base unit ends. Extension I/O numbering always repeats in groups of 8 (X000-X007, Y000-Y007, octal numbers), to allow it to be added anywhere in the sequence of I/O points for the system without causing a number conflict. For example, if the system consists of 32 I/O with a 16 I/O base unit, an 8 point input block, and an 8 point output block, the numbering would work as follows.

| | | |
|---|---|---|
| Base Unit | Inputs: | X000-X007 |
| | Outputs: | Y000-Y007 |
| 8 point input block: | Inputs: | X010-X017 (actually numbered X000-X007 on the block) |
| | Outputs: | None |
| 8 point output block: | Inputs: | None |
| | Outputs: | Y010-Y017 (actually numbered Y000-Y007 on the block) |

**Note:** From a software point of view, the application program would see a seamless range of physical I/O from X000-X017 and Y000-Y017.

**Table 1: 5V Bus Supply**
The FX2N base unit supplies 5VDC to special function blocks via its expansion bus. This is used to operate the special function blocks' CPUs. The specifications in this section guide show how much of this 5V supply current each special function block consumes. To insure your configuration falls within the limits of the base unit's supply, total the 5V current consumed by all special function blocks. For a permissible configuration, this should be equal to or less than the total in the table. It is possible to add extra 5V power to a system by using a powered expansion unit.

### Table 1

| Module | Max. Current on 5V bus |
|---|---|
| FX2N-□□M□-ES/UL (ESS/UL) | 290 mA |
| FX2N-□□E□-ES/UL (ESS/UL) | 690 mA |

**Tables 2 and 3: Service Power Supply**
The FX2N base unit has a built-in 24VDC service power supply intended to power sensors and other peripheral equipment. The amount of current available from this supply is dependent on the number of extension I/O that has been added to the base unit.

### Table 2: 24VDC Power For 16 – 32 I/O Units

| Product | 24VDC Value | Max. Input Extension | Max. Output Extension |
|---|---|---|---|
| FX2N-16M*<br>FX2N-32M*<br>FX2N-32E* | 250mA | 32 points | 24 points |

### Table 3: 24VDC Power For 48 – 128 I/O Units

| Product | 24VDC Bus Supply | Max. Input Extension | Max. Output Extension |
|---|---|---|---|
| FX2N-48M*<br>FX2N-64M*<br>FX2N-80M*<br>FX2N-128M*<br>FX2N-48E* | 460mA | 64 points | 48 points |

*Refers to any base PLC or powered extension module.

## FX2N Sample Power Calculation

The current values for the special function blocks can be found in the specifications on the following pages and in the FX2N Hardware Manual.

| Module | No. | 24VDC Calculation | | 5VDC Calculation | |
|---|---|---|---|---|---|
| | | Current / Module | Calculation | Current / Module | Total Current |
| FX2N-80MR-ES | 1 | +460 mA | +460 mA | +290 mA | +290 mA |
| FX2N-4AD | 3 | +50 mA | (-150 mA) | (-30 mA) | (-90 mA) |
| FX2N-4DA | 1 | +200 mA | (-200 mA) | (-30 mA) | (-30 mA) |
| FX2N-232IF | 1 | +80 mA | (-80 mA) | (-40 mA) | (-40 mA) |
| | | | **+30 mA** | | **290 - 160 mA** |
| | | | | | **Result: 130 mA (OK)** |

| Module | No. | Number of I/Os | | | 24VDC Calculation* | | 5VDC Calculation | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | X/Y | Total[1] | Total Current | Current / Module | Total Current |
| FX2N-48MR-ES/UL | 1 | 24 | 24 | — | +460 mA | | +290 mA | +290 mA |
| FX2N-16EYR-ES/UL | 1 | — | 16 | — | (-150 mA) | (-150 mA) | — | 0 mA |
| FX0N-8EX-ES/UL | 1 | 8 | — | — | (-50 mA) | (-50 mA) | — | 0 mA |
| FX0N-8EYR-ES/UL | 1 | — | 8 | — | (-75 mA) | (-75 mA) | — | 0 mA |
| FX0N-3A | 1 | — | — | 8 | (-90 mA) | (-90 mA) | (-30 mA) | (-30 mA) |
| | | | | | | **+95 mA (OK)** | | **+260 mA (OK)** |
| FX2N-32ER-ES/UL | 1 | 16 | 16 | — | +250 mA | +250 mA | +690 mA | +690 mA |
| FX2N-16EX-ES/UL* | 2 | 16 | — | — | (-100 mA) | (-200 mA) | — | 0 mA |
| FX2N-4AD | 1 | — | — | 8 | (-30 mA) | (-30 mA) | (-55 mA) | (-55 mA) |
| FX2N-1HC | 1 | — | — | 8 | 0 mA | 0 mA | (-90 mA) | (-90 mA) |
| | **Result:** | **64 + 64 + 24 + = 152 (<256) OK** | | | **+20 mA (OK)** | | **+545mA (OK)** | |

**Note: 1.** See Maximum Extension Input and Output tables on previous page.

## FX2N Performance Specifications

| Model Number | | FX2N | REMARK |
|---|---|---|---|
| Operation Control Method | | Cyclic operation by stored program | |
| I/O Control Method | | Batch processing<br>(takes place after END instruction is executed) | I/O refresh instruction is available |
| Operation Process Time | | Basic instructions: 0.08μs — Applied instructions: 1.52 - several 100μs per instruction | |
| Programming Language | | Relay symbolic language + Stepladder | Stepladder can be used to produce an SFC style program |
| Program Capacity | | 16K (8000 step) standard | Expandable to 32K (16000 steps) using addl. memory cassette |
| Number of Instructions | | Basic sequence instructions: 27 — Step ladder instructions: 2 — Applied instructions: 125 | |
| I/O Configuration | | Max hardware I/O config. pts. 256, dependent on user selection (Max. software addressable inputs & outputs 256) | |
| Auxiliary Relay (M Coils) | General | 3072 points | M0 to M3071 |
| | Latched | 2572 points (subset) | M500 to M3071 (Battery backed) |
| | Special | 256 points | From the range M8000 to M8255 |
| State Relays (S Coils) | General | 1000 points | S0 to S999 |
| | Latched | 500 points (subset) | S500 to S999 (Battery backed) |
| | Initial | 10 points | S0 to S9 |
| | Annunciator | 100 points | S900 to S999 |
| Timers (T) | 100 msec | Range: 0 to 3,276.7 sec. 200 points | T0 to T199 |
| | 10 msec | Range: 0 to 327.67 sec. 46 points | T200 to T245 |
| | 1 msec Retentive | Range: 0 to 32.767 sec. 4 points | T246 to T249 (Battery backed) |
| | 100 msec Retentive | Range: 0 to 3,276.7 sec. 6 points | T250 to T255 (Battery backed) |
| Counters (C) | General 16 bit | Range: 1 to 32,767 counts 200 points | C0 to C199 Type: 16 bit up counter |
| | Latched 16 bit | 100 points (subset) | C100 to C199 Type: 16 bit up counter (Battery backed) |
| | General 32 bit | Range:-2,147,483,648 to 2,147,483,647 35 points | C200 to C234 Type: 32 bit up/down counter |
| | Latched 32 bit | 15 points (subset) | C219 to C234 Type: 32 bit up/down counter (Battery backed) |
| High-Speed Counters (C) | 1 Phase | Range:-2,147,483,648 to +2,147,483,647 counts<br>Note: All high speed counters are latched | C235 to C240 6 points (Battery backed) |
| | 1 ph., c/w start/stop input | | C241 to C245 5 points (Battery backed) |
| | 2 phase | | C246 to C250 5 points (Battery backed) |
| | A/B phase | | C251 to C255 5 points (Battery backed) |
| Data Registers (D) | General | 8000 points | D0 to D7999 Type: 16 bit data storage register, pair for 32 bit device |
| | Latched | 7800 points (subset) | D200 to D7999 Type: 16 bit data storage register, pair for 32 bit device |
| | File Registers | 7000 points (subset) | D1000 to D7999 set by parameter in 14 blocks of 500 program steps:<br>Type: 16 bit data storage register |
| | Special | 256 points | From the range D8000 to D8255 Type: 16 bit data storage register |
| | Index | 16 points | V0 to V7 and Z0 to Z7 Type: 16 bit data storage register |
| Pointers (P) | For Use w/ CALL | 128 points | P0 to P127 |
| | For Use w/ Interrupts | 6 input points, 3 timers, 6 counters | I00□ to I50□ and I6☆☆ to I8☆☆<br>I010 to I060 (rising trigger □=1, falling trigger □=0, ☆☆= time in msec) (Battery backed) |
| Nest Levels | | 8 points for use with MC and MCR | N0 to N7 |
| Numbers | Decimal K | 16 bit: -32,768 to +32,767 32 bit: -2,147,483,648 to +2,147,483,647 | |
| | Hexadecimal H | 16 bit; 0000 to FFFF 32 bit: 00000000 to FFFFFFFF | |
| | Floating Point | 32 bit: 0, $-1.175 \times 10^{-38}$, $-3.403 \times 10^{38}$ | |
| Environmental | | | |
| Ambient Temperature | | 0–55° C (in operation) –20 ±70° C (in storage) | |
| Ambient Humidity | | 35–85% RH, no condensation (in operation) | |
| Vibration Resistance | | Conforms to JIS C0911. 10–55Hz 0.5mm (0.02 in.) (Max. 2G) 2 hours in each of 3 axis directions (0.5G on DIN rail) | |
| Shock Resistance | | Conforms to JIS C0912 (10G 3 times in 3 directions) | |
| Noise Immunity | | 1000 Vpp noise voltage, 1 μs pulse width at 30–100Hz | |
| Dielectric Withstand Voltage | | 1500VAC for 1 minute | Between all terminals and ground |
| Insulation Resistance | | 5MΩ or larger by 500VDC insulation resistance tester | Between all terminals and ground |
| Ground | | Class 3 ground, where available. (100Ω or less) | |
| Operating Environment | | Must be free from corrosive gases. Dust should be minimal. | |

**Battery backup:** Parameters for scope of battery backup adjustable.
**Note:** Fixed battery backup for M1024-M3071, D512-D7999.

# Ⓐ FX2N Base Units

## FX2N Base Unit Hardware Specifications

| Specifications | | FX2N-16MR-ES/UL | FX2N-16MR-UA1/UL | FX2N-16MT-ESS/UL | FX2N-32MR-DS | FX2N-32MR-ES/UL | FX2N-32MR-UA1/UL | FX2N-32MT-DSS | FX2N-32MT-ESS/UL |
|---|---|---|---|---|---|---|---|---|---|
| Stocked Item | | S | S | S | S | S | S | S | S |
| Rating | | UL•cUL•CE•DNV LR•GL•ABS•RINA BV | UL•cUL•CE • DNV•ABS | UL•cUL•CE•DNV LR•GL•ABS•RINA BV | CE•ABS | UL•cUL•CE•DNV LR•GL•ABS•RINA BV | UL•cUL•CE • DNV•ABS | CE•ABS | UL•cUL•CE•DNV LR•GL•ABS•RINA BV |
| Integrated Inputs / Outputs | | 16 | 16 | 16 | 32 | 32 | 32 | 32 | 32 |
| Power Supply | AC Range (+10%, -15%) | 100–240VAC | 100–240VAC | 100–240VAC | — | 100–240VAC | 100–240VAC | — | 100–240VAC |
| | Frequency at AC Hz | 50/60 (±10%) | 50/60 (±10%) | 50/60 (±10%) | — | 50/60 (±10%) | 50/60 (±10%) | — | 50/60 (±10%) |
| | DC Range (+10%, -15%) | — | — | — | 24VDC | — | — | 24VDC | — |
| Max. Input Apparent Power | | 30 VA | 30 VA | 30 VA | 25 W | 40 VA | 40 VA | 25 W | 40 VA |
| Inrush Current at ON | 100VAC | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms | — | 40 A < 5 ms | 40 A < 5 ms | — | 40 A < 5 ms |
| | 200VAC | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms | — | 60 A < 5 ms | 60 A < 5 ms | — | 60 A < 5 ms |
| Allowable Momentary Power Failure Time (ms) | | 10 | 10 | 10 | 5 | 10 | 10 | 5 | 10 |
| External Service Power Supply (24VDC) mA | | 250 | N/A | 250 | — | 250 | N/A | — | 250 |
| Power Supply Int. Bus (5VDC) mA | | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 |
| Integrated Inputs* | | 8 (24VDC) | 8 (120VAC) | 8 (24VDC) | 16 (24VDC) | 16 (24VDC) | 16 (120VAC) | 16 (24VDC) | 16 (24VDC) |
| Min. Current for Logical 1 (mA) (X0 - X7 / X10 onwards) | | 4.5 / 3.5 | 3.8 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 3.8 | 4.5 / 3.5 | 4.5 / 3.5 |
| Max. Current for Logical 0 (mA) | | 1.5 | 1.7 | 1.5 | 1.5 | 1.5 | 1.7 | 1.5 | 1.5 |
| Response Time (ms) | | 0-15 | 25 | 0-15 | 0-15 | 0-15 | 25 | 0-15 | 0-15 |
| Integrated Outputs* | | 8 | 8 | 8 | 16 | 16 | 16 | 16 | 16 |
| Output Type | | Relay | Relay | Source Transistor | Relay | Relay | Relay | Source Transistor | Source Transistor |
| ON Voltage (Max.) V | | Generally for relay version: <240VAC, <30VDC: for transistor version: 5 – 30VDC | | | | | | | |
| Max. Output Current | Per Output (A) | 2 | 2 | 0.5 | 2 | 2 | 2 | 0.5 | 0.5 |
| | Per Group* (A) | 8 | 8 | 0.8 | 8 | 8 | 8 | 0.8 | 0.8 |
| Max Switching Load | Inductive Load | 80 VA | 80 VA | 12 W | 80 VA | 80 VA | 80 VA | 12 W | 12 W |
| | Lamp Load (W) | 100 | 100 | 1.5 | 100 | 100 | 100 | 1.5 | 1.5 |
| Response Time (ms) | | 10 | 10 | < 0.2 | 10 | < 0.2 | 10 | < 0.2 | < 0.2 |
| Life of Contacts (Switching Times) | | For all base units of the MELSEC FX2N series values: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 200,000 at 80 VA | | | | | | | |
| Weight (kg) | | 0.6 | 0.6 | 0.60 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 |
| Dimensions (W x H x D) mm | | 130 x 90 x 87 | 130 x 90 x 87 | 150 x 90 x 87 | 150 x 90 x 87 | 150 x 90 x 87 | 182 x 90 x 87 | 150 x 90 x 87 | 150 x 90 x 87 |
| Required Manuals | | FX2N Hardware Manual • JY992D76401, FX Programming Manual II • JY992D88101 | | | | | | | |

* Sink / Source except for MT & MS units: Sink only.

## FX2N Base Unit Hardware Specifications

| Specifications | | FX2N-48 MR-DS | FX2N-48MR-ES/UL | FX2N-48MR-UA1/UL | FX2N-48 MT-ESS/UL | FX2N-48 MT-DSS | FX2N-64 MR-DS | FX2N-64MR-ES/UL | FX2N-64 MR-UA1/UL | FX2N-64 MT-DSS | FX2N-64 MT-ESS/UL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stocked Item | | S | S | S | S | – | S | S | S | – | S |
| Rating | | CE•ABS | UL•cUL•CE•DNV•LR•GL•ABS•RI• NA•BV | UL•cUL•CE DNV•ABS | UL•cUL•CE•DNV• LR• GL• ABS•RINA•BV | CE•ABS | CE•ABS | •LR•GL•ABS•RINA•BVUL•cUL •CE•DNV | UL•cUL•CE DNV•ABS | CE•ABS | UL•cUL•CE•DNV•LR•GL•ABS• RINA•BV |
| Integrated Inputs / Outputs | | 48 | 48 | 48 | 48 | 48 | 64 | 64 | 64 | 64 | 64 |
| Power Supply | AC Range (+10%, -15%) | — | 100–240 VAC | 100–240 VAC | 100–240 VAC | — | — | 100–240 VAC | 100–240 VAC | — | 100–240 VAC |
| | Frequency at AC Hz | — | 50/60 (±10%) | 50/60 (±10%) | 50/60 (±10%) | — | — | 50/60 (±10%) | 50/60 (±10%) | — | 50/60 (±10%) |
| | DC Range (+10%, -15%) | 24VDC | — | — | — | 24VDC | 24VDC | — | — | 24VDC | — |
| Max. Input Apparent Power | | 30 W | 50 VA | 50 VA | 50 VA | 30 W | 35 W | 60 VA | 60 VA | 35 W | 60 VA |
| Inrush Current at ON | 100VAC | — | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms | — | — | 40 A < 5 ms | 40 A < 5 ms | — | 40 A < 5 ms |
| | 200VAC | — | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms | — | — | 60 A < 5 ms | 60 A < 5 ms | — | 60 A < 5 ms |
| Allowable Momentary Power Failure Time (ms) | | 5 | 10 | 10 | 10 | 5 | 5 | 10 | 10 | 5 | 10 |
| External Service Power Supply (24VDC) mA | | — | 460 | N/A | 460 | — | — | 460 | N/A | — | 460 |
| Power Supply Int. Bus (5VDC) mA | | 290 | 290 | 290 | 290 | 290 | 290 | 290 | — | 290 | 290 |
| Integrated Inputs* | | 24 (24VDC) | 24 (24VDC) | 24 (120VAC) | 24 (24VDC) | 24 (24VDC) | 32 (24VDC) | 32 (24VDC) | 32 (120VAC) | 32 (24VDC) | 32 (24VDC) |
| Min. Current for Logical 1 (mA) (X0 - X7 / X10 onwards) | | 4.5 / 3.5 | 4.5 / 3.5 | 3.8 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 3.8 | 4.5 / 3.5 | 4.5 / 3.5 |
| Max. Current for Logical 0 (mA) | | 1.5 | 1.5 | 1.7 | 1.5 | 1.5 | 1.5 | 1.5 | 1.7 | 1.5 | 1.5 |
| Response Time | | 0-15 | 0-15 | 25 | 0-15 | 0-15 | 0-15 | 0-15 | 25 | 0-15 | 0-15 |
| Integrated Outputs* | | 24 | 24 | 24 | 24 | 24 | 32 | 32 | 32 | 32 | 32 |
| Output Type | | Relay | Relay | Relay | Source Transistor | Source Transistor | Relay | Relay | Relay | Source Transistor | Source Transistor |
| ON Voltage (Max.) V | | Generally for relay version: <240VAC, <30VDC: for transistor version: 5 – 30VDC | | | | | | | | | |
| Max. Output Current | Per Output (A) | 2 | 2 | 2 | 0.5 | 0.5 | 2 | 2 | 2 | 0.5 | 0.5 |
| | Per Group* (A) | 8 | 8 | 8 | 0.8 | 0.8 | 8 | 8 | 8 | 0.8 | 0.8 |
| Max Switching Load | Inductive Load | 80 VA | 80 VA | 80 VA | 12 W | 12 W | 80 VA | 80 VA | 80 VA | 12 W | 12 W |
| | Lamp Load (W) | 100 | 100 | 100 | 1.5 | 1.5 | 100 | 1.5 | 100 | 1.5 | 1.5 |
| Response Time (ms) | | 10 | 10 | 10 | < 0.2 | <0.2 | 10 | 10 | 10 | < 0.2 | < 0.2 |
| Life of Contacts (Switching Times) | | For all base units of the MELSEC FX2N series values: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 200,000 at 80 VA | | | | | | | | | |
| Weight (kg) | | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Dimensions (W x H x D) mm | | 182 x 90 x 87 | 182 x 90 x 87 | 220 x 90 x 87 | 182 x 90 x 87 | 182 x 90 x 87 | 220 x 90 x 87 | 220 x 90 x 87 | 285 x 90 x 87 | 220 x 90 x 87 | 220 x 90 x 87 |
| Required Manuals | | FX2N Hardware Manual • JY992D76401, FX Programming Manual II • JY992D88101 | | | | | | | | | |

* Sink / Source except for MT & MS units: Sink only.

## FX2N Base Unit Hardware Specifications

| Specifications | | FX2N-80MR-DS | FX2N-80 MR-ES/UL | FX2N-80 MT-ESS/UL | FX2N-80 MT-DSS | FX2N-128 MR-ES/UL | FX2N-128 MT-ESS/UL |
|---|---|---|---|---|---|---|---|
| Stocked Item | | – | S | – | – | S | S |
| Rating | | CE•ABS | UL•cUL•CE•DNV•LR GL•ABS•RINA•BV | UL•cUL•CE•DNV•LR GL•ABS•RINA•BV | CE•ABS | UL•cUL•CE•DNV•LR GL•ABS•RINA•BV | UL•cUL•CE•DNV•LR GL•ABS•RINA•BV |
| Integrated Inputs / Outputs | | 80 | 80 | 80 | 80 | 128 | 128 |
| Power Supply | AC Range (+10%, -15%) | — | 100–240VAC | 100–240VAC | — | 100–240VAC | 100–240VAC |
| | Frequency at AC Hz | — | 50/60 (±10%) | 50/60 (±10%) | — | 50/60 (±10%) | 50/60 (±10%) |
| | DC Range (+10%, -15%) | 24VDC | — | — | 24VDC | — | — |
| Max. Input Apparent Power | | 40 W | 70 VA | 70 VA | 40 W | 100 VA | 100 VA |
| Inrush Current at ON | 100VAC | — | 40 A < 5 ms | 40 A < 5 ms | — | 50 A < 7 ms | 50 A < 7 ms |
| | 200VAC | — | 60 A < 5 ms | 60 A < 5 ms | — | 70 A < 7ms | 70 A < 7 ms |
| Allowable Momentary Power Failure Time (ms) | | 5 | 10 | 10 | 5 | 10 | 10 |
| External Service Power Supply (24VDC) mA | | — | 460 | 460 | — | 460 | 460 |
| Power Supply Int. Bus (5VDC) | | 290 | 290 | 290 | 290 | 290 | 290 |
| Integrated Inputs* | | 40 (24VDC) | 40 (24VDC) | 40 (24VDC) | 40 (24VDC) | 64 (24VDC) | 64 (24VDC) |
| Min. Current for Logical 1 (mA) (X0-X7/X10 onwards) | | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 |
| Max. Current for Logical 0 (mA) | | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Response Time | | 0-15 | 0-15 | 0-15 | 0-15 | 0-15 | 0-15 |
| Integrated Outputs* | | 40 | 40 | 40 | 40 | 64 | 64 |
| Output Type | | Relay | Relay | Source Transistor | Source Transistor | Relay | Source Transistor |
| ON Voltage (Max.) V | | Generally for relay version: <240VAC, <30VDC: for transistor version: 5 – 30VDC | | | | | |
| Max. Output Current | Per Output (A) | 2 | 2 | 0.5 | 0.5 | 2 | 0.5 |
| | Per 4 Outputs (A) | 8 | 8 | 0.8 | 0.8 | 8 | 0.8 |
| Max Switching Load | Inductive Load | 80 VA | 80 VA | 12 W | 12 W | 80 VA | 12 W |
| | Lamp Load (W) | 100 | 100 | 1.5 | 1.5 | 100 | 1.5 |
| Response Time (ms) | | 10 | 10 | < 0.2 | < 0.2 | 10 | < 0.2 |
| Life of Contacts (Switching Times) | | For all base units of the MELSEC FX2N series: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 200,000 at 80 VA | | | | | |
| Weight (kg) | | 1.2 | 1.2 | 1.2 | 1.2 | 1.8 | 1.8 |
| Dimensions (W x H x D) mm | | 285 x 90 x 87 | 285 x 90 x 87 | 285 x 90 x 87 | 285 x 90 x 87 | 350 x 90 x 87 | 350 x 90 x 87 |
| Required Manuals | | FX2N Hardware Manual • JY992D76401, FX Programming Manual II • JY992D88101 | | | | | |

* Sink / Source except for MT & MS units: Sink only.

## FX2N Base Unit Hardware Specifications (Sink Transistor Units)

| Specifications | | FX2N-16MT-E/UL | FX2N-32MT-E/UL | FX2N-48MT-E/UL | FX2N-64MT | FX2N-80MT | FX2N-128MT |
|---|---|---|---|---|---|---|---|
| Stocked Item | | S | S | S | S | – | – |
| Rating | | UL | UL | UL | — | — | — |
| Integrated Inputs / Outputs | | 16 | 32 | 48 | 64 | 80 | 128 |
| Power Supply | AC Range (+10%, -15%) | 100–240VAC | 100–240VAC | 100–240VAC | 100–240VAC | 100–240VAC | 100–240VAC |
| | Frequency at AC Hz | 50/60Hz | 50/60Hz | 50/60Hz | 50/60Hz | 50/60Hz | 50/60Hz |
| | DC Range (+10%, -15%) | — | — | — | — | — | — |
| Max. Input Apparent Power | | 35 VA | 40 VA | 50 VA | 60 VA | 70 VA | 100 VA |
| Inrush Current at ON | 100VAC | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms |
| | 200VAC | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms |
| Allowable Momentary Power Failure Time (ms) | | 10 | 10 | 10 | 10 | 10 | 10 |
| External Service Power Supply (24VDC) mA | | 250 | 250 | 460 | 460 | 460 | 460 |
| Power Supply Int. Bus (5VDC) mA | | 290 | 290 | 290 | 290 | 290 | 290 |
| Integrated Inputs* | | 8 (24VDC) | 16 (24VDC) | 24 (24VDC) | 32 (24VDC) | 40 (24VDC) | 64 (24VDC) |
| Min. Current for Logical 1 (mA) (X0-X7/X10 onwards) | | 4.5 / 3.5 | 4.3 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 |
| Max. Current for Logical 0 (mA) | | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Response Time | | 0-15 | 0-15 | 0-15 | 0-15 | 0-15 | 0-15 |
| Integrated Outputs* | | 8 | 16 | 24 | 32 | 40 | 64 |
| Output Type | | Sink Transistor | Sink Transistor | Sink Transistor | Sink Transistor | Sink Transistor | Sink Transistor |
| ON Voltage (Max.) V | | Generally for relay version: <240VAC, <30VDC: for transistor version: 5 – 30VDC | | | | | |
| Max. Output Current | Per Output (A) | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| | Per 4 Outputs (A) | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Max Switching Load | Inductive Load | 12 W | 12 W | 12 W | 12 W | 12 W | 12 W |
| | Lamp load (W) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Response Time (ms) | | — | — | — | — | — | — |
| Life of Contacts (Switching Times) | | — | — | — | — | — | — |
| Weight (kg) | | 0.6 | 0.65 | 0.85 | 1 | 1.2 | 1.8 |
| Dimensions (W x H x D) mm | | 130 x 90 x 87 | 150 x 90 x 87 | 182 x 90 x 87 | 220 x 90 x 87 | 285 x 90 x 87 | 350 x 90 x 87 |
| Required Manuals | | FX2N Hardware Manual • JY992D76401, FX Programming Manual II • JY992D88101 | | | | | |

* Sink / Source except for MT & MS units: Sink only.

### FX2N Base Unit Hardware Specifications (Triac Output Units)

| Specifications | | FX2N-16MS | FX2N-32MS-E/UL | FX2N-48MS-E/UL | FX2N-64MS | FX2N-80MS |
|---|---|---|---|---|---|---|
| Stocked Item | | – | S | S | – | – |
| Rating | | UL | UL | — | — | — |
| Integrated Inputs / Outputs | | 16 | 32 | 48 | 64 | 80 |
| Power Supply | AC Range (+10%, -15%) | 100–240VAC | 100–240VAC | 100–240VAC | 100–240VAC | 100–240VAC |
| | Frequency at AC Hz | 50/60Hz | 50/60Hz | 50/60Hz | 50/60Hz | 50/60Hz |
| | DC Range (+10%, -15%) | — | — | — | — | — |
| Max. Input Apparent Power | | 35 VA | 40 VA | 50 VA | 60 VA | 70 VA |
| Inrush Current at ON | 100VAC | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms |
| | 200VAC | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms |
| Allowable Momentary Power Failure Time (ms) | | 10 | 10 | 10 | 10 | 10 |
| External Service Power Supply (24VDC) mA | | 250 | 250 | 460 | 460 | 460 |
| Power Supply Int. Bus (5VDC) mA | | 290 | 290 | 290 | 290 | 290 |
| Integrated Inputs* | | 8 (24VDC) | 16 (24VDC) | 24 (24VDC) | 32 (24VDC) | 40 (24VDC) |
| Min. Current for Logical 1 (mA) (X0-X7/X10 onwards) | | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 |
| Max. Current for Logical 0 (mA) | | 1.5 | 1.5 | 1.5 | 1.5 | 1.51.5 |
| Response Time | | 0-15 | 0-15 | 0-15 | 0-15 | 0-15 |
| Integrated Outputs* | | 8 | 16 | 24 | 32 | 40 |
| Output Type | | Triac (SSR) | Triac (SSR) | Triac (SSR) | Triac (SSR) | Triac (SSR) |
| ON Voltage (Max.) | | 242VAC | 242VAC | 242VAC | 242VAC | 242VAC |
| Max. Output Current | Per Output (A) | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| | Per 4 Outputs (A) | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Max Switching Load | Inductive Load | 36 VA | 36 VA | 36 VA | 36 VA | 36 VA |
| | Lamp Load (W) | 30 W | 30 W | 30 W | 30 W | 30 W |
| Response Time (ms) | | ON:1ms/OFF:10ms | ON:1ms/OFF:10ms | ON:1ms/OFF:10ms | ON:1ms/OFF:10ms | ON:1ms/OFF:10ms |
| Life of Contacts (Switching Times) | | — | — | — | — | — |
| Weight (kg) | | 0.6 | 0.65 | 0.85 | 1 | 1.2 |
| Dimensions (W x H x D) mm | | 130 x 90 x 87 | 150 x 90 x 87 | 182 x 90 x 87 | 220 x 90 x 87 | 285 x 90 x 87 |
| Required Manuals | | FX2N Hardware Manual • JY992D76401, FX Programming Manual II • JY992D88101 | | | | |

* Sink / Source except for MT & MS units: Sink only.

## Ⓑ Memory Cassettes

### FX Removable Memory Cassettes

| Specifications | FX-EEPROM-4 | FX-EEPROM-4C | FX-EEPROM-8 | FX-EEPROM-8C | FX-EPROM-8 |
|---|---|---|---|---|---|
| Stocked Item | S | S | S | – | S |
| Rating | CE | CE | CE | CE | CE |
| Applicable PLCs | FX2N | FX2N | FX2N | FX2N | FX2N |
| Memory Type | EEPROM | EEPROM | EEPROM | EEPROM | EEPROM |
| Memory Size | 8K | 8K | 16K | 16K | 16K |
| Number of Program Steps | 4K | 4K | 8K | 8K | 8K |
| Clock Function (*2) | No | Yes | No | Yes | No |
| Calendar Function (*2) | No | Yes | No | Yes | No |
| Non Volatile Storage | Yes | Yes | Yes | Yes | Yes |
| Write Protection | Yes (switch) | Yes (switch) | Yes (switch) | Yes (switch) | Yes (EPROM) |
| Required Manuals | JY992D45801 | JY992D45901 | JY992D45801 | JY992D45901 | JY992D45801 |

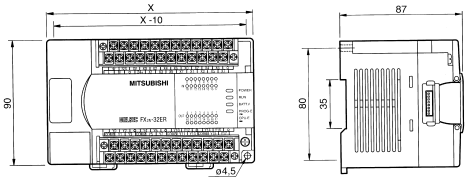
| Specifications | FX-RAM-8 | FX-RAM-8C | FX-EEPROM-16 | FX2N-ROM-E1 |
|---|---|---|---|---|
| Stocked Item | S | – | S | S |
| Rating | — | — | — | — |
| Applicable PLCs | FX2N (*1) | FX2N | FX2N (*1) | FX2N (*1) |
| Memory Type | RAM | RAM | EEPROM | EEPROM |
| Memory Size | 16K | 16K | 32K | 32K |
| Number of Program Steps | 8K | 8K | 16K | 16K |
| Clock Function (*2) | No | Yes | No | No |
| Calendar Function (*2) | No | Yes | No | No |
| Non Volatile Storage | No | No | Yes | Yes |
| Write Protection | No | No | Yes (switch) | Yes (switch) |
| Required Manuals | JY992D45801 | JY992D45901 | JY992D45801 | JY997D00101 |

**Notes:**
1. FX0-10LDR and FX-EEPROM-□ can be used to download porgrams to FX0N/0S/1N/1S PLCs.Cassette memory size must match PLC memory size.
2. FX2N PLCs include a built-in RTC. FX2NC PLCs do not have a built-in RTC.

### FX2N Base Unit Dimensions

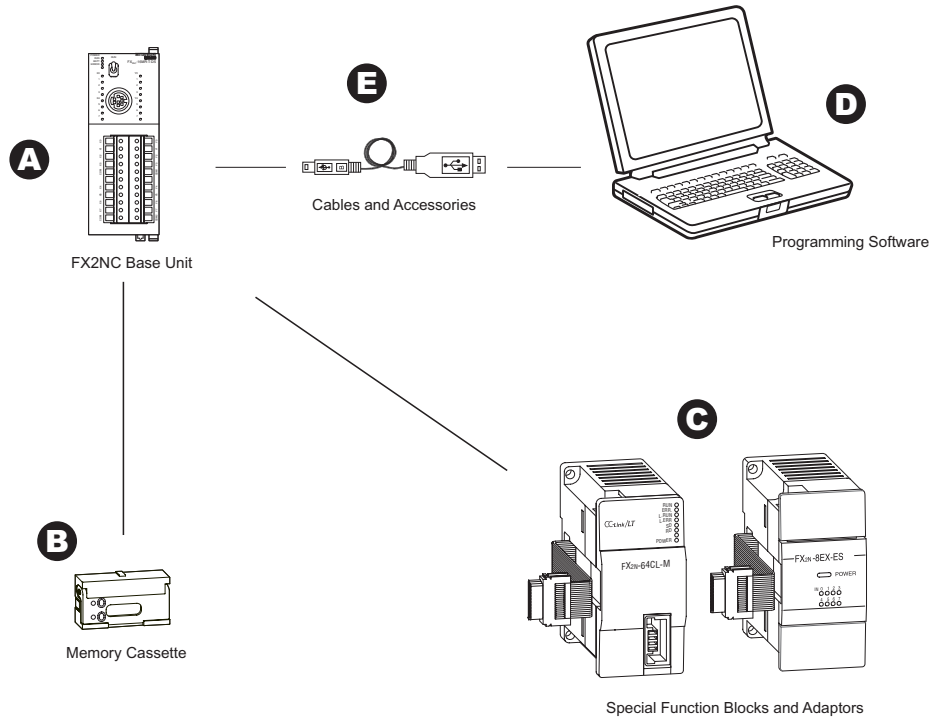
| Type | X (mm) |
|---|---|
| FX2N-16M | 130 |
| FX2N-32M | 150 |
| FX2N-48M | 182 |
| FX2N-64M | 220 |
| FX2N-80M | 285 |
| FX2N-128M | 350 |

**Note:** All base units of same I/O count are the same length with the exception of 32, 48 and 64 I/O **MR-UA1/UL units which are slightly longer.



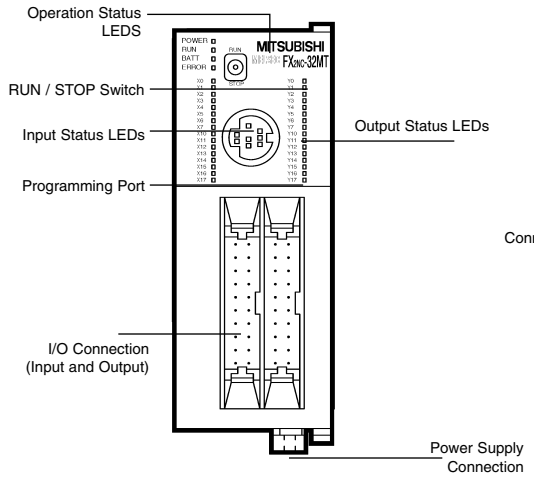
# Programmable Logic Controllers FX2NC SuperMicro™

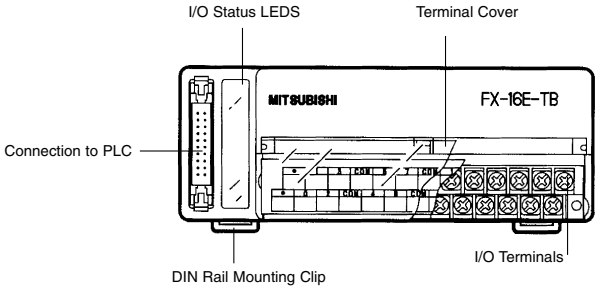
The FX2NC SuperMicro™ offers all the features of the FX2N, but in an ultra compact format. By using distributed terminal block I/O, the FX2NC offers machine and panel builders significant productivity benefits. The FX2NC allows the cost and labor of regular wire harness construction and installation to be reduced by up to 80% by using Mitsubishi Electric or third party terminal block I/O systems.



# FX2NC

- Conventional panels require several layers of wiring, termination, and labeling. The FX2NC uses high-density cables that connect the PLC directly to the field terminals by locking IDC connectors.
- Panel size can be decreased, and construction time/effort associated with wiring, terminating, and labeling are greatly reduced, allowing faster and more cost-effective panel construction.
- Wires in groups of 16 circuits, via distributed terminal blocks, or connect directly to custom-designed harnesses. Use Mitsubishi or third party terminal products.
- Tiny — 16 and 32 I/O CPUs are about the size of a cassette tape case.
- Compatibility with all other Mitsubishi FX2N SuperMicro™ and FX0N products including software, operator interfaces, CPU performance, options, software and connectivity.
- CPU virtually same as FX2N; 32K program memory, 8K data memory, 80 nanosecond execution, embedded twin axis motion control, floating point math, and auto-tuning PID control, etc.
- The real time clock feature is optional for FX2NC CPUs.




## FX2NC Base Unit Extension Rules

The FX2NC series input extension I/O blocks and FX2NC series output extension I/O blocks can be directly connected to the FX2NC series base unit. These input/output extension blocks can be connected in the desired order. After connection, octal numbers will be assigned to the input/output points of the extension blocks. These octal numbers are regarded as the input/output numbers, and the smallest number will be assigned to the input/output point next to the main unit, and then sequentially increased for the subsequent input/output points.

### Rules

**1.** Add the input/output points of the extension blocks and special function blocks to the input/output points of the main unit. The total number of input points should be 184 points or less, and the total number of output points should be 184 points or less also. The total number of input and output points should be 256 points.
**2.** The FX2NC series base unit supplies the control power (5VDC) to the extension blocks and special function blocks. For this reason, the total current consumption of all the blocks connected to the main unit should not exceed the current capacity of the main unit.
**3.** Next to the FX2NC-CNV-IF, up to 4 blocks can be connected. To connect a special function unit, such as the FX2N-1RM-E-SET, refer to the instruction manual of the corresponding special function block. To connect the FX2NC series main unit to the FX0N or FX2N series extension blocks, be sure to connect the FX2NC-CNV-IF connector conversion adapter first. Following the adapter, you can connect up to 4 blocks. In addition, one communication adapter can be connected to the left side of the base unit.

## Example System Configuration Using FX2NC Series Extension I/O

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | X020 | X040 | | X060 | | | X100 | |
| X000-X017 | X037 | X057 | | X077 | | | X117 | |
| FX2NC-32MT-DSS | | | | | | | | |
| | 16EX | 16EX | 16EYT | 16EX | 16EYT | 16EYT | 16EX | 16EYT |
| X: 16 Points | 16 Points | 16 Points | 16 Points | 16 Points | 16 Points | 16 Points | 16 Points | 16 Points |
| Y: 16 Points | | | | | | | | |
| | | | Y020 | | Y040 | Y060 | | Y100 |
| Y000-Y017 | | | Y037 | | Y057 | Y077 | | Y117 |

## Example System Configuration Using FX2NC, FX0N and FX2N Series Extension I/O

FX0N-232ADP (Communication adapter) FX2NC-CNV-IF (Connector conversion adapter)

| | FX2NC-32MT-DSS | FX2NC Series extension blocks | FX2N-16EYR-ES/UL relay output block | FX2N-232IF RS-232C block | FX2N-1PG pulse output block | FX2N-4AD analog block |
|---|---|---|---|---|---|---|
| | | | 4 blocks, maximum | | | |

## 5V Current Consumption and I/O Totals

The following tables show the 5V current consumption and input/output points of various types of FX2NC series base units, I/O extension blocks in general and special function blocks. Use these tables to determine the total 5V current being drawn from the base unit and the total system I/O. This will allow you to remain within the specified limits.

### FX2NC Base Units (all types)

| Model | Current Capacity 5VDC | Input X | Output Y | Total |
|---|---|---|---|---|
| FX2NC-16M | 600mA | 8 | 8 | 16 |
| FX2NC-32M | 560mA | 16 | 16 | 32 |
| FX2NC-64M | 480mA | 32 | 32 | 64 |
| FX2NC-96M | 400mA | 48 | 48 | 96 |

### I/O Extension Blocks (all types)

| Model | Current Consumption 5VDC | Input X | Output Y | Total |
|---|---|---|---|---|
| FX2NC-16EX-DS | 30mA | 16 | — | 16 |
| FX2NC-16EYT-DSS | 50mA | — | 16 | 16 |
| FX2NC-32EX-DS | 60mA | 32 | — | 32 |
| FX2NC-32EYT-DSS | 100mA | — | 32 | 32 |
| FX2NC-16EX-T-DS | 30mA | 16 | — | 16 |
| FX2NC-16EYR-T-DS | 50mA | — | 16 | 16 |
| FX2N-8ER-ES/UL | 25mA | 4 (8) | 4 (8) | 16* |
| FX2N-8EX-ES/UL | 25mA | 8 | — | 8 |
| FX2N-8EX-UA1/UL | 25mA | 8 | — | 8 |
| FX2N-8EYR-ES/UL | 30mA | — | 8 | 8 |
| FX2N-8EYT-ESS/UL | 30mA | — | 8 | 8 |
| FX2N-16EX-ES/UL | 40mA | 16 | — | 16 |
| FX2N-16EYT-ESS/UL | 40mA | — | 16 | 16 |
| FX2N-16EX-ES/UL | 45mA | 16 | — | 16 |
| FX2N-16EYR-ES/UL | 40mA | — | 16 | 16 |
| FX2N-16EYT-ESS/UL | 180mA | — | 16 | 16 |

*8 points are used for actual input/output, however, this block occupies 16 input/output points

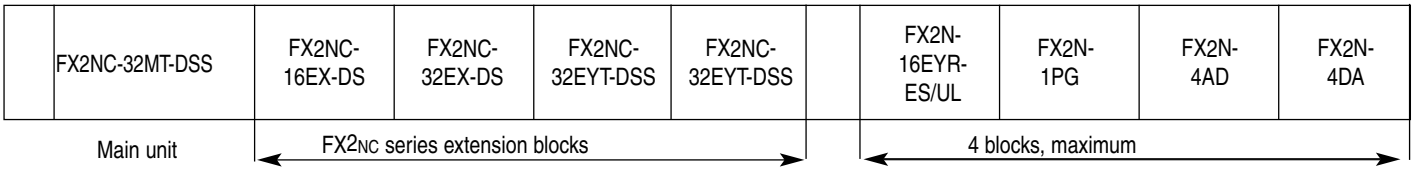
### Special Function Blocks and Communication Adapters

| Model | Current Consumption 5VDC | Input X | X/Y | Output Y | Total |
|---|---|---|---|---|---|
| FX0N-3A | 30mA | — | 8 | — | 8 |
| FX0N-16NT | 20mA | 8 | — | 8 | 16 |
| FX0N-32NT-DP | 170mA | — | 8 | — | 8 |
| FX2N-2AD | 20mA | — | 8 | — | 8 |
| FX2N-4AD | 30mA | — | 8 | — | 8 |
| FX2N-4AD-PT | 30mA | — | 8 | — | 8 |
| FX2N-4AD-TC | 30mA | — | 8 | — | 8 |
| FX2N-2DA | 30mA | — | 8 | — | 8 |
| FX2N-4DA | 30mA | — | 8 | — | 8 |
| FX2N-1HC | 90mA | — | 8 | — | 8 |
| FX2N-1PG | 55mA | — | 8 | — | 8 |
| FX2N-232IF | 40mA | — | 8 | — | 8 |
| FX2N-32CCL | 130mA | — | 8 | — | 8 |
| FX2N-16LNK-M | 200mA | * | 8 | * | * |
| FX0N-232ADP | 200mA | — | — | — | — |
| FX0N-485ADP | 30mA | — | — | — | — |
| FX-2PIF | 290mA | — | — | — | — |
| FX2NC-232ADP | 100mA | — | — | — | — |
| FX2NC-485ADP | 150mA | — | — | — | — |
| FX2NC-4AD | 50mA | — | 8 | — | 8 |
| FX2NC-4DA | 30mA | — | 8 | — | 8 |

* I/O Link Master: Value depends on number of remote I/O being used.

## FX2NC System Configuration Example

FX0N-485ADP (Communication Adapter) — FX2NC-CNV-IF (Connector Conversion Adapter)




## Example Calculation

| Block | Model | Current Consumption | Number of Blocks Connected | Current Consumption x Number of Blocks | Input X | X/Y | Output Y |
|---|---|---|---|---|---|---|---|
| FX2NC Series Input Extension Block | FX2NC-16EX-DS | 30 mA | 1 blocks | 30 mA | 16 points | | 0 points |
| | FX2NC-32EX-DS | 60 mA | 1 blocks | 60 mA | 32 points | | 0 points |
| FX2NC Series Output Extension Block | FX2NC-16EYT-DSS | 50 mA | 0 blocks | 0 mA | 0 points | | 0 points |
| | FX2NC-32EYT-DSS | 100 mA | 2 blocks | 200 mA | 0 points | | 64 points |
| FXON/FX2N Series Extension Block (4 Block Maximum) | FX2N-16EYR-ES/UL | 40 mA | 1 blocks | 40 mA | 0 points | points | 16 points |
| | FX2N-1PG | 55 mA | 1 blocks | 55 mA | 0 points | 8 points | 0 points |
| | FX2N-4AD | 30 mA | 1 blocks | 30 mA | 0 points | 8 points | 0 points |
| | FX2N-4DA | 30 mA | 1 blocks | 30 mA | 0 points | 8 points | 0 points |
| Function Adapter | FX2N-485ADP | 30 mA | 1 blocks | 30 mA | — | | |
| 2-Port Interface | FX-2PIF | 310 mA | 0 blocks | 0 mA | — | | |
| | | | | 5 Total current consumption: 475 mA | Total input points: | | 48 points |
| | | | | | Total output points: | | 80 points |
| | | | | | Total input/output common points: | | 24 points |
| | | | | | Total I/O points: | | 152 points |

## Judgment (Example)

### a) 5VDC Control Current Capacity Check

**5VDC current capacity of main unit** 560 **mA** ≥ **Total current consumption of all connected blocks (from table above)** 475 **mA**

### b) Input/Output Point Connection Upper Limit Check

**Input point connection Upper limit: 184 points** ≥ ( **Input points of main unit (from table above):** 16 **points** + **Total input points of all connected blocks (from table above):** 48 **points** ) = 64 **points**

**Output point connection Upper limit: 184 points** ≥ ( **Output points of main unit (from table above):** 16 **points** + **Total output points of all connected blocks (from table above):** 80 **points** ) = 96 **points**

**Total I/O points Upper limit: 256 points** ≥ ( **Input/Output points of main unit (from table above):** 32 **points** + **Total I/O points of all connected blocks from table above):** 152 **points** ) = 184 **points**

**Calculation results:**
The 5VDC power total current consumption value and total input/output points are in the specified ranges, therefore the above system configuration is possible.

## FX2NC Performance Specifications

| Model Number | | FX2NC | REMARKS |
|---|---|---|---|
| Operation Control Method | | Cyclic operation by stored program | |
| I/O Control Method | | Batch processing (takes place after END instruction is executed) | I/O refresh instruction is available |
| Operation Process Time | | Basic instructions: 0.08µs — Applied instructions: 1.52 - several 100µs per instruction | |
| Programming Language | | Relay symbolic language + Stepladder | Stepladder can be used to produce an SFC style program |
| Program Capacity | | 16K (8000 step) standard | Expandable to 32K (16000 steps) using addl. memory cassette |
| Number of Instructions | | Basic sequence instructions: 27 — Step ladder instructions: 2 — Applied instructions: 125 | |
| I/O Configuration | | Max hardware I/O config. pts. 256, dependent on user selection (Max. software addressable inputs & outputs 256) | |
| Auxiliary Relay (M Coils) | General | 3072 points | M0 to M371 |
| | Latched | 2572 points (subset) | M500 to M3071 (Battery backed) |
| | Special | 256 points | From the range M8000 to M8255 |
| State Relays (S Coils) | General | 1000 points | S0 to S999 |
| | Latched | 500 points (subset) | S500 to S999 (Battery backed) |
| | Initial | 10 points | S0 to S9 |
| | Annunciator | 100 points | S900 to S999 |
| Timers (T) | 100 Msec | Range: 0 to 3,276.7 sec. 200 points | T0 to T199 |
| | 10 Msec | Range: 0 to 327.67 sec. 46 points | T200 to T245 |
| | 1 Msec Retentive | Range: 0 to 32.767 sec. 4 points | T246 to T249 (Battery backed) |
| | 100 Msec Retentive | Range: 0 to 3,276.7 sec. 6 points | T250 to T255 (Battery backed) |
| Counters (C) | General 16 Bit | Range: 1 to 32,767 counts 200 points | C0 to C199 Type: 16 bit up counter |
| | Latched 16 Bit | 100 points (subset) | C0 to C199 Type: 16 bit up counter (Battery backed) |
| | General 32 Bit | Range:-2,147,483,648 to 2,147,483,647 35 points | C200 to C234 Type: 32 bit up/down counter |
| | Latched 32 Bit | 15 points (subset) | C219 to C234 Type: 32 bit up/down counter (Battery backed) |
| High Speed Counters (C) | 1 Phase | Range:-2,147,483,648 to +2,147,483,647 counts<br>Note: All high speed counters are latched | C235 to C240 6 points |
| | 1 Ph., C/W Start/Stop Input | | C241 to C245 5 points |
| | 2 Phase | | C246 to C250 5 points |
| | A/B Phase | | C251 to C255 5 points |
| Data Registers (D) | General | 8000 points | D0 to D7999 Type: 16 bit data storage register, pair for 32 bit device |
| | Latched | 7800 points (subset) | D200 to D7999 Type: 16 bit data storage register, pair for 32 bit device |
| | File Registers | 7000 points (subset) | D1000 to D7999 set by parameter in 14 blocks of 500 program steps: Type: 16 bit data storage register |
| | Special | 256 points | From the range D8000 to D8255 Type: 16 bit data storage register |
| | Index | 16 points | V0 to V7 and Z0 to Z7 Type: 16 bit data storage register |
| Pointers (P) | For Use w/ CALL | 128 points | P0 to P127 |
| | For Use w/ Interrupts | 6 input points, 3 timers, 6 counters | I00□ to I50□ and I6☆☆ to I8☆☆<br>I010 to I060 (rising trigger □=1, falling trigger □=0, ☆☆= time in msec) |
| Nest Levels | | 8 points for use with MC and MCR | N0 to N7 |
| Numbers | Decimal K | 16 bit: -32,768 to +32,767 32 bit: -2,147,483,648 to +2,147,483,647 | |
| | Hexadecimal H | 16 bit; 0000 to FFFF 32 bit: 00000000 to FFFFFFFF | |
| | Floating Point | 32 bit: 0, $-1.175 \times 10^{-38}$, $-3.403 \times 10^{38}$ | |
| Environment | | | |
| Ambient Temperature | | 0–55° C (in operation) –20 +70° C (in storage) | |
| Ambient Humidity | | 35–85% RH, no condensation (in operation) | |
| Vibration Resistance – Direct Mounting | | Conforms to JIS C0040; 10-57 Hz: 0.75 mm Half Amplitude 57-150 Hz: 9.8m/s² Acceleration | |
| Vibration Resistance – DIN Rail Mounting | | Conforms to JIS C0040; 10-57 Hz: 0.035 mm Half Amplitude 57-150 Hz: 4.9m/s² Acceleration | |
| Shock Resistance | | Conforms to JIS C0041: 147m/s$^2$ Acceleration, Action Time: 11 ms 3 times in each direction X, Y, and Z | |
| Noise Immunity | | 1000 Vpp noise voltage, 1 µs pulse width at 30–100Hz | |
| Dielectric Withstand Voltage | | 500VAC for 1 minute | Between all terminals and ground |
| Insulation Resistance | | 5MΩ or larger by 500VDC insulation resistance tester | Between all terminals and ground |
| Ground | | Class 3 ground, where available. (100Ω or less) | |
| Operating Environment | | Must be free from corrosive gases. Dust should be minimal. | |

# Ⓐ FX2NC Base Units

## FX2NC Base Unit Hardware Specifications

| Specifications | | FX2NC-16 MR-T-DS | FX2NC-16 MT-D-UL | FX2NC-16 MT-DSS | FX2NC-32 MT-D/UL | FX2NC-32 MT-DSS | FX2NC-64 MT-D/UL | FX2NC-64 MT-DSS | FX2NC-96 MT-D/UL | FX2NC-96 MT-DSS |
|---|---|---|---|---|---|---|---|---|---|---|
| Stocked Item | | S | – | S | – | S | S | – | – | S |
| Rating | | UL • cUL • CE | UL • cUL | UL • cUL • CE | UL • cUL | UL • cUL • CE | UL • cUL | UL • cUL • CE | UL • cUL | UL • cUL • CE |
| Integrated Inputs / Outputs | | 16 | 16 | 16 | 32 | 32 | 64 | 64 | 96 | 96 |
| Power Supply | AC Range (+10%, -15%) | — | | | | | | | | |
| | Frequency at AC Hz | — | | | | | | | | |
| | DC Range (+10%, -15%) | 24VDC | | | | | | | | |
| Max. Apparent Input Power | | 6W | 6 W | 6 W | 8 W | 8 W | 11 W | 11 W | 14 W | 14 W |
| Inrush Current at ON | 100VAC | — | | | | | | | | |
| | 200VAC | — | | | | | | | | |
| | 24VDC | 30 A/0.5 ms | | | | | | | | |
| Allowable Momentary Power Failure Time (ms) | | 5 | | | | | | | | |
| External Service Power Supply (24VDC) mA | | — | | | | | | | | |
| Integrated Inputs* | | 8 (24VDC) | 8 (24VDC) | 8 (24VDC) | 16 (24VDC) | 16 (24VDC) | 32 (24VDC) | 32 (24VDC) | 48 (24VDC) | 48 (24VDC) |
| Min. Current for Logical 1 (mA) (X0-X7/X10 onwards) | | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 | 4.5 / 3.5 |
| Max. Current for Logical 0 (mA) | | 1.5 | | | | | | | | |
| Response Time (ms) | | 0 to 60 X000-X007 All other inputs 10 | 0 to 60 X000-X007 All other inputs 10 | 0 to 60 X000-X007 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 | 0 to 60 X000-X017 All other inputs 10 |
| Integrated Outputs | | 8 | 8 | 8 | 16 | 16 | 32 | 32 | 48 | 48 |
| Output | | Relay | Sink Trans. | Source Trans. | Sink Trans. | Source Trans. | Sink Trans. | Source Trans. | Sink Trans. | Source Trans. |
| Switching Voltage (Max.) VDC | | 250VAC, 30VDC | 30 | | | | | | | |
| Max. Output Current | Per Output (A) | 2A/pt | 0.1 (0.3 A/pt Y0 to Y3) | | | | | | | |
| | Per 4 Outputs (A) | 4A | 0.8 | | | | | | | |
| Max Switching Current | Inductive Load (W) | — | 2.4 (7.2 [Y0 to Y3]) | | | | | | | |
| | Lamp Load (W) | 100W | 0.3 (0.9 [Y0 to Y3]) | | | | | | | |
| Response Time (ms) | OFF→ON | 10 ms | <0.2 (<15 µs, Y0, Y1) | | | | | | | |
| | ON→OFF | 10 ms | <0.2 (<30 µs, Y0, Y1) | | | | | | | |
| Life of Relay Contacts (Cycles) | | 1,000,000@ 35VA | — | | | | | | | |
| Weight (kg) | | .25 | 0.20 | 0.20 | 0.20 | 0.20 | 0.35 | 0.35 | 0.45 | 0.45 |
| Dimensions (W x H x D) mm | | 35 x 90 x 87 | 35 x 90 x 87 | 35 x 90 x 87 | 35 x 90 x 87 | 35 x 90 x 87 | 60 x 90 x 87 | 60 x 90 x 87 | 86 x 90 x 87 | 86 x 90 x 87 |

* Sink/Source except for MT and MT-D units = Sink only

# Ⓑ FX2NC Memory Cassettes

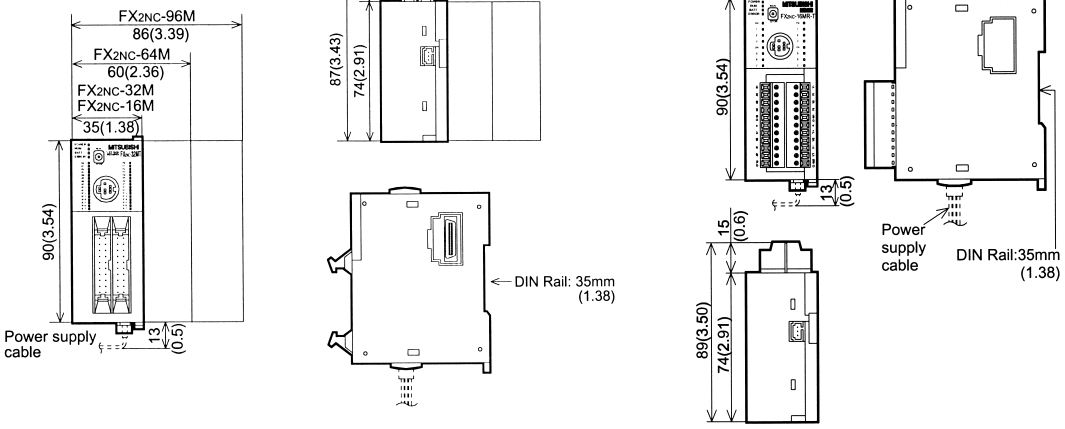
| Specifications | FX2NC-EEPROM-4C | FX2NC-EEPROM-16 | FX2NC-EEPROM-16C | FX2NC-RTC |
|---|---|---|---|---|
| Stocked Item | – | – | S | – |
| Rating | — | — | — | — |
| Applicable PLCs | FX2NC | | | |
| Memory Type | EEPROM | EEPROM | EEPROM | None |
| Memory Size | 8K | 32K | 32K | None |
| Number of Program Steps | 4K | 16K | 16K | None |
| Clock Function (*2) | Yes | No | Yes | Yes |
| Calendar Function (*2) | Yes | No | Yes | Yes |
| Non Volatile Storage | Yes | Yes | Yes | N/A |
| Write Protection | Yes (switch) | Yes (switch) | Yes (switch) | N/A |
| Required Manuals | JY992D76101 | — | JY992D76101 | JY992D76101 |

**Notes:**

1. FX0-10LDR and FX-EEPROM-□ can be used to download porgrams to FX0N/0S/1N/1S PLCs.Cassette memory size must match PLC memory size.
2. FX2N PLCs include a built-in RTC. FX2NC PLCs do not have a built-in RTC.

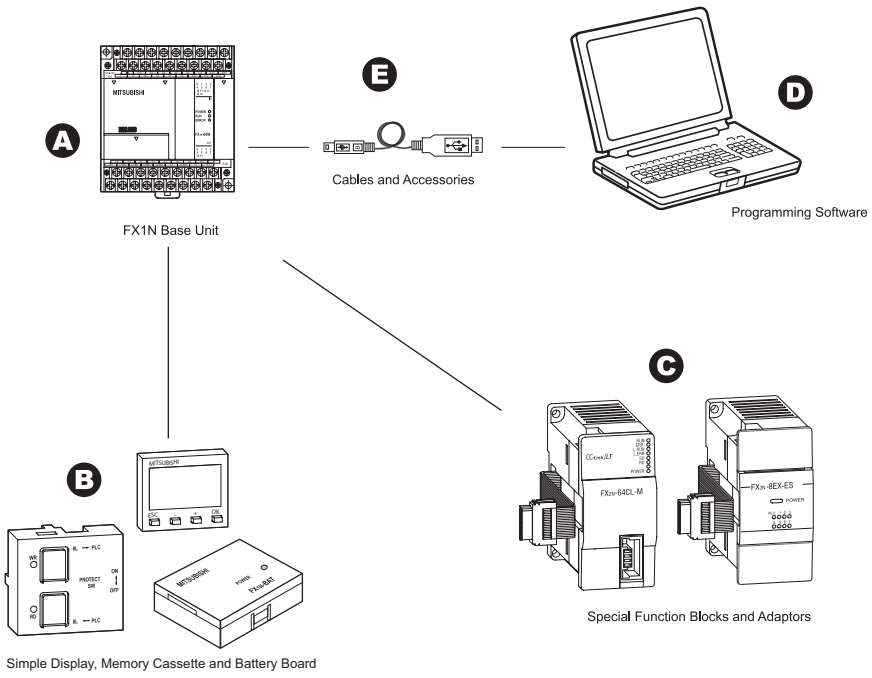
## FX2NC Base Unit Dimensions

**Units: mm (inches)**



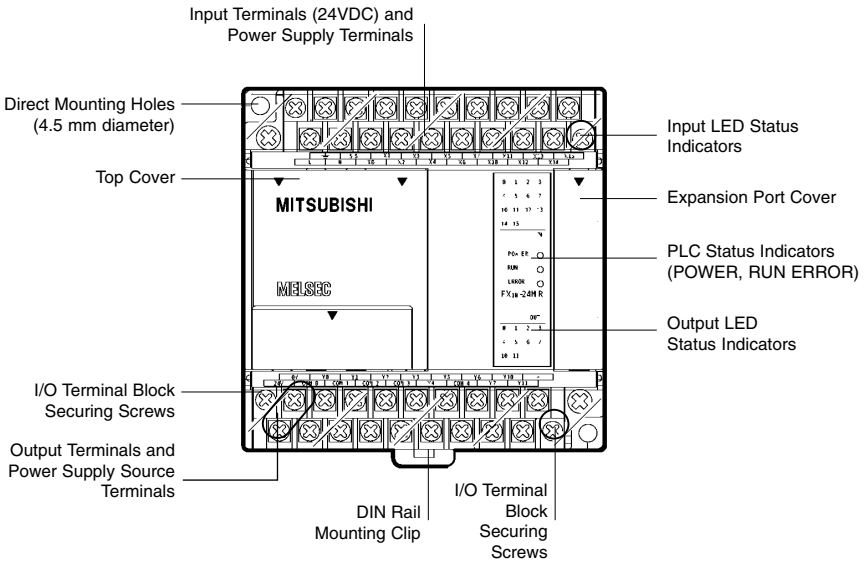
# Programmable Logic Controllers • FX1N

The FX1N takes the technology of the FX1S and applies it in a micro PLC with expansion capabilities. Extend your FX1N system up to 128 I/O, and add communications and analog I/O. In keeping with the FX1S, a wide variety of I/O options are available.



# FX1N

- The FX1N combines the flexibility of an expandable programmable controller with the size of a micro-PLC. Expandable to 128 I/O and with the optional analog I/O communications and other options, the FX1N is suitable for a variety of applications.
- Wide tolerance power supply means that the FX1N can be used anywhere in the world, regardless of the local power supply.
- All AC powered FX1N processors are equipped with a 400 mA, 24 VDC service supply.
- The FX1N can be mounted directly to a panel, or on a DIN rail using its built-in DIN rail mounting hardware. This is also the case for expansion I/O. Removable terminal strips make maintenance easy.
- In addition to using the built-in EEPROM memory for storing up to a 16KB (8000 steps) application program, FX1N processors can also use removable Memory Cassettes which are excellent for Program storage and remote upgrades.
- Real-time clocks are embedded into every unit. All clocks are Y3K compliant.
- In addition to digital I/O, special function I/O modules can be added to the FX1N to increase system capabilities. Interchange FX2N and FX0N modules for maximum flexibility.
- The FX1N has a supplemented FX1S instruction set. Online programming, the ability to change your application program without stopping the PLC, is supported by the FX1N.
- The FX1N has a built-in Run/Stop switch as well as two analog potentiometers for on-the-fly adjustments and maintenance.

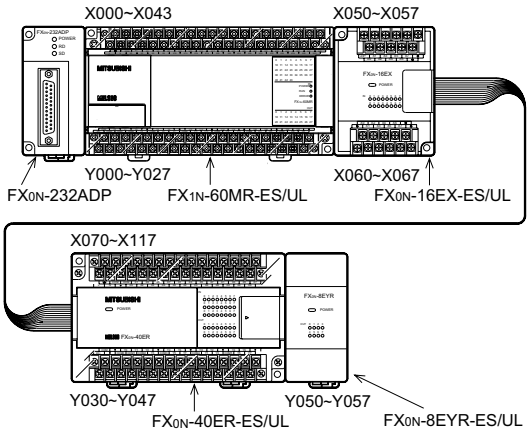



## FX1N Base Unit Extension Rules

The FX1N Series can be expanded by 2 special function blocks or up to 32 points of I/O when used on its own. It can also be expanded by 4 special function blocks when used in conjunction with an FX0N extension unit (2+2), or expanded by 8 special function blocks when used in conjunction with an FX2N extension unit (2+6).

The maximum for an FX1N system is 128 points of I/O and 8 special function blocks.

| | | |
|---|---|---|
| Base Unit | Inputs: | X000-X015 (14 inputs) |
| | Outputs: | Y000-Y011 (10 outputs) |
| 8 point input block: | Inputs: | X020-X027 (actually numbered X000-X007 on the block) |
| | Outputs: | None |
| 8 point output block: | Inputs: | None |
| | Outputs: | Y020-Y027 (actually numbered Y000-Y007 on the block) |



## FX1N Performance Specifications

| Model Number | | FX1N | REMARK |
|---|---|---|---|
| Operation Control Method | | Cyclic operation by stored program | |
| I/O Control Method | | Batch processing (takes place after END instruction is executed) | I/O refresh instruction is available |
| Operation Processing Time | | Basic instructions: 0.55 to 0.7 μs. Applied instructions: 1.65 to several 100 μs | |
| Programming Language | | Relay symbolic language + step ladder | Step ladder can be used to produce an SFC style program |
| Program Capacity | | 8K steps Provided by built in EEPROM memory | |
| Number of Instructions | | Sequence (basic) instructions: 29; Stepladder instructions: 2<br>Applied instructions: 89 | Maximum number of 120 applied instructions are available including all variations |
| I/O Configuration | | Max. hardware I/O configuration points 128, dependent on user selection.<br>(Max. software addressable 128 inputs, 128 Outputs) | |
| Auxiliary Relay (M Coils) | General | 384 points | M0 to M383 |
| | Latched | M384~M511 | 20 years, EEPROM backed |
| | Special | M512~M1535 | 10 Days, capacitor backed |
| State Relays (S Coils) | Latched | S0~S127 | 20 years, EEPROM backed |
| | Initial | S128~S999 | 10 Days, capacitor backed |
| Timers | 100 msec | Range: 0 to 3,276.7 sec; 200 points | T0 to T199 |
| | 10 msec | Range: 0 to 327.67 sec; 46 points | T200 to T245 |
| | 1 msec Retentive | Range: 0 to 32.767 sec; 4 points | T246 to T249, 10 days, capacitor backed |
| | 100 msec Retentive | Range: 0 to 3,276.7 sec; 6 points | T250 to T255, 10 days, capacitor backed |
| Counters (C) | General | Range: 1 to 32,767 counts; 16 points | C0 to C15 Type: 16 bit up counter |
| | Latched (EEPROM) | C16~C31 | C16 to C199 Type: EEPROM backed |
| | Latched (Capacitor) | C32~C199 | 10 Days, capacitor backed |
| | General | Range: 1 to 32,767 counts; 20 points | C200 to C219 Type: 32 bit bi-directional counter |
| | Latched | 15 points (subset) | C220 to C234 Type: 32 bit bi-directional counter |
| High Speed Counters (C) | 1 Phase | Range: -2,147,483,648 to +2,147,483,647 | C235 to C238 4 points |
| | 1 Phase C/W Start Stop Input | FX1N has two Super High Speed Counters that can count up to 100 kHz apiece. The Y0 and Y1 outputs can send pulse train outputs up to 100kHz. Up to six 1-phase counters (10kHz max.) or three 2-phase counters (up to 5 kHz) can be used to count frequencies up to a maximum of 60 kHz for High Speed Counters. 2-phase counters must be doubled when calculating the total frequency used. | C241, C242 and C244 3 points |
| | 2 Phase | | C246, C247 and C249 3 points |
| | A/B Phase | | C251, C252 and C254 3 points |
| Data Registers (D) | General | 7128 points | D0 to D127 & D1000 to D7999<br>Type: 16 bit data storage register, pair for 32 bit device |
| | Latched (EEPROM) | D128~D255 | 20 years, EEPROM backed |
| | Latched (Capacitor) | D1000~D7999 | 10 days, Capacitor backed* |
| | Externally Adjusted | Range: 0 to 255 2 points | Data is moved from external setting potentiometers to registers D8030 and D8031 |
| | Special | 256 points (inclusive of D8013, D8030 and D8031) | From the range D8000 to D8255 Type: 16 bit data storage register |
| | Index | 16 points | V and Z Type: 16 bit data storage register |
| Pointers (P) | For Use w/ CALL | 128 points | P0 to P127 |
| | For Use w/ Interrupts | 6 points | 100□ to 130□ (rising trigger □ =1, falling trigger □=0) |
| Nest Levels | | 8 points for use with MC and MCR | N0 to N7 |
| Constants | Decimal K | 16 bit: -32,768 to +32,767 32 bit: -2,147,483,648 to +2,147,483,647 | |
| | Hexadecimal H | 16 bit; 0000 to FFFF 32 bit: 00000000 to FFFFFFFF | |
| Environmental | | AC Powered Units | DC Powered Units |
| Dielectric Withstand Voltage | | 1500VAC for 1 min. | 500VAC for 1 min. |
| Insulation Resistance | | 5MΩ or larger by 500VDC insulation resistance tester | |
| Noise Durability | | Noise voltage: 1000Vp-p, width: 1ms, frequency: 30 to 100Hz, tested by noise simulator | |
| Grounding | | Class 3 grounding (100Ω or less) | |
| Ambient Operating Temp. / 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 / 0.02 in.(max. 2G, 0.5G if mounted on DIN rail), 2 hrs. in 3 directions | |
| Shock Resistance | | JIS C0912, 10G, 3 times in 3 directions | |

* Capacitor backed memory will change to random values after 10 days. Please use the FX1N-BAT for external battery backup.

# Ⓐ FX1N Base Units

## FX1N Base Unit Hardware Specifications

| Specifications | | FX1N-14 MR-DS | FX1N-14 MR-ES/UL | FX1N-14 MT-ESS/UL | FX1N-14 MT-DSS | FX1N-24 MR-DS | FX1N-24 MR-ES/UL | FX1N-24 MT-ESS/UL | FX1N-24 MT-DSS | FX1N-24MT |
|---|---|---|---|---|---|---|---|---|---|---|
| Stocked Item | | S | S | S | S | S | S | S | S | S |
| Rating | | UL • cUL • CE | | | | | | | | UL • cUL |
| Max. Number of Inputs / Outputs | | 14 | 14 | 14 | 14 | 24 | 24 | 24 | 24 | 24 |
| Power Supply | AC Range (+10%, -15%) | — | 100–240VAC | 100–240VAC | — | — | 100–240VAC | 100–240VAC | — | 100–240VAC |
| | Frequency at AC Hz | — | 50/60 | 50/60 | — | — | 50/60 | 50/60 | — | 50/60 |
| | DC Range (+10%, -15%) | 12–24VDC | — | — | 12–24VDC | 12–24VDC | — | — | 12–24VDC | — |
| Max. Apparent Input Power | | 13 W | 29 W | 29 W | 13 W | 15 W | 30 W | 30 W | 15 W | 30 W |
| Inrush Current at ON | 100VAC (ms) | — | 30A (5ms) | 30A (5ms) | — | — | 30A (5ms) | 30A (5ms) | — | 30A (5ms) |
| | 200VAC (ms) | — | 50A (5ms) | 50A (5ms) | — | — | 50A (5ms) | 50A (5ms) | — | 50A (5ms) |
| | 24VDC (ms) | — | — | — | — | 25A (1ms) | — | — | 25A (1ms) | — |
| Allowable Momentary Power Failure Time (ms) | | 5 | 10 | 10 | 5 | 5 | 10 | 10 | 5 | 10 |
| External Service Power Supply (24VDC) mA | | — | 400 | 400 | — | — | 400 | 400 | — | 400 |
| Integrated Inputs* | | 8 (24VDC) | 8 (24VDC) | 8 (24VDC) | 8 (24VDC) | 14 (24VDC) | 14 (24VDC) | 14 (24VDC) | 14 (24VDC) | 14 (24VDC) |
| Min. Current for Logical 1 (mA) | | > 4.5 / 3.5 | | | | | | | | |
| Max. Current for Logical 0 (mA) (X0-X7 / X10 onwards) | | < 1.5 | | | | | | | | |
| Response Time | | For all base units of the FX1N series; 10 ms (at time of shipping), adjustable from 0 to 15 ms in steps of 1 ms | | | | | | | | |
| Integrated Outputs | | 6 | 6 | 6 | 6 | 10 | 10 | 10 | 10 | 10 |
| Output Type | | Relay | Relay | Source Trans. | Source Trans. | Relay | Relay | Source Trans. | Source Trans. | Sink Trans. |
| Switching Voltage (Max.) V | | For relay version: < 240VAC, < 30VDC: for transistor version: 5 – 30VDC | | | | | | | | |
| Max. Output Current | Per Output (A) | 2 | 2 | 0.5 | 0.5 | 2 | 2 | 0.5 | 0.5 | 0.5 |
| | Per 4 Outputs (A) | 8 | 8 | 0.8 | 0.8 | 8 | 8 | 0.8 | 0.8 | 0.8 |
| Max Switching Load | Inductive Load | 80 VA | 80 VA | 12W | 12 W | 80 VA | 80 VA | 12W | 12W | 12W |
| | Lamp Load (W) | 100 | 100 | 1.5 | 1.5 | 100 | 100 | 1.5 | 1.5 | 1.5 |
| Response Time (ms) | | 10 | 10 | <0.2 | <0.2 | 10 | 10 | <0.2 | <0.2 | <0.2 |
| Life of Relay Contacts (Number of Cycles) | | For all base units of the FX1N series: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 200,000 at 80 VA | | | | | | | | |
| Weight (kg) | | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.6 | 0.6 | 0.45 | 0.45 |
| Dimensions (W x H x D) mm | | 90 x 90 x 75 | 90 x 90 x 75 | 90 x 90 x 75 | 90 x 90 x 75 | 90 x 90 x 75 | 90 x 90 x 75 | 90 x 90 x 75 | 90 x 90 x 75 | 90 x 90 x 75 |
| Required Manuals | | FX Series Programming Manual II, JY992D88101 | | | | | | | | |

* Sink / Source except for MT units = Sink only.

## FX1N Base Unit Hardware Specifications

| Specifications | | FX1N-40 MR-DS | FX1N-40 MR-ES/UL | FX1N-40 MT-ESS/UL | FX1N-40 MT-DSS | FX1N-40MT | FX1N-60 MR-DS | FX1N-60 MR-ES/UL | FX1N-60 MT-ESS/UL | FX1N-60 MT-DSS | FX1N-60MT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stocked Item | | S | S | S | S | S | – | S | S | S | S |
| Rating | | UL • cUL • CE | | | | UL • cUL | UL • cUL • CE | | | | UL • cUL |
| Max. Number of Inputs / Outputs | | 40 | 40 | 40 | 40 | 40 | 60 | 60 | 60 | 60 | 60 |
| Power Supply | AC Range (+10%, -15%) | — | 100–240VAC | 100–240VAC | — | 100–240VAC | — | 100–240VAC | 100–240VAC | — | 100-240VAC |
| | Frequency at AC Hz | — | 50/60 | 50/60 | — | 50/60 | — | 50/60 | 50/60 | — | 50/60 |
| | DC Range (+10%, -15%) | 12–24VDC | — | — | 12–24VDC | — | 12 – 24VDC | — | — | 12 – 24VDC | — |
| Max. Apparent Input Power | | 18 W | 32 W | 32 W | 18 W | 32 W | 20 W | 35 W | 35 W | 20 W | 35 W |
| Inrush Current at ON | 100VAC (ms) | — | 30A (5ms) | 30A (5ms) | — | 30A (5ms) | — | 15 A / 5 | 15 A / 5 | — | 15 A / 5 |
| | 200VAC (ms) | — | 50A (5ms) | 50A (5ms) | — | 50A (5ms) | — | 25 A / 5 | 25 A / 5 | — | 25 A / 5 |
| | 24VDC (ms) | 25A (1ms) | — | — | 25A (1ms) | — | 60 A / 50 | — | — | 60 A / 50 | — |
| Allowable Momentary Power Failure Time (ms) | | 5 | 10 | 10 | 5 | 10 | 5 | 10 | 10 | 5 | 10 |
| External Service Power Supply (24VDC) mA | | — | 400 | 400 | — | 400 | — | 400 | 400 | — | 400 |
| Integrated Inputs* | | 24 (24VDC) | 24 (24VDC) | 24 (24VDC) | 24 (24VDC) | 24 (24VDC) | 36 (24VDC) | 36 (24VDC) | 36 (24VDC) | 36 (24VDC) | 36 (24VDC) |
| Min. Current for Logical 1 (mA) | | > 4.5 / 3.5 | | | | | | | | | |
| Max. Current for Logical 0 (mA) (X0-X7 / X10 onwards) | | < 1.5 | | | | | | | | | |
| Response Time | | For all base units of the FX1N series; 10 ms (at time of shipping), adjustable from 0 to 15 ms in steps of 1 ms | | | | | | | | | |
| Integrated Outputs | | 16 | 16 | 16 | 16 | 16 | 24 | 24 | 24 | 24 | 24 |
| Output Type | | Relay | Relay | Source Trans. | Source Trans. | Sink Trans. | Relay | Relay | Source Trans. | Source Trans. | Sink Trans. |
| Switching Voltage (Max.) V | | For relay version: < 240VAC, < 30VDC: for transistor version: 5 – 30VDC | | | | | | | | | |
| Max. Output Current | Per Output (A) | 2 | 2 | 0.5 | 0.5 | 0.5 | 2 | 2 | 0.5 | 0.5 | 0.5 |
| | Per 4 Outputs (A) | 8 | 8 | 0.8 | 0.8 | 0.8 | 8 | 8 | 0.8 | 0.8 | 0.8 |
| Max Switching Load | Inductive Load | 80 VA | 80 VA | 12W | 12W | 12W | 80 VA | 80 VA | 12 W | 12 W | 12 W |
| | Lamp Load (W) | 100 | 100 | 1.5 | 1.5 | 1.5 | 100 | 100 | 1.5 | 1.5 | 1.5 |
| Response Time (ms) | | 10 | 10 | <0.2 | <0.2 | <0.2 | 10 | 10 | <0.2 | <0.2 | < 0.2 |
| Life of Relay Contacts (Number of Cycles) | | For all base units of the FX1N series: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 200,000 at 80 VA | | | | | | | | | |
| Weight (kg) | | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Dimensions (W x H x D) mm | | 130 x 90 x 75 | 130 x 90 x 75 | 130 x 90 x 75 | 130 x 90 x 75 | 130 x 90 x 75 | 175 x 90 x 75 | 175 x 90 x 75 | 175 x 90 x 75 | 175 x 90 x 75 | 175 x 90 x 75 |
| Required Manuals | | FX Series Programming Manual II, JY992D88101 | | | | | | | | | |

* Sink / Source except for MT units = Sink only.

# Ⓑ FX1N Memory Cassettes and Battery Board

## FX1N Memory Cassettes

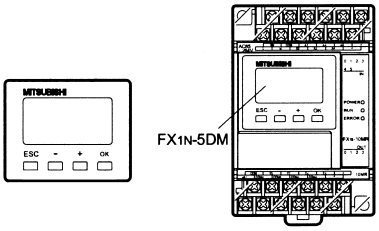
| Specifications | FX1N-EEPROM-8L |
|---|---|
| Stocked Item | S |
| Rating | UL • cUL • CE |
| Applicable PLCs | FX1S / 1N |
| General Specifications | See FX1S & 1N Environmental Specifications |
| Capacity | FX1N=16 KB (8,000 steps) / FX1S=4 KB (2,000 steps) |
| Function | Serves as removable memory with read/write capability |
| Required Manual | JY992D85001 |

## FX1N Battery BD Board

| Specifications | FX1N-BAT |
|---|---|
| Stocked Item | S |
| Compatibility | FX1N |
| Life | 2 years @ 25°C |
| Devices Backed by the Battery | D1000~D7999, M512~M1535, S128~S999, T246~T255, C32~C199, C220~C234, and the Real Time clock |

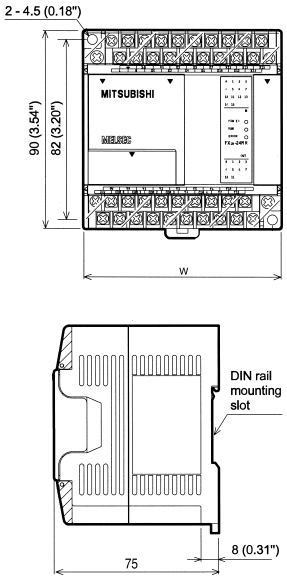
## FX1N Simple Display

| Specifications | FX1N-5DM |
|---|---|
| Stocked Item | S |
| Rating | UL • cUL • CE |
| Applicable PLCs | FX1S / 1N |
| General Specifications | See FX1S & 1N Environmental Specifications |
| Interface | — |
| Power Supply | Taken from base 5VDC 110 mA |
| Weight | 20 g |
| Dimensions | 40 x 32 x 17 |
| Function | Micro display, X, Y, M, S, T, C, D to monitor/test |
| Required Manual | JY992D84901 |



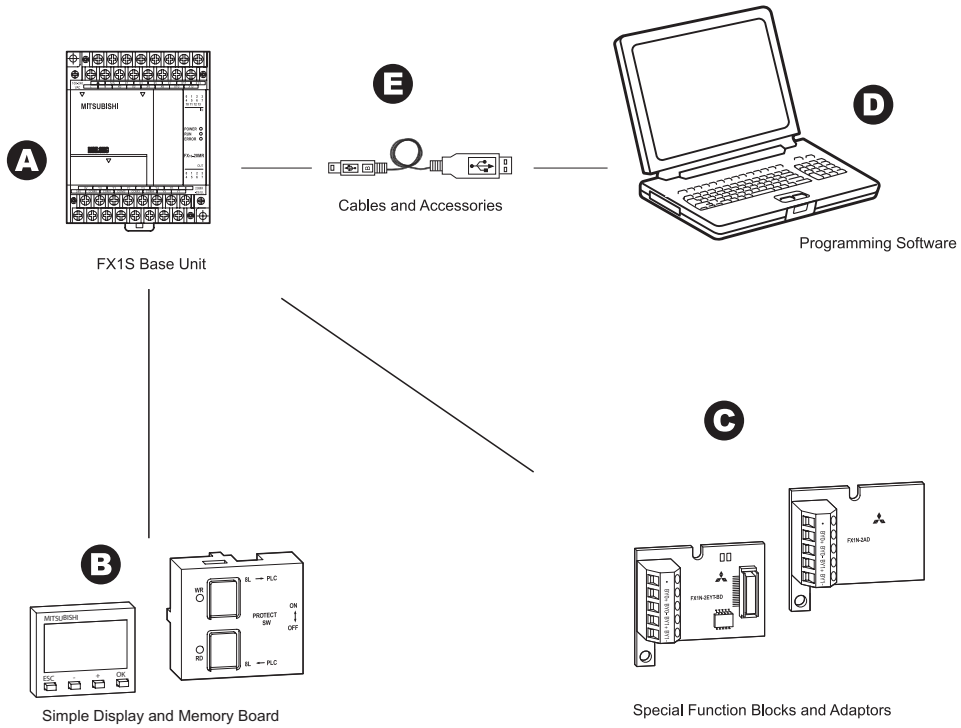

## FX1N Base Unit Dimensions

| Type | W (mm) |
|---|---|
| FX1N-14MR-ES/UL | 90 |
| FX1N-24MR-ES/UL | 90 |
| FX1N-40MR-ES/UL | 130 |
| FX1N-60MR-ES/UL | 175 |
| FX1N-14MR-DS | 90 |
| FX1N-24MR-DS | 90 |
| FX1N-40MR-DS | 130 |
| FX1N-60MR-DS | 175 |
| FX1N-14MT-DSS | 90 |
| FX1N-24MT-DSS | 90 |
| FX1N-40MT-DSS | 130 |
| FX1N-60MT-DSS | 175 |
| FX1N-14MT | 90 |
| FX1N-24MT | 90 |
| FX1N-40MT | 130 |
| FX1N-60MT | 175 |
| FX1N-14MT-ESS/UL | 90 |
| FX1N-24MT-ESS/UL | 90 |
| FX1N-40MT-ESS/UL | 130 |
| FX1N-60MT-ESS/UL | 175 |



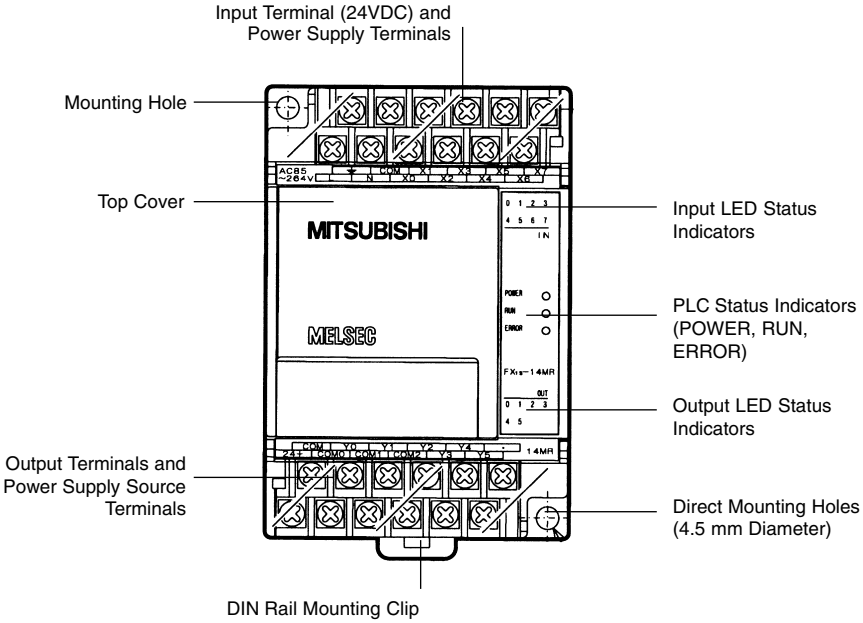
# Programmable Logic Controllers • FX1S

The new FX1S SuperMicro Programmable Logic Controllers boasts integrated I/O, power supply and CPU in a "unitized" package. Every model packs an extensive instruction set and abundant user memory. No other controller is better suited to tackle modern automation demands in jobs ranging from the simplest and smallest I/O count, to those demanding the pinnacle of complexity and speed.



# FX1S

- As with all Mitsubishi Electric FX Family controllers, the power supply, CPU, and I/O components of the FX1S are integrated into a single compact unit. This facilitates cost-effective, high volume manufacturing and increased system reliability. The FX1S is the smallest, most cost effective programmable controller manufactured by Mitsubishi Electric.
- The FX1S uses a wide tolerance power supply. FX1S are so flexible that they can be used almost anywhere in the world, regardless of the local power supply.
- The FX1S has a concealed, built-in Run/Stop switch, allowing quick and easy mode switching. In addition, two analog potentiometers are included which can be used to change the value of data register or timer/counter values.
- The FX1S can be mounted directly to a panel or on a DIN using its built-in DIN rail mounting hardware.
- AC powered FX1S processors with DC inputs are equipped with a 400 mA, 24VDC service supply.
- Through the use of EEPROM memory in the FX1S, all retentive data and programs reside in non-volatile, reliable, and maintenance free EEPROM.
- The FX1S is available with sink/source selectable DC inputs providing high speed counting and interrupt capability.
- All relay output models of the FX1S have high current relay outputs. These outputs are rated to switch currents up to 2 Amps, with an off to on time of approximately 10 msec.
- Transistor output models of the FX1S are rated to switch 0.5 Amp and have the ability to actuate under 0.2 ms. The maximum frequency of operation tops out at a whopping 100 kHz.
- The FX1S uses 35 application instructions, as well as the familiar standard 20 Basic Instructions that are found on all FX family programmable controllers.
- Real-time clocks are embedded in every unit. All clocks are Y3K compliant.



## FX1S Performance Specifications

| Model Number | | FX1S | REMARK |
|---|---|---|---|
| Operation Control Method | | Cyclic operation by stored program | |
| I/O Control Method | | Batch processing (takes place after END instruction is executed) | I/O refresh instruction is available |
| Operation Processing Time | | Basic instructions: 0.55 to 0.7 μs Applied instructions: 1.65 to several 100 μs | |
| Programming Language | | Relay symbolic language + step ladder | Step ladder can be used to produce and SFC style program |
| Program Capacity | | 2K steps | |
| Number of Instructions | | Sequence (basic) instructions: 20; Stepladder instructions: 2; Applied instructions: 35 | Maximum number of 116 applied instructions are available including all variations |
| I/O Configuration | | Max total I/O set by Main Processing Unit | |
| Auxiliary Relay (M Coils) | General | 384 points | M0 to M383 |
| | Latched | 128 points | M384 to M511 (saved in EEPROM) |
| | Special | 256 points | From the range M8000 to M8255 |
| State Relays (S Coils) | General | 128 points | S0 to S127 |
| | Initial | 10 points (subset) | S0 to S9 |
| Timers | 100 msec | Range: 0 to 3,276.7 sec; 63 points | T0 to T62 |
| | 10 msec | Range: 0 to 327.67 sec; 31 points | T23 to T62 when special M coil M8028 is driven ON |
| | 1 msec | Range: 0.001 to 32.767 sec; 1 point | T63 (saved in EEPROM) |
| Counters (C) | General | Range: 1 to 32,767 counts; 16 points | C0 to C15 Type: 16 bit up counter |
| | Latched | C16-C31 (saved in EEPROM) | C16 to C31 Type: 16 bit up counter |
| High Speed Counters (C) | 1 Phase | Range: -2,147,483,648 to +2,147,483,647<br>FX1S has two Super High Speed Counters that can count up to 100 kHz apiece.<br>The Y0 and Y1 outputs can send pulse train outputs up to 100kHz. Up to six 1-phase counters (10kHz max.) or three 2-phase counters (up to 5 kHz) can be used to count frequencies up to a combined maximum of 60 kHz for High Speed Counters.<br>2-phase counter frequencies must be doubled when calculating the total frequency used. | C235 TO C238 (Note C235 is latched) 4 points |
| | 1 Phase C/W Start Stop Input | | C241 (latched), C242 and C244 (latched) 3 points |
| | 2 Phase | | C246, C247 and C249 (all latched) 3 points |
| | A/B Phase | | C251, C252 and C254 (all latched) 3 points |
| Data Registers (D) | General | 128 points | D0 to D127 Type: 16 bit data storage register, pair for 32 bit device |
| | Latched | D128-D255 (saved in EEPROM) | D128 to D255 Type: 16 bit data storage register, pair for 32 bit device |
| | Externally Adjusted | Range: 0 to 255; 2 points | D8013 or D8030 &D8031<br>Data is entered directly through the external setting potentiometer |
| | Special | 256 points (inclusive of D8013) | From the range D8000 to D8255 Type: 16 bit data storage register |
| | Index | 16 points | V and Z Type: 16 bit data storage register |
| Pointers (P) | For Use w/ CALL | 64 points | P0 to P63 |
| | For Use w/ Interrupts | 6 points | 100□ to 130□ (rising trigger □ =1, falling trigger □=0) |
| Nest Levels | | 8 points for use with MC and MCR | N0 to N7 |
| Numbers | Decimal K | 16 bit: -32,768 to +32,767 32 bit: -2,147,483,648 to +2,147,483,647 | |
| | Hexadecimal H | 16 bit; 0000 to FFFF 32 bit: 00000000 to FFFFFFFF | |
| **Environmental** | | **AC Powered Units** | **DC Powered Units** |
| Dielectric Withstand Voltage | | 1500VAC for 1 min. | 500VAC for 1 min. |
| Insulation Resistance | | 5MΩ or larger by 500VDC insulation resistance tester | |
| Noise Durability | | Noise voltage: 1000Vp-p, width: 1ms, frequency: 30 to 100Hz, tested by noise simulator | |
| Grounding | | Class 3 grounding (100Ω or less) | |
| Ambient Operating Temp. / 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 | | IEC 68-2-6, 10 to 55 Hz, 0.5mm / 0.02 in.(max. 2G, 0.5G if mounted on DIN rail), 80 min. in 3 directions | |
| Shock Resistance | | IEC-68-27, 147 m/s², 3 times in 3 directions | |

# Ⓐ FX1S Base Units

## FX1S Base Unit Hardware Specifications

| Specifications | | FX1S-10MR-DS | FX1S-10MT-ESS/UL | FX1S-10MR-ES/UL | FX1S-10MT-DSS | FX1S-10MT | FX1S-14MR-DS | FX1S-14MR-ES/UL | FX1S-14MT-ESS/UL | FX1S-14MT-DSS | FX1S-14MT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stocked Item | | – | S | S | S | – | S | S | S | S | S |
| Rating | | UL • cUL • CE | | | | UL • cUL | UL • cUL • CE | | | | UL • cUL |
| Max. Number of Inputs / Outputs | | 10 | 10 | 10 | 10 | 10 | 14 | 14 | 14 | 14 | 14 |
| Power Supply | AC Range (+10%, -15%) | — | 100-240VAC | 100-240VAC | — | 100-240VAC | — | 100-240VAC | 100-240VAC | — | 100-240VAC |
| | Frequency at AC Hz | — | 50/60 | 50/60 | — | 50/60 | — | 50/60 | 50/60 | — | 50/60 |
| | DC Range (+10%, -15%) | 24VDC | — | — | 24VDC | — | 24VDC | — | — | 24VDC | — |
| Max. Apparent Input Power | | 6W | 19W | 19W | 6W | 19W | 6.5W | 19W | 19W | 6.5W | 19W |
| Inrush Current at ON | 100VAC (ms) | — | 15 A / 5 | 15 A / 5 | — | 15 A / 5 | — | 15 A / 5 | 15 A / 5 | — | 15 A / 5 |
| | 200VAC (ms) | — | 25 A / 5 | 25 A / 5 | — | 25 A / 5 | — | 25 A / 5 | 25 A / 5 | — | 25 A / 5 |
| | 24VDC (ms) | 15A/0.1 | — | — | 15A / 0.1 | — | 15A/0.1 | — | — | 15A/0.1 | — |
| Allowable Momentary Power Failure Time (ms) | | 5 | 10 | 10 | 5 | 10 | 5 | 10 | 10 | 5 | 10 |
| External Service Power Supply (24VDC) mA | | — | 400 | 400 | — | 400 | — | 400 | 400 | — | 400 |
| Integrated Inputs | | 6 (24VDC) | 6 (24VDC) | 6 (24VDC) | 6 (24VDC) | 6 (24VDC) | 8 (24VDC) | 8 (24VDC) | 8 (24VDC) | 8 (24VDC) | 8 (24VDC) |
| Min. Current for Logical 1 (mA) (x10 – x17) | | >4.5/3.5 | | | | | | | | | |
| Max. Current for Logical 0 (mA) | | <1.5 | | | | | | | | | |
| Response Time | | For all base units of the FX1S Series; 10 ms (at time of shipping), adjustable from 0 to 15 ms in steps of 1 ms | | | | | | | | | |
| Integrated Outputs | | 4 | 4 | 4 | 4 | 4 | 6 | 6 | 6 | 6 | 6 |
| Output Type | | Relay | Source Trans. | Relay | Source Trans. | Sink Trans. | Relay | Relay | Source Trans. | Relay | Sink Trans. |
| Switching Voltage (Max.) V | | For all relay versions: <240VAC, <30VDC: for transistor version: 5 – 30VDC | | | | | | | | | |
| Max. Output Current | Per Output (A) | 2 | 0.5 | 2 | 0.5 | 0.5 | 2 | 2 | 0.5 | 0.5 | 0.5 |
| | Per 4 Outputs (A) | 8 | 0.8 | 8 | 0.8 | 0.8 | 8 | 8 | 0.8 | 0.8 | 0.8 |
| Max Switching Load | Inductive Load | 80 VA | 12W | 80 VA | 12W | 12W | 80 VA | 80 VA | 12 W | 12 W | 12 W |
| | Lamp Load (W) | 100 | 0.9 | 100 | 0.9 | 0.9 | 100 | 100 | 0.9 | 0.9 | 0.9 |
| Response Time (ms) | | 10 | <0.2 | 10 | <0.2 | <0.2 | 10 | 10 | <0.2 | <0.2 | <0.2 |
| Life of Relay Contacts (Number of Cycles) | | For all relay base units of the FX1S series: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 200,0000 at 80 VA | | | | | | | | | |
| Weight (kg) | | 0.22 | 0.30 | 0.30 | 0.22 | 0.30 | 0.22 | 0.30 | 0.30 | 0.22 | 0.30 |
| Dimensions (W x H x D) mm | | 60 x 90 x 49 | 60 x 90 x 75 | 60 x 90 x 75 | 60 x 90 x 49 | 60 x 90 x 75 | 60 x 90 x 49 | 60 x 90 x 75 | 60 x 90 x 75 | 60 x 90 x 49 | 60 x 90 x 75 |
| Required Manuals | | FX Series Programming Manual II, JY992D88101 | | | | | | | | | |

## FX1S Base Unit Hardware Specifications

| Specifications | | FX1S-20MR-DS | FX1S-20MT-ESS/UL | FX1S-20MR-ES/UL | FX1S-20MT-DSS | FX1S-20MT | FX1S-30MR-DS | FX1S-30MR-ES/UL | FX1S-30MT-ESS/UL | FX1S-30MT-DSS | FX1S-30MT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stocked Item | | S | S | S | S | S | S | S | S | S | S |
| Rating | | UL • cUL • CE | | | | UL • cUL | UL • cUL • CE | | | | UL • cUL |
| Max. Number of Inputs / Outputs | | 20 | 20 | 20 | 20 | 20 | 30 | 30 | 30 | 30 | 30 |
| Power Supply | AC Range (+10%, -15%) | — | 100-240VAC | 100-240VAC | — | 100-240VAC | — | 100-240VAC | 100-240VAC | — | 100-240VAC |
| | Frequency at AC Hz | — | 50/60 | 50/60 | — | 50/60 | — | 50/60 | 50/60 | — | 50/60 |
| | DC Range (+10%, -15%) | 24VDC | — | — | 24VDC | — | 24VDC | — | — | 24VDC | — |
| Max. Apparent Input Power | | 7 W | 20 W | 20 W | 7 W | 20 W | 8 W | 21 W | 21 W | 8 W | 21 W |
| Inrush Current at ON | 100VAC (ms) | — | 15A / 5 | 15A / 5 | — | 15A / 5 | — | 15A / 5 | 15A / 5 | — | 15A / 5 |
| | 200VAC (ms) | — | 25A / 5 | 25A / 5 | — | 25A / 5 | — | 25A / 5 | 25A / 5 | — | 25A / 5 |
| | 24VDC (ms) | 15A / 0.1 | — | — | 15A / 0.1 | — | 15 A / 0.1 | — | — | 15 A / 0.1 | — |
| Allowable Momentary Power Failure Time (ms) | | 5 | 10 | 10 | 5 | 10 | 5 | 10 | 10 | 5 | 10 |
| External Service Power Supply (24VDC) mA | | — | 400 | 400 | — | 400 | — | 400 | 400 | — | 400 |
| Integrated Inputs | | 12 (24VDC) | 12 (24VDC) | 12 (24VDC) | 12 (24VDC) | 12 (24VDC) | 16 (24VDC) | 16 (24VDC) | 16 (24VDC) | 16 (24VDC) | 16 (24VDC) |
| Min. Current for Logical 1 (mA) (x10 – x17) | | >4.5/3.5 | | | | | | | | | |
| Max. Current for Logical 0 (mA) | | <1.5 | | | | | | | | | |
| Response Time | | For all base units of the FX1S series; 10 ms (at time of shipping), adjustable from 0 to 15 ms in steps of 1 ms | | | | | | | | | |
| Integrated Outputs | | 8 | 8 | 8 | 8 | 8 | 14 | 14 | 14 | 14 | 14 |
| Output Type | | Relay | Source Trans. | Relay | Source Trans. | Sink Trans. | Relay | Relay | Source Trans. | Source Trans. | Sink Trans. |
| Switching Voltage (Max.) V | | For all relay versions: < 240VAC, < 30VDC: for transistor version: 5 – 30VDC | | | | | | | | | |
| Max. Output Current Max Switching Load | Per Output (A) | 2 | 0.5 | 2 | 0.5 | 0.5 | 2 | 2 | 0.5 | 0.5 | 0.5 |
| | Per 4 Outputs (A) | 8 | 0.8 | 8 | 0.8 | 0.8 | 8 | 8 | 0.8 | 0.8 | 0.8 |
| | Inductive Load | 80 VA | 12 W | 80 VA | 12 W | 12 W | 80 VA | 80 VA | 12 W | 12 W | 12 W |
| | Lamp Load (W) | 100 | 0.9 | 100 | 0.9 | 0.9 | 100 | 100 | 0.9 | 0.9 | 0.9 |
| Response Time (ms) | | 10 | <0.2 | 10 | <0.2 | <0.2 | 10 | 10 | <0.2 | <0.2 | <0.2 |
| Life of Relay Contacts (Number of Cycles) | | For all relay base units of the FX1S series: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 200,000 at 80 VA | | | | | | | | | |
| Weight (kg) | | 0.30 | 0.40 | 0.40 | 0.30 | 0.40 | 0.35 | 0.45 | 0.45 | 0.35 | 0.45 |
| Dimensions (W x H x D) mm | | 75 x 90 x 49 | 75 x 90 x 75 | 75 x 90 x 75 | 75 x 90 x 49 | 75 x 90 x 75 | 100 x 90 x 49 | 100 x 90 x 75 | 100 x 90 x 75 | 100 x 90 x 49 | 100 x 90 x 75 |
| Required Manuals | | FX Series Programming Manual II, JY992D88101 | | | | | | | | | |

# Ⓑ FX1N Menory Cassettes and Simple Display

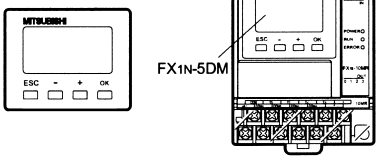
## FX1N Memory Cassettes

| Specifications | FX1N-EEPROM-8L |
|---|---|
| Stocked Item | S |
| Rating | UL • cUL • CE |
| Applicable PLCs | FX1S / 1N |
| General Specifications | See FX1S & 1N Environmental Specifications |
| Capacity | FX1N=16 KB (8,000 steps) / FX1S=4 KB (2,000 steps) |
| Function | Serves as removable memory with read/write capability |
| Required Manual | JY992D85001 |

## FX1N Simple Display

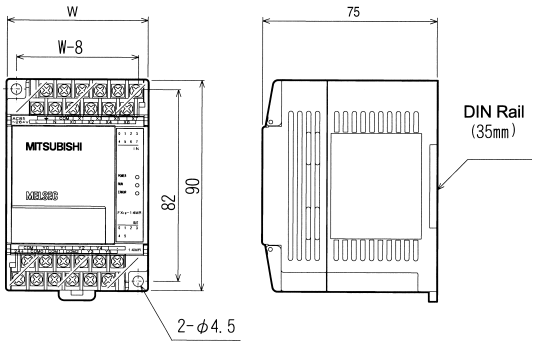
| Specifications | FX1N-5DM |
|---|---|
| Stocked Item | S |
| Rating | UL • cUL • CE |
| Applicable PLCs | FX1S / 1N |
| General Specifications | See FX1S Environmental Specs. |
| Interface | — |
| Power Supply | Taken from base 5VDC 110 mA |
| Weight | 20 g |
| Dimensions | 40 x 32 x 17 |
| Function | Micro display, X, Y, M, S, T, C, D to monitor/test |
| Required Manual | JY992D84901 |

*Micro display can be used with the FX1S base units.




## FX1S Base Unit Dimensions

| Type | W (mm) |
|---|---|
| FX1S-10MR-ES/UL | 60 |
| FX1S-14MR-ES/UL | 60 |
| FX1S-20MR-ES/UL | 75 |
| FX1S-30MR-ES/UL | 100 |
| FX1S-10MR-DS | 60 |
| FX1S-14MR-DS | 60 |
| FX1S-20MR-DS | 75 |
| FX1S-30MR-DS | 100 |
| FX1S-10MT-DSS | 60 |
| FX1S-14MT-DSS | 60 |
| FX1S-20MT-DSS | 75 |
| FX1S-30MT-DSS | 100 |
| FX1S-10MT | 60 |
| FX1S-14MT | 60 |
| FX1S-20MT | 75 |
| FX1S-30MT | 100 |
| FX1S-10MT-ESS/UL | 60 |
| FX1S-14MT-ESS/UL | 60 |
| FX1S-20MT-ESS/UL | 75 |
| FX1S-30MT-ESS/UL | 100 |



# ⓒ FX Special Function Block Compatibility

## FX Special Function Block Compatibility

| Special Function Block | Model | FX3U | FC3UC | FX2N | FX2NC | FX1N | FX1S |
|---|---|---|---|---|---|---|---|
| Analog Input | FX3U-4AD-PT-ADP | ✔ | ✔ | | | | |
| | FX3U-4AD-TC-ADP | ✔ | ✔ | | | | |
| | FX3U-4AD | ✔ | ✔ (*5) | | | | |
| | FX3U-4AD-ADP | ✔ | ✔ (*5) | | | | |
| | FX2N-2AD | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-4AD | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-4AD-PT | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-4AD-TC | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-8AD | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2NC-4AD | | ✔ | | ✔ | | |
| Analog Input/Output | FX3U-4DA | ✔ | ✔ (*5) | | | | |
| | FX3U-4DA-ADP | ✔ | ✔ (*5) | | | | |
| | FX2N-2DA | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-4DA | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-5A | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX0N-3A | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| High Speed Adaptor Modules | FX3U-2HSY-ADP | ✔ | | | | | |
| | FX3U-4HSX-ADP | ✔ | | | | | |
| Temperature Control | FX2N-2LC | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| I/O Powered Extension Units | FX2N-32ER-ES/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-32ES | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-32ET | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-32ET-ESS/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-48ER-DS | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-48ER-ES/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-48ER-UA1/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-48ET | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-48ET-DSS | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-48ET-ESS/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX0N-40ER-DS | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX0N-40ER-ES/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX0N-40ET-DSS | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| I/O Extension Block Hardware | FX2N-8ER-ES/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-8EX-ES/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-8EX-UA1/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-8EYR-ES/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-8EYT | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-8EYT-ESS/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-8EYT-H | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-16EX | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-16EX-ES/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-16EYR-ES/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-16EYS | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-16EYT | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-16EYT-ESS/UL | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2NC-16EX-D/UL | | ✔ | | ✔ | | |
| | FX2NC-16EX-DS | | ✔ | | ✔ | | |
| | FX2NC-16EX-T-DS | | ✔ | | ✔ | | |
| | FX2NC-16EYR-T-DS | | ✔ | | ✔ | | |
| | FX2NC-16EYT-D/UL | | ✔ | | ✔ | | |
| | FX2NC-16EYT-DSS | | ✔ | | ✔ | | |
| | FX2NC-32EX-DS | | ✔ | | ✔ | | |
| | FX2NC-32EYT-D/UL | | ✔ | | ✔ | | |
| SSCNET Motion | FX3U-20SSC-H | ✔ | ✔ (*5) | | | | |
| Positioning Modules | FX2N-1HC | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-1PG-E | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2N-10PG | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| Terminal Blocks (4) | FX-16E-TB | | ✔ | | ✔ | | |
| | FX-16E-TB/UL | | ✔ | | ✔ | | |
| | FX-16EX-A1-TB | | ✔ | | ✔ | | |
| | FX-16EX-A1-TB/UL | | ✔ | | ✔ | | |
| | FX-16EYR-ES-TB/UL | | ✔ | | ✔ | | |
| | FX16EYS-TB | | ✔ | | ✔ | | |
| | FX-16EYS-ES-TB/UL | | ✔ | | ✔ | | |
| | FX16EYT-TB | | ✔ | | ✔ | | |
| | FX-16EYT-ES-TB/UL | | ✔ | | ✔ | | |
| | FX-16EYT-ESS-TB/UL | | ✔ | | ✔ | | |
| | FX-32E-TB/UL | | ✔ | | ✔ | | |

| Special Function Block | Model | FX3U | FX3UC | FX2N | FX2NC | FX1N | FX1S |
|---|---|---|---|---|---|---|---|
| Terminal Block Cables (*4) | FX-16E-150CAB-R | | ✔ | | ✔ | | |
| | FX-16E-300CAB-R | | ✔ | | ✔ | | |
| | FX-16E-500CAB-R | | ✔ | | ✔ | | |
| Conversion Interface | FX2N-CNV-IF | | | ✔ | | | |
| Power Supply | FX3U-1PSU-5V | ✔ | ✔ | | | | |
| | FX2N-20PSU | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| Electronic Cam Switch | FX2N-1RM-E-SET | ✔ | ✔ (*5) | ✔ | ✔ (*1) | | |
| Profibus Master | FX3U-64DP-M | ✔ | ✔ (*5) | | | | |
| | FX2N-32DP-IF | ✔ | ✔ (*5) | ✔ | ✔ (*1) | | |
| Profibus DP Slave | FX0N-32NT-DP | ✔ | ✔ (*5) | ✔ | ✔ | | |
| Ethernet Module | FX3U-ENET | ✔ | ✔ (*5) | | | | |
| | FX2NC-ENET-ADP | | | ✔ (2) | ✔ | ✔ (*2) | ✔ |
| DeviceNet Interface | FX2N-64DNET | ✔ | ✔ (*5) | ✔ | ✔ (*1) | | |
| CC-Link Interface | FX2N-16CCL-M | ✔ | ✔ (*5) | ✔ | ✔ | ✔ | |
| | FX2N-32CCL (*3) | ✔ | ✔ (*5) | ✔ | ✔ | ✔ | |
| AS-i Master | FX2N-32ASI-M | ✔ | ✔ (*5) | ✔ | ✔ | ✔ | |
| I/O Link | FX2N-16LNK-M | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| Communication and Expansion Boards | FX2N-232-BD | | | ✔ | | | |
| | FX2N-422-BD | | | ✔ | | | |
| | FX2N-485-BD | | | ✔ | | | |
| | FX2N-8AV-BD | | | ✔ | | | |
| | FX2N-6AV-BDC | | | ✔ | | | |
| | FX2N-CNV-BD | | | ✔ | | | |
| | FX2N-232IF | ✔ | ✔ (*5) | ✔ | ✔ (*1) | ✔ | |
| | FX2NC-232ADP | | | ✔ | ✔ | ✔ | |
| | FX2NC-485ADP | | | ✔ | ✔ | ✔ | |
| | FX1N-232-BD | | | | | ✔ | ✔ |
| | FX1N-8AV-BD | | | | | ✔ | ✔ |
| | FX1N-CNV-BD | | | | | ✔ | ✔ |
| | FX1N-1DA-BD | | | | | ✔ | ✔ |
| | FX1N-2AD-BD | | | | | ✔ | ✔ |
| | FX1N-2EYT-BD | | | | | ✔ | ✔ |
| | FX1N-485-BD | | | | | ✔ | ✔ |
| | FX1N-4EX-BD | | | | | ✔ | ✔ |

**Notes:**
1. Connection to an FX2NC PLC required an FX2NC-CNV-IF.
2. Connection to an FX2N PLC requires an FX2N-CNV-DB. Connections to an FX1S/1N PLC requires an FX1N-CNV-BD.
3. Cannot use with FX2N-32ASI-M AS-i interface master block.
4. Use with FX2NC-□□MT-DSS base units only.
5. Connection to an FX3UC PLC requires an FX2NC-CNV-IF.

## Analog Input Blocks

| Specifications | | FX3U-4AD-PT-ADP | FX3U-4AD-TC-ADP | FX3U-4AD | FX3U-4AD-ADP | FX2N-2AD | FX2N-4AD | FX2N-4AD-TC | FX2N-4AD-PT | FX2N-8AD | FX2NC-4AD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stocked Item | | S | S | S | S | S | S | S | S | S | S |
| Rating | | CE • UL • cUL | | | | CE (EMC only), ABS | CE • LR • GL • ABS • RINA • BV | | | UL • cUL • CE | CE |
| Applicable PLCs | | FX3U | | | | FX3U / FX3UC* / FX2N / FX2NC* / FX1N | | | | | FX2NC |
| General Specifications | | Same as Environmental Specifications in their respective sections, except dielectric withstand voltage, 500VAC for 1 min. between all terminals and ground | | | | | | | | | |
| Power Supply | | 5VDC /15 mA (from base unit); 24VDC / 50 mA | | 5VDC / 110 mA (from base unit), 24VDC / 90 MA | 5VDC /15 mA (from base unit); 24VDC / 150 mA | 5VDC /20 mA (from base unit), 24VDC ±10% / 50 mA (from base unit) | 5VDC / 30 mA (from base unit), 24VDC / 50 MA | | | 5VDC /50 mA (from base unit), 24VDC / 80 mA (from base unit) | 5VDC / 50 mA (from base unit), 24VDC / 130 mA |
| Compensated Temperature Range | | -50 to +250° C | -100 to +600° C (J type) / -100 to +1000° C (K type) | — | — | — | — | -100 to +600° C (J type) / -100 to +1200° C (K type) | -100 to +600° C | — | — |
| Analog I/O Inputs | | 4 (Pt 100 sensors) | 4 (K or J type) | 4 | 4 | 2 | 4 | 4 (K or J type) | 4 (Pt 100 sensors) | 8 | 4 |
| Analog Input Range | | — | — | ± 10VDC ± 20mA | 0-10VDC 4-20 mA | 0-10VDC, 0-5VDC, 4-20mA | -10VDC to +10VDC – +20mA to +20 mA / 4–20 mA | — | — | ±10VDC to ±20 mA 4—20 mA: K, J and T Thermocouples | -10VDC to +10 VDC / +20 mA - +20 mA / 4-20 mA |
| Input Resistance | Voltage Input | — | — | 200 kΩ | 200 kΩ | 200 kΩ | 200 kΩ | — | — | 200 kΩ | 200 kΩ |
| | Current Input | — | — | 250 Ω | 250 Ω | 250 Ω | 250 Ω | — | — | 250 Ω | 250 Ω |
| Digital Outputs | | -500 to +2500 | -1000 to +6000 (J type) / -1000 to +10000 (K type) | — | — | — | — | -1000 to +6000 (J type) / -1000 to +12000 (K type) | -1000 to +6000 (12 bit conversion) | — | — |
| Resolution | | 0.1° C | 0.3° C (J type) / 0.4° C (K type) | 15 bit + sign for voltage; 14 bit + sign for current | 12 bit for voltage; 11 bit for current | 2.5mV (0-10 VDC), 2.5mV (0-10 VDC), | 5 mV / 20 µA (11 bit + sign) | 0.3° C (J type) / 0.4° C (K type) | 0.2° C | 0.63 mV (±10 VDC); 2.5 µA (±20 mA); 2.00 µA (4-20 mA); 0.1°C or 0.1°F (K, N, T thermocouple) | Voltage Output: 0.32 mV or 20V x 1/64000 Current: 1.25 µA or 40 mA x 1/32000 (14 bit plus sign) Current Output: 20µA (20mA x 1/1000) |
| Overall Accuracy | | ± 0.5% at ambient temp ± 1% full scale | ± 0.5% full scale +1°C | ± 0.3% at ambient; ± 0.5% full scall | ± 0.5% at ambient temp; ± 1.0% at full range | ± 1% (full scale) | ± 1% | ±0.5% | ±1% over full linear range | ± 17 (full scale) | ± 0.5% |
| Conversion Speed Digital—Analog | | 200 µ seconds | | 500 µs per channel | 200 µs (total) | 2.5 ms per channel | 15 ms per channel / 6 ms per channel (high speed) | 240 ms per channel (±2%) | 15 ms for 4 channels | 500 us per channel | 15 ms per channel / 6 ms per channel (high speed) |
| Related I/O Points | | 0 | 0 | 8 | 0 | 8 | 8 | 8 | 8 | 8 | 8 |
| Weight (kg) | | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Dimensions W x H x D (mm) | | 18 x 90 x 74 | 18 x 90 x 74 | 55 x 90 x 87 | 18 x 90 x 90 | 43 x 90 x 87 | 55 x 90 x 87 | 55 x 90 x 87 | 55 x 90 x 87 | 67 x 90 x 75 | 20 x 90 x 89 |
| Function | | PT100 RTD input | Thermocouple input | General purpose multi analog to digital conversion (input) | | General purpose analog to digital conversion (input) | | Thermocouple input | PT100 RTD input | Gen. purpose multi analog to digital conversion (input) | General purpose analog to digital conversion (input) |
| Required Manuals | | JY997D14701 | JY997D14801 | JY997D20701 | JY997D13901 | JY992D74701 | JY992D65201 | JY992D65501 | JY992D65601 | JY992D86001 | JY997D07801 |

**Note:** Requires FX2NC-CNV-IF interface module.

## Analog Input / Output Modules

| Specifications | | FX3U-4DA | FX3U-4DA-ADP | FX2N-2DA | FX2N-4DA | FX2N-5A | FX0N-3A |
|---|---|---|---|---|---|---|---|
| Stocked Item | | S | S | S | S | S | S |
| Rating | | UL • cUL • CE | | CE (EMC only) • ABS | CE • LR • GL • ABS • RINA • BV | UL • cUL • CE | CE (EMC only) |
| Applicable PLCs | | FX3U/FX3UC* | | FX3U / FX3UC* / FX2N / FX2NC* / FX1N | | | |
| General Specifications | | Same as Environmental Specifications in each respective sections except dielectric withstand voltage, 500VAC for 1 min. between all terminals and ground | | | | | |
| Power Supply | | 5VDC / 120mA (from base unit), 24VDC/ 160mA | 5VDC / 30mA (from base unit) 24VDC / 200mA | 5VDC / 30mA (from base unit), 24VDC ±10% / 85mA base unit) | 5VDC / 30mA (from base unit), 24VDC ±10% / 200mA | 5VDC / 70mA (from base unit) 24VDC / 90mA | 24VDC / 90mA (from base unit), 5VDC / 30mA |
| Analog I/O | Inputs | — | — | — | — | 4 | 2 |
| | Outputs | 4 | 4 | 2 | 4 | 1 | 1 |
| Analog Input Range | | — | — | — | — | ±10VDC; ±20 mA; ±100 mV | 0–10VDC, 0–5VDC 4–20mA |
| Analog Output Range | | -10 to 10VDC, 0.20mA | 0 to 10VDC, 0.20mA | 0-10VDC, 0-5VDC, 4-20mA | -10VDC to +10VDC / 0mA, +20mA | ±10VDC; ±20mA | 0–10VDC, 0–5VDC 4–20mA |
| Resolution | | 15 bits + sign | 12 bits | 8 bit | 11 bit + sign | 11 bit + sign | 8 bit |
| Overall Accuracy | | ± 0.3% at ambient temp | ± 0.5% at ambient temp. | ± 1% (full scale) | | | |
| | | ± 0.5% at ambient temp | ±1% over full linear range | — | — | — | — |
| Conversion Speed | Digital – Analog | — | — | — | — | 1-2 ms per channel used | varies by connected PLC |
| | Analog – Digital | 1 ms (not dependent upon the number of channels used) | 200 µs (total) | 4 ms per channel | 2.1 ms for 4 channels | 1-2 ms per channel used | 100 µs |
| Related I/O Points | | 8 | 0 | 8 | 8 | 8 | 8 |
| Weight (kg) | | 0.2 | 0.1 | 0.2 | 0.3 | 0.3 | 0.2 |
| Dimensions W x H x D (mm) | | 55 x 90 x 87 | 17 x 90 x 90 | 43 x 90 x 87 | 55 x 90 x 87 | 55 x 90 x 87 | 43 x 90 x 87 |
| Function | | General purpose digital to analog conversion (output) | General purpose digital to analog conversion (output) | General purpose digital to analog conversion (output) | General purpose digital to analog conversion (output) | General purpose and load cell analog module; 4 inputs / 1 output | General purpose and load cell analog module; 2 inputs / 1 output |
| Required Manuals | | JY997D20801 | JY997D14001 | JY992D74901 | JY992D65901 | JY997D11401A | JY992D49001 |

**Note:** Requires FX2NC-CNV-IF interface module.

## High Speed Adaptor Modules

| Specifications | | FX3U-4HSX-ADP | FX3U-2HSY-ADP |
|---|---|---|---|
| Stocked Item | | S | S |
| Rating | | UL • cUL CE | |
| Applicable PLCs | | FX3U | |
| Power Supply | | 30 mA @ 5VDC; 30 mA @ 24VDC both supplied from base unit | 30 mA @ 5VDC; 60 mA @ 24VDC both supplied from base unit |
| Counter Inputs | | 4 (1 phase) or 1 (2 phase) | — |
| Max. Counting Frequency (kHz) | | 1 phase 200kHz 2 phase 100kHz | — |
| Type of Counter | | Up/down counter, ring counter | — |
| Accessible Axes | | — | 1 |
| Output Frequency | | — | 200K max |
| Counting Range | 16 Bit | 0 – 65535 | — |
| | 32 Bit | -2147483648 to +2147483647 | — |
| Output Type | | — | 2 transistor (0.5 A, 24VDC) |
| Related I/O Points | | 0 | 0 |
| Weight (kg) | | 0.1 | 0.1 |
| Dimensions W x H x D (mm) | | 18 x 90 x 90 | 18 x 90 x 90 |
| Function | | High speed pulse / encoder pulse counters | Servo / stepper pulse control |
| Required Manuals | | JY997D16301 | JY997D16401 |

## Temperature Loop Control Module

| Specifications | FX2N-2LC |
|---|---|
| Stocked Item | S |
| Rating | UL • cUL • CE |
| General Specifications | Same as Environmental Specifications in each respective section except dielectric withstand voltage, 500VAC for 1 min. between all terminals and ground |
| Applicable PLCs | FX3U / FX3UC* / FX2N / FX2NC* / FX1N |
| Power Supply | 5VDC / 70mA, 24VDC / 55 mA |
| Analog Inputs | 2 (K, J, R, S, E, T, B, N,PLII, RRC 5 = 26, LL, L PT100, JPT 100) |
| Cold Contact Temp Error | within ±1.0 |
| Digital Outputs | 2 open collector transistor |
| Rated Load Voltage | 5-24VDC (30VDC max. load) 100 mA max. current load |
| Control Output Cycle | 30 seconds |
| Resolution | 0.1° C (0.1° F) or 1° C (1° F) varies depending on input range of used sensor |
| Overall Accuracy | ±0.7% of full range |
| Conversion Speed | 500ms |
| Related I/O Points | 8 |
| Weight (kg) | 0.3 |
| Dimensions W x H x D (mm) | 55 x 90 x 87 |
| Function | 2 Loop Temperature controller |
| Required Manual | JY992D85801 |

**Note:** Requires FX2NC-CNV-IF interface module.

## I/O Powered Extension Units

| Specifications | | FX2N-32ER-ES/UL | FX2N-32ES | FX2N-32ET | FX2N-32ET-ESS/UL | FX2N-48ER-DS | FX2N-48ER-ES/UL | FX2N-48ER-UA1/UL |
|---|---|---|---|---|---|---|---|---|
| Stocked Item | | S | – | – | S | – | S | S |
| Rating | | UL•cUL•CE•DNV LR•GL•ABS•RINA•BV | — | — | UL•cUL•CE•DNV LR•GL•ABS•RINA•BV | CE•ABS | UL•cUL•CE•DNV LR•GL•ABS•RINA•BV | UL•cUL•CE DNV•ABS |
| Applicable PLCs | | FX3U / FX3UC* / FX2N / FX2NC* / FX1N | | | | | | |
| Integrated Inputs / Outputs | | 32 | 32 | 32 | 32 | 48 | 48 | 16 |
| Power Supply | AC Range (+10%, -15%) | 100–240VAC | 100–240VAC | 100–240VAC | 100–240VAC | – | 100–240VAC | 100–240VAC |
| | Frequency at AC Hz | 50/60 (±10%) | 50/60 | 50/60 | 50/60 (±10%) | – | 50/60 (±10%) | — |
| | DC Range (+10%, -15%) | — | — | — | — | 24VDC | — | — |
| Max. Input Apparent Power | | 35 VA | 35 VA | 35 VA | 35 VA | 30 W | 45 VA | 45 VA |
| Inrush Current at ON | 100VAC | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms | — | 40 A < 5 ms | 40 A < 5 ms |
| | 200VAC | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms | — | 60 A < 5 ms | 60 A < 5 ms |
| Allowable Momentary Power Failure Time (ms) | | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| External Service Power Supply (24VDC) mA | | 250 | 250 | 250 | 250 | — | 250 | 460 |
| Power Supply Int. Bus (5VDC) mA | | 690 | 690 | 690 | 690 | 690 | 690 | 690 |
| Integrated Inputs | | 16 (24VDC) | 16 (24VDC) | 16 (24VDC) | 16 (24VDC) | 16 (24VDC) | 16 (24VDC) | 24 (120VDC) |
| Min. Current for Logical 1 (mA) (X0-X7/X10 onwards) | | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.8 |
| Max. Current for Logical 0 (mA) | | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.7 |
| Response Time | | 10 ms | 10 ms | 10 ms | 10 ms | 10 ms | 10 ms | 25 ms |
| Integrated Outputs | | 16 | 16 | 16 | 16 | 24 | 24 | 24 |
| Output Type | | Relay | Triac (SSR) | Sink Trans. | Source Trans. | Relay | Relay | Relay |
| ON Voltage (Max.) | | For relay version: < 240VAC, < 30VDC: for transistor version: 5 – 30VDC Source | | | | | | |
| Max. Output Current | Per Output (A) | 2 | 0.3 | 0.5 | 0.5 | 2 | 2 | 2 |
| | Per 4 Outputs (A) | 8 | 0.8 | 0.8 | 0.8 | 8 | 8 | 8 |
| Max Switching Load | Inductive Load | 80 VA | 36 VA | 12 W | 12 W | 80 VA | 80 VA | 80 VA |
| | Lamp Load (W) | 100 | 30 | 1.5 | 1.5 | 100 | 100 | 100 |
| Response Time (ms) | | 10 | ON:1ms/OFF:10ms | 0.2 | < 0.2 | 10 | 10 | 10 |
| Life of Contacts (Switching Times) | | For all extension blocks of the FX0N series: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 200,000 at 80 VA | | | | | | |
| Weight (kg) | | 0.65 | 0.65 | 0.65 | 0.65 | 0.85 | 0.85 | 0.85 |
| Dimensions (W x H x D) mm | | 150 x 90 x 87 | 150 x 90 x 87 | 150 x 90 x 87 | 150 x 90 x 87 | 182 x 90 x 87 | 182 x 90 x 87 | 182 x 90 x 87 |
| Required Manuals | | Hardware JY992D76401; Programming JY992D88101 | | | | | | |

**Note:** Requires FX2NC-CNV-IF interface module.

| Specifications | | FX2N-48ET | FX2N-48ET-DSS | FX2N-48ET-ESS/UL | FX0N-40ER-DS | FX0N-40ER-ES/UL | FX0N-40ET-DSS |
|---|---|---|---|---|---|---|---|
| Stocked Item | | – | – | – | – | – | – |
| Rating | | – | CE•ABS | UL•cUL•CE•DNV LR•GL•ABS•RINA•BV | CE • RINA | UL • cUL • CE • DNV • NK | CE • RINA |
| Applicable PLCs | | FX3U / FX3UC* / FX2N / FX2NC* / FX1N | | | | | |
| Integrated Inputs / Outputs | | 48 | 48 | 48 | 40 | 40 | 40 |
| Power Supply | AC Range (+10%, -15%) | 100–240VAC | — | 100–240VAC | — | 100–240 V | — |
| | Frequency at AC Hz | 50/60 | — | 50/60 (±10%) | — | 50/60 | — |
| | DC Range (+10%, -15%) | — | 24VDC | — | 24VDC | — | DC 24 V |
| Max. Input Apparent Power | | 50VA | 30 W | 45 VA | 20 W | 40VA | 20 W |
| Inrush Current at ON | 100VAC | 40 A < 5 ms | 40 A < 5 ms | 40 A < 5 ms | — | 30 A / 5 ms | — |
| | 200VAC | 60 A < 5 ms | 60 A < 5 ms | 60 A < 5 ms | — | 50 A / 5 ms | — |
| Allowable Momentary Power Failure Time (ms) | | 10 | 10 | 10 | 10 | 10 | 10 |
| External Service Power Supply (24VDC) mA | | 460 | — | 460 | — | 200 | — |
| Power Supply Int. Bus (5VDC) mA | | 690 | 690 | 690 | — | — | — |
| Integrated Inputs | | 24 (24VDC) | 24 (24VDC) | 24 (24VDC) | 24 (24VDC) | 24 (24VDC) | 24 (24VDC) |
| Min. Current for Logical 1 (mA) (X0-X7/X10 onwards) | | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Max. Current for Logical 0 (mA) | | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Response Time | | 10 ms | 10 ms | 10 ms | 10 | 10 | 10 |
| Integrated Outputs | | 24 | 24 | 24 | 16 | 16 | 16 |
| Output Type | | Sink Trans. | Source Trans. | Source Trans. | Relay | Relay | Source Transistor |
| ON Voltage (Max.) | | For relay version: < 240VAC, < 30VDC: for transistor version: 5 – 30VDC Source | | | | | |
| Max. Output Current | Per Output (A) | 0.5 | 0.5 | 0.5 | 2 | 2 | 0.5 |
| | Per 4 Outputs (A) | 0.8 | 0.8 | 0.8 | 8 | 8 | 0.8 |
| Max Switching Load | Inductive Load | 12 W | 12 W | 12 W | 80 VA | 80 VA | 12 W |
| | Lamp Load (W) | 1.5 | 1.5 | 1.5 | 100 | 100 | 1.5 |
| Response Time (ms) | | 0.2 | 0.2 | 0.2 | 10 | 10 | < 0.2 |
| Life of Contacts (Switching Times) | | For all extension blocks of the FX0N series: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 200,000 at 80 VA | | | | | |
| Weight (kg) | | 0.85 | 0.85 | 0.85 | 0.6 | 0.6 | 0.6 |
| Dimensions (W x H x D) mm | | 182 x 90 x 87 | 182 x 90 x 87 | 182 x 90 x 87 | 150 x 90 x 87 | 150 x 90 x 87 | 150 x 90 x 87 |
| Required Manuals | | Hardware JY992D76401; Programming JY992D88101 | | | Programming JY992D88101 | | |

**Note:** Requires FX2NC-CNV-IF interface module.

## I/O Extension Blocks

| Specification | | FX2N-8ER-ES/UL | FX2N-8EX-ES/UL | FX2N-8EX-UA1/UL | FX2N-8EYR-ES/UL | FX2N-8EYT | FX2N-8EYT-ESS/UL | FX2N-8EYT-H |
|---|---|---|---|---|---|---|---|---|
| Stocked Item | | S | S | S | S | S | S | S |
| Rating | | UL • cUL • CE DNK • NK | UL • cUL• CE DNK • NK | UL • cUL DNV | UL • cUL • CE DNV • NK | — | UL • cUL CE • DNV | — |
| Applicable PLCs | | FX3U / FX3UC* / FX2N / FX2NC* / FX1N | | | | | | |
| Integrated Inputs / Outputs | | 8 | 8 | 8 | 8 | 8 | 8 | 16 |
| Power Supply | | All modular extension units are powered by the base unit | | | | | | |
| Integrated Inputs | | 4 (24VDC) | 8 (24VDC) | 8 (120VAC) | — | — | — | — |
| Min. Current for Logical 1 (mA) | | 3.5 | 3.5 | 3.8 | — | — | — | — |
| Max. Current for Logical 0 (mA) | | 1.5 | 1.5 | 1.7 | — | — | — | — |
| Response Time (ms) | | 10 | 10 | 25 | — | — | — | — |
| Integrated Outputs | | 4 | — | — | 8 | 8 | 8 | 8 |
| Output Type | | Relay | — | — | Relay | Sink Trans. | Source Trans. | Sink Trans. |
| Max. Switching Voltage | | For relay version: < 264VAC, < 30VDC: for transistor version: 5 – 30VDC Source | | | | | | |
| Max. Output Current | Per Output (A) | 2 | — | — | 2 | 0.5 | 0.5 | 1 |
| | Per 4 Outputs (A) | 8 | — | — | 8 | 0.8 | 0.8 | 2 |
| Max Load Switching | Inductive Load | 80 VA | — | — | 80 VA | 12 W | 12 W | 24 W |
| | Lamp Load (W) | 100 | — | — | 100 | 1.5 | 1.5 | 3W |
| Response Time (ms) | | 10 | 10 | — | 10 | < 0.2 | < 0.2 | 0.4 ON-OFF 0.2 OFF-ON |
| Life of Relay Contacts (No. of Cycles) | | For all extension blocks of the FX2N series: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 200,000 at 80 VA | | | | | | |
| 5VDC Current Consumption (mA) | | 25 | 25 | 25 | 30 | 30 | 30 | 30 |
| Weight (kg) | | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Dimensions (W x H x D) mm | | 43 x 90 x 87 | 43 x 90 x 87 | 43 x 90 x 87 | 43 x 90 x 87 | 43 x 90 x 87 | 43 x 90 x 87 | 43 x 90 x 87 |

**Note:** Requires FX2NC-CNV-IF interface module.

| Specification | | FX2N-16EX | FX2N-16EX-ES/UL | FX2N-16EYR-ES/UL | FX2N-16EYS | FX2N-16EYT | FX2N-16EYT-ESS/UL | FX2NC-16EX-D/UL |
|---|---|---|---|---|---|---|---|---|
| Stocked Item | | – | S | S | S | S | S | – |
| Rating | | — | UL • cUL • CE DNV • NK | UL • cUL • CE DNV •NK | UL • cUL | — | UL • cUL CE • DNV | UL • cUL |
| Applicable PLCs | | FX3U / FX3UC* / FX2N / FX2NC* / FX1N | | | | | | FX2NC |
| Integrated Inputs / Outputs | | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Power Supply | | All modular extension units are powered by the base unit | | | | | | |
| Integrated Inputs | | 16 | 16 (24VDC) | — | — | — | — | 16 |
| Min. Current for Logical 1 (mA) | | 3.5 | 3.5 | — | — | — | — | 3.5 |
| Max. Current for Logical 0 (mA) | | 1.5 | 1.5 | — | — | — | — | 1.5 |
| Response Time (ms) | | 10 | 10 | — | — | — | — | 10 |
| Integrated Outputs | | — | — | 16 | 16 | 16 | 16 | — |
| Output Type | | — | — | Relay | Triac (SSR) | Sink Transistor | Source Trans. | — |
| Max. Switching Voltage | | — | — | — | 242VDC | 30VDC | — | — |
| Max. Output Current | Per Output (A) | — | — | 2 | 0.3 | 0.5 | 0.5 | — |
| | Per 4 Outputs (A) | — | — | 8 | 0.8 | 0.8 | 0.8 | — |
| Max Load Switching | Inductive Load | — | — | 80 VA | 30 VA | 12 W | 12 W | — |
| | Lamp Load (W) | — | — | 100 | 30 W | 1.5 W | 1.5 | — |
| Response Time (ms) | | — | 10 | 10 | ON:1ms/OFF:10ms | < 0.2 | < 0.2 | — |
| Life of Relay Contacts (No. of Cycles) | | For all extension blocks of the FX2N series: 3,000,000 at 20 VA: 1,000,000 at 35 VA; 200,000 at 80 VA | | | | | | |
| 5VDC Current Consumption (mA) | | 40 | 45 | 40 | 160 | 180 | 180 | — |
| Weight (kg) | | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.15 |
| Dimensions (W x H x D) mm | | 40 x 90 x 87 | 70 x 90 x 87 | 70 x 90 x 87 | 40 x 90 x 87 | 40 x 90 x 87 | 70 x 90 x 87 | 14.6 x 90 x 87 |

**Note:** Requires FX2NC-CNV-IF interface module.

## I/O Extension Block Hardware

| Specification | | FX2NC-16EX-DS | FX2NC-16EX-T-DS | FX2NC-16EYR-T-DS | FX2NC-16EYT-D/UL | FX2NC-16EYT-DSS | FX2NC-32EX-DS | FX2NC-32EYT-D/UL |
|---|---|---|---|---|---|---|---|---|
| Stocked Item | | S | S | S | S | S | – | – |
| Rating | | UL • cUL • CE | UL • cUL • CE | UL • cUL • CE | UL • cUL | UL • cUL • CE | UL • cUL • CE | UL • cUL |
| Applicable PLCs | | FX3UC / FX2NC | | | | | | |
| Integrated Inputs / Outputs | | 16 | 16 | 16 | 16 | 16 | 32 | 32 |
| Power Supply | | All modular extension units are powered by the base unit | | | | | | |
| Integrated Inputs | | 16 | 16 | — | — | — | 32 | — |
| Min. Current for Logical 1 (mA) | | 3.5 | 3.5 | — | — | — | 3.5 | — |
| Max. Current for Logical 0 (mA) | | 1.5 | 1.5 | — | — | — | 1.5 | — |
| Response Time (ms) | | 10 | 10 | 10 | — | — | 10 | — |
| Integrated Outputs | | — | — | 16 | 16 | 16 | — | 32 |
| Output Type | | — | — | Relay | Sink Trans. | Source Tran. | — | Sink Trans. |
| Max. Switching Voltage | | — | — | 30 | 30 | 30 | — | 30 |
| Max. Output Current | Per Output (A) | — | — | 2A | 0.1 | 0.1 | — | 0.1 |
| | Per 4 Outputs (A) | — | — | 4A | 0.8 | 0.8 | — | 0.8 |
| Max Load Switching | Inductive Load | — | — | — | 2.4 | 2.4 | — | 2.4 |
| | Lamp Load (W) | — | — | 100 | 0.3 | 0.3 | — | 0.3 |
| Response Time (ms) | | — | — | 10 | <0.2 | <0.2 | — | <0.2 |
| 5VDC Current Consumption (mA) | | 30 | 30 | 50 | 30 | 50 | 60 | 100 |
| Weight (kg) | | 0.15 | 0.15 | 0.2 | 0.15 | 0.15 | 0.2 | 0.2 |
| Dimensions (W x H x D) mm | | 14.6 x 90 x 87 | 20.2 x 90 x 87 | 24.4 x 90 x 87 | 14.6 x 90 x 87 | 14.6 x 90 x 87 | 26.2 x 90 x 87 | 26.2 x 90 x 87 |

## SSCNET Motion Module

Coordinate two axes of servo option via SSCNETIII per module. Axes can be controlled independently or by linear or circular interpolation.

| Specifications | FX3U-20SSC-H |
|---|---|
| Stocked Item | S |
| Rating | UL • cUL • CE |
| General Specifications | Please see Installation Manual |
| Applicable PLCs | FX3U / FX3UC* |
| Applicable Servo Amplifier | MELSERVO MR-J3-B Series |
| Power Supply | 5VDC / 100 mA (from base unit) |
| | 24V DC / 260 mA |
| Servo Bus | SSCNET III |
| Interpolation Functions | 2-Axes Linear or Circular |
| Data Table Points | 300 |
| Scan Cycle | 1.77ms |
| Control Input | Interrupt Input: 2 / Axis |
| | DOG: 1 / Axis |
| | START Input: 1 / Axis |
| | Manual Pulse Generator: 1 / Axis (A/B phase) |
| Related I/O Points | 8 |
| Weight (kg) | 0.3 |
| Dimensions W x H x D (mm) | 55 x 90 x 87 |
| Function | High Speed Fiber Optic Servo Control |
| Required Manuals | JY997D21101 (Installation Manual) |
| | JY997D12301 (User's Manual) |
| Cables | MR-J3BUS☐☐M |

**Note:** Requires FX2NC-CNV-IF interface module.

## Positioning Modules

| Specifications | | FX2N-1HC | FX2N-1PG-E | FX2N-10PG |
|---|---|---|---|---|
| Stocked Item | | S | S | S |
| Rating | | CE • LR • GL • ABS • RINA • BV | CE • LR • GL • ABS • RINA • BV | EMC |
| General Specifications | | Same as Environmental Specs. in their respective sections except dielectric with stand voltage, 500VAC for 1 min. between all terminals and ground | | |
| Applicable PLCs | | FX3U / FX3UC* / FX2N / FX2NC* / FX1N | | |
| Signal Level | | 5, 12, 24VDC / 7 mA | 24VDC / 7 – 40 mA | 5 – 24VDC / <100 mA |
| Power Supply | | 5VDC / 90 mA from base unit | 5 — 24VDC / 60 mA | 5VDC / 120 mA from base |
| Counter Inputs | | 2 (1 phase) or 1 (2 phase) | — | — |
| Max. Counting Frequency (kHz) | | 50 | — | — |
| Type of Counter | | Up/down counter, ring counter | — | — |
| Accessible Axes | | — | 1 | 1 |
| Input Format (Bit) | | 16, 32 | — | — |
| Output Frequency | | — | 10–100,000 pulse/sec | 1–1,000,000 pulse/sec |
| Counting Range | 16 Bit | 0 – 65535 | — | — |
| | 32 Bit | -2147483648 to +2147483647 | — | — |
| Output Type | | 2 x transistor (5 – 24VDC; 0.5 A) | — | — |
| Related I/O Points | | 8 | 8 | 8 |
| Weight (kg) | | 0.3 | 0.3 | 0.2 |
| Dimensions W x H x D (mm) | | 55 x 90 x 87 | 43 x 90 x 87 | 43 x 90 x 87 |
| Function | | High speed pulse / encoder pulse counters | Servo / stepper pulse control | Advanced servo/stepper control |
| Required Manuals | | JY992D65401 | JY992D65301 | JY992D93401 |

**Note:** Requires FX2NC-CNV-IF interface module.

## Terminal Blocks

| Specifications | | FX-16E-TB | FX-16E-TB/UL | FX-16EX-A1-TB | FX-16EX-A1-TB/UL | FX-16EYR-ES-TB/UL | FX16EYS-TB |
|---|---|---|---|---|---|---|---|
| Stocked Item | | – | S | – | – | S | – |
| Compatibility | | FX3UC / FX2NC | | | | | |
| Max. Number of Inputs/Outputs | | 16 | 16 | 16 | 16 | 16 | 16 |
| Integrated Inputs (Sink) | | 16 (24VDC) | 16 (24VDC) | 16 (120VAC) | 16 (120VAC) | — | — |
| Min. Current for Logical 1 (mA) | | Passive block: same as FX2NC base unit | Passive block: same as FX2NC base unit | 3.8 | 3.8 | — | — |
| Max. Current for Logical 0 (mA) | | Passive block: same as FX2NC base unit | Passive block: same as FX2NC base unit | 1.7 | 1.7 | — | — |
| Response Time (ms) | | Passive block: same as FX2NC base unit | Passive block: same as FX2NC base unit | 25 | 25 | — | — |
| Integrated Outputs | | — | — | — | — | 16 | 16 |
| Output | | — | — | — | — | Relay | Triac (SSR) |
| Switching Voltage (Max.) | | — | — | — | — | 240VAC / 30VDC | 242VAC |
| Max. Output Current | Per Output (A) | — | — | — | — | 2 | 0.3 |
| | Per 4 Outputs (A) | — | — | — | — | 8 | 0.8 |
| Max Switching Load | Inductive Load (W) | — | — | — | — | 80 VA | 30 VA |
| | Lamp Load | — | — | — | — | 100 W | 30 W |
| Response Time (ms) | ON→OFF | — | — | — | — | 10 | <12 |
| | OFF→ON | — | — | — | — | 10 | <2 |
| Dimensions (W x H x D) mm | | 150 x 55 x 45 | 150 x 55 x 45 | 150 x 55 x 45 | 150 x 55 x 45 | 150 x 55 x 45 | 150 x 55 x 45 |

| Specifications | | FX-16EYS-ES-TB/UL | FX16EYT-TB | FX-16EYT-ES-TB/UL | FX-16EYT-ESS-TB/UL | FX-32E-TB/UL |
|---|---|---|---|---|---|---|
| Stocked Item | | – | – | – | – | – |
| Compatibility | | FX3UC / FX2NC | | | | |
| Max. Number of Inputs/Outputs | | 16 | 16 | 16 | 16 | 32 |
| Integrated Inputs (Sink) | | — | — | — | — | 32 (24VDC) |
| Min. Current for Logical 1 (mA) | | — | — | — | — | Passive block: same as FX2NC base unit |
| Max. Current for Logical 0 (mA) | | — | — | — | — | Passive block: same as FX2NC base unit |
| Response Time (ms) | | — | — | — | — | Passive block: same as FX2NC base unit |
| Integrated Outputs | | 16 | 16 | 16 | 16 | — |
| Output | | Triac (SSR) | Sink Transistor | Sink Trans. | Source Trans. | — |
| Switching Voltage (Max.) | | 242VAC | 30VDC | 30VDC | 30VDC | — |
| Max. Output Current | Per Output (A) | 0.3 | 0.5 | 0.5 | 0.5 | — |
| | Per 4 Outputs (A) | 0.8 | 0.8 | 0.8 | 0.8 | — |
| Max Switching Load | Inductive Load (W) | 30 VA | 12 W | 12 W | 12 W | — |
| | Lamp Load | 30 W | 1.5 W | 1.5 W | 1.5 W | — |
| Response Time (ms) | ON→OFF | <12 | 1.5 | 1.5 | 1.5 | — |
| | OFF→ON | <2 | 0.2 | 0.2 | 0.2 | — |
| Dimensions (W x H x D) mm | | 150 x 55 x 45 | 150 x 55 x 45 | 150 x 55 x 45 | 150 x 55 x 45 | 150 x 55 x 45 |

## Terminal Block Cables

| Specifications | FX-16E-150CAB-R | FX-16E-300CAB-R | FX-16E-500CAB-R |
|---|---|---|---|
| Stocked Item | S | S | – |
| Compatibility | **Use with FX2NC base units and terminal blocks**<br>Note: Users are encouraged to make their own wiring harnesses to meet specific length requirements | | |
| Connector Type | MIL C 83503 or equivalent | | |
| Number of Pins | 20 (2x10) | | |
| Length | 1.5 m | 3 m | 5 m |

## FX2N Conversion Interface

Enables FX2N PLCs to connect to FX Series extension modules.

| Specifications | FX2N-CNV-IF |
|---|---|
| Stocked Item | S |
| Rating | CE • ABS |
| General Specifications | Same as FX2N Environmental Specs.except dielectric withstand voltage, 500VAC for 1 min. between all terminals and ground |
| Applicable PLCs | FX2N |
| Power Supply | Not Applicable |
| Related I/O Point | 0 |
| Weight (kg) | 0.15 |
| Dimensions W x H x D (mm) | 23 x 140 x 45 |

## Power Supply

| Specifications | | | FX3U-1PSU-5V | FX2N-20PSU |
|---|---|---|---|---|
| Stocked Item | | | S | S |
| Rating | | | UL • cUL • CE | UL • cUL • CE • Class II |
| Applicable PLC | | | FX3U/FX3UC | Any 24VDC equipment |
| General Specifications | | | Please see installation manual | Same as FX2N Environmental Specs. |
| Input | Input | | 85-264VAC | 85-264VAC |
| | Frequency | | 50/60 Hz | 50/60 Hz |
| | Rush Current | 100VAC | 30 A max for 5 ms or less | — |
| | | 200VAC | 69 A for 5 ms or less | 60 A |
| | | Fuse Rating | — | 3.15A (built in) |
| Output Current | | 24VDC | 300 mA | Green LED (POWER) is lit while voltage is output |
| | | 5VDC | 1.0 A | 2A (maximum), 0.2A (minimum)<br>(Derating is performed if ambient temperature exceeds 40° C) |
| | | Ripple Noise | — | 500mVp-p or less |
| | | Hold Time | — | 10 ms/100VAC |
| I/O Points | | | — | — |
| Weight (kg) | | | 0.3 | 0.3 |
| Dimensions W x H x D (mm) | | | 55 x 90 x 87 | 60 x 90 x 75 |
| Required Manual | | | JY997D22501 | JY992D85101 |

## Electronic Cam Switch

| Specifications | FX2N-1RM-E-SET |
|---|---|
| Stocked Item | S |
| Rating | CE • ABS |
| Applicable PLCs | FX3U / FX3UC* / FX2N / FX2NC* / FX1N |
| General Specifications | Same as Environ. Specs. in each respective section except dielectric withstand voltage, 500VAC for 1 min. between all terminals and ground |
| Power Supply 24VDC | 400 mA |
| I/O Points | 8 |
| 5VDC Requirements | N/A |
| Weight | N/A |
| Dimensions W x H x D (mm) | 55 x 90 x 97 |
| Function | Electronic cam switch block<br>(includes resolver, cable and keypad) |
| Required Manual | JY992D71101 |

**Note:** Requires FX2NC-CNV-IF interface module.

## Profibus Master / Slave Modules

| Specifications | | FX3U-64DP-M | FX2N-32DP-IF | FX0N-32NT-DP |
|---|---|---|---|---|
| Stocked Item | | S | – | S |
| Master/Slave | | Master | Master | Slave |
| Rating | | UL • cUL • CE | UL • cUL | CE (EMC only) |
| General Specifications | | See Environmental Specifications for FX3U | Same as Environ. Specs. in their respective sections except dielectric withstand voltage, 500VAC for 1 min. between all terminals and ground | See Environmental Specifications in each respective section. |
| Applicable PLCs | | FX3U | FX3U / FX2N / FX2NC* | |
| Power Supply 24VDC | | 155 mA @ 24VDC (from main unit) | 5VDC, 1A, 24VDC, 500 mA | 5VDC / max. 170 mA (from base unit), 24VDC / 60 mA |
| Interface | | Profibus-DP Ver 1.0 | Profibus-DP | Profibus DP |
| Comm. Speed | Distances | | | |
| | 1200 m | 9.6 / 19.2 / 93.75 kbit/s | 9.6 / 19.2 / 93.75 kbit/s | 9.6 / 19.2 / 93.75 |
| | 1000 m | 187.5 kbit/s | 187.5 kbit/s | 187.5 |
| | 200 m | 1.5 M | 3000 / 6000 / 12000 kbit/s | 3000 / 6000 / 12000 |
| | 100 m | 3 M, 6 M, 12 M | 1500 kbit/s | 1500 |
| Maximum Number of Slaves | | 64 | — | — |
| Communication Distance (m) | | | Max. 1200m (comms. speed varies with distance) | Max. 1200 (depends on communication speed) |
| Communication Cable | | Standard Profibus-DP cable with 9-pin DSUB connector | Standard Profibus-DP cable with 9-pin DSUB connector | PROFIBUS cable with 9-pin D-SUB plug |
| Related I/O Points | | 8 | 8 | 8 |
| Dimensions W x H x D (mm) | | 43 x 80 x 87 | 75 x 90 x 87 | 43 x 90 x 87 |
| Function | | Profibus-DP master module (for I/O and special function modules) | Profibus-DP slave interface (for I/O and special function modules) | Profibus-DP slave module (for FX0N/2N/3U PLCs) |
| Required Manuals | | JY997D19201 Users Man. • JY997D19901 Install. Man. | JY992D77101 | JY992D61401 |

**Note:** Requires FX2NC-CNV-IF interface module.

## Ethernet Module

| Specifications | FX3U-ENET | FX2NC-ENET-ADP |
|---|---|---|
| Stocked Item | S | S |
| Rating | UL • cUL | UL • cUL |
| Applicable PLCs | FX3U / FX3UC (*2) | FX2N / FX2NC / FX1N (*1) |
| General Specifications | Same as Environ. Specs. in their respective sections except dielectric withstand voltage, 500VAC for 1 min. between all terminals and ground | |
| Max. Data Transmission | 1023 words x 8 | 16 words |
| Power Supply 24VDC | 24VDC / 240 mA (from base unit) | Supplied from PLC |
| Communication Cable | Ethernet with RJ45 connector | Ethernet with RJ45 connector |
| Communication Protocol | TCP / IP / UDP | — |
| Related I/O Points | 8 | 8 |
| Communication With Mail Server | SMTP / POP3 | — |
| Maximum Transfer Rate | 100 Mbits / 10 Mbits | — |
| Maximum Segment Length | 100 m | — |
| Dimensions W x H x D (mm) | 55 x 90 x 87 | 19 x 90 x 78 |
| Function | Ethernet connection module | Ethernet connection module |
| Required Manuals | JY997D15901 | JY997D12301 |

**Note:**

1. Conversion module is required; FX3UC-CNV-IF or FX2NC-CNV-IF for the appropriate series.
2. Requires FX2NC-CNV-IF interface module.

## DeviceNet Interface

| Specifications | FX2N-64DNET |
|---|---|
| Stocked Item | S |
| Rating | UL • cUL • CE |
| Applicable PLCs | FX3U / FX2N / FX2NC* |
| General Specifications | Same as Environmental Specs.in their respective sections except dielectric withstand voltage, 500VAC for 1 min. between all terminals and ground |
| Power Supply 24VDC | 50 mA |
| I/O Points | 8 |
| 5VDC Requirements | 120 mA |
| Weight | 0.2 |
| Dimensions W x H x D (mm) | 43 x 90 x 87 |
| Function | DeviceNet slave interface block (for PLC) |
| Required Manual | JY992D86301 |

**Note:** Requires FX2NC-CNV-IF interface module.

## CC-Link Interface Modules

| Specifications | FX2N-16CCL-M | FX2N-32CCL |
|---|---|---|
| Stocked Item | S | S |
| Rating | — | CE (EMC only) |
| Applicable PLCs | FX3U/FX1N/2N (Ver 2.20 or later) / FX2NC* (Ver. 2.20 or later). Cannot use with FX2N-32ASI-M AS-i interface master block | |
| General Specifications | Same as Environmental Specs. in their respective sections except dielectric withstand voltage, 500VAC for 1 min. between all terminals and ground | |
| Power Supply 24VDC | 150 mA | 50 mA |
| I/O Points | 8 | 8 |
| 5VDC Requirements | — | 130 mA |
| Weight | 0.4 | 0.2 |
| Dimensions W x H x D (mm) | 85 x 90 x 87 | 43 x 90 x 87 |
| Function | CC-Link Network Master | CC-Link slave interface block |
| Required Manuals | JY992D93101 | JY992D71801 |

**Note:** Requires FX2NC-CNV-IF interface module.

## AS-i Master Module

| Specifications | FX2N-32ASI-M |
|---|---|
| Stocked Item | S |
| Rating | CE (EMC only) |
| Applicable PLCs | FX3U / FX3UC* / FX2N / FX2NC* / FX1N |
| General Specifications | Same as Environ. Specs. in their respective sections except dielectric withstand voltage, 500VAC for 1 min. between all terminals and ground |
| Power Supply 24VDC | Powered by AS-i standard power supply |
| Certification | “Shadow” AS-i mark |
| Related I/O Points | 8 |
| Weight | 0.2 kg |
| Dimensions W x H x D (mm) | 55 x 90 x 87 |
| Function | AS-i network master |
| Required Manuals | JY992D76901 |

**Note:** Requires FX2NC-CNV-IF interface module.

## I/O Link Module

| Specifications | FX2N-16LNK-M |
|---|---|
| Stocked Item | S |
| Rating | UL • cUL • CE |
| Applicable PLCs | FX3U / FX3UC* / FX2N / FX2NC* / FX1N |
| General Specifications | Same as Environ. Specs. on in their respective sections except dielectric withstand voltage, 500VAC for 1 min. between all terminals and ground |
| Power Supply 24VDC | 90 mA |
| I/O Points | — |
| 5VDC Requirements | 200 mA |
| Weight | 0.5 kg |
| Dimensions W x H x D (mm) | 43 x 90 x 87 |
| Function | I/O Link master |
| Required Manual | JY992D73701 |

**Note:** Requires FX2NC-CNV-IF interface module.

## Communication and Expansion Boards

| Specifications | FX2N-232-BD | FX2N-422-BD | FX2N-485-BD | FX2N-232IF | FX2NC-232ADP | FX2NC-485ADP | FX1N-232-BD | FX1N-485-BD |
|---|---|---|---|---|---|---|---|---|
| Stocked Item | S | S | S | S | S | S | S | S |
| Rating | CE • ABS | CE • ABS | CE • ABS | CE • LR • GL • ABS • RINA • BV | CE (EMC only) | CE (EMC only) | UL • cUL • CE | UL • cUL • CE |
| Applicable PLCs | FX2N | FX2N | FX2N | FX3U / FX3UC* / FX2N / FX2NC* / FX1N | FX2N / FX2NC* / FX1N | | FX1S / 1N | FX1S / 1N |
| General Specifications | Same as Environmental Specifications from their respective sections | | | | | | | |
| Interface | RS-232 with 9 pole D-SUB connector | RS-422 8 pole mini DIN connector | RS-485 / RS-422 | RS-232 with 9-pole D-SUB connector | RS-232 with 25 pole D-SUB compact plug (Photocoupler isolated) | RS-485/422 with screw terminals | RS-232 with 9 pole D-SUB connector | RS-485 / RS-422 |
| Power Supply | 5VDC / 60 mA (from base unit) | 5VDC / 60 mA (from base unit) | 5VDC / 60 mA (from base unit) | 5VDC / 40 mA (from base unit), 24VDC / 80 mA | 5VDC / 100 mA (from base unit) | 5VDC / max150 mA (from base unit), 24VDC / 50 mA | 5VDC / 20 mA (from base unit) | 5VDC / 60 mA (from base unit) |
| Communication Speed (bit/s) | 300, 600, 1200, 2400, 4800, 9600, 19200 | | | | | | | |
| Communication Distance (m) | Max. 15 | Max. 50 | Max. 50 | Max. 15 | Max. 15 | Max. 500 | Max. 15 | Max. 50 |
| Communication Cable | Various, please see manual for details | | | | | | | |
| Communication Mode | Half duplex | Half duplex | — | Full duplex | Half duplex | Half duplex | Half duplex | — |
| Protocols | Freely programmable via PLC / protocol 1 or 4 | Freely p rogrammable via PLC/Use as 2nd prog. port | Protocol 1 or 4 / no protocol / parallel link / master+slave | No protocol mode / start-stop synchronization | Defined under program control | Protocol 1 or 4 / no protocol / parallel link / master+slave | Freely programmable via PLC / protocol 1 or 4 | Protocol 1 or 4 / no protocol / parallel link / master+slave |
| Related I/O Points | — | — | — | 8 | 8 | 8 | — | — |
| Function | General purpose RS-232 communications | Duplicate programming port for HMI/PC connections | Multidrop network/master/slave general purpose RS-485/422 communications | Send/receive ASCII communication strings | General purpose RS-232 communications | Multidrop network/master/slave general purpose RS-485/422 communications | General purpose RS-232 communications | Multidrop network/master/slave general purpose RS-485/422 communications |
| Weight (kg) | 0.08 | 0.08 | 0.08 | 0.3 | 0.2 | 0.2 | 0.08 | 0.08 |
| Dimensions (mm) | 35 x 54 x 22 | 35 x 54 x 22 | 35 x 54 x 22 | 55 x 90 x 87 | 19 x 90 x 74 | 19 x 90 x 74 | 38.5 x 43 | 38.5 x 43 |
| Required Manuals | JY992D66001 | JY992D84101 | JY992D66201 | JY992D66701 | JY997D01101 | JY997D01201 | JY992D84401 | JY992D84201 |

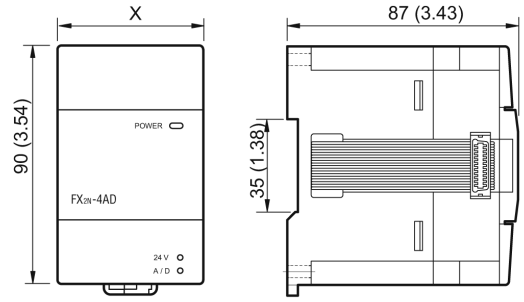
| Specifications | FX2N-8AV-BD | FX2N-CNV-BD | FX1N-8AV-BD | FX1N-CNV-BD | FX1N-1DA-BD | FX1N-2AD-BD | FX1N-2EYT-BD | FX1N-4EX-BD |
|---|---|---|---|---|---|---|---|---|
| Stocked Item | S | S | S | S | S | S | S | S |
| Rating | CE • ABS | — | CE • UL • cUL | CE • UL • cUL | CE • UL • cUL | UL • cUL • CE | UL • cUL • CE | UL • cUL • CE |
| Applicable PLCs | FX2N | FX2N | FX1S / 1N | FX1S / 1N | FX1S / 1N | FX1S / 1N | FX1S / 1N | FX1S / 1N |
| General Specifications | See each respective section for Environmental Specifications | | | | | | | |
| Power Supply | From base unit | Not necessary | From base unit | Not Necessary | 5VDC / 60 mA (from base unit) | 5VDC / 60 mA (from base unit) | 5VDC / 60 mA (from base unit) | 5VDC / 60 mA (from base unit) |
| Overall Accuracy | — | — | — | — | ± 1% full scale | ± 1% full scale | — | — |
| Analog Input | — | — | — | — | — | 0-10VDC, 4-20mA | — | — |
| Analog Output | — | — | — | — | 0-10VDC 4-20mA | — | — | — |
| Resolution | — | — | — | — | 2.5 mV (10/4000) 2.5 mV (10/4000) | 2.5 mV (10/4000) 8µA (4-20/2000) | — | — |
| Function | Analog manually adjustable potentiometers | For connection for FX0N-□□□ADP units | Analog manually adjustable potentiometers. | For connection for FX0N-□□□ADP units | 1 channel general purpose digital to analog conversion (output) | 2 channel general purpose analog to digital conversion (input) | 2 points general purpose transistor outputs | 4 points general purpose DC input |
| Conversion Speed | — | — | — | — | 1 scan time | 1 scan time | — | — |
| Weight (kg) | 0.08 | 0.15 | 0.08 | 0.15 | 0.08 | 0.08 | 0.08 | 0.08 |
| Dimensions (mm) | 52 x 35 | 52 x 35 | 38.5 x 43 | 38.5 x 43 | 38.5 x 43 | 38.5 x 43 | 38.5 x 43 | 38.5 x 43 |
| Required Manuals | — | — | JY992D84601 | JY992D84701 | JY992D96401 | JY992D96201 | JY992D95201 | JY992D95001 |

## Special Function Block Dimensions

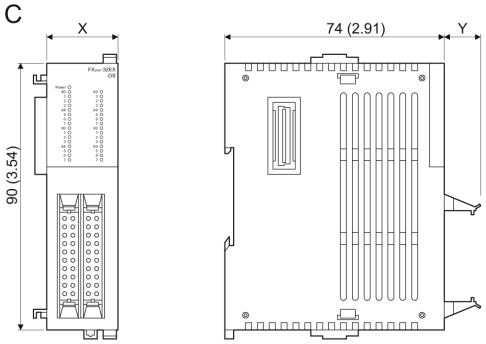
| Model | X | H | D | Y | Image |
|---|---|---|---|---|---|
| FX0N-40ER-DS | 150 | 90 | 87 | | A |
| FX0N-40ET-DSS | 150 | 90 | 87 | | A |
| FX2N-16EX-ES/UL | 40 | 90 | 87 | | A |
| FX2N-16EYR-ES/UL | 40 | 90 | 87 | | A |
| FX2N-16EYS | 40 | 90 | 87 | | A |
| FX2N-16EYT-ESS/UL | 40 | 90 | 87 | | A |
| FX2N-32ER-ES/UL | 150 | 90 | 87 | | A |
| FX2N-32ET-ESS/UL | 150 | 90 | 87 | | A |
| FX2N-48ER-DS | 182 | 90 | 87 | | A |
| FX2N-48ER-ES/UL | 182 | 90 | 87 | | A |
| FX2N-48ER-UA1/UL | 220 | 90 | 87 | | A |
| FX2N-48ET-DSS | 182 | 90 | 87 | | A |
| FX2N-48ET-ESS/UL | 182 | 90 | 87 | | A |
| FX2N-8ER-ES/UL | 43 | 90 | 87 | | A |
| FX2N-8EX-ES/UL | 43 | 90 | 87 | | A |
| FX2N-8EX-UA1/UL | 43 | 90 | 87 | | A |
| FX2N-8EYR-ES/UL | 43 | 90 | 87 | | A |
| FX2N-8EYT-ESS/UL | 43 | 90 | 87 | | A |
| FX3U-ENET | 55 | 90 | 87 | | A |
| FX2N-232IF | 55 | 90 | 87 | | A |
| FX2N-64DNET | 43 | 90 | 87 | | A |
| FX3U-64DP-M | 43 | 90 | 87 | | A |
| FX2N-32CCL (3) | 43 | 90 | 87 | | A |
| FX0N-32NT-DP | 43 | 90 | 87 | | A |
| FX2N-32ASI-M | 55 | 90 | 87 | | A |
| FX3U-20SSC-H | 55 | 90 | 87 | | A |
| FX2N-16CCL-M | 85 | 90 | 87 | | A |
| FX2N-10PG | 43 | 90 | 87 | | A |
| FX3U-1PSU-5V | 55 | 90 | 87 | | A |
| FX2N-5A | 55 | 90 | 87 | | A |
| FX2N-4AD | 55 | 90 | 87 | | A |
| FX2N-4AD-PT | 55 | 90 | 87 | | A |
| FX2N-4AD-TC | 55 | 90 | 87 | | A |
| FX2N-4DA | 55 | 90 | 87 | | A |
| FX3U-4AD | 55 | 90 | 87 | | A |

| Model | X | H | D | Y | Image |
|---|---|---|---|---|---|
| FX3U-4DA | 55 | 90 | 87 | | A |
| FX0N-3A | 43 | 90 | 87 | | A |
| FX2N-2AD | 43 | 90 | 87 | | A |
| FX2N-2DA | 43 | 90 | 87 | | A |
| FX2N-2LC | 55 | 90 | 87 | | A |
| FX2N-1HC | 55 | 90 | 87 | | A |
| FX2N-1PG-E | 43 | 90 | 87 | | A |
| FX2NC-16EYR-T-DS | 24.2 | 90 | 74 | 15.5 | B |
| FX2NC-ENET-ADP | 19.1 | 90 | 74 | 4 | B |
| FX2NC-485ADP | 19.1 | 90 | 74 | 4 | B |
| FX2NC-232ADP | 19.1 | 90 | 74 | 4 | B |
| FX3U-4AD-ADP | 17.6 | 90 | 74 | 15.5 | B |
| FX3U-4AD-PT-ADP | 17.6 | 90 | 74 | 15.5 | B |
| FX3U-4AD-TC-ADP | 17.6 | 90 | 74 | 15.5 | B |
| FX3U-4DA-ADP | 17.6 | 90 | 74 | 15.5 | B |
| FX3U-4HSX-ADP | 17.6 | 90 | 74 | 15.5 | B |
| FX2NC-4AD | 20.2 | 90 | 74 | 4 | B |
| FX3U-2HSY-ADP | 17.6 | 90 | 74 | 15.5 | B |
| FX2NC-16EX-D/UL | 14.6 | 90 | 74 | 13 | C |
| FX2NC-16EX-DS | 14.6 | 90 | 74 | 13 | C |
| FX2NC-16EYT-D/UL | 14.6 | 90 | 74 | 13 | C |
| FX2NC-16EYT-DSS | 14.6 | 90 | 74 | 13 | C |
| FX2NC-32EX-DS | 26.2 | 90 | 74 | 13 | C |
| FX2NC-32EYT-D/UL | 26.2 | 90 | 74 | 13 | C |
| FX2NC-16EX-T-DS | 20.2 | 90 | 74 | 15 | C |
| FX-16E-TB | 150 | 55 | 45 | | D |
| FX-16E-TB/UL | 150 | 55 | 45 | | D |
| FX-16EX-A1-TB | 150 | 55 | 45 | | D |
| FX-16EX-A1-TB/UL | 150 | 55 | 45 | | D |
| FX-16EYR-ES-TB/UL | 150 | 55 | 45 | | D |
| FX-16EYS-ES-TB/UL | 150 | 55 | 45 | | D |
| FX-16EYT-ESS-TB/UL | 150 | 55 | 45 | | D |
| FX-16EYT-ES-TB/UL | 150 | 55 | 45 | | D |
| FX16EYT-TB | 150 | 55 | 45 | | D |
| FX-32E-TB/UL | 150 | 55 | 45 | | D |

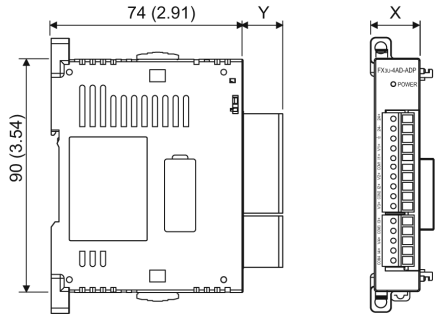
A



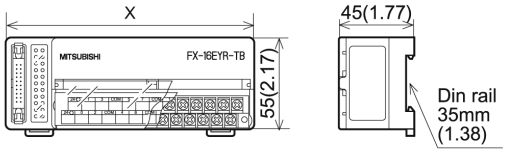

C




B




D



# D FX Programming Software and Tools

## GX Developer-FX

As an alternative for FX PLC users, GX Developer-FX (GX-DEV-FX) is a scaled down version of GX-DEV supporting the FX Series PLCs. GX-DEV-FX is 100% compatible with the full blown version of GX-DEV and files can be shared between the two (limited to FX PLC programs). Customers who have already purchased GX-DEV do not need GX-DEV-FX as all the functionality for the FX PLCs is the same in both packages. Also included on the GX Developer-FX CD is the FX-Configurator-EN software add-on.

## FX Programming Tools

| Specifications | FX-10P-E | FX-20P-E-SET-0 | FX0-10LDR |
|---|---|---|---|
| Stocked Item | S | S | S |
| Rating | — | CE (EMC only) | — |
| Purpose | For online PLC programming | For online or offline PLC programming | For program up/download |
| Display | 2x16 LCD | 4x16 backlit LCD | N/A |
| Off Line Programming | No | Yes | N/A |
| Compatible PLCs | **All FX** | **All FX (*1)** | **All FX (*2)** |
| Cable Required | FX-20P-CAB + FX-20P-CADP | Supplied (FX-20P-CAB0) | Supplied |

**Note:** This table excludes programming software. Please refer to the Software Selection Guide for these products.
1. For connection to F / F1 / F2 / FX, the FX-20P-ADP-KIT is also required.
2. Program download size for FX1N/2N is 8k step unless otherwise specified; an FX-EEPROM-4 cannot be used with these PLCs unless the programming area is reduced (GX-Developer/View/Project/Data List/Parameter/Memory Capacity)

# E FX Cables and Accessories

## FX Network Accessories

| Specifications | FX-485PC-IF-KIT |
|---|---|
| Stocked Item | – |
| Rating | CE (EMC only) |
| Applicable PLCs | **FX / FX0N / FX2N / FX2NC** |
| Purpose | RS-232-422/485 converter for multi-drop network connection to PC |
| Power Supply | Supplied |

## FX Battery Back-Up

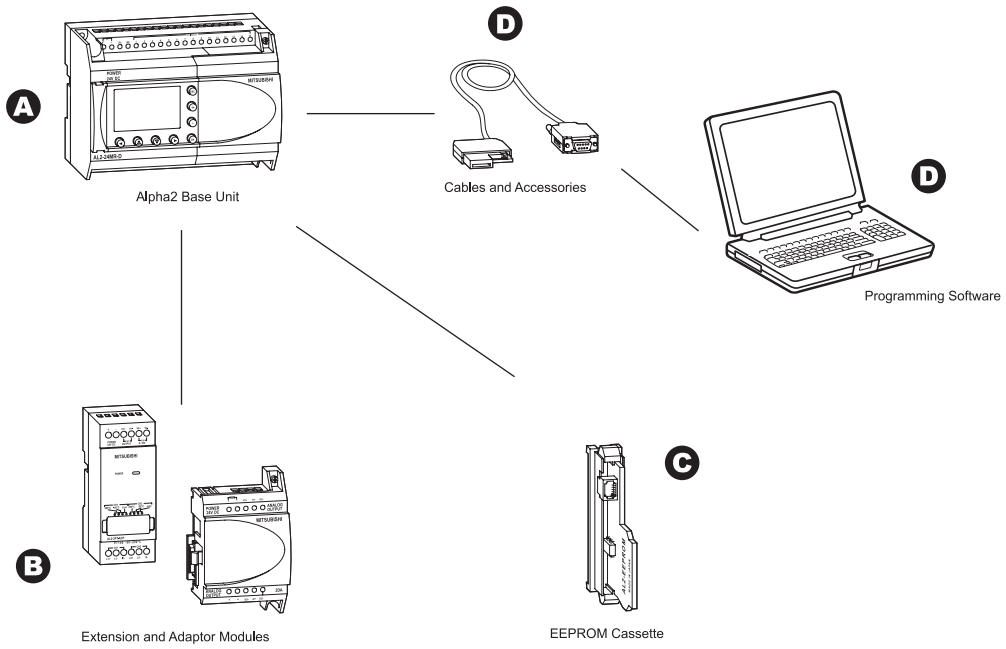
| Specifications | F2-40BL | FX2NC-32BL | FX0N-40B | FX3U-32BL |
|---|---|---|---|---|
| Stocked Item | S | S | S | S |
| Purpose | Maintains base unit memory during power down | Maintains base unit memory during power down | Maintains RTC data during power down (if RTC option installed) | Maintains base unit memory during power down |
| Compatible PLCs | **FX2N/FX** | **FX2NC** | **FX0N** | **FX3U/FX3UC** |

## FX Accessory Cables

| Specifications | FX0N-30EC | FX0N-65EC | FX2N-CNV-BC |
|---|---|---|---|
| Stocked Item | S | S | S |
| Purpose | For extending distance between base unit and powered extension units. | | Converter Module |
| Length (mm) | 300 | 650 | |
| Compatible PLCs | **FX0N, FX1N, FX2N; FX2NC (when used with FX2NC-CNV-IF)** | | **Use with FX0N-30EC and FX0N-65EC** |

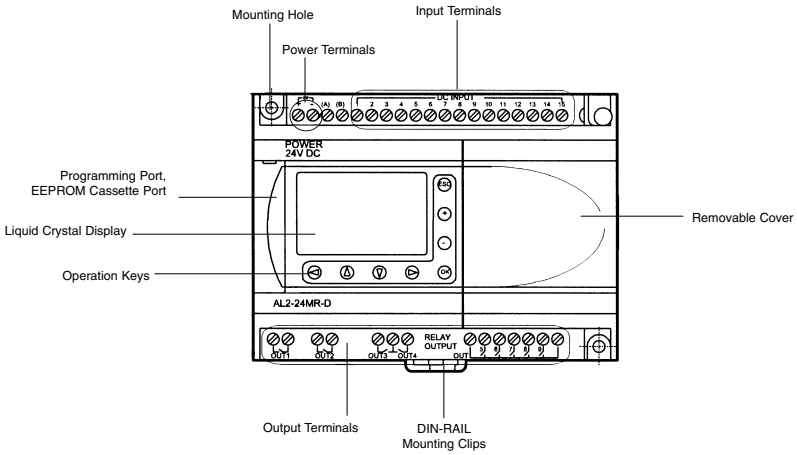
# Programmable Logic Controllers • Alpha2 Series

Mitsubishi Electric's Alpha2 Series Controllers are the "Tiny Giants" of automation, designed to provide easy, flexible, and powerful control that is rugged enough for the factory floor and easy enough to use at home. The Tiny Giants offer an unbeatable combination of features, including real-time clock, high current output relays, analog inputs, secured access, built-in display / programming panel, battery backup, and industrial ruggedness and reliability.



The Alpha2 is a new class of controller, *not* a PLC, designed to address simple control applications at the low end of the industrial and commercial control markets. Key features include:

- Very compact size.
- 14 and 24 I/O
- Program directly on the unit or via optional VLS Windows software.
- Built-in LCD screen for programming panel or operator interface functions.
- Programmable display screen.
- Graphical "function block" style programming with drag and drop icons.
- Expanded memory to 200 FBS.
- 120 – 240VAC input versions.
- 8 Amp relay output.
- AC and DC power versions.
- Dual function DC discrete/analog input versions (an input can be "on/off" or 8-bit, 0-10VDC).
- Real-time clock with 4 digit year.
- Easy to program scheduling functions.
- AS-i network interface available.
- Modem and SMS messaging (via GSM modem).
- High speed counter optional.




The Alpha2 uses a simple icon-based graphical function block language. The instruction set includes logic gates, such as AND, OR and NOT. It also includes special function blocks, such as timer, counter, latch, and compare. Using the Visual Logic Software, the programmer literally "wires" these blocks together to produce control algorithms. The programming software also includes a simulation mode to allow off-line program testing without any hardware connected.

## Ⓐ Alpha2 Series Base Unit Hardware Specifications

| Specifications | | AL2-10MR-A | AL2-10MR-D | AL2-14MR-A | AL2-14MR-D | AL2-24MR-A | AL2-24MR-D |
|---|---|---|---|---|---|---|---|
| Stocked Item | | S | S | S | S | S | S |
| Rating | | UL • cUL • CE | UL • cUL • CE | UL • cUL • CE | UL • cUL • CE | UL • cUL • CE | UL • cUL • CE |
| Max. Number of Inputs / Outputs | | 10 | 10 | 14 | 14 | 24 | 24 |
| Power Supply | AC Range (+10%, -15%) | 100-240VAC | — | 100-240VAC | — | 100-240VAC | — |
| | Frequency at AC Hz | — | 50/60 | — | 50/60 | — | 50/60 |
| | DC Range (+20%, -15%) | — | 24VDC | — | 24VDC | — | 24VDC |
| Max. Apparent Input Power (W) | | 4.9 | 4.0 | 5.5 | 7.5 | 7.0 | 9.0 |
| Inrush Current at ON | 120VAC | <3.5A | — | <3.5A | — | <3.5A | — |
| | 240VAC | <6.5A | — | <6.5A | — | <6.5A | — |
| | 24VDC | — | <7A | — | <7A | — | <7A |
| Allowable Momentary Power Failure Time (ms) | | 10 | 5 | 10 | 5 | 10 | 5 |
| Integrated Inputs (*1) | | 6 | 6 | 8 | 8 | 15 | 15 |
| Min. Current for Logical 1 (mA) | | — | 4.3 | — | 4.3 | — | 4.3 |
| Max. Current for Logical 0 (mA) | | — | 1.1 | — | 1.1 | — | 1.1 |
| Min. Voltage for Logical 1 | | 80VAC | 18VDC | 80VAC | 18VDC | 80VAC | 18VDC |
| Max. Voltage for Logical 0 | | 40VAC | 4VDC | 40VAC | 4VDC | 40VAC | 4VDC |
| Response Time (ms) | | 10-40 ms | 10-20 ms | 10-40 ms | 10-20 ms | 10-40 ms | 10-20 ms |
| Analog Input Range | | — | 0-255 | — | 0-255 | — | 0-255 |
| Analog Resolution (mV) | | — | 10,000 / 256 | — | 10,000 / 256 | — | 10,000 / 256 |
| Analog Conversion Speed (ms) | | — | 10 | — | 10 | — | 10 |
| Analog Voltage Range | | — | 0-10 | — | 0-10 | — | 0-10 |
| Analog Input Impedance (kOhm) | | — | — | — | — | — | — |
| Analog Accuracy | | — | ±5VDC | — | ±5VDC | — | ±5VDC |
| Analog Offset | | — | -32768 to +32767 | — | -32768 to +32767 | — | -32768 to +32767 |
| Analog Gain | | — | 0-255 | — | 0-255 | — | 0-255 |
| Analog Temperature Drift | | — | ±3 LSB | — | ±3 LSB | — | ±3 LSB |
| Integrated Outputs | | 4 | 4 | 6 | 6 | 9 | 9 |
| Output Type | | Relay | Relay | Relay | Relay | Relay | Relay |
| Switching Voltage (max.) | | 250VAC / 30VDC | 30VDC | 250VAC / 30VDC | 30VDC | 250VAC / 30VDC | 30VDC |
| Max. Output Current Per Output (A) | | 8 | 8 | 8 | 8 | 8 | 8 |
| Max. Switching Load | Inductive Load | 249 VA | 249 VA | 249 VA | 249 VA | 249 VA | 249 VA |
| Response Time (ms) | | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 |
| Life of Relay Contacts (Number of Cycles) | | 100,000 @ 8A | | | | | |
| Weight (kg) | | 0.2 | 0.2 | 0.3 | 0.3 | 0.35 | 0.3 |
| Required Manuals | | JY992D97301 Hardware Manual; JY992D97101 Programming Manual; JY992D76601 Programming Manual; JY992D97701 Communication Manual; JY992D74001 Software Manual | | | | | |

(*1) Sink/Source

## Ⓑ Alpha2 Expansion / Adapter Modules

| Model Number | Descriptions | Stocked Item |
|---|---|---|
| **AL2-4EX*** | 4 digital inputs (24VDC) with 2 selectable high-speed counter (1kHZ) | S |
| **AL2-4EX-A2*** | 4 digital inputs (240VAC) | S |
| **AL2-4EYR*** | 4 relay outputs (2 A) | – |
| **AL2-4EYT*** | 4 transistor outputs (1 A) | – |
| **AL2-2TC-ADP** | 2 Channel TC Input Adaptor Module | S |
| **AL2-2PT-ADP** | 2 Channel PT Input Adaptor Module | S |
| **AL2-2DA*** | 2 Channel Digital to Analog Expansion Module | S |

*AL2 Expansion Cassettes cannot be used with AL2-10M** controllers due to size constraints.

## Ⓒ Alpha2 Removable Memory Cassettes

| Specification | AL2-EEPROM2 |
|---|---|
| **Stocked Item** | S |
| **Rating** | — |
| **Memory Type** | EEPROM |
| **Memory Size** | 5000 bytes |
| **Number of Program Steps** | 200 function blocks |
| **Non-Volatile Storage** | Yes |
| **Write Protection** | Yes |

## Ⓓ Alpha VLS Software and Cables

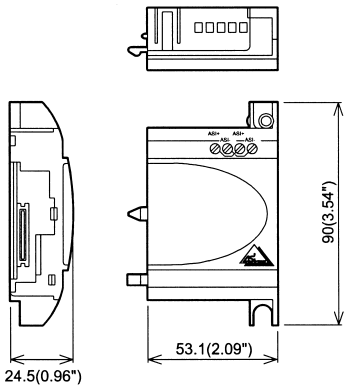
The Alpha VLS software is a Windows based programming package designed to support the full line of Alpha controllers. The Alpha programming cable (AL-232CAB) is required to connect the PC to the Alpha controller. See the Software section of this manual for details.

| | | |
|---|---|---|
| **Applicable Controllers** | Alpha or Alpha2 Series | |
| **Software** | ALPHA-WIN-□ | |
| **Cables** | AL-232-CAB | Program Upload/Download |
| | AL2-GSM-CAB | GSM modem communication or C++ / Visual Basic communication |

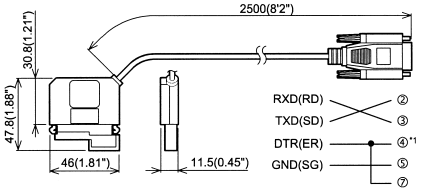
### AL2-ASi-BD Connector Pin Assignment

| Number | Name | Usage |
|---|---|---|
| 1&3 | ASi+ | For ASi+ cable connection |
| 2&4 | ASi- | For ASi- cable connection |

### AL2-ASi-BD Layout




### AL2-GSM-CAB




### Alpha2 Dimensions